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Application Number: 17742166 Document Date: 05/11/2022

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Form Revision Date: March 1, 2019

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PTO/AIA/82A (07-13)
Approved for use through 01/31/2018. OMB 0651-0035
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NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	
Filing Date	Herewith
First Named Inventor	Gauthier RENARD
Title	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS
Art Unit	
Examiner Name	
Attorney Docket Number	21063.0018USC1

SIGNATURE of Applicant or Patent Practitioner

Signature	/Thomas Lee/	Date (Optional)	2022-05-11
Name	Thomas Lee	Registration Number	66,396
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)			

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

☑ *Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82B (07-13)
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POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number	Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

☑ I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above: 52835

OR

☐ I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:

☑ The address associated with the above-mentioned Customer Number

OR

☐ The address associated with Customer Number:

OR

Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

BARCO N.V.

☐ Inventor or Joint Inventor (title not required below)

☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)

☑ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)

☐ Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature		Date (Optional)	26/05/2021
Name	Jenny Dierickx		
Title	IPC Service Manager		

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

☐ Total of forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Fig. 1A (Fig.1)

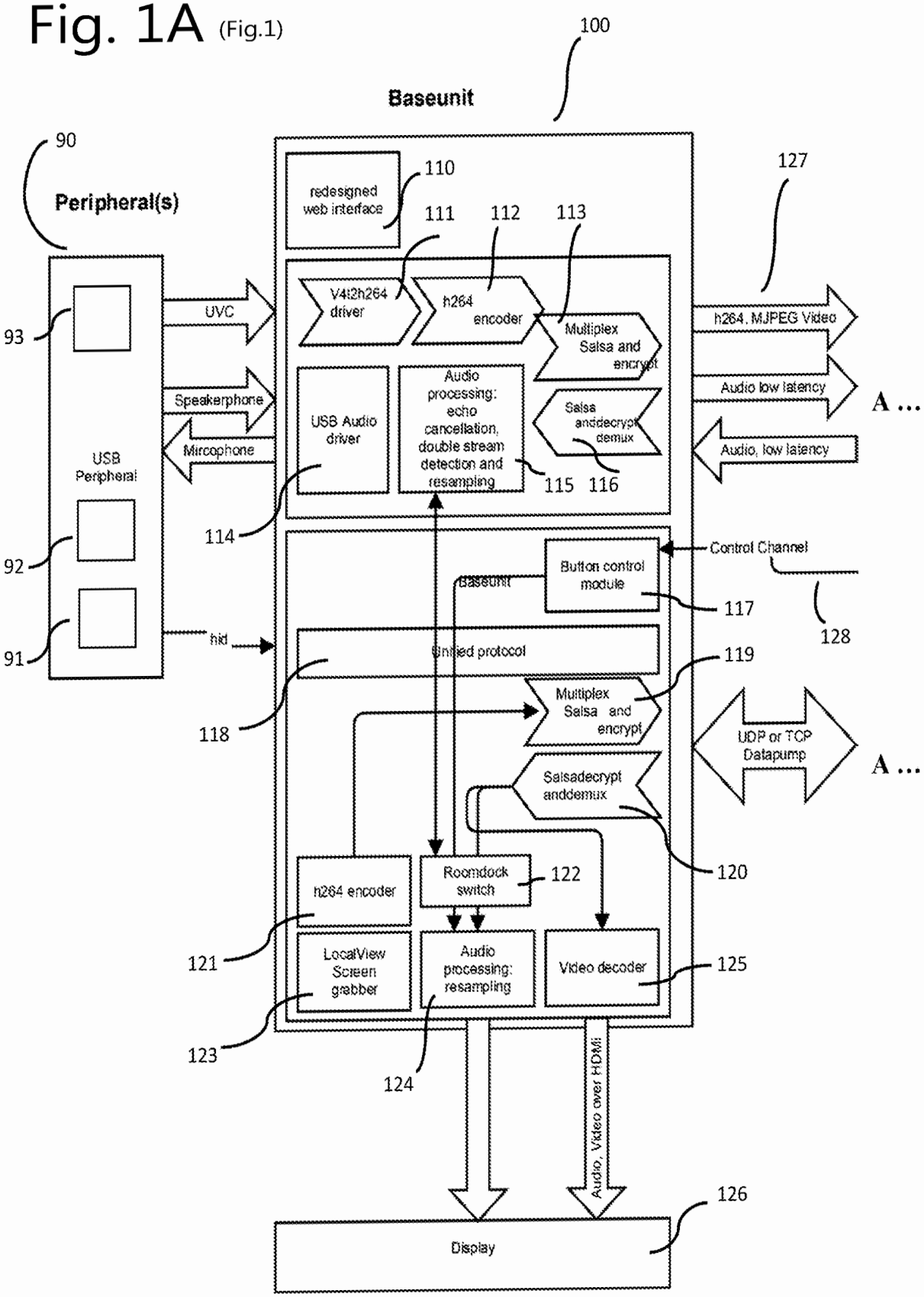

100
Baseunit
90
Peripheral(s)
93
USB Peripheral
92
91
UVC
Speakerphone
Mircophone
hid
redesigned web interface
110
111
112
113
V4l2h264 driver
h264 encoder
Multiplex Salsa and encrypt
Salsa anddecrypt demux
USB Audio driver
Audio processing: echo cancellation, double stream detection and resampling
115
116
114
127
h264, MJPEG Video
Audio low latency
Audio, low latency
A ...
Control Channel
128
Button control module
117
Baseunit
Unified protocol
118
119
Multiplex Salsa and encrypt
UDP or TCP Datapump
A ...
Salsadecrypt anddemux
120
h264 encoder
Roomdock switch
122
121
LocalView Screen grabber
Audio processing: resampling
Video decoder
125
123
124
Audio, Video over HDMI
126
Display

Fig. 1B

(Fig.1 continued)

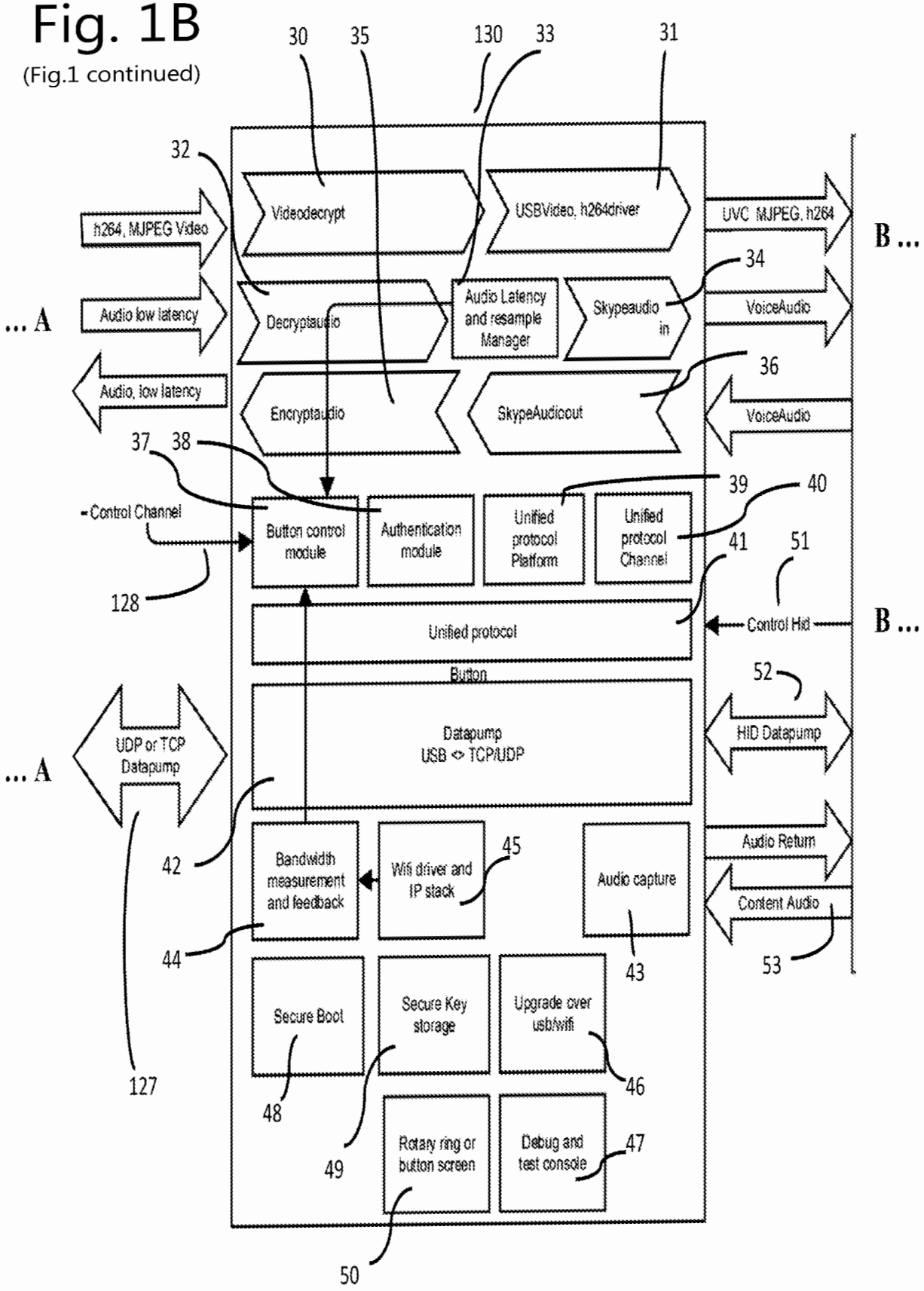
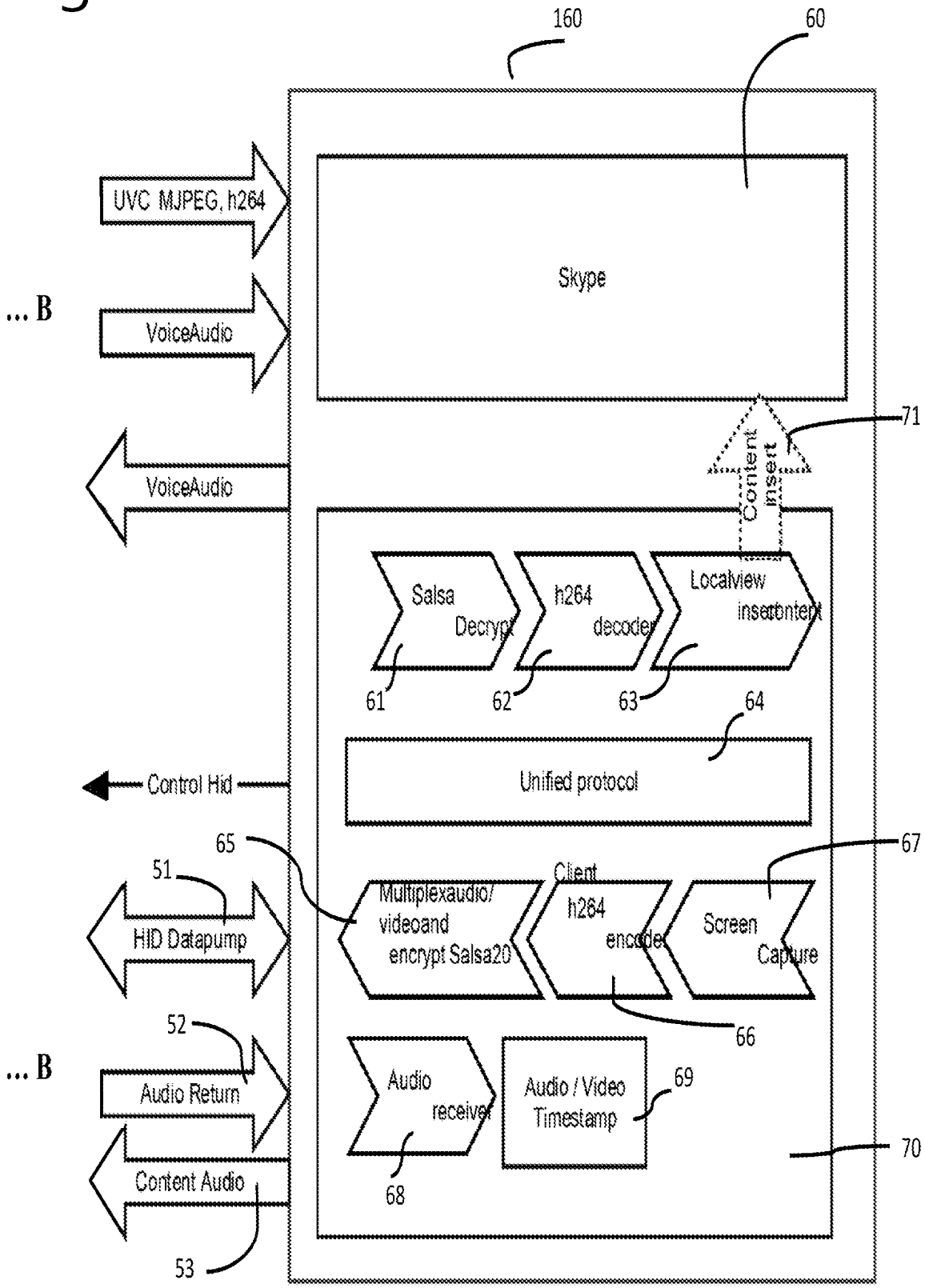


Fig. 1C (Fig.1 continued)



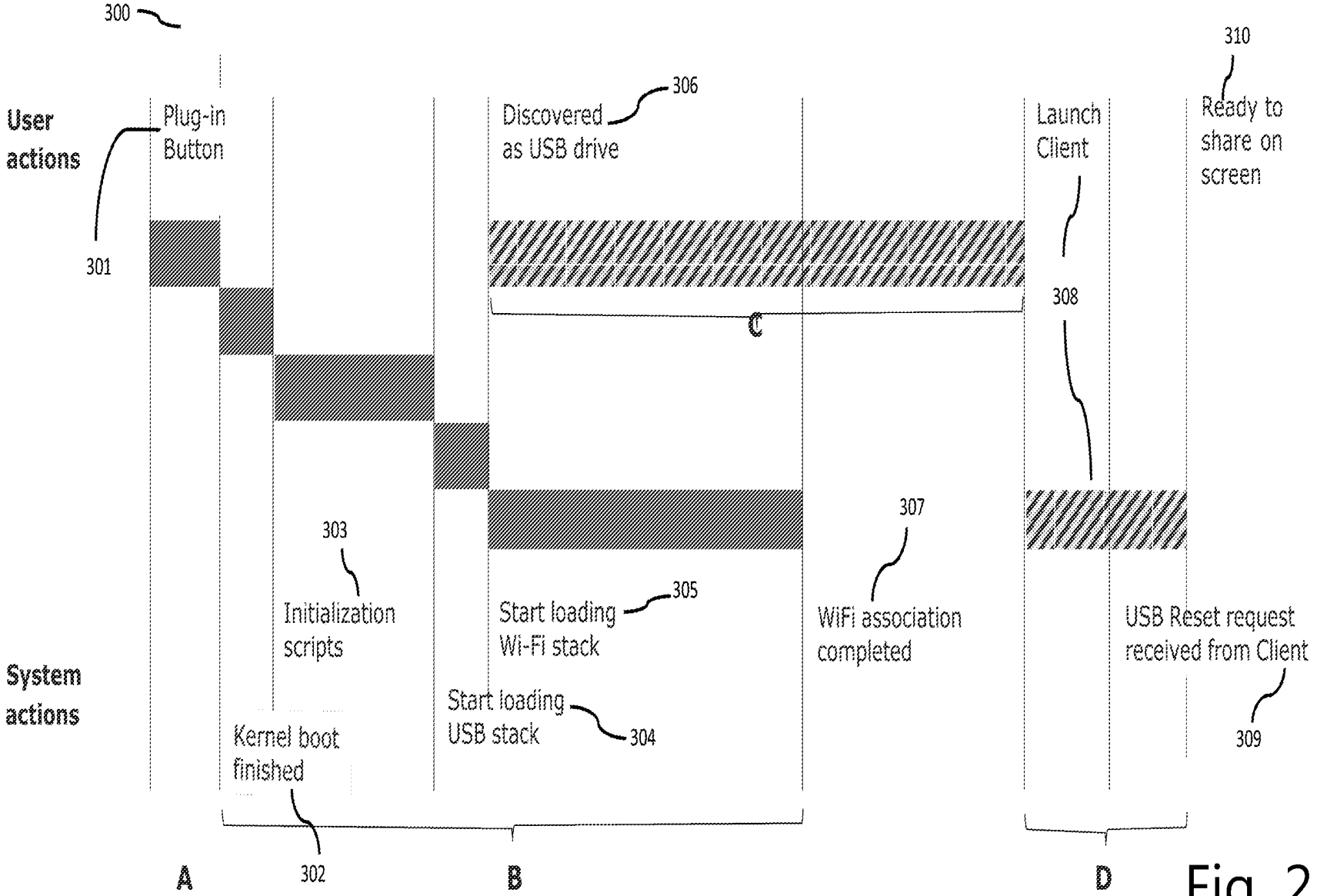
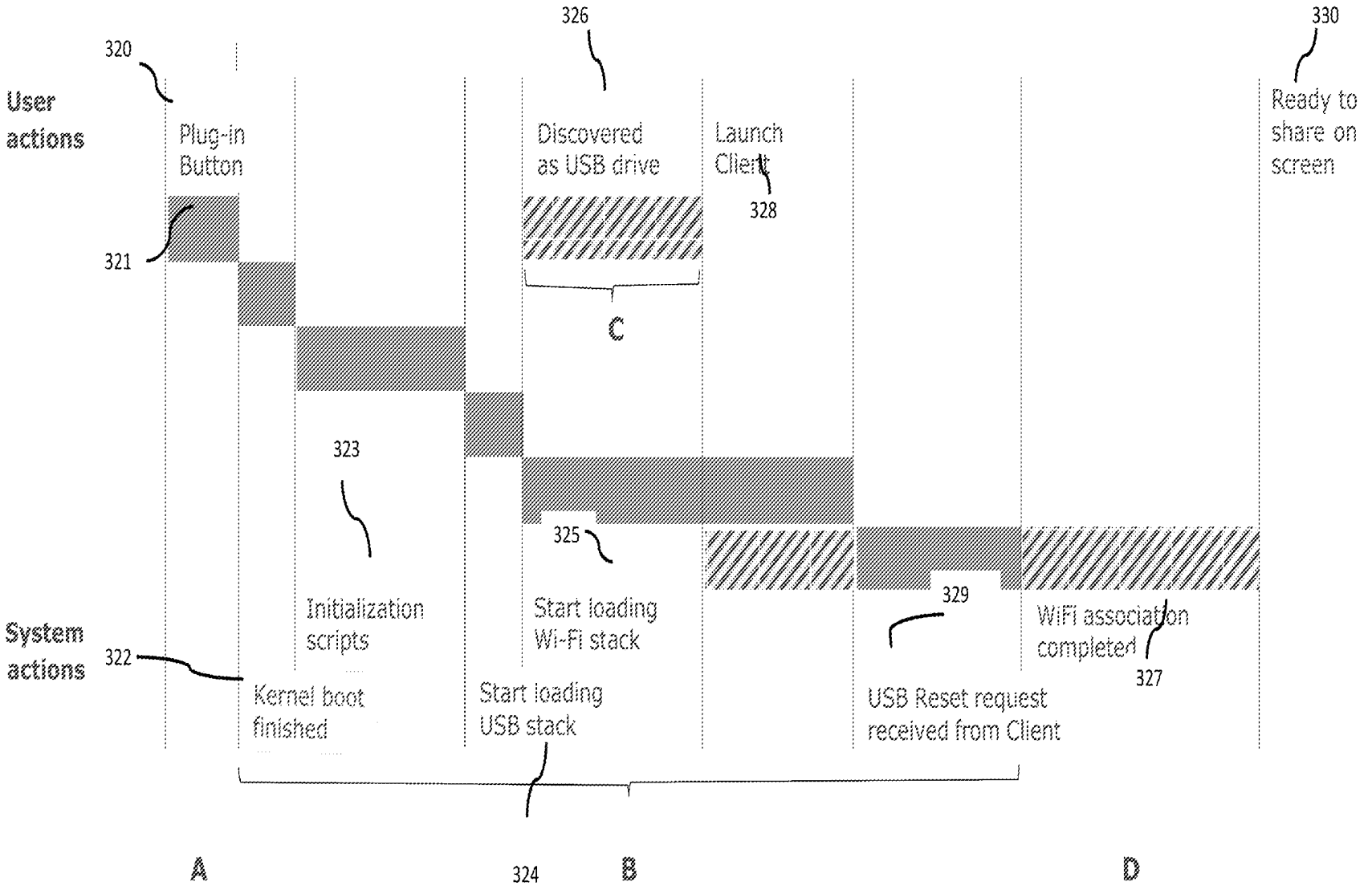

300
310
User actions
Plug-in Button
301
Discovered as USB drive
306
Launch Client
Ready to share on screen
C
308
303
Initialization scripts
307
Start loading Wi-Fi stack
305
WiFi association completed
USB Reset request received from Client
309
System actions
Start loading USB stack
304
Kernel boot finished
302
A
B
D

Fig. 2

4/19

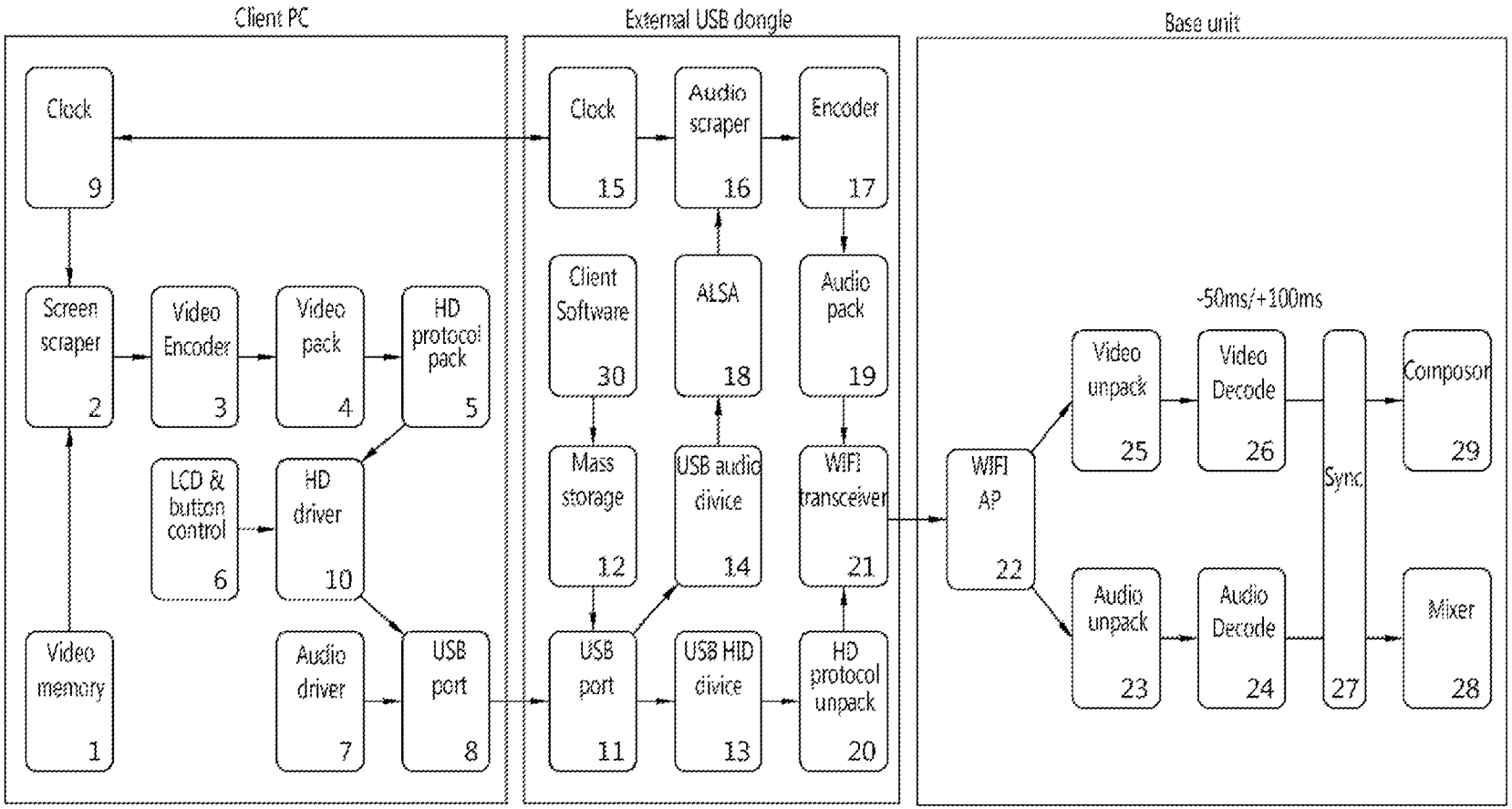


Current average timing for A+B+D ≈ 28 seconds – in stand-alone mode with launcher

Fig. 3

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Fig. 4


Client PC
External USB dongle
Base unit
Clock
9
Screen scraper
2
Video Encoder
3
Video pack
4
HD protocol pack
5
LCD & button control
6
HD driver
10
Video memory
1
Audio driver
7
USB port
8
Clock
15
Audio scraper
16
Encoder
17
Client Software
30
ALSA
18
Audio pack
19
Mass storage
12
USB audio divice
14
WIFI transceiver
21
USB port
11
USB HID divice
13
HD protocol unpack
20
WIFI AP
22
-50ms/+100ms
Video unpack
25
Video Decode
26
Sync
27
Composor
29
Audio unpack
23
Audio Decode
24
Mixer
28

6/19

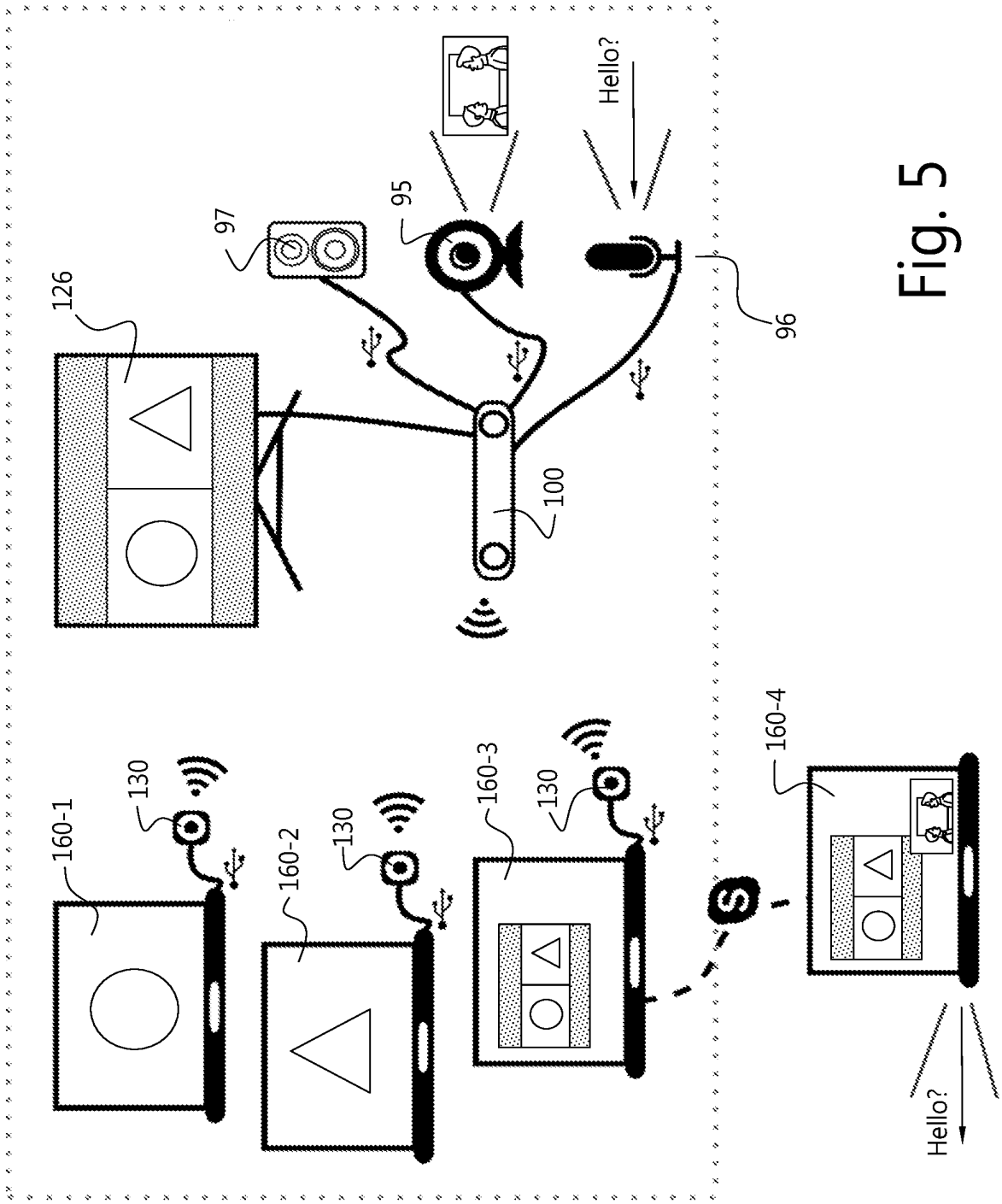


Fig. 5

Fig. 6

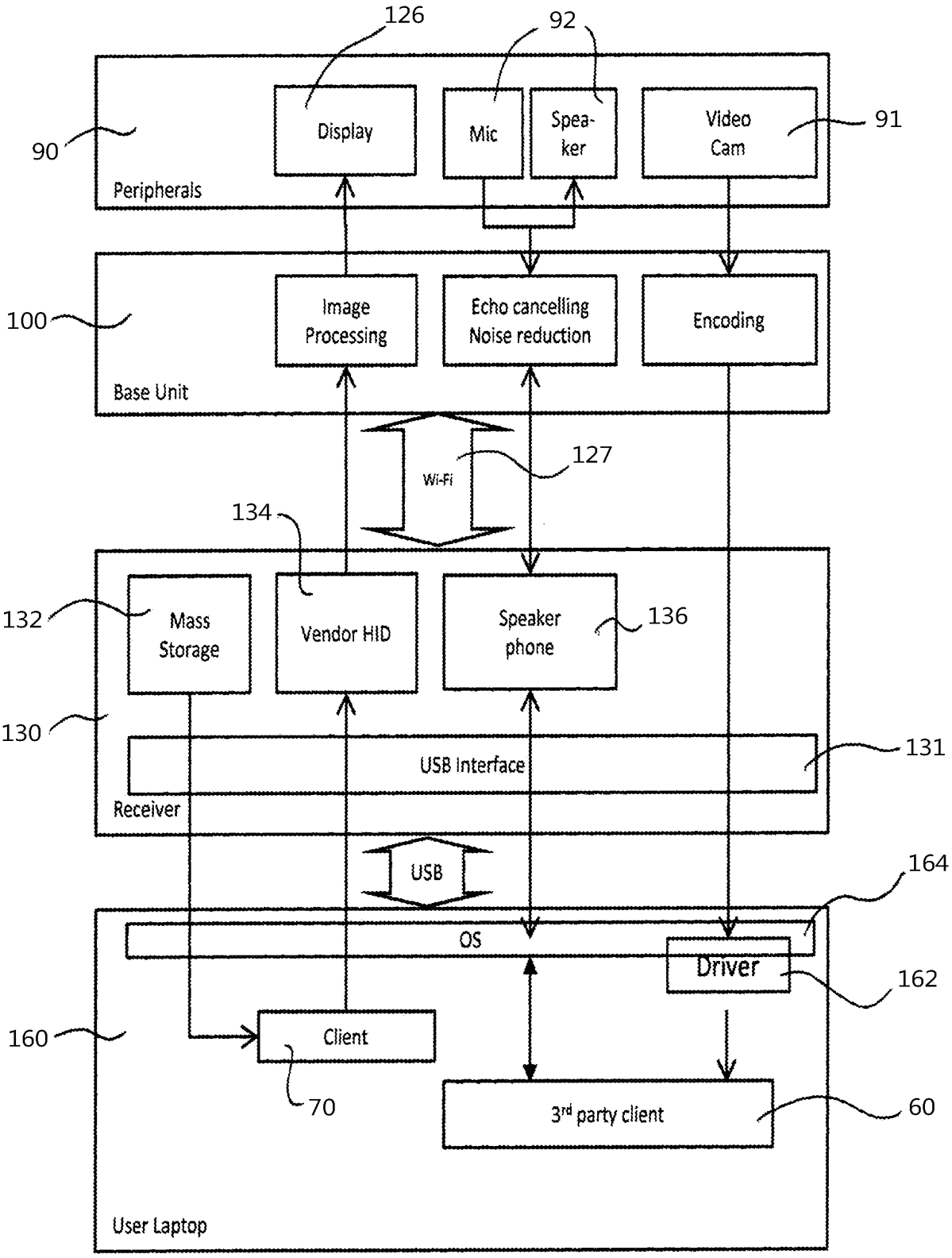

126
92
Display
Mic
Spea-
ker
Video
Cam
91
90
Peripherals
Image
Processing
Echo cancelling
Noise reduction
Encoding
100
Base Unit
127
Wi-Fi
134
132
Mass
Storage
Vendor HID
Speaker
phone
136
130
USB Interface
131
Receiver
USB
164
OS
Driver
162
160
Client
70
3rd party client
60
User Laptop

Fig. 7

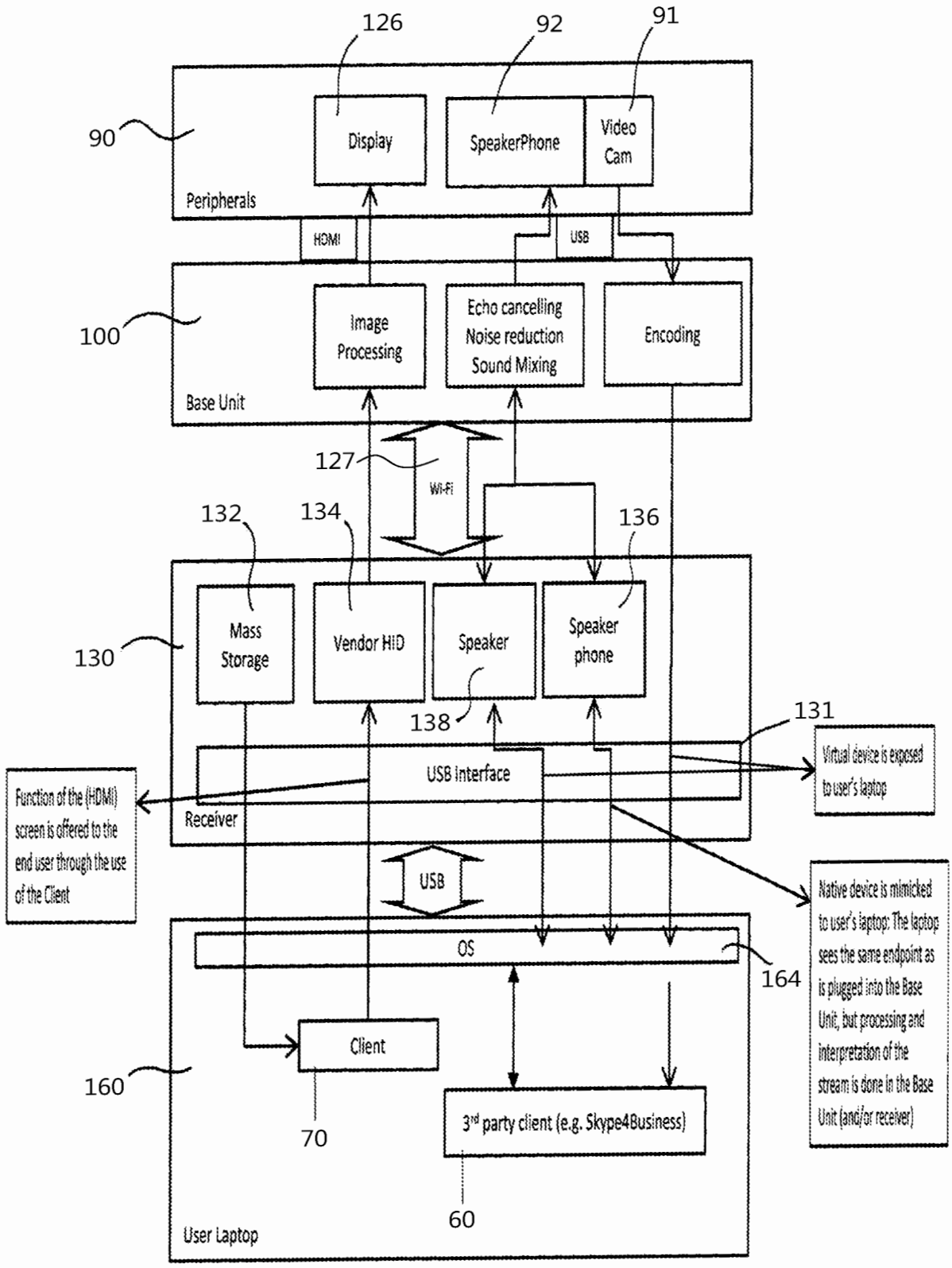

126
92
91
90
Display
SpeakerPhone
Video Cam
Peripherals
HDMI
USB
100
Image Processing
Echo cancelling Noise reduction Sound Mixing
Encoding
Base Unit
127
Wi-Fi
132
134
136
130
Mass Storage
Vendor HID
Speaker
Speaker phone
138
131
USB Interface
Virtual device is exposed to user's laptop
Function of the (HDMI) screen is offered to the end user through the use of the Client
Receiver
USB
Native device is mimicked to user's laptop. The laptop sees the same endpoint as is plugged into the Base Unit, but processing and interpretation of the stream is done in the Base Unit (and/or receiver)
OS
164
Client
160
70
3rd party client (e.g. Skype4Business)
60
User Laptop

Fig. 8

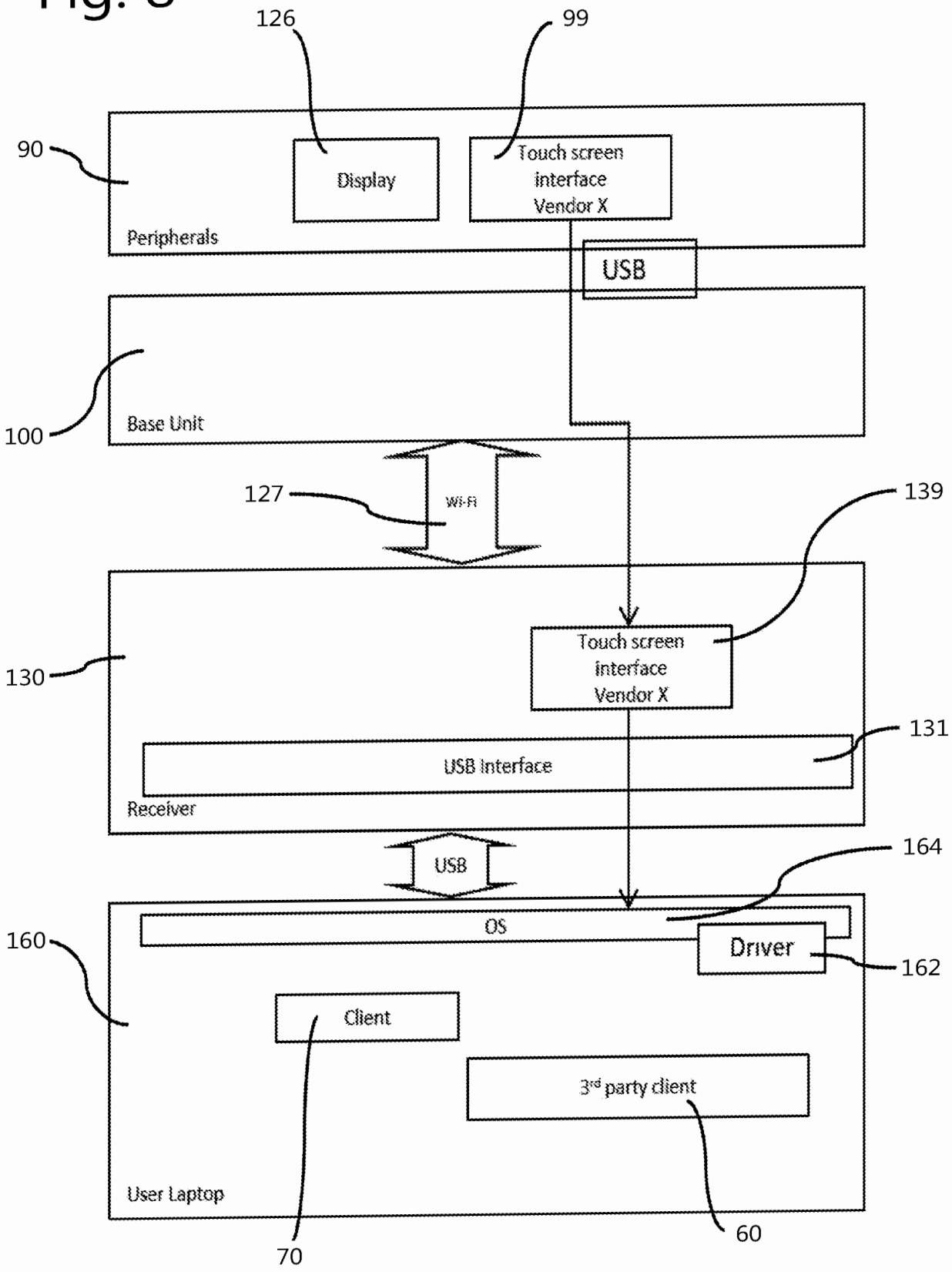

126
99
90
Display
Touch screen interface Vendor X
Peripherals
USB
100
Base Unit
127
Wi-Fi
139
Touch screen interface Vendor X
130
131
USB Interface
Receiver
USB
164
OS
160
Driver
162
Client
3rd party client
User Laptop
70
60

Fig. 9

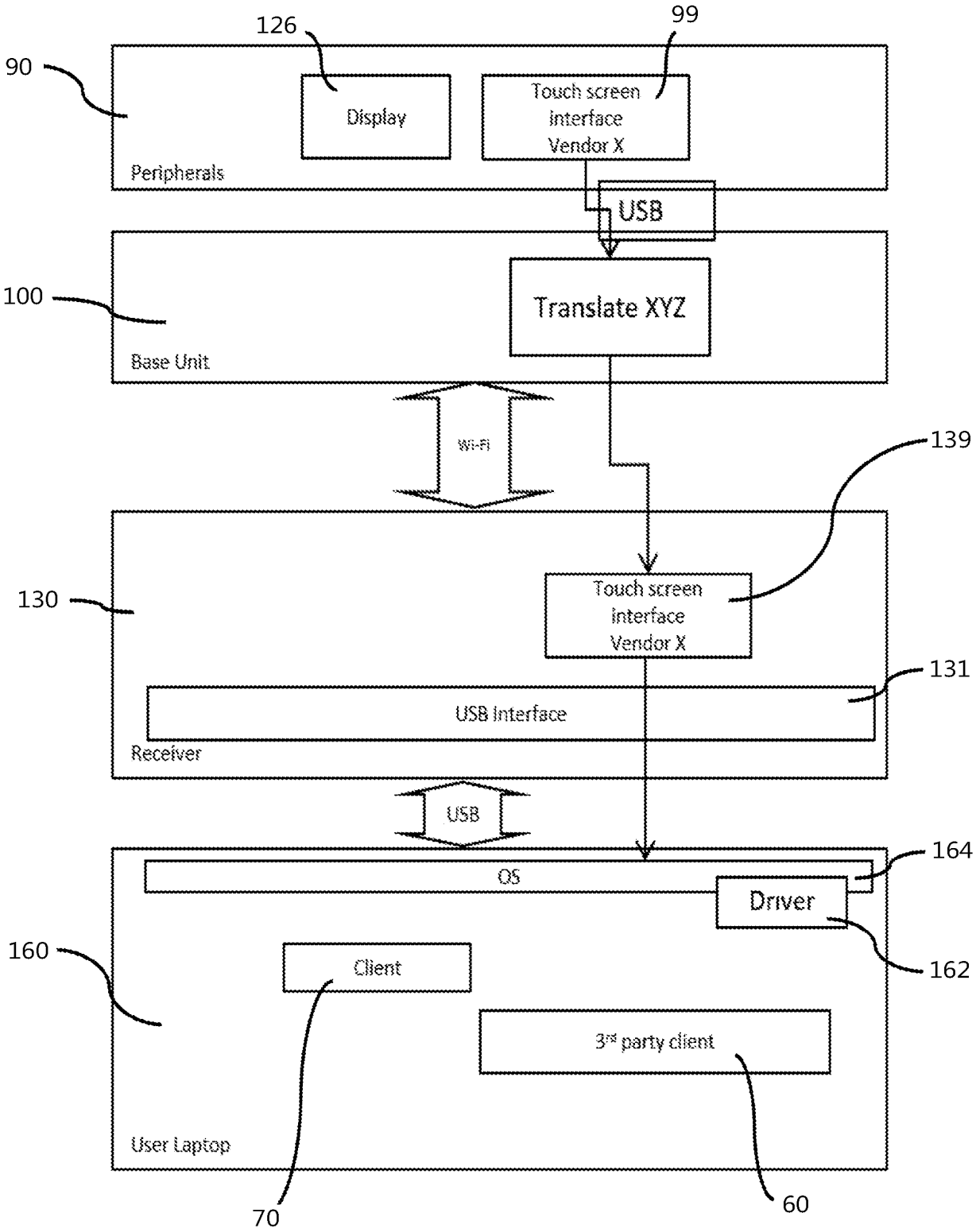

126
99
90
Display
Touch screen
Interface
Vendor X
Peripherals
USB
100
Translate XYZ
Base Unit
Wi-Fi
139
130
Touch screen
Interface
Vendor X
131
USB Interface
Receiver
USB
164
OS
Driver
160
162
Client
3rd party client
User Laptop
70
60

Fig. 10

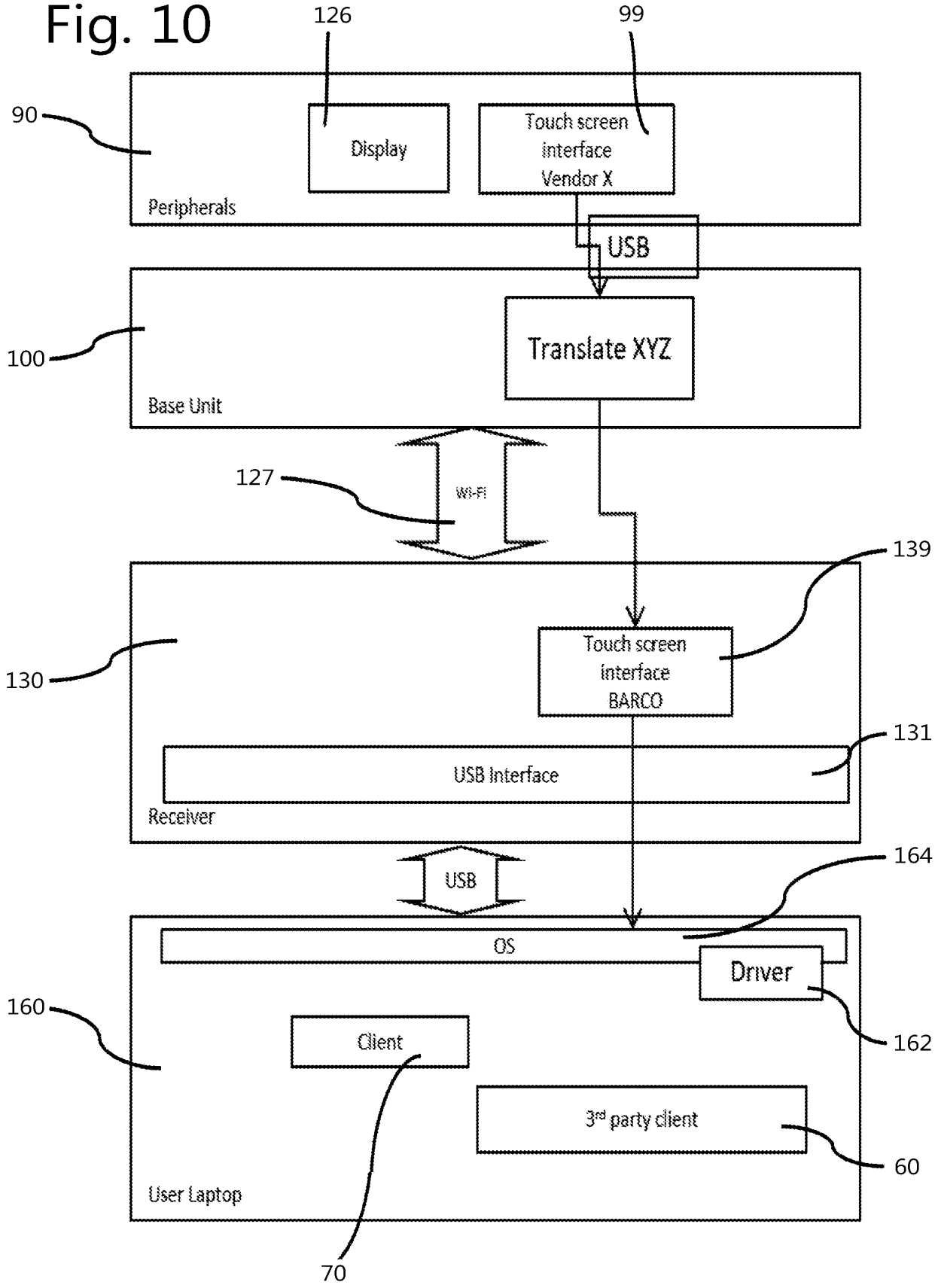
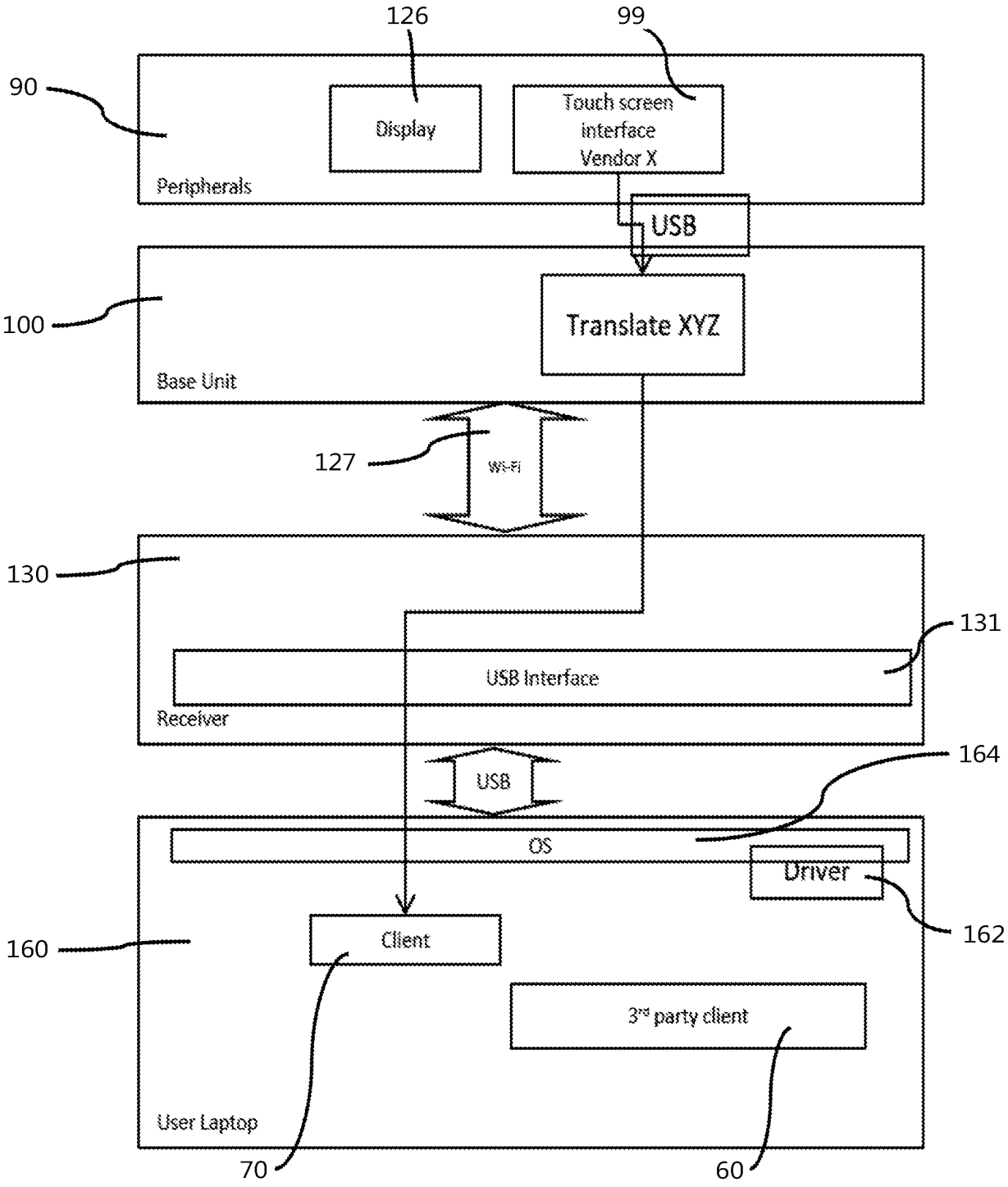

126
99
90
Display
Touch screen interface Vendor X
Peripherals
USB
100
Translate XYZ
Base Unit
127
Wi-Fi
139
130
Touch screen interface BARCO
131
USB Interface
Receiver
USB
164
OS
Driver
160
162
Client
3rd party client
60
User Laptop
70

Fig. 11


126
99
90
Display
Touch screen interface Vendor X
Peripherals
USB
100
Translate XYZ
Base Unit
127
Wi-Fi
130
131
USB Interface
Receiver
USB
164
OS
Driver
162
160
Client
3rd party client
User Laptop
70
60

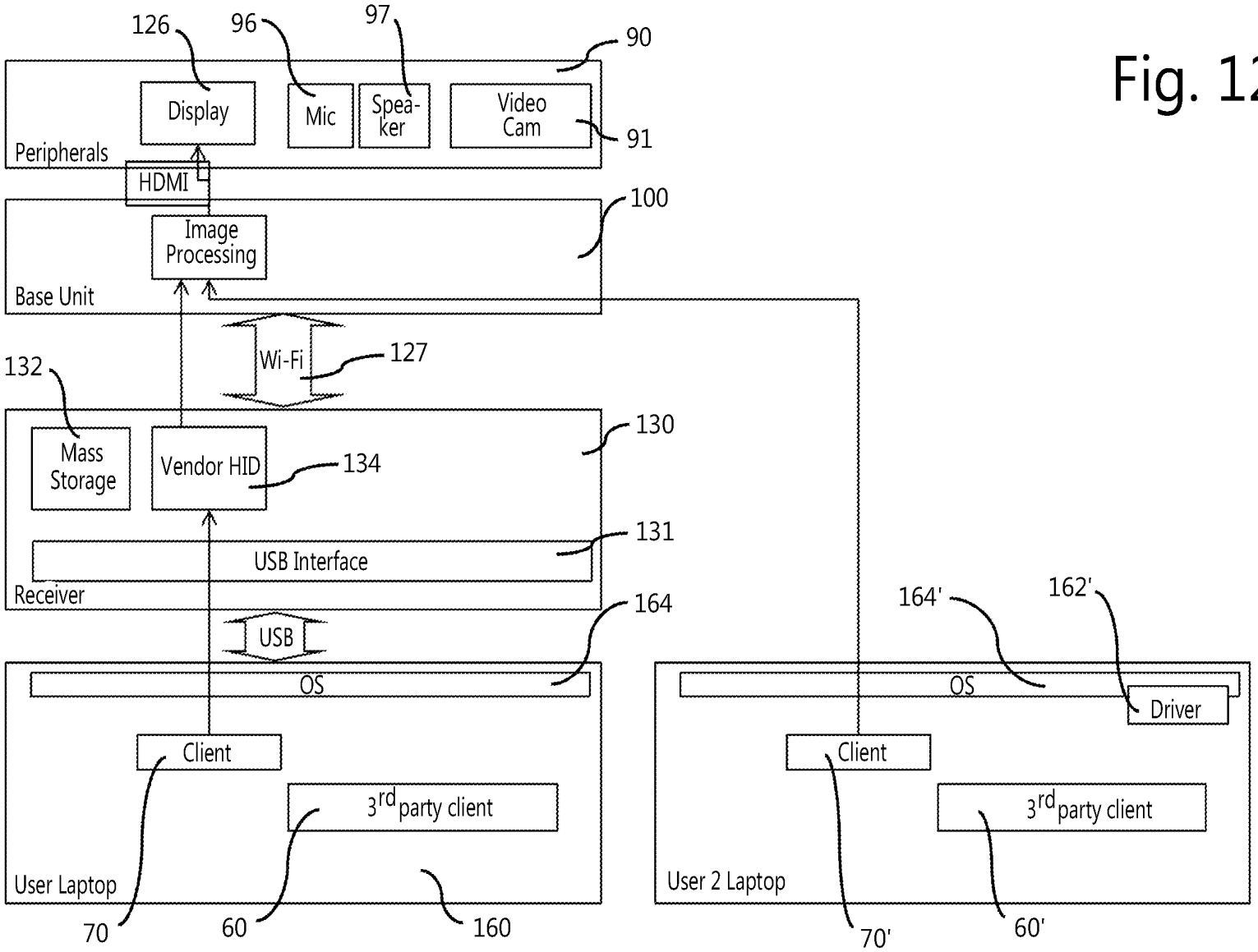

126
96
97
90
Display
Mic
Spea-
ker
Video
Cam
91
Peripherals
HDMI
100
Image
Processing
Base Unit
Wi-Fi
127
132
130
Mass
Storage
Vendor HID
134
131
USB Interface
Receiver
164
USB
OS
Client
3rd party client
User Laptop
70
60
160
164'
162'
OS
Driver
Client
3rd party client
User 2 Laptop
70'
60'

Fig. 12

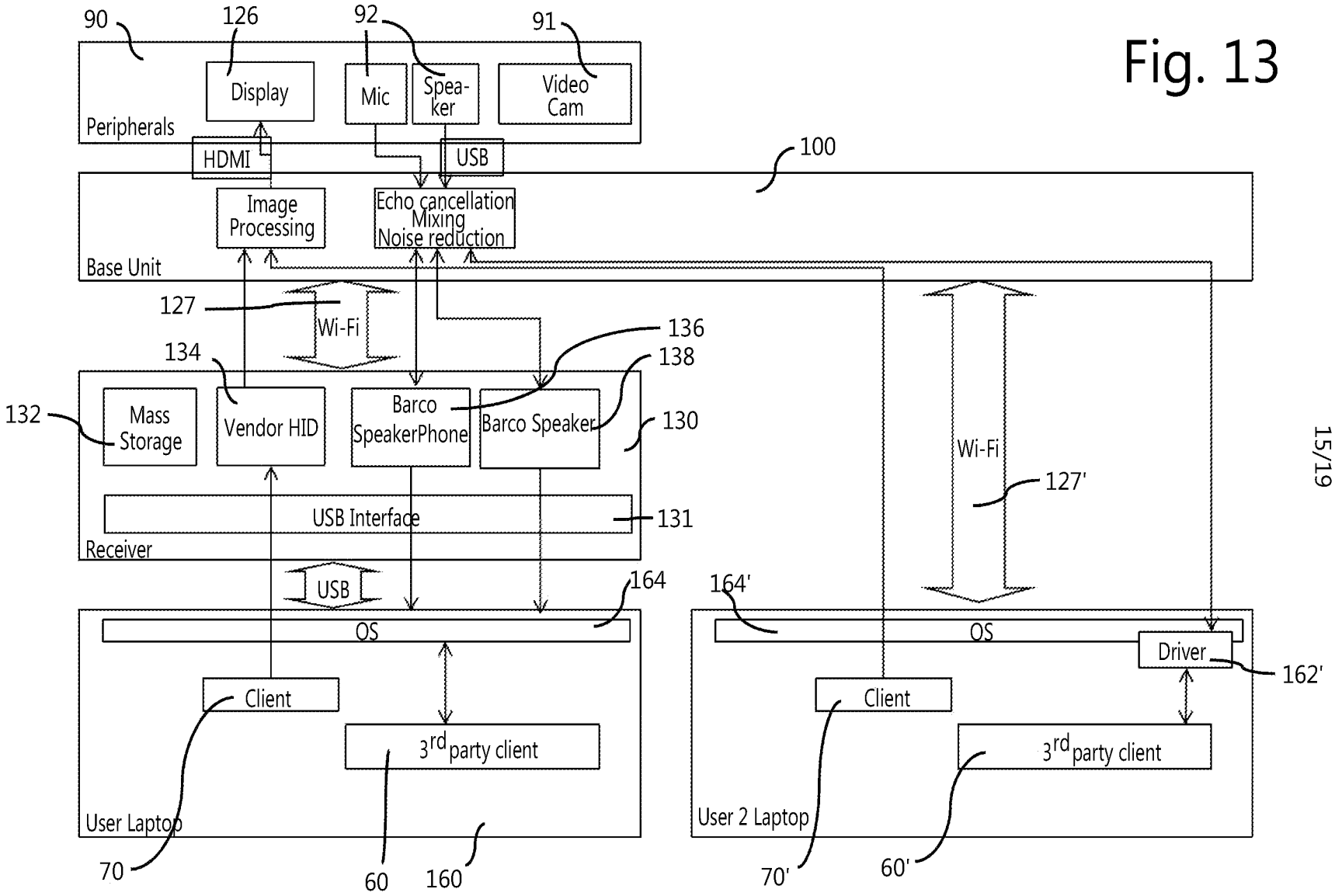

90
126
92
91
Display
Mic
Spea-ker
Video Cam
Peripherals
HDMI
USB
100
Image Processing
Echo cancellation
Mixing
Noise reduction
Base Unit
127
Wi-Fi
136
134
138
132
Mass Storage
Vendor HID
Barco SpeakerPhone
Barco Speaker
130
USB Interface
131
Receiver
USB
164
164'
OS
OS
Driver
162'
Client
Client
3rd party client
3rd party client
User Laptop
User 2 Laptop
70
60
160
70'
60'
Wi-Fi
127'

Fig. 13

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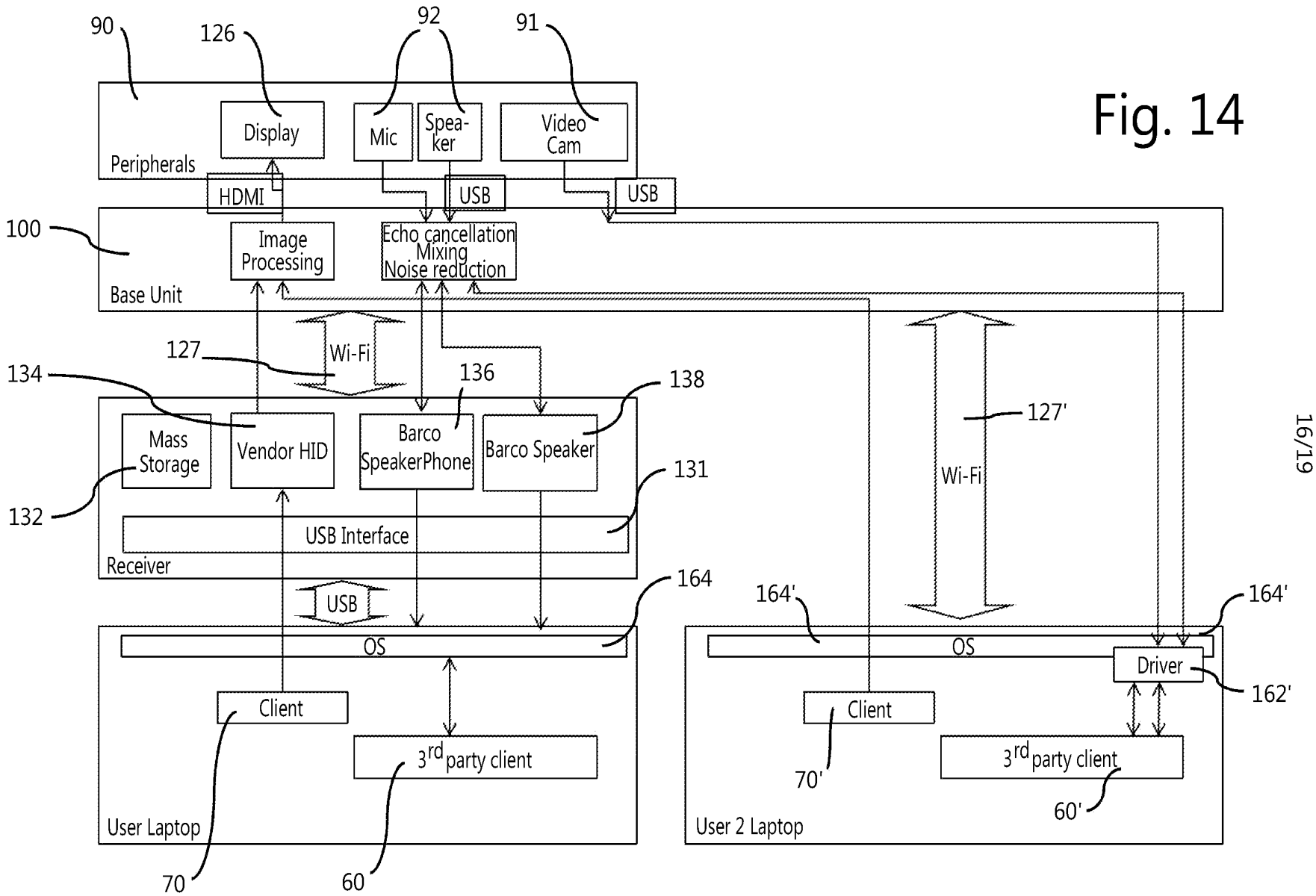

90
126
92
91
Display
Mic
Spea-
ker
Video
Cam
Peripherals
HDMI
USB
USB
100
Image
Processing
Echo cancellation
Mixing
Noise reduction
Base Unit
127
Wi-Fi
134
136
138
Mass
Storage
Vendor HID
Barco
SpeakerPhone
Barco Speaker
127'
Wi-Fi
132
131
USB Interface
Receiver
USB
164
164'
164'
OS
OS
Driver
162'
Client
Client
3rd party client
3rd party client
70'
60'
User Laptop
User 2 Laptop
70
60

Fig. 14

16/19

Fig. 15

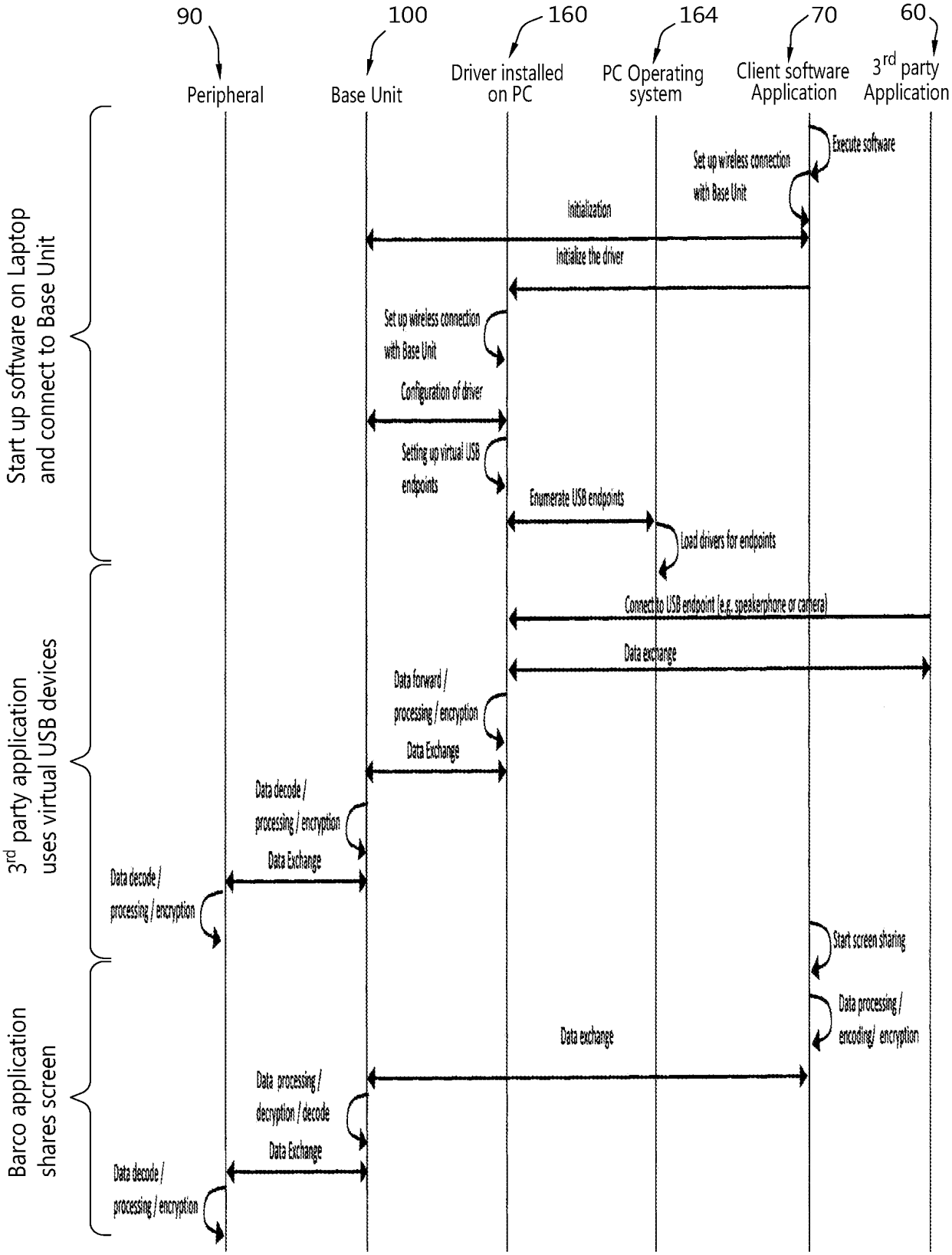

90
100
160
164
70
60
Peripheral
Base Unit
Driver installed on PC
PC Operating system
Client software Application
3rd party Application
Start up software on Laptop and connect to Base Unit
3rd party application uses virtual USB devices
Barco application shares screen
Execute software
Set up wireless connection with Base Unit
Initialization
Initialize the driver
Set up wireless connection with Base Unit
Configuration of driver
Setting up virtual USB endpoints
Enumerate USB endpoints
Load drivers for endpoints
Connect to USB endpoint (e.g. speakerphone or camera)
Data exchange
Data forward / processing / encryption
Data Exchange
Data decode / processing / encryption
Data Exchange
Data decode / processing / encryption
Start screen sharing
Data processing / encoding/ encryption
Data exchange
Data processing / decryption / decode
Data Exchange
Data decode / processing / encryption

Fig. 16

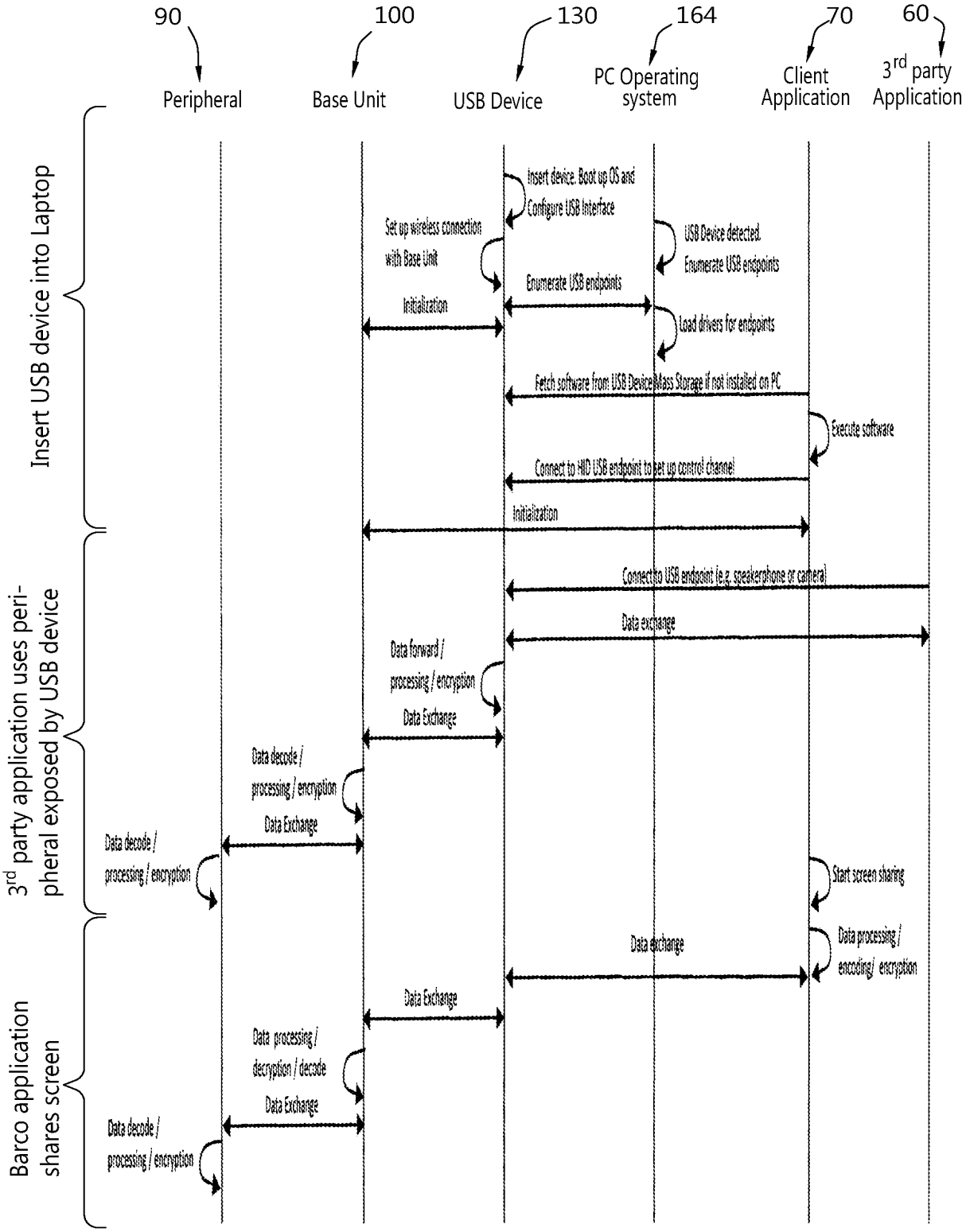
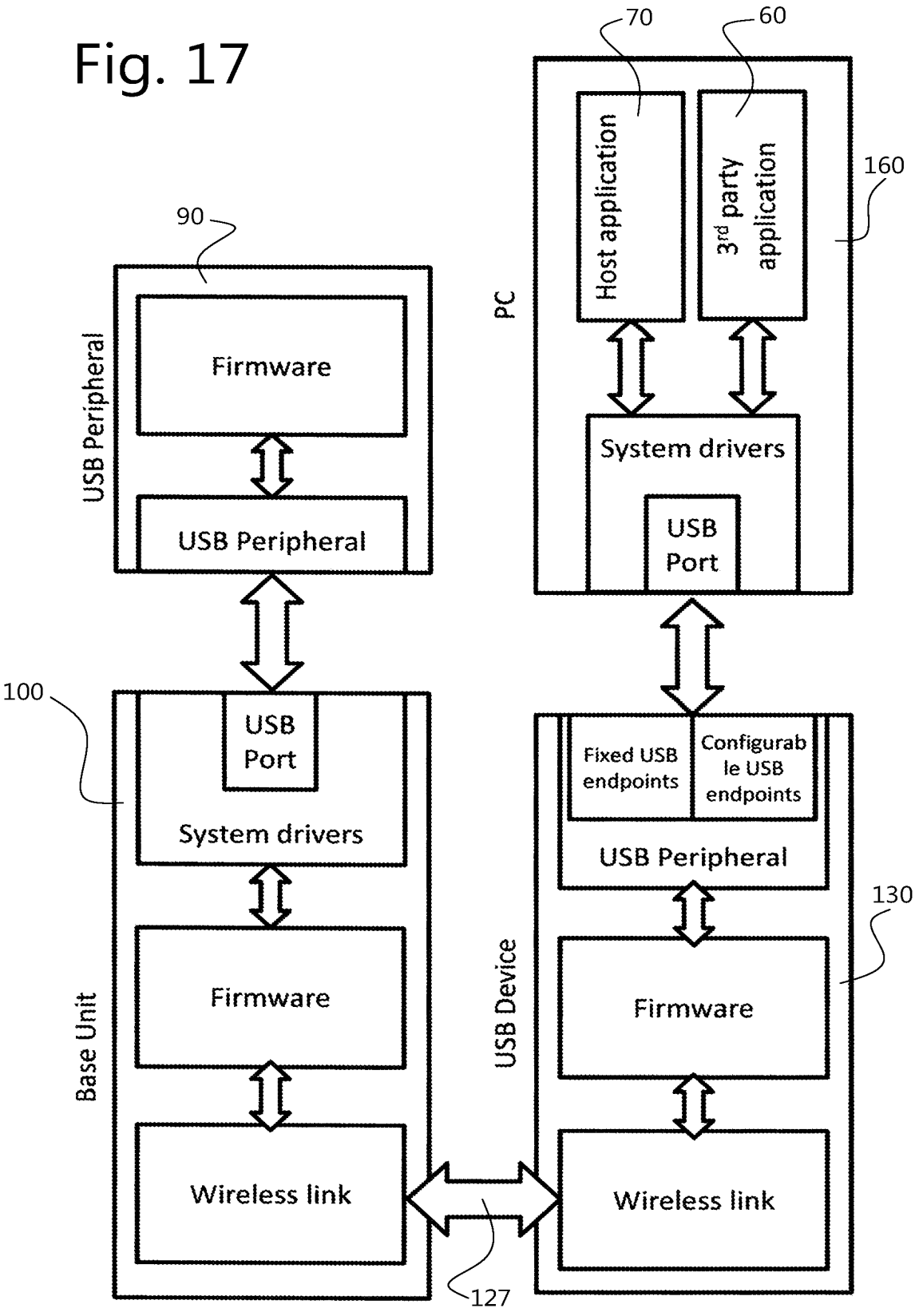

90
100
130
164
70
60
Peripheral
Base Unit
USB Device
PC Operating system
Client Application
3rd party Application
Insert USB device into Laptop
3rd party application uses peri-pheral exposed by USB device
Barco application shares screen
Insert device. Boot up OS and Configure USB Interface
Set up wireless connection with Base Unit
USB Device detected. Enumerate USB endpoints
Enumerate USB endpoints
Initialization
Load drivers for endpoints
Fetch software from USB Device/Mass Storage if not installed on PC
Execute software
Connect to HID USB endpoint to set up control channel
Initialization
Connect to USB endpoint (e.g. speakerphone or camera)
Data exchange
Data forward / processing / encryption
Data Exchange
Data decode / processing / encryption
Data Exchange
Data decode / processing / encryption
Start screen sharing
Data exchange
Data processing / encoding/ encryption
Data Exchange
Data processing / decryption / decode
Data Exchange
Data decode / processing / encryption

Fig. 17


70
60
Host application
3rd party application
160
PC
90
USB Peripheral
Firmware
USB Peripheral
System drivers
USB Port
100
USB Port
System drivers
Fixed USB endpoints
Configurable USB endpoints
USB Peripheral
130
Firmware
Firmware
Base Unit
USB Device
Wireless link
Wireless link
127

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS
First Named Inventor/Applicant Name:	Gauthier RENARD
Filer:	Thomas Lee/Yanling Cottle
Attorney Docket Number:	21063.0018USC1

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
UTILITY APPLICATION FILING	1011	1	320	320
UTILITY SEARCH FEE	1111	1	700	700
UTILITY EXAMINATION FEE	1311	1	800	800
Pages:				
Claims:				
CLAIMS IN EXCESS OF 20	1202	8	100	800
Miscellaneous-Filing:				
Petition:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**2620**

Electronic Acknowledgement Receipt

EFS ID:	45689198
Application Number:	17742166
International Application Number:	
Confirmation Number:	9959
Title of Invention:	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS
First Named Inventor/Applicant Name:	Gauthier RENARD
Customer Number:	52835
Filer:	Thomas Lee/Yanling Cottle
Filer Authorized By:	Thomas Lee
Attorney Docket Number:	21063.0018USC1
Receipt Date:	11-MAY-2022
Filing Date:	
Time Stamp:	17:45:19
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$2620
RAM confirmation Number	E20225AH45502807
Deposit Account	503478
Authorized User	Yanling Cottle

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37 CFR 1.16 (National application filing, search, and examination fees)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	ADS_0018USC1.pdf	2226164 b609a8307f65c2717978d7a9e18eaff8b1052c27	no	9
Warnings:					
Information:					
2	Oath or Declaration filed	DEC_0018USC1.pdf	125983 fb053d53383679c59ee541deb9290139644b16b	no	2
Warnings:					
Information:					
3		Application_0018USC1.pdf	269228 33457a7e63c4bb8d095f188caa925d51db0d3620	yes	46

Multipart Description/PDF files in .zip description

Document Description	Start	End
Specification	1	40
Claims	41	45
Abstract	46	46

Warnings:					
Information:					
4	Power of Attorney	POA_0018USC1.pdf	523199 5879212d1361f12df33a57bc34bb1cc12c276231	no	2
Warnings:					
Information:					
5	Drawings-only black and white line drawings	Figures.pdf	4905486 e3daa6759690b469ed6a147f9878fa1626111e41	no	19

Warnings:					
Information:					
6	Fee Worksheet (SB06)	fee-info.pdf	46349 65d26f45d4d200c6a5522fb59b18bd9978fd1ac7	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	8096409	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/AIA/14 (01-22)
Approved for use through 05/31/2024. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	21063.0018USC1
	Application Number	
Title of Invention	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Gauthier		RENARD	

Residence Information (Select One) US Residency ● Non US Residency Active US Military Service

City	Country of Residence [i]
Kuurne	BE

Mailing Address of Inventor:

Address 1	Watertorenstraat 21
Address 2	
City	Kuurne **State/Province**
Postal Code	B-8520 **Country** [i] BE

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Johan	Peter Frans	DEGRAEF	

Residence Information (Select One) US Residency ◉ Non US Residency Active US Military Service

City	Country of Residence [i]
Gent	BE

Mailing Address of Inventor:

Address 1	Twaalfkameren 45
Address 2	
City	Gent **State/Province**
Postal Code	9000 **Country** [i] BE

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

PTO/AIA/14 (01-22)
Approved for use through 05/31/2024. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	21063.0018USC1
	Application Number	
Title of Invention	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS	

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	52835		
Email Address		Add Email	Remove Email

Application Information:

Title of the Invention	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS		
Attorney Docket Number	21063.0018USC1	**Small Entity Status Claimed**	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	19	**Suggested Figure for Publication (if any)**	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	● Customer Number	US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	52835		

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	21063.0018USC1
	Application Number	
Title of Invention	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS	

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Continuation of	16/771068	2020-06-09
Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
16/771068	a 371 of international	PCT/EP2018/086537	2018-12-21
Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
PCT/EP2018/086537	Continuation in part of	15/858668	2017-12-29

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	21063.0018USC1
	Application Number	
Title of Invention	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS	

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	21063.0018USC1
	Application Number	
Title of Invention	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	21063.0018USC1
	Application Number	
Title of Invention	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1 — Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

● Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
Person to whom the inventor is obligated to assign.	Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	Barco N.V.		
Mailing Address Information For Applicant:			
Address 1	President Kennedypark 35		
Address 2			
City	Kortrijk	**State/Province**	
Country	BE	Postal Code	B-8500
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	21063.0018USC1
	Application Number	
Title of Invention	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☒

Organization Name	BARCO N.V.

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1	President Kennedypark 35		
Address 2			
City	Kortrijk	**State/Province**	
Country i	BE	Postal Code	B-8500
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Thomas Lee/			Date (YYYY-MM-DD)	2022-05-11
First Name	Thomas	Last Name	Lee	Registration Number	66,396

Additional Signature may be generated within this form by selecting the Add button. Add

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	21063.0018USC1
	Application Number	
Title of Invention	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1 The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3 A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent CooperationTreaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Box No. VIII (iv) DECLARATION: INVENTORSHIP (only for the purposes of the designation of the United States of America)

The declaration must conform to the following standardized wording provided for in Section 214; see Notes to Boxes Nos. VIII, VIII (i) to (v) (in general) and the specific Notes to Box No. VIII (iv). If this Box is not used, this sheet should not be included in the request.

Declaration of inventorship (Rules 4.17(iv) and 51*bis*.1(a)(iv))
for the purposes of the designation of the United States of America:

I hereby declare that I believe I am the original inventor or an original joint inventor of a claimed invention in the application.

This declaration is directed to the international application of which it forms a part (if filing declaration with application).

This declaration is directed to international application No. PCT/ EP2018/086537 (if furnishing declaration pursuant to Rule 26*ter*).

I hereby declare that the above-identified international application was made or authorized to be made by me.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

Name: RENARD, Gauthier

Residence: Oudenaarde, Belgium
(city and either US state, if applicable, or country)

Mailing Address: Broekstraat 282 bus 3

B-9700 Oudenaarde

Belgium

Inventor's Signature: Date: 12/03/2019
(The signature must be that of the inventor, not that of the agent)

Name: DEGRAEF, Johan Peter Frans

Residence: Gent, Belgium
(city and either US state, if applicable, or country)

Mailing Address: Twaalfkameren 46

B-9000 GENT

Belgium

Inventor's Signature: Date:
(The signature must be that of the inventor, not that of the agent)

Name:

Residence:
(city and either US state, if applicable, or country)

Mailing Address:

Inventor's Signature: Date:
(The signature must be that of the inventor, not that of the agent)

☐ This declaration is continued on the following sheet, "Continuation of Box No. VIII (iv)".

Box No. VIII (iv) DECLARATION: INVENTORSHIP (only for the purposes of the designation of the United States of America)

The declaration must conform to the following standardized wording provided for in Section 214; see Notes to Boxes Nos. VIII, VIII (i) to (v) (in general) and the specific Notes to Box No. VIII (iv). If this Box is not used, this sheet should not be included in the request.

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for the purposes of the designation of the United States of America:

I hereby declare that I believe I am the original inventor or an original joint inventor of a claimed invention in the application.

This declaration is directed to the international application of which it forms a part (if filing declaration with application).

This declaration is directed to international application No. PCT/ EP2018/086537 (if furnishing declaration pursuant to Rule 26*ter*).

I hereby declare that the above-identified international application was made or authorized to be made by me.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

Name: RENARD, Gauthier

Residence: Oudenaarde, Belgium
(city and either US state, if applicable, or country)

Mailing Address: Broekstraat 282 bus 3

B-9700 Oudenaarde

Belgium

Inventor's Signature: ..... Date: .....
(The signature must be that of the inventor, not that of the agent)

Name: DEGRAEF, Johan Peter Frans

Residence: Gent, Belgium
(city and either US state, if applicable, or country)

Mailing Address: Twaalfkameren 45

B-9000 GENT

Belgium

Inventor's Signature: ..... Date: September 10, 2018
(The signature must be that of the inventor, not that of the agent)

Name: .....

Residence: .....
(city and either US state, if applicable, or country)

Mailing Address: .....

.....

.....

Inventor's Signature: ..... Date: .....
(The signature must be that of the inventor, not that of the agent)

☐ This declaration is continued on the following sheet, "Continuation of Box No. VIII (iv)".

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation application of U.S. Application No. 16/771,068 filed June 9, 2020, which was a national stages application of PCT/EP2018/086537 filed on December 21, 2018, which was a continuation-in-part of U.S. Application No. 15/858,668 filed December 29, 2017, the entire contents of which are incorporated herein by reference.

The present invention relates to methods, devices and systems for making functional devices available to participants of meetings, as well as software for carrying out such methods.

Background

Allowing ad hoc groups of persons to communicate with each other is one of the fundamental aspects of collaboration, problem solving, negotiation, teaching and education, etc. To assist in communication, there has been an explosion of electronic communication tools such as electronic conferencing tools, e.g. synchronous and asynchronous conferencing, online chat, Instant Messaging, audio conferencing, videoconferencing, data conferencing, application sharing, remote desktop sharing, electronic meeting systems, collaborative management (coordination) tools, project management systems, knowledge management systems, and social software systems.

One classic approach is the lecture or seminar often involving a presentation using presentation software. To a large extent the traditional single person presentation or lecture has been maintained with the audience being in a rather passive mode as far as determining, constructing, augmenting or modifying the information to be presented is concerned.

As with other business processes, meetings are going digital. Increasingly, people are using computer technology alone and in conjunction with broadband networks to support their meeting objectives prior to and during an actual meeting. For example, e- mail is used to pass around files for people to read prior to a meeting.

However, certain functionalities such as microphones and load speakers tend to have a low quality if these are provided by portable devices such as laptops and mobile phones. As meetings get larger in size there is a need for high quality audio as well as visual signals to be made available to participants at a meeting.

Summary of the Invention.

Embodiments of the present invention relate to methods, devices and systems for making functional devices available to participants of meetings, as well as software for carrying out such methods.

Embodiments of the present invention provide a system for connecting a processing device to a functional device connected to or in a base unit of a communications network, the processing device having a memory, a display and an operating system, the system comprising :

a first peripheral device being adapted to be coupled to the processing device via a generic communications protocol, the base unit having a transmitter and the first peripheral device having a receiver and at least one fixed or configurable endpoint of the functional device exposed on the first peripheral device;
the base unit and the first peripheral device being adapted to transmit and receive data respectively over the communications network from the functional device to the processing device via the at least one fixed or configurable endpoint using the generic communications protocol for communication between the processing device and the first peripheral device.

The communications network is preferably a wireless network. This enables the **sharing or combining** of at least a selection of functionalities/endpoints of the secondary peripheral devices, i.e. the one-to-many scenario.

The data that is transmitted or received, i.e. streaming data carrying images, audio, etc. can be in a raw or unaltered format.

There can be more than one first peripheral device. For example, the data can be transmitted from the functional device to at least two processing devices using at least two first peripheral devices.

A functional device can be run with a vendor specific driver alone.

The functional device can be a data generating device such as any one or more of a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a video camera, a webcamera.

The at least one fixed or configurable endpoint of the functional device exposed on the first peripheral device can be a human interface device.

The processing device can be adapted to communicate with the at least one fixed or configurable endpoint with the pre-installed generic driver being a human interface device driver.

The at least one fixed or configurable endpoint of the functional device exposed on the first peripheral device can be a mass storage device.

The processing device can be adapted to communicate with the at least one fixed or configurable endpoint with a pre-installed generic driver being a mass storage device driver.

The at least one fixed or a configurable endpoint of the functional device exposed on the first peripheral device can be a composite device.

The processing device can be adapted to communicate with the at least one fixed or configurable endpoint with a pre-installed generic driver being a composite device driver.

Embodiments of the present invention include the combining of endpoints: the present invention includes a system wherein two endpoints are combined and exposed to the processing device as one endpoint.

An **exposure** or **enumeration** feature determines which endpoints the first peripheral (e.g. button) sees. With respect to **exposure** this can be done with **descriptor fields.** A specific device can expose a peripheral device or other device. This means that the specific device configures one or more endpoints with specific descriptor fields or **descriptive field**. An endpoint is defined by a number of descriptive fields.

A basic form of descriptive fields can be "USB over IP", and the actual transfer of the unaltered data can be done with tunneling.

The exposure can be implemented with **descriptor fields**. The Endpoints are the **capabilities/functionalities** of the **physical devices** (second peripherals, or functional device), e.g. a telephone device is a second peripheral while it can have several endpoints, e.g. a microphone or a loudspeaker or an IP connection, etc.

The **differentiation** between endpoints and second peripherals/functional devices defines endpoints.

Embodiments of the present invention provide a system that enables the use of the original vendor's driver for each functional device (and related endpoint), e.g. in the context of mirroring. Hence the functional devices can be run with the vendor specific driver alone.

The system can comprise means for encoding, optionally encrypting the data. Hence the system may comprise an encoder for encoding, optionally encrypting the data.

The processing device can be adapted to host a unified communication between two or more processing devices. The unified communication can be a Skype™ call or a Skype™ for Business call. The first peripheral device can be adapted to present the functional device to the unified communication between two or more processing devices. For example, the functional device can be a speaker phone, a microphone, a speaker, a videocamera, a webcam, a camera, or other audio source.

The system can be adapted to share data from other processing devices in a meeting in the call. A manual action can be used to activate this sharing to be performed by the person sharing or the host via local view window.

The system can be adapted to select of a camera, e.g. via a manual action in UC clients. The system can be adapted to synchronize the sharing state of the first peripheral device with the sharing state of the UC client.

Sharing of functionalities/endpoints can be sharing of a room display. Combining of resources can be using two room loudspeakers (e.g. to increase quality) but the user only sees "one room loudspeaker". The latter case would also comprise the combining feature if there are more than one participant/user in the room. Sharing is also envisioned as a selection of functionalities/endpoints of a certain functional device.

Embodiments of the present invention can use multiple endpoints, at least one fixed or configurable endpoint and the sharing can be to multiple processing devices, i.e. the use of **multiple first peripherals** (e.g. buttons) is also supported.

The system can be adapted to provide a multiuser wireless speakerphone. The speakerphone can be made accessible to every processing device in a meeting with a first peripheral device connected to each of the processing devices. There is no moderation or need to perform an action to get access to this device.

The system can be adapted to provide separate controls, e.g. on the peripheral device to control a volume of an audio output of the Base Unit and to mute a room microphone. When muted, a microphone can also be muted for all other first peripheral devices connected to processing devices in a meeting.

Audio signals should be picked up by a microphone or the Base Unit can be adapted to have to inject audio signals in any audio feed such as in a microphone signal to a first peripheral device connected to a processing device.

The system can be adapted to expose the same type of functional device to the user as is connected to the Base Unit so that a user can use drivers provided by a vendor of the functional device installed on the processing device.
The system can be adapted such that for a plurality of processing devices communicating with the Base Unit, a functional device connected to the base unit will be exposed to all the

plurality of processing devices. The functional device can be exposed natively.

Exposure can be implemented with **descriptor fields**.

The system can be adapted to allow any processing device connected to the communications network through the first peripheral device the ability to view any audiovisual content that is displayed, provided or projected in the meeting room on that processing device called "local view".

A processing device which is a receiver of the local view can have, but is not limited to, following functionality:

- The ability to open a window and view the meeting room content in there.
- The ability to zoom into the content.
- The local view can allow the user to start and/or participate in a blackboard or annotation session from his/her own processing device

The system can be adapted provide alternative methods and systems if there are too few first peripheral devices in a certain meeting room.

The system can be adapted to provide a warning if a first peripheral device is attempting to connect to the wrong base unit.

In another aspect the present invention provides a method for connecting a processing device to a functional device connected to or in a base unit of a communications network, the processing device having a memory, a display and an operating system, the base unit having a transmitter and the first peripheral device having a receiver the method comprising :

coupling a first peripheral device being to the processing device via a generic communications protocol, providing at least one fixed or a configurable endpoint of the functional device exposed on the first peripheral device;

transmitting data from the base unit and receiving the data at the first peripheral device over the communications network from the functional device to the processing device via the at least one fixed or configurable endpoint using the generic communications protocol for communication between the processing device and the first peripheral device.

The communications network is preferably a wireless network. This enables the **sharing or combining** of at least a selection of functionalities/endpoints of the secondary peripheral devices, i.e. the one-to-many scenario.

The data that is transmitted or received, i.e. streaming data carrying images, audio, etc. can be in a raw or unaltered format.

There can be more than one first peripheral device. The data can be transmitted from the functional device to at least two processing devices using at least two first peripheral devices.

A functional device can be run with a vendor specific driver alone.

The functional device can provide any one or more of a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a video camera, a webcamera.

The method can include presenting the at least one fixed or a configurable endpoint of the functional device exposed on the first peripheral device as one of a human interface device, a mass storage device, a composite device, a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a video camera, or a webcamera.

The data can be encoded, and/or optionally encrypted.

A unified communication between two or more further processing devices can be hosted on the processing device.

The first peripheral device can present a functional device to the unified communication between two or more processing devices.

The method can include exposing the same type of functional device to the processing device as is connected to the Base Unit and using at least one driver for the functional device installed on the processing device.

Exposure can be implemented with **descriptor fields**.

In another aspect a peripheral device adapted to be coupled to a processing device via a generic communications protocol is provided, the peripheral device having a receiver and at least one fixed or a configurable endpoint of a functional device exposed on the first peripheral device;
the receiver of the first peripheral device being adapted to receive data over the communications network from the functional device and for sending the data to the processing device via the at least one fixed or configurable endpoint using the generic communications protocol for communication between the processing device and the peripheral device.

The communications network is preferably a wireless network. This enables the **sharing or combining** of at least a selection of functionalities/endpoints of the secondary peripheral devices, i.e. the one-to-many scenario.

The at least one fixed or a configurable endpoint of the functional device exposed on the first peripheral device can be one of a human interface device, a mass storage device, a composite device, a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a video camera, or a webcamera. The exposure can be implemented with **descriptor fields**.

A functional device can be run with a vendor specific driver alone.

In another aspect, a computer program product is provided for carrying out any of the method steps of claim 10 when executed on a processor. A non-transitory signal storage means can be used to store the computer program. The non-transitory signal storage means can be an optical disk such as a CD-ROM or a DVD-ROM, a magnetic disk such as a hard disk, a solid state memory such as a flash memory, a magnetic tape or similar.

Brief Description of the drawings

Figure 1 shows in Figures 1A to C an embodiment of the present invention.

Figures 2 and 3 show message flows of how a peripheral device is connected to a processing device in embodiments of the present invention.

Figure 4 shows an arrangement of components that can be used in embodiments of the present invention. This figure is Figure 11 of WO 2013/037980 entitled "Electronic tools and methods with audio for meetings" which is incorporated herein by reference with respect to Figure 11 thereof and also in its entirety.

Figure 5 shows an arrangement of processing devices as used in a meeting with a unified communication in progress according to an embodiment of the present invention.

Figures 6 to 11 show embodiments of the present invention where a peripheral device is coupled to a processing device.

Figures 12 to 14 show embodiments of the present invention where a peripheral device is not coupled to a processing device.

Figure 15 shows a message flow for use with any of the embodiments 1 to 11 and 17 according to an embodiment of the present invention.

Figure 16 shows a message flow for use with any of the embodiments 12 to 14 according to an embodiment of the present invention.

Figure 17 shows a further embodiment of the present invention.

Definitions

"**Plug and play"** is a term used to describe the characteristic of a computer bus, or device specification, which facilitates the discovery of a hardware component in a system, without the need for physical device configuration, or user intervention in resolving resource conflicts. Plug and play devices can be added to a bus of a computing system (while running or when shut down), and the newly added device and possibly the rest of the computing system is automatically configured to make the newly added device work, both from hardware and from software perspective.

Plug and play interfaces include for example (not an exhaustive list): Firewire (IEEE-1394), PCI, Mini PCI, PCI Express, Mini PCI Express, PCMCIA, PC Card, Universal Serial Bus (USB), SDIO cards, HDMI, DisplayPort, Bluetooth etc.

"**Auto-configuration**" is the automatic configuration of devices without manual intervention, without setting any switches or jumpers, and without any need for software configuration. An example of auto-configuring devices: USB devices. Examples of auto-configuring protocols: DHCP, Zeroconf, Bonjour.

A plug and play device has auto-configuration software by default to make it plug and play. Example: USB devices are made to be plug and play by including the correct auto-configuration software (e.g. host driver, host stack, application software). Autoconfiguration can also refer to a software alone and is not restricted to a physical device.

"**Hot swapping and hot plugging**" are terms used to describe the functions of replacing computer system components without shutting down the system. More specifically, hot swapping describes replacing components without significant interruption to the system, while hot plugging describes the addition of components that would expand the system without significant interruption to the operation of the system. A well-known example of this functionality is the Universal Serial Bus (USB) that allows users to add or remove peripheral components such as a mouse, keyboard, or printer. Other examples are eSATA, PCIe, FireWire, for example.

A "**portable application**" (portable app), sometimes also called standalone, is a computer software program designed to run without installation on the target machine. This type of application is stored on a removable storage device such as a CD, USB flash drive, flash card, or floppy disk—storing its program files, configuration information and data on the storage medium alone. It is a program that can be stored on an electronic device such as a USB flash drive, iPod, memory card, portable hard drive or other portable electronic device and runs on a computer or other processing device coupled to the electronic device without making permanent configuration changes to the host computer. All such programs have a zero-footprint, meaning all temporary files, registry entries, and any other changes to the machine exist only while the program is running.

To be considered a portable application, for purpose of this invention, a software program must:

Not require any kind of formal installation onto a computer's permanent storage device to be executed, and can be stored on a removable storage device such as USB flash drive, iPod, memory card, portable hard drive or other portable electronic storage device thus enabling it to be used on multiple computers.
Settings are stored with, and can be preferably carried around with, the software (i.e., they are written to the electronic device such as a USB drive). Settings are not stored to the registry or any other central system database of the computer.

Leaves a zero (or near-zero) "footprint" on any PC it is run on after being used. i.e., all temporary files/registry settings should be either avoided or at least removed once the program has exited, and files created by the user can be saved directly to the same removable media as the application is stored on.

A portable application does not leave its files or settings on the host computer on which it runs. For example, the application does not write to the Windows registry or store its configuration files (such as an INI file) in the user's profile; instead, it stores its configuration files in the program's directory. Another requirement, since file paths will often differ on changing computers due to variation in Windows drive letter assignments, is the need for applications to store them in a relative format. Preferably, such a program does not require a launcher program to copy necessary settings and files to the host computer when the application starts and move them back to the application's directory when it closes as this may leave a residue on the hard drive in case of power failure.

"**Electronic meeting systems**" (EMS) need to be distinguished on the one hand from classic groupware, on the other from web conferencing systems. In reality, there is some overlap between minor features of products of the named categories. The main difference from groupware is the intensity of collaboration. EMS should be distinguished from systems with which it is possible to show the contents of an individual computer screen on a remote display with multiple users at the same time.

"**Groupware**" supports collaboration within groups where the individual contributions remain identifiable. In contrast, EMS enables the group to cooperatively produce a result for which the group is responsible as a whole. In a business process, groupware and electronic meeting systems complement each other: Groupware supports teams when researching and creating documents in the run up to an EMS session or when implementing the results of such a session.

"**Web conferencing systems**" and "electronic meeting systems" complement each other in the online meeting or workshop: EMS extends the web conferencing system by providing interactive tools for producing and documenting group results. On the other hand, "web conferencing systems" complement EMS with the screen sharing and voice conferencing functionality required in synchronous online meetings and not present in EMS.

"**Data conferencing**" refers to a communication session among two or more participants sharing computer data in real time. Interaction and presentation devices such as a screen, keyboard, mouse, camera, etc. can be shared. It is a term used to distinguish from video conferencing and audio conferencing. The data can include screen, documents, graphics, drawings and applications that can be seen by the participants of the meeting.

"**Application sharing**" is an element of remote access, falling under the collaborative software umbrella, that enables two or more users to access a shared application or document from their respective computers simultaneously in real time. Generally, the shared application or document will be running on a host computer, and remote access to the shared content will be provided to other users by the host user. Application sharing should be distinguished from systems in which collaboration on the applications between different users is not possible, but the contents of individual computer screens can be projected onto a remote display with multiple users at the same time.

The term "**arbitrary media content**" refers to the fact that a user may generate, create or select any media content that is appropriate to display. This differs from client voting on or selecting of media content that is displayed by another in a meeting or presentation. This term refers to client oriented, distributed rights and privileges for the display of content rather than a central presenter providing content which is presented to the members of the meeting.

"**Unified Communications system or tools**" refers to audio or audio visual communications such as provided by "Skype™" or "Skype™ for business". Such software can take over audio and/or visual data provided from a host processing device. Unified communication tool can be described as a collection of tools to do VOIP, (web) conferencing, shared whiteboarding, message exchange (e.g. chat), file transfer, or presence. Unified Communications system or tools can make use of a protocol- or standard defined or specific communication session or interaction, such as Voice-Over-Internet-Protocol ("VoIP), text or instant messaging (e.g., AIM, Blauk, eBuddy, Gadu-Gadu, IBM Lotus Sametime, ICQ, iMessage, IMVU, Lync, MXit, Paltalk, Skype, Tencent QQ, Windows Live Messenger™ or MSN Messenger™, Wireclub, Xfire, and Yahoo! Messenger™ email, Twitter (e.g., tweeting), Digital Service Protocol (DSP), and the like. Unified Communications system or tools can make use of video conferencing cloud service including a video conferencing node to allow one or more users located at the first video conferencing endpoint to communicate with one or more users located at the second video conferencing endpoint in a video conference.

"**Screen scraping**" in the sense of the present invention refers to reading the video frame buffers and processing them, rather than just rendering them on a display. Screen scraping for presentations is described in US2002/0196378 to Slobodin et al which is included herein by reference.

"**Auto composition**" or "**auto layout**" refers to the automatic nature in which multiple graphics/video sources are rendered on a central display, without user intervention and in a way that a user would intuitively expect it to happen.

"**Wireless**" and "**wireless communication network**" can be any network that does not use cable links between nodes, e.g. uses RF, optical or InfraRed for communication purposes, such as IrDA, diffuse infra-red, WLAN, WiMax, WiFi, WiFi Direct, LiFi, ultrasound, ZigBee, or Bluetooth or any other wireless communication network known to the person skilled in the art. Any communications network disclosed below can be and preferably is a wireless network. This enables the **sharing or combining** of at least a selection of functionalities/endpoints of the secondary peripheral devices, i.e. the one-to-many scenario.

"**Computer**" generally refers to a processing device, i.e. having a processing engine capable of various types of digital processing, such as rendering graphics images for display. A computer can be in the form of a work station, a personal computer, a laptop, a palm top, a PDA, a smartphone, a tablet etc. Generally, a computer has memory such as volatile RAM. Non-volatile memory such as a hard disc, optical disk or solid state memory can be included in the computer or can be a peripheral device. Currently most computers are electronic, but the term "computer" also includes optics based computing devices.

The term "**pre-installed generic driver**" is intended to mean a driver which is installed on a processing device such as a computer as a standard driver, e.g. is installed with the installation of the operating system. Such a driver is standard for the operating system and can drive a standard class of peripheral devices coupled to or connected to the processing device. The installation of a specific driver for such a peripheral device is not required. Such a generic driver can be a human interface driver (HID) or a mass storage device driver, which has predetermined software components configured for driving mass storage, a CD-ROM, a keyboard etc. or combinations of these. Such devices can be readable and writable computer peripheral memory devices such as USB memory sticks, flash memories, external hard drives, or more.

"Host device" is a processing device that wants to share using a first peripheral device or dongle.

"**Functional device**" is a second peripheral device connected in some way to a base unit. The system has the ability to expose second peripheral devices connected to the Base Unit to the first peripheral device transparently as if it were attached to the processing device to which the first peripheral device is connected. The exposure can be implemented with **descriptor fields**. A functional device can be run with a vendor specific driver alone.

"Endpoints" can be described as data sources or sinks and are defined for USB Devices which can be physical devices or virtual devices. In the present invention endpoints should be interpreted broadly as data sources or sinks. Hence data can be stored at an endpoint or emitted. An endpoint can act as a kind of buffer can be defined for physical devices or virtual devices. The data stored at an endpoint may either be received from or waiting for being sent to the host such as a USB Host. An endpoint is defined by a number of

descriptive fields. For example, an endpoint can be configured to support different transfer types such as four transfer types. These transfers can be as defined in the USB specification, e.g. Control Transfers, Interrupt Transfers, Isochronous Transfers, and Bulk Transfers. The skilled person can use these transfer types as required in the present invention. Within the limits of the hardware, endpoints can be configured using middleware, e.g. USB Middleware. An endpoint can be limited to a certain transfer type. A USB Host's client may send data to an Endpoint 1 for example. Coming from the USB Host, the data will be sent to the OUT Endpoint 1. The software running will then read the data as soon as it is ready to do so. Returning data has to be written to the IN Endpoint 1, as the software cannot access the USB bus freely as the USB bus is controlled by the USB Host. The data in IN Endpoint 1 stays there until the host sends an IN packet to Endpoint 1 requesting the data.

A limit can be placed on the number of endpoints. Each endpoint can have one transfer direction. A specific endpoint can be defined, for example, for control transfers only and cannot be assigned to any other function.

Control Transfers can be bi-directional transfers reserved for the host to send and request configuration information to and from a device using a specific IN and OUT Endpoint.

Each Control Transfer can comprise a number of transactions. Control Transfers can have several stages:

1. The **SETUP** stage carries a Setup packet, defining the request, and specifying how many data should be transferred in the DATA stage.
2. The **DATA** stage is optional. If present, it always starts with a transaction containing a DATA1 packet. Then, the transaction type alternates between DATA0 and DATA1 until all required data have been transferred.
3. The **STATUS** stage is a transaction containing a zero-length DATA1 packet. If the DATA stage was IN, then the STATUS stage is OUT, and vice-versa.

Interrupt Transfers have a limited latency to or from a device. In USB, an Interrupt Transfer, or Interrupt Pipe, has a defined polling rate. Typically, Interrupt Transfer data consists of event notifications, characters, or coordinates from a pointing device.

Isochronous Transfers are used for transmitting real-time information such as audio and

video data, can be sent at a constant rate. USB isochronous data streams are allocated a dedicated portion of USB bandwidth to ensure that data can be delivered at the desired rate. An Isochronous pipe sends a new data packet in every frame, regardless of the success or failure of the last packet. Isochronous Transfers need not have error detection. Any error in electrical transmission is not corrected.

Bulk Transfers are used for data which are not of the type Control, Interrupt, or Isochronous. Reliable exchange of data is ensured at the hardware level using error detection.

Bulk Transfers take up all the bandwidth that is available after the other transfers have finished. If the bus is very busy, then a Bulk Transfer may be delayed.

"**A specific device exposes a peripheral device or other device**" means that the specific device configures one or more endpoints with specific descriptor fields.

Detailed Description of the Invention

Embodiments of the present invention allow a wireless connection between a user processing device such as a laptop, computer, PDA, smartphone etc. and a base unit of a wireless network. The wireless connection may be made by an integrated wireless transceiver in the user processing device such as the laptop, the computer, the PDA, or the smartphone etc. Alternatively, in some embodiments of the present invention the wireless connection is made via a first peripheral device plugged into, coupled, connected or attached in some way to the user processing device or is provided by other hardware or software.

Embodiments of the present invention allow users, e.g. participants in a meeting room, to make use of at least one functional device, some functional devices or all functional equipment attached to the base unit whereby the at least one functional device has an electronic output such as a digital electronic output and can co-operate with other devices plugged into, coupled, connected or attached in some way to the base unit or is provided by other hardware or software. The at least one functional device can be provided by either plugging in a second peripheral device e.g. a dongle or by a wireless connected second peripheral device or by connecting to the at least one functional device with some software

which can be downloaded or pre-installed. The at least one functional device can have an electronic output such as provided by a touch screen, a microphone, a speakerphone, a camera and can function with devices which have an electronic input such as a display or a speaker. Embodiments of the present invention provide the functional device for shared use by participants in a classroom or meeting room.

The at least one functional device coupled or connected or attached to the base unit, e.g. via a serial connection such as a serial plug-and-play connection e.g. USB or via a wireless connection such as a Near Field Communication (NFC) connection, e.g. a Bluetooth connection, an IR connection etc. is made accessible and usable to one or more users in the meeting room or classroom. Preferably this is done in a transparent and standard way. In different cases, the system can behave as a wireless (e.g. USB) hub, in another case, the first peripheral device or other hardware or software exposes a virtual device that has the same functionality or more as the combined functionalities of the functional devices e.g. second peripherals which are coupled or connected or attached to the base unit.

Embodiments of the present invention make use of a base unit, the base unit comprising at least a transmitting function and usually a transmitting and receiving function such as a transceiver function. The base unit is a base unit of a network such as a wireless network and hence can have a transmitter, a receiver or a transceiver. The base unit can be a hardware box comprising a digital processing engine such as an FPGA, a CPU, a GPU etc. as well as memory and input/output ports and which is adapted for connection to e.g. by plugging it in, any functional device such as one or more second peripheral devices that can be used in a meeting room or classroom with or without visual or audio capabilities. Functional devices, such as the one or more second peripheral devices, for use with the base unit can include one, some or all of a television or other video provider e.g. providing images such as video over an HDMI, DVI, USB or other connection, an image capturing device such as a camera, e.g. for providing captured images like video over a USB or HDMI or other connection, audio devices such as speakerphones providing audio such as speech or music over a USB connection or other connection, or speakers over a USB connection, making use for example of a 3.5mm audio jack, SPDIF or other connection, or one or more microphones making use for example of a 3.5mm jack, USB or other connection, display devices such as touchscreens making use for example of a USB or other connection, all-in-ones over a USB connection and any other functional device or first

peripheral device that can be connected to e.g. plugged into the first device such as the base unit and which have, for example, an electronic output such as a digital electronic output.

Embodiments of the present invention comprise a device such as a first peripheral device comprising at least a receiving function and usually a transmitting and receiving function such as a transceiver function. The first peripheral device (being at least a receiver device) can be hardware e.g. having a wireless or wired connection capability, software or a combination of both that can be connected to the base unit over a wireless connection such as a Wi-Fi, Bluetooth, Wi-Gig, Li-Fi, NFC or similar connection, or a wired link e.g. a USB, Ethernet, etc. connection. This allows the base unit to expose and make available any functional device such as a second peripheral device that is connected to the base unit, to one or more first peripheral devices (e.g. receiver devices) such as to expose and make available simultaneously with a plurality of first peripheral device (e.g. receiver devices) in one of following ways:

1. By exposing the or each functional device (such as the or each second peripheral device) connected to the base unit in a one-on-one manner or in a one to more of the first peripheral devices or user processing devices manner, e.g. to one or more first peripheral devices or user processing devices, preferably without interpretation or processing the electronic signals from each functional device e.g. the second peripheral device e.g. by tunneling the packets from the base unit to the endpoints of the one to more of the first peripheral devices or user processing devices.
2. By interpreting, processing and translating the electronic signal coming from the at least one functional device, e.g. the second peripheral device and, for example mimicking the at least one functional device, e.g. the second peripheral device at the first peripherals' end (e.g. receiver devices' end), either in software or hardware or both. With mimicking is meant that the same device is exposed in the endpoints as the second peripheral device connected with the base unit although the communication is not simply being tunneled as in the first and second methods described above.
3. By combining one or more functional devices, e.g. second peripheral devices or part of a second peripheral device and exposing it to the one or more first peripheral devices, e.g. receiver devices through a custom device in hardware, software or both.
4. By combining one or more functional devices e.g. second peripheral device(s) or

part of a second peripheral device and exposing its functionality to the end user through proprietary software.

5. By combining any of the above methods to provide the function of the functional device e.g. the second peripheral device to the one or more first peripheral devices such as receiver devices.

When a functional device, e.g. a second peripheral device is exposed natively or as a mimic of such a device in hardware, use can be made of endpoints such as USB endpoints on the first peripheral device or the user processing device which can expose the corresponding second peripheral devices such as USB devices connected to or plugged into the base unit (as is done in a hub), so no proprietary software or drivers need to be installed to support this.

When exposing custom devices, i.e. specifically developed to work with the present invention use is made of these same endpoints of the first peripheral devices such as the receiver's hardware or it can be done in software with a driver.

A first peripheral device can be used to set up a connection such as a wireless or wired connection between a first peripheral device and base unit, e.g. by acting as a hub such as a wireless hub of which a wireless USB-hub is one example. Whatever second peripheral device is connected to or plug into the base unit e.g. a second peripheral device selected from the non-exhaustive list given above of a TV, video device, audio device, speakerphone, camera, display …, is exposed to the first peripheral device in any of the 5 ways described above.

Advantages of embodiments of the present invention can be one, some or all of the following:

- In one implementation, all second peripheral devices, which can be USB devices, are mirrored one on one, needing no additional drivers or software to be installed on the users' processing devices other than the second peripheral's vendor's drivers. The second peripheral devices can be exposed to the user's processing device either by the hardware of the first peripheral device directly, or by using a software virtual hub on the first peripheral device or on the user's processing device.

- In another implementation, different second peripheral devices (e.g. speakers, microphones, e.g. with electronic outputs and/or inputs) can be combined and connected to the same base unit. Additional functionality such as echo cancellation, translation, encoding/decoding, etc) can be provided in the base unit. Only one second peripheral needs to be exposed through the first peripheral device to the user's processing device.
- A combination of previous two methods can be provided for one or a combination of devices or functions. Different approaches can be used within one final solution, depending on if the device or function needs to be available to multiple users at once, the technical feasibility of simply mirroring of the device etc.
- By adding some software to the client software running on the user processing device, configuration for these devices can be made easier (e.g. set as default devices) and some custom controls (mute, pan/tilt/zoom,…) can be added.
    - Some controls can be added to the first peripheral device
    - Some processing can be done on the base unit to make such controls obsolete (e.g. automatic gain control on an audio signal, framing of participants to remove the need for PTZ)
- Multiple users can use the functional devices in contrast to regular hub, with which only one person can plug in only one cable. Each user processing device to which a first peripheral device is plugged in can use these functional devices and the base unit will make sure all streams are correctly captured, played, processed, combined and/or enhanced.
- Different streams can be given different priority (speed, throughput,…) to adjust to the unpredictable nature of the wireless communication channel. E.g. to prioritize audio streams over video streams to enhance the call experience.
- When having a VOIP call such as a Skype™ call in a meeting, the first peripheral device is connected to, e.g. plugged into a user processing device and all the functional devices connected to the base unit can be used, e.g. a better camera that gives a wide a room view, a better microphone and better speakers). This is especially beneficial when there are multiple people in the room that want to attend the conference call such as a VOIP or skype™ call.

With reference to Figure 1 group 90 is a microprocessor or FPGA based device comprising

one or more peripheral devices 91-93 which can be connected to, e.g. plugged into a base unit 100. The peripheral devices 91-93 may be connected to the base unit100 by means of standard connections such as serial connection of which Firewire (IEEE-1394), PCI, Mini PCI, PCI Express, Mini PCI Express, PCMCIA, PC Card, Universal Serial Bus (USB), SDIO cards, HDMI, DisplayPort, Bluetooth etc.

Group 90 can be used to expose for example the peripheral devices

- A webcam 91
- A speakerphone 92
- A number of HID endpoints 93

The Base Unit 100 has an electronic digital processor such as a microprocessor or FPGA based device and comprises for example:

- A Web interface 110 which is an interface for the base unit 100 in which one can configure the system
- One or more drivers 111, e.g. two specific drivers for webcam 91 and speakerphone 92 running on the base unit 100 to receive or send data from/to the group 90 and USB peripherals 91-93.
- Additional processing is done in blocks 112, 114, 115 for both audio and webcam encoding, mixing, (de)multiplexing and other processing.
- Data can be encrypted or decrypted in decrypters/encryptors 113, 116 before being sent to the first peripheral device 130 over a wireless link 127.
- The control modules 117 in base unit 100, and 37 in the first peripheral device 130 use a control channel 128 between the base unit 100 and the first peripheral device 130 to perform various functions such as keep alive, identification, crypto key exchange etc.
- Unified protocol block 118 is a functional block abstracting primary functions of the system: screen sharing and other non-media streaming (e.g. mouse pointer)
- Encryption and decryption modules 119, 120 are provided for the main communication with the first peripheral device 130 and other applications.
- An encoder such as H264 encoder 121 provides and local view block 123 (which is a functional device or functional devices as it/they emit a signal from the base unit 100 towards the user processing device 160) are provided to capture the rendered

image on the main display 126, encode it and send it back to the first peripheral device130 and other clients

- Audio processing blocks 124 are provided for audio content.
- Video decoder 125 is provided to decode and render the screen content to the display 126.

First peripheral device 130 is a microprocessor or FPGA based device comprising for example

- Webcam video coming from webcam 91 of base unit 100 is decrypted in block 30 and exposed to processing device 160 through a USB video endpoint via USB video and drivers such as H264 drivers 31.
- Audio signals from speakerphone 92 connected to the base unit 100 are decrypted in block 32, processed and exposed as microphone signal from the USB speakerphone endpoint 92.
- Audio signals from processing device 160 coming through a Speakerphone USB endpoint is encrypted in block 35 and sent to the Base Unit 100 via wireless connection 127.
- Control HID (Human Interface Device) 51 is a mirror of additional HID USB endpoints that the Group 90 and the second peripheral devices 91-93 have exposed to the Base Unit 100.
- A vendor specific HID endpoint indicated as datapump 42 is used for a channel 52 which can be a high bandwidth data channel between vendor specific software such as software 70 running on processing device 160 and the Base Unit 100 over the first peripheral device 130. Screen video and audio signals for display 126 can be sent over this channel 52. This is preferred compared with doing this over a control HID endpoint in the first peripheral device 130. Also the screen input of display 126 which is captured (block 123) and encoded (block 121) in the Base Unit 100, is sent to the vendor specific software running on the processing device 160 to allow other users such as a plurality of users or participants in a meeting each of which has got a processing device 160 and optionally a first peripheral device 130 plugged in, to view what is on the display 126 on a display (not shown) on their own processing device 160.
- A number of basic components such as the operating system (OS) and the drivers to control optical indicators such as an LED ring on the first peripheral device 130,

bandwidth measurement module and other the wi-fi modules, update/upgrade modules e.g. over wireless, secure boot module, secure key storage, debug and test module, etc. are provided in blocks 45 to 50.

- The audio capture module 43 exposes speakers' endpoint to the processing device 160. The module 43 captures this audio and sends it back to the vendor software 70 running on the processing device 160 where it can be timestamped (block 69) and aligned with the video data and then sent, for example, to the Base Unit 100 through the datapump 42. This allows better timestamping and lipsync.
- In a less preferred embodiment the audio can be captured and processed on the first peripheral device 130 and sent immediately to the Base Unit 100.

A microprocessor or FPGA processing device 160 such as a computer, laptop, smart phone, personal assistant (PDA) etc. runs proprietary software 60, 70 including for example 3rd party software (e.g. Skype) 60.

- 3rd party software 60 is running on processing device 160 (e.g. communications software such as Skype™) which uses the video endpoint from the at least one functional device 91-93 (e.g. the webcam 91 that was attached to the Base Unit 100) and/or the speakerphone endpoints (both speakerphone microphone and speakerphone speakers)
- Block 70 comprises software developed and dedicated to the present invention to:
  - Decrypt (61) and decode (62) a pipeline which will then show the screen data of display 126 from the Base Unit 100 in a window of the software. The data following the arrow 71 going out of the last stage (local view 63) is captured by the communications software such as Skype™ client software 60.
  - The unified protocol block 64 is a module that handles the control layer and controls the media paths, the connection to the first peripheral device 130 and (indirectly) the connection to the Base Unit 100.
  - Pipeline 65-67 is for screen capture (67), encoding (66) and encryption (65) for the screen sharing to the Base Unit 100.
  - Pipeline 68, 69 receives the speaker's audio signals (block 68) back from the first peripheral device 130, does processing (e.g. timestamping, block 69) and sends it out through the HID endpoint (the "datapump" 52).
- Endpoints not used by the software in this case are the control HID from the second

peripheral devices. If some software were running from the vendor of a second peripheral device, this software can communicate with the relevant second peripheral device over these HID endpoints (e.g. camera pan/tilt/zoom).

- Speakers endpoint (the content audio arrow 53) is used by the operating system (OS) of the processing device 160 to send all (non-speakerphone) sounds/audio signals.

Connecting a first peripheral device to a user processing device

A first peripheral device 130 can be connected to a user processing device 160 by a method 300 as indicated in Figure 2. The connection can be a serial connection such as a USB connection for example, such as USB 1, 2, 3 or -C etc. and the peripheral device 130 is connected to, e.g. plugged into a plug-and-play serial port such as provided for a USB connection. The first peripheral device 130 may include a user input device, e.g. an actuator. The first peripheral device 130 can be configured as a connection unit and can be a physical device in the form of a connector for a plug and play interface of a user processing device. It can have a base and a flexible data and power connection attached to the base. The base can have the actuator, e.g. a button configured to be an input device which can be activated by a user.

The flexible data and power connection should be adapted so that the base lies flat on the meeting table independent of the orientation of the connector needed to insert the connector into the plug and play interface. The base preferably includes electronics and optionally has permanent storage for storing an application such as a portable application. Network configuration parameters for the WiFi connection to the base unit 100 can also be stored in a memory. The first peripheral unit may have a processing engine (e.g. CPU, GPU, FPGA), a wireless transmitter/receiver such as for WiFi or LiFi, a plug and play interface such as a USB interface, a light ring such as an LED ring or strip as visual indicator. The portable application can be stored on the first peripheral device 160, i.e. in the base or it can be downloaded, obtained from on another pluggable device like a flash drive, be downloaded from the base unit 100 etc. The visual indicator is for allowing user feedback from the connection unit of the status of any activity.

Some examples for activation of the actuator which can be used with any of the

embodiments of the present invention: Sound activated (hand clap, voice recognition, computer sound, music, ...) Remote controlled via wireless connected device (IR, Bluetooth, WiFi, LiFi...), Light activated, Pressure activated, e.g. depression with a finger or hand, Touch activated, Proximity ('near-touch' on the actuator or bringing the actuator close to some object, Biometric reader such as Fingerprint reader, Iris scanner, DNA analyser, Keypad, e.g. for entering Keycode e.g. a password.

The method 300 comprises in step 301 connecting the first peripheral device 130 to a processing device 160, e.g. by plugging in. This results in a kernel boot step 302 and exchange of initialization scripts in step 303. The first peripheral device 130 is discovered to be a USB device in step 306 and the USB protocol stack is loaded in step 304 followed by loading the wireless connection protocol stack in step 305. The parameters for the wireless connection are input e.g. from a memory on the first peripheral device 130 or by the user and the wireless connection association completed in step 307. Any client software that needs to be loaded onto the processing device 160 is now loaded and launched in step 308, e.g. by user action. The first peripheral device 130 is now ready in step 310 to share data with a display screen 126 attached to the base unit 100.

As show in Figure 3 if a launcher program is available e.g. stored on the first peripheral device 130 or stored on the processing device 160, or retrievable from a remote location such as a URL on the Internet, or form a LAN server, this can launch the client software in step 328 automatically. Steps 321 to 327 and 329 and 330 are the same as steps 301 to 307 and 309 and 310 of Figure 2.

For example, the client software can be the software 70 of Figure 1 running on processing device 160. Other software such as communications software 60 e.g. Skype™ can be pre-installed on processing device 160. Client software 70 can be for the processing of video data from the processing device 160, and this client software is executed on the processing device 160 e.g. using a processing engine such as a CPU, GPU or FPGA. The client software 60 can be screen scraping software that screen scrapes the screen of the processing device 160. This client software 60 can be stored as a software program in memory such as mass storage on the first peripheral device 130. This software program is executed such as loaded onto the processing device 160 when it is coupled thereto, either automatically or by user action as described above. When the software 60 is running on the processing

device 160 it is preferred that it leaves zero footprint on termination. The software 60 when executed on the processing device 160 captures the video data that is available on the processing device 160, e.g. from a presentation or video that is running on the processing device 160. For example, the software 70 when executed on the processing device 160, is adapted to screen scrape, e.g. to read one or more video frame buffers from a graphics card in the processing device 160. Generally, the processing device 160 will have its own display and hence will have a graphics card or something equivalent with a buffer for storing video data. This read video information can be time stamped (in block 69) with a clock time, to be able to later synchronize the captured video signal with a related audio signal. The video signal is then encoded in a video encoder (block 66), for transport (arrow 53) over the plug and play interface using a generic driver, such as over a USB interface using generic pre-installed drivers, e.g. a generic pre-installed Human Interface Driver (HID). The data is transmitted to the wireless communications network 127 such as a WiFi or LiFi network and routed over the communications network 127 to the base unit 100, inserted into a suitable composition such as an OpenGL based composition in a compositor for display on the display device 126.

Sending data from the processing device to the base unit

With reference to Figure 4 the audio data on the processing device 160 such as a computer, laptop, smartphone, PDA, tablet, etc, the audio is sent over a port using generic drivers such as over a USB port 8 using the standard built- in generic audio driver such as UAC driver 7. On the first peripheral device 130, the audio packets are read from the generic port, e.g. USB port 11 by a dedicated audio device 14. These packets are then processed by any of a mixer a rate converter, an echo canceller, noise canceller or similar. Any of the mixing, rate conversion, echo cancelling, noise cancelling can be executed using an ALSA driver 18. The ALSA driver offers the packets to a dummy audio device 16 such as an audio scraper. In this audio device 16 the audio packets can be time stamped from the clock 15 that can be synchronized with clock 9 of the processing device 31. This information is then encoded in an encoder 17 and packetized in a packetizer 19 before being transferred to the communications network between the first peripheral device 130 and the base unit 100. The network can be a wireless network such as a WiFi or LiFi network. For this purpose, a suitable transmitter 21 is provided in the first peripheral device 130. On the base unit 100 the audio information stream is recovered at a suitable communications interface such as

the WiFi access point 22. The audio is then unpacked in an unpacker 23, decoded in a decoder 24 before being before being offered to an audio mixer 28. In order to synchronise the audio and video streams these are both sent to a synchronizer 27 in which the two streams are synchronized and thus keep lip synchronization.

Sending data from the processing device to the base unit

Embodiments of the present invention can capture data such as visual or audio signals and bring these to one or more processing devices 160 so that this captured data can be shared with other participants. These visual or audio signals are captured from, provided by, obtained from functional devices such as a webcam 91 a speakerphone 92, but also captured from display 126. For example, a functional device could be a microphone which located at an appropriate position in a meeting to give good reception of audio data. This can be used with a central speaker system which can be of higher quality than is provided in the processing devices 160 of meeting participants. Such a speaker system could be a quadrophonic surround speaker system for example. This can also avoid the difficulties with multiple microphones and speakers which can result in annoying positive feedback.

Embodiments of the present invention can include the features discussed with respect to Figures 1 to 4 to provide additional functionality which can be shared, for example, by all participants of a meeting who have a processing device 160 optionally with a plug-in first peripheral device 130. In embodiments of the present invention, fixed USB endpoints on the first peripheral device 130 are provided for the basic functionality. These are fixed and are a combination of vendor specific endpoints and a number of standard endpoints and can be interpreted or understood as a custom Driver, a default OS driver and/or a host application as has been described with reference to Figure 4 do screen sharing and audio.

The configurable USB endpoints are configured either when pairing a first peripheral device 130 device with a base unit 100 or over the wireless connection 127 between the processing device 160 and the base unit 100. Once configured, the USB endpoints will expose second peripherals devices 91-93 which can be interpreted as custom drivers, vendor specific drivers or default OS drivers. These can be used by either a host application or third party applications. These endpoints can be an exact copy of the ones of the second

peripheral device 91-93 connected to the Base Unit 100 or can be dedicated specified endpoints.

Communication of these USB endpoints with the processing device 160 can be done through standard enumeration of the USB endpoints when connecting, such as plugging in, the first peripheral device 130 to the processing device 160. All information on how to communicate with the Base Unit 100 and which endpoints to expose can be stored on the first peripheral device 130 and can be set up by firmware of the first peripheral device 130.

The decision of which endpoints the first peripheral device 130 should expose can be determined by the Base Unit 100, which can be adapted to analyze which second peripheral devices are connected to the Base Unit 100 (which connection can be through a USB connection or other) and create a configuration for the relevant USB endpoint on the first peripheral device 130.

As indicated above, for embodiments of the present invention, during operations, data can flow in both directions, i.e. to or from the processing device 160:

1. Data from a second peripheral device connected to the Base Unit 100 can flow into the Base Unit 100 or can be captured in the base unit 100 such as data for display 126. Any such data can be interpreted and possibly processed, enhanced, encoded and/or encrypted using firmware of the base unit 100 to generate processed data. In some embodiments this processed data will then be sent to the first peripheral device 130 through a wireless link 127. This first peripheral device 130 will, if necessary, decode, decrypt, process and/or interpret the data and make it available through one or more of the USB endpoints of this first peripheral device 130 (e.g. either the fixed or the configured ones). This data will then be captured by the operating system of the processing device 160 and will be made available through a custom or standard driver to either the host application or a 3rd party application running on the processing device 160 or to other processing devices 160 of other participants of the meeting.
2. Data, which might be coming from the host application and/or one or more 3rd party applications running on the processing device 160 can be sent through a handle which is made available by the system. The data will then be sent to the appropriate

USB endpoint of the first peripheral device 130 through the system (standard generic) drivers and the USB port. The first peripheral device 130 will then receive this data via firmware of the first peripheral device 130, where it will process, enhance, encode and/or encrypt the data and send it through the wireless link 127 to the Base Unit 100. The Base Unit 100 will receive the data via firmware on the base unit 100, will decrypt, process, decode and/or enhance the data and forward it to the appropriate first peripheral device, which can be connected or attached to the Base Unit 100 through a serial connection such as USB, HDMI or other interface.

Such a meeting of multiple participants is shown schematically in Figure 6 with four processing devices 160 (160-1, 160-2, 160-3, 160-4) which can be laptops. Three of the processing devices (160-1, 160-2, 160-3) each are connected to a first peripheral device 130, e.g. by inserting in a USB connection. One processing device 160-4 can be the host of a Unified Communication (UC) call such as a Skype call or a Skype for Business call. The first peripheral devices of two of the processing devices (160-1, 160-2) have completed connection to a WiFi connection with a base unit 100 and are sharing media to the main screen 126.The processing devices 160-3 and 160-4 are sharing the Unified Communication (UC) call such as the Skype call or a Skype for Business call.

Connected to the Base Unit 100 is or are any of the following:

- Webcam 91
- A 4K touch screen 94
- A camera 95, connected through USB or HDMI
- A USB speakerphone 92
- USB microphone 96 and a speaker set 97 (connected through an audio jack, s/pdif, USB, HDMI, etc.)

The host processing device 160-4 has pre-installed UC client software. This software interacts with USB endpoints on the first peripheral device 130 connected to e.g. plugged into the host. This type of client software will use speakerphone USB endpoints as a default audio device (e.g. microphone plus speaker). Embodiments of the present invention are in control of all audio or visual signals emitted from and injected in the processing device 160.

The speakerphone 92 can be used by any of the users at least with a first peripheral device 130 connected and functioning. There is no need to perform an action to get access to this device. Separate controls can be made available on a first peripheral device for example to control the volume of the audio output of the Base Unit 100 and to mute the room microphone 96 if necessary. When muted, the microphone 96 is also muted for all other Buttons or apps using this device.

The UC client software 60 running on the host processing device 160-4 does not inject the audio content. The microphone 96 can pick up this signal, or the Base Unit 100 can inject it in the microphone signal to the first peripheral device 130 connected to the host 160-4. There is no need for lip-sync with the content video (even if sharing) as the latency is low.

The same type of second peripheral device is exposed to a user as is plugged in into the Base Unit 100 so that the user can use the drivers provided by the vendor.
If one of the processing devices 130 is sharing in the room, the content audio is shared in the room too.

A processing device with functioning first peripheral device can access the room camera 96 wirelessly. All other devices connected to the Base Unit 100 (e.g. HID control devices 93) will be exposed natively.

Any user connected to the system e.g. through a first peripheral device has the ability to view the content that is projected in the meeting room on a display of the user's processing device, i.e. "local view". The receiver of the local view can have, but is not limited to, one some or all of the following functionality:

The ability to open a window and view the meeting room content in that window independently of whether it is the stream itself, the annotation or a blackboard session.

The ability to zoom into the content.

Additional measures to assure the picture quality when zooming in can be added to the feature

The local view could allow the user to start and/or participate in a blackboard or annotation session from his/her own device

The ability to take screenshots and/or pause the local view.

Figures 6 to 15 and 17 show ways of making various functions available to participants in a room, e.g. a meeting. There are four basic methods each of which is an embodiment of the present invention:

a) to use a generic driver of the OS 164 of the host processing device 160 and endpoints like mass storage or HID endpoints to allow transfer of data using client software running on the host processing device 160 without the host processing device 160 being aware that the final device is a functional device like a camera, touchscreen, microphone, loudspeaker, speakerphone etc. which is connected in or with the base unit 100.

b) to have an endpoint on the first peripheral device of a functional device connected with or in the base unit 100 which means that the host processing device 160 detects that it is connected to the functional device and interacts with it as if it were such a device.

c) to have an endpoint on the first peripheral device of a functional device connected with or in the base unit 100 which means that the host processing device 160 detects that it is connected to the functional device but client software needs to have the vendor specific drivers to be able to interact with the functional device.

d) to have an endpoint on the first peripheral device of a functional device connected with or in the base unit 100 which means that the host processing device 160 detects that it is connected to the functional device but pre-processing is made on the base unit 100 so that the processing device 160 can interact with the functional device. One method is to make a common endpoint on the first peripheral device so that the processing device can work with any functional device for which preprocessing exists in the base unit 100.

Figure 6 shows the processing device 160 in communication with a first peripheral device 130 connected thereto, base unit 100 in wireless communication 127 with the first peripheral device 130. Various functional devices such as a display 126, a speakerphone 92 (or microphone and speaker set 96, 97) and a videocam 91 (or other camera 95) are connected to the base unit 100.

A generic driver allows the client software 70 to transfer data to and receive data from a mass storage device 132 on the first peripheral device 130 via a USB interface 131. The client software 70 also has a USB endpoint 134 which can be a USB HID endpoint and if necessary, a vendor specific endpoint. This endpoint 134 is the endpoint for the client

software 70 for transmitting the data for the display 126 to the base unit 100 where the data can be image processed (blocks 124, 125 of Figure 1) before being transmitted to the group 90 e.g. via an HDMI connection or similar. Thus, the HID endpoint 134 makes the HDMI display 126 and its audiovisual signals available to any processing device 160 with a first peripheral device attached thereto, when in a meeting room. However, the display 126 is not exposed on the processing device 160, i.e. it is not presented as a display but as an HID endpoint. The videocam 91 can be exposed on the first peripheral device 130 as an endpoint (in a way as described for Figure 1), the video data being encoded e.g. in block 122 of Figure 1. Alternatively, as shown in Figure 6, the video data is encoded in the base unit 100 and is sent via the first peripheral device 130 to a driver 162 of the operating system 164 of the processing device 60 which exposes the encoded data from the videocam 91 on the processing device 160 and makes the video data available to the UC call, e.g. Skype™.

Data from the speakerphone 92 can be processed on the base unit 100 and/or on the first peripheral device 130 and can be mimicked to the processing device 160. The microphone of the speakerphone 92 generates a signal that is transmitted to the processing device 160 via a USB speakerphone endpoint 136 on the first peripheral device whereby any noise reduction or echo cancellation can be carried out in the base unit 100 as described with respect to Figure 1 (block 115). The microphone data is made available to the UC call as the speakerphone endpoint 136 is recognized by the processing device 160 as a speakerphone as if the speakerphone were plugged into the processing device 160. Also, the microphone data is made available to all other users who have a processing device 160 with a connected first peripheral device. In this embodiment the speaker of the speakerphone has its USB endpoint 136 on the first peripheral device 130.

Figure 7 shows a similar configuration to that of Figure 6 except there are two USB endpoints 136 and 138 for a speakerphone and a speaker respectively. As previously, the HID endpoint 134 makes the HDMI display 126 available to any processing device 160 with a first peripheral device 130 attached thereto when in a meeting room for providing audiovisual signals to the display 126. However, the display 126 is not exposed on the processing device 160, i.e. it is not presented as a display but as a HID endpoint.

The two endpoints 136, 138 receive audio signals from two different sources. The sound from the UC call can be dealt with as described for Figure 6 via the speakerphone endpoint

136 and processed on the base unit. But if there is additional audio data which is not part of the UC call, this data is sent via the speaker endpoint 138. As there is no second peripheral device in the group 90 which is a standalone speaker, the base unit 100 mixes the audio signals for the speakerphone and the speaker before sending all audio data to the speaker of the speakerphone 92. If there were a separate speaker 97 in group 90, then the base unit 100 could send this audio data to the speaker. The result is that a virtual speaker has been exposed on the processing device 160.

Figures 8 to 11 and 17 describe various embodiments of the present invention with the example of how a touchscreen 99 is made available in a meeting room. When a touchscreen is touched it generates a signal related to the co-ordinates of the touch position. This needs to be conveyed to processing devices 160 in a meeting whereby the actual signals must be interpreted if they are to be applied to a different screen on the processing device 160. If there is a meeting with a variety of processing devices being used by participants, then a method needs to be found of presenting the touch co-ordinates to all the different processing devices. Figures 8 to 11 disclose the four basic methods mentioned above.

In the embodiment of Figure 8, there is a group 90, base unit 100, first peripheral device 130 and processing device 160. There are two functional devices connected to or in the base unit 100, namely a display 126 and a touchscreen 99. The touch screen 99 has a touchscreen endpoint 139 in the first peripheral device 130. The processing device 160 recognises this endpoint and can interact with it if the OS 164 has the relevant driver 162. This driver can be downloaded if required. This embodiment requires that each processing device 160 in a meeting downloads or has installed the relevant driver 162.

In the embodiment of Figure 9, there is a group 90, base unit 100, first peripheral device 130 and processing device 160. There are two functional devices connected to or in the base unit 100, namely a display 126 and a touchscreen 99. The touch screen 99 has a touchscreen endpoint 139 in the first peripheral device 130. The processing device 160 recognises this endpoint and can interact with it if the base unit 100 is adapted to translate the co-ordinates of the touch to ones that can be used by the processing device 160, i.e. the OS 164 has the relevant driver 162. This driver can be downloaded if required. This embodiment requires that each processing device 160 in a meeting downloads or has installed the relevant driver 162 but the translation function of the base unit 100 can reduce

the number of different drivers that might be required.

In the embodiment of Figure 10, there is a group 90, base unit 100, first peripheral device 130 and processing device 160. There are two functional devices connected to or in the base unit 100, namely a display 126 and a touchscreen 99. The touch screen 99 has a touchscreen endpoint 139 in the first peripheral device 130. The processing device 160 recognises this endpoint and can interact with it if the base unit 100 is adapted to translate the co-ordinates of the touch to ones that can be used by the processing device 160, i.e. the OS 164 has the relevant driver 162. This driver is a standard driver which can be distributed, e.g. this driver can be downloaded if required. This embodiment requires that each processing device 160 in a meeting downloads or has installed the relevant driver 162 but the translation function of the base unit 100 can reduce the number of different drivers that might be required even more than with the previous embodiment of Figure 9.

In the embodiment of Figure 11, there is a group 90, base unit 100, first peripheral device 130 and processing device 160. There are two functional devices connected to or in the base unit 100, namely a display 126 and a touchscreen 99. The touch screen 99 is now dealt with by the client software 70 as has been described previously, namely that the client software running on the first peripheral device 130 is adapted to interact with the touchscreen 99 through the USB interface 131 and to interact with the OS164 of the processing device 160. This means that the touchscreen 99 is not exposed to the processing device 160. The client software 70 is adapted to simulate a touch event and to provide the correct co-ordinates to the OS164 of the processing device 160. This is therefore a proprietary solution which requires the client software 70 to be adapted to interact with each type of touchscreen 99 through a USB interface 131.

Figures 12 to 14 relate to embodiments of the present invention in which there are multiple users. First of all, each participant in a meeting can make use of any of the embodiments described in Figures 8 to 11. Thus, the present invention provides multiuser solutions.

In Figure 12 the processing device 60' has no first peripheral device 130, e.g. none is available. In such a case client software 70' can be adapted to interact directly with base unit 100 over a wireless connection 127' and the client software 70' is adapted to provide any simulations, or translations as required to present the display device 126 to the

processing unit 160' and to allow interaction therewith. The client software 70' can be adapted to simulate any of the embodiments described with respect to Figures 1 to 11 without however using a first peripheral device 130. The client software 70' can simulate for example a UB interface of the type used in any of the embodiments of Figures 1 to 11. For the processing device 160, the methods described with respect to any of Figures 1 to 11 can be used.

In Figure 13 the processing device 60' has no first peripheral device 130, e.g. none is available. In such a case client software 70' can be adapted to interact directly with base unit 100 over a wireless connection 127' and the client software 70' is adapted to provide any simulations, or translations as required to present the display device 126 to the processing unit 160' and to allow interaction therewith exactly as described with respect to Figure 12. However, group 90 has a microphone and speaker combination such as a speakerphone 92 or a microphone and speaker combination 96, 97. Processing device 160 can make use of any of the embodiments of Figures 1 to 11. The client software 70' of processing device 160' can be adapted to provide video data directly to the base unit 100 where it is processed, e.g. decoded and composited and provided to display 126 over a suitable connection such as an HDMI connection.

For the processing device 160' the client software 70' and a driver 162' can present a simulated speakerphone 92 to the OS 164' thus creating a virtual microphone and a virtual speaker. The third party software 60' for the Unified Communication such as the Skype™ call will be presented with these virtual devices which it then uses for the call.

In Figure 14 the processing device 60' has no first peripheral device 130, e.g. none is available. In such a case client software 70' can be adapted to interact directly with base unit 100 over a wireless connection 127' and the client software 70' is adapted to provide any simulations, or translations as required to present the display device 126 to the processing unit 160' and to allow interaction therewith exactly as described with respect to Figure 13. However, group 90 has a videocam 91 connected e.g. via a USB connection to the base unit 100. Processing device 160 can make use of any of the embodiments of Figures 1 to 11. The client software 70' of processing device 160' can be adapted to receive video data directly from the base unit 100.

For the processing device 160' the client software 70' and a driver 162' can present a simulated videocam 91 to the OS 164' thus creating a virtual videocam device. The third party software 60' for the Unified Communication such as the Skype™ call will be presented with all of the virtual devices which it then uses for the call.

Figure 15 shows a messaging flow diagram applicable to any of the embodiments described with respect to figures 1 to 11.

Figure 16 shows a messaging flow applicable to any of the embodiments described with respect to figures 12 to 14 where no first peripheral device is used.

Figure 17 shows a further embodiment of the present invention comprising a processing device 160 with a processor and memory and executing and optionally storing a client software 70 comprising also a host application as well as a third party application 60 which can be adapted to execute a unified communications call such as a Skype™ call or a Skype™ for business call. The processing device 160 has a serial port such as a USB port and generic or custom drivers for communicating across the port with a first peripheral device 130. The peripheral device 130 has a processor and memory and executes and optionally stores firmware which provides a wireless link 127 to a base unit 100 as well as providing at least one configurable or fixed endpoint of a functional device 90 which is connected to or is connected in the base unit 100. The base unit has a processor and a memory for executing and optionally storing firmware for providing a connection to the wireless link 127 and also to provide a port to the functional device 90. The functional device 90 has a processor and memory and executes and optionally stores firmware for providing the link and interface to the base unit 100 and for providing data to be sent to the at least one configurable or fixed endpoints on the peripheral device 130.

Methods according to the present invention can be performed by a computer system. The present invention can use a processing engine to carry out functions. The processing engine preferably has digital processing capability such as provided by one or more microprocessors, FPGA's, or a central processing unit (CPU) and/or a Graphics Processing Unit (GPU), and which is adapted to carry out the respective functions by being programmed with software, i.e. one or more computer programs. References to software can encompass any type of programs in any language executable directly or indirectly by a

processor, either via a compiled or interpretative language. The implementation of any of the methods of the present invention can be performed by logic circuits, electronic hardware, processors or circuitry which can encompass any kind of logic or analog circuitry, integrated to any degree, and not limited to general purpose processors, digital signal processors, ASICs, FPGAs, discrete components or transistor logic gates and similar.

A processing device may have memory (such as non-transitory computer readable medium, RAM and/or ROM), an operating system, optionally a display such as a fixed format display, ports for data entry devices such as a keyboard, a pointer device such as a "mouse", serial or parallel ports to communicate other devices, network cards and connections to connect to any of the networks.

The software can be embodied in a computer program product adapted to carry out the functions of any of the methods of the present invention, e.g. as itemised below when the software is loaded onto a computer and executed on one or more processing engines such as microprocessors, ASIC's, FPGA's etc. Hence any of the embodiments of the present invention can incorporate a computer system capable of running one or more computer applications in the form of computer software.

The methods described with respect to embodiments of the present invention above can be performed by one or more computer application programs running on the computer system by being loaded into a memory and run on or in association with an operating system such as WindowsTM supplied by Microsoft Corp, USA, Linux, Android or similar. The computer system can include a main memory, preferably random access memory (RAM), and may also include a non-transitory hard disk drive and/or a removable non-transitory memory, and/or a non-transitory solid state memory. Non-transitory removable memory can be an optical disk such as a compact disc (CD-ROM or DVD-ROM), a magnetic tape, which is read by and written to by a suitable reader. The removable non-transitory memory can be a computer readable medium having stored therein computer software and/or data. The non-volatile storage memory can be used to store persistent information that should not be lost if the computer system is powered down. The application programs may use and store information in the non-volatile

memory.

The software embodied in the computer program product is adapted to carry out the following functions when the software is loaded onto the respective device or devices and executed on one or more processing engines such as microprocessors, ASIC's, FPGA's etc.:

connecting a processing device to a functional device connected to or in a base unit of a communications network, the processing device having a memory, a display and an operating system, the base unit having a transmitter and the first peripheral device having a receiver;

coupling a first peripheral device to the processing device via a generic communications protocol, providing at least one fixed or a configurable endpoint of the functional device exposed on the first peripheral device;

transmitting data from the base unit and receiving the data at the first peripheral device over the communications network from the functional device to the processing device via the at least one fixed or configurable endpoint using the generic communications protocol for communication between the processing device and the first peripheral device.

The software embodied in the computer program product is adapted to carry out the following functions when the software is loaded onto the respective device or devices and executed on one or more processing engines such as microprocessors, ASIC's, FPGA's etc.:

Transmitting or receiving data, i.e. streaming data carrying images, audio, etc. in a raw or unaltered format;

Connecting the functional device to or in a base unit of a wireless communications network;

Running the functional device with the vendor specific driver alone.

The software embodied in the computer program product is adapted to carry out the

following functions when the software is loaded onto the respective device or devices and executed on one or more processing engines such as microprocessors, ASIC's, FPGA's etc.:

exposure implemented with **descriptor fields**;

transmitting the data from the functional device to at least two processing devices using at least two first peripheral devices;

combining and exposing two endpoints to the processing device as one endpoint.

The software embodied in the computer program product is adapted to carry out the following functions when the software is loaded onto the respective device or devices and executed on one or more processing engines such as microprocessors, ASIC's, FPGA's etc.:

the functional device enables one or more of a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a video camera, a webcamera;

presenting the at least one fixed or a configurable endpoint of the functional device exposed on the first peripheral device as one of a human interface device, a mass storage device, a composite device, a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a video camera, or a webcamera.

The software embodied in the computer program product is adapted to carry out the following functions when the software is loaded onto the respective device or devices and executed on one or more processing engines such as microprocessors, ASIC's, FPGA's etc.:

encoding, and/or optionally encrypting the data;

hosting a unified communication between two or more further processing devices on the processing device;

the first peripheral device presenting a functional device to the unified communication between two or more processing devices; or

exposing the same type of functional device to the processing device as is connected to the Base Unit and using at least one driver for the functional device installed on the processing device.

Any of the above software may be implemented as a computer program product which has been compiled for a processing engine in any of the servers or nodes of the network. The computer program product may be stored on a non-transitory signal storage medium such as an optical disk (CD-ROM or DVD-ROM), a digital magnetic tape, a magnetic disk, a solid state memory such as a USB flash memory, a ROM, etc.

Claims:

1. A method for connecting a processing device to a functional device, the functional device being connected to or in a base unit of a communications network, the processing device having a memory, a display and an operating system, wherein the processing device hosts a host application, further comprising: a first peripheral device being configured to be coupled to the processing device via a generic communications protocol, the base unit having a transmitter and the first peripheral device having a receiver and at least one fixed or configurable endpoint of the functional device is exposed on the first peripheral device, the method further comprising:

the base unit being configured to transmit and the first peripheral device being configured to receive first processed video data over the communications network,

the functional device being configured for first video data to flow into the base unit or first video data is captured in the base unit, the first video data being processed in the base unit to generate the first processed video data, wherein the first processed video data is sent to the first peripheral device, the first peripheral device being configured to process the first processed video data received by the first peripheral device to generate second video data, the first peripheral device being configured to make the second video data available through the at least one fixed or configurable endpoint of the first peripheral device, the operating system of the processing device being configured to capture the second video data and to make it available through a custom or standard driver to either the host application or a 3rd party application running on the processing device or to other processing devices.

2. The method of claim 1, wherein the first video data is interpreted and/or encoded in the base unit to form the first processed video data.

3. The method of claim 2, wherein the first video data is enhanced, mixed, multiplexed, and/or encrypted in the base unit.

4. The method of claim 2, wherein the first processed video data is received by the first peripheral device, and the first peripheral device is configured to decode and/or interpret the first processed video data and to generate the second video data.

5. The method of claim 4 wherein the first peripheral device demultiplexes, and/or decrypts,

the first processed video data received by the first peripheral device to generate the second video data.

6. The method according to claim 1, wherein the functional device is exposed natively on the first peripheral device.

7. The method according to claim 4, wherein the first processed video data is sent to the first peripheral device through a wireless link.

8. The method according to claim 1, wherein the first video data is for display on a display.

9. The method according to claim 1, wherein the 3rd party application is a hosted Unified Communication.

10. The method according to claim 9, wherein third video data, received from the host application and/or from the 3rd party application running on the processing device, is sent to an endpoint of the first peripheral device via a standard generic driver, the first peripheral device receiving the third video data and processing the third video data to form second processed video data.

11. The method according to claim 9, wherein the third video data is enhanced, and/or encoded to form the second processed data and the second processed data is sent through a wireless link to the base unit.

12. The method of claim 10, wherein the base unit receives the second processed data, and decodes and/or enhances the second processed data and forwards it to a functional device which is connected or attached to the base unit through a serial connection.

13. The method of claim 11, wherein the base unit decrypts the second processed data.

14. The method of claim 13, the base unit being configured to expose and make available the functional device that is connected to the base unit, simultaneously with a plurality of first peripheral devices by interpreting, processing and translating the electronic signals coming from the functional device.

15. The method of claim 1, wherein the functional device is a second peripheral device.

16. A system for making a functional device available to a processing device, the functional device being connected to or in a base unit of a communications network, the processing device having a memory, a display and an operating system, wherein the processing device hosts a host application, further comprising: the first peripheral device being configured to be coupled to the processing device via a generic communications protocol, the base unit having a transmitter and the first peripheral device having a receiver and at least one fixed or configurable endpoint of the functional device is exposed on the first peripheral device, the system further comprising:

the base unit being configured to transmit and the first peripheral device being configured to receive first processed video data over the communications network,

the functional device being configured for first video data to flow into the base unit or first video data to be captured in the base unit, the first video data being processed in the base unit to generate the first processed video data, wherein the first processed video data is sent to the first peripheral device, the first peripheral device being configured to process the first processed video data received by the first peripheral device to generate second video data, the first peripheral device being configured to make the second video data available through the at least one fixed or configurable endpoint of the first peripheral device, the operating system of the processing device being configured to capture the second video data and to make it available through a custom or standard driver to either the host application or a 3rd party application running on the processing device or to other processing devices.

17. The system of claim 16, wherein the base unit is configured to interpret and/or encode the first video data to form the first processed video data.

18. The system of claim 17, wherein the base unit is configured to enhance, mix, multiplex, and/or encrypt the first video data.

19. The system of claim 17, wherein the first peripheral device is configured to decode, and/or interpret the first processed video data received by the first peripheral device to generate the second video data.

20. The system of claim 19, wherein the first peripheral device is configured to demultiplex and/or decrypt, the first processed video data received by the first peripheral device.

21. The system according to claim 16, wherein the functional device is configured to be exposed natively on the first peripheral device.

22. The system according to claim 16, wherein base unit is configured to transmit the first processed video data to the first peripheral device through a wireless link.

23. The system according to claim 16, wherein the first video data is for display on a display.

24. The system according to claim 16, wherein the 3rd party application is a hosted Unified Communication.

25. The system according to claim 16, wherein third video data, received from the host application and/or from the 3rd party application running on the processing device, are sent to an endpoint of the first peripheral device via a generic driver, the first peripheral device being configured to receive the third video data and to process the third video data to form second processed video data.

26. The system of claim 25, wherein the base unit is configured to receive the second processed video data, to decode and/or to enhance the second processed video data and to subsequently forward it to a functional device or a second peripheral device which is connected or attached to the base unit through a serial connection.

27. The system of claim 26, wherein the base unit is configured to receive the second processed video data, and to decrypt the second processed video data and to subsequently forward it to a functional device or a second peripheral device which is connected or attached to the base unit through a serial connection.

28. The system of claim 16, wherein the base unit is configured to expose and to make available the functional device that is connected to the base unit, simultaneously with a

plurality of first peripheral devices by interpreting, processing and translating the electronic signals coming from the functional device.

ABSTRACT

A system and method for connecting a processing device to a functional device connected to or in a base unit of a communications network, the base unit having a transmitter and the processing device having a memory, a display and an operating system. A first peripheral device is adapted to be coupled to the processing device via a generic communications protocol, the first peripheral device having a receiver and at least one fixed or configurable endpoint of the functional device exposed on the first peripheral device. The base unit and the first peripheral device is adapted to transmit and receive data respectively over the communications network from the functional device to the processing device via the at least one fixed or configurable endpoint using the generic communications protocol for communication between the processing device and the first peripheral device.

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
17/742,166	05/11/2022	2676	2620	21063.0018USC1	28	2

CONFIRMATION NO. 9959

52835
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45 South Seventh Street
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FILING RECEIPT



Date Mailed: 05/20/2022

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

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Inventor(s)

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Applicant(s)

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Assignment For Published Patent Application

BARCO N.V., Kortrijk, BELGIUM

Power of Attorney: The patent practitioners associated with Customer Number 52835

Domestic Priority data as claimed by applicant

This application is a CON of 16/771,068 06/09/2020
which is a 371 of PCT/EP2018/086537 12/21/2018
which is a CON of 15/858,668 12/29/2017 PAT 10684972

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

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The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 17/742,166**

Projected Publication Date: 08/25/2022

Non-Publication Request: No

Early Publication Request: No

Title

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Preliminary Class

358

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 17/742,166

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	320
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	700
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	800
TOTAL CLAIMS (37 CFR 1.16(i))	28 minus 20 =	* 8			OR	x 100 =	800
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2 minus 3 =	*				x 480 =	0.00
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	2620

APPLICATION AS AMENDED - PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

PTO/SB/08a (03-15)
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(Not for submission under 37 CFR 1.99)

Application Number	17742166
Filing Date	2022-05-11
First Named Inventor	Gauthier RENARD
Art Unit	
Examiner Name	
Attorney Docket Number	21063.0018USC1

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	9722986	B2	2017-08-01	Brands	Corresponds to CN104412542
	2	7761627		2010-07-20	Christison	
	3	7617342		2009-11-10	Rofougaran	
	4	9183164		2015-11-10	Brabenac	
	5	9201826		2015-12-01	Huang	
	6	9804977		2017-10-31	Ghosh	
	7	9934168		2018-04-03	Griffin	
	8	9722986		2017-08-01	Brands	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	First Named Inventor	Gauthier RENARD
	Art Unit	
	Examiner Name	
	Attorney Docket Number	21063.0018USC1

	9	9538138		2017-01-03	Leete	
	10	9083769		2015-07-14	Beel	
	11	8896656		2014-11-25	Epstein	
	12	8756348		2014-06-17	Beel	
	13	8316138		2012-11-20	Chang	
	14	10031873	B2	2018-07-24	Hundal et al.	

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	1	20140181325	A1	2014-06-26	Hundal et al.	
	2	20160125838	A1	2016-05-05	Hundal et al.	
	3	20020196378	A1	2002-12-26	Slobodin et al.	

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	Application Number	17742166
	Filing Date	2022-05-11
	First Named Inventor	Gauthier RENARD
	Art Unit	
	Examiner Name	
	Attorney Docket Number	21063.0018USC1

	4	20060075100		2006-04-06	Stirbu	
	5	20140148152	A1	2014-05-29	Periyalwar et al.	
	6	20160092153		2016-03-31	Demik	
	7	20140362161		2014-12-11	Leete	
	8	20100302130		2010-12-02	kikuchi	
	9	20100115145		2010-05-06	Banerjee	
	10	20090198839		2009-08-06	Banerjee	
	11	20150169477	A1	2015-06-18	Beel et al.	
	12	20150121466	A1	2015-04-30	Brands et al.	
	13	20150263905	A1	2015-09-17	Beel et al.	

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	Filing Date	2022-05-11
	First Named Inventor	Gauthier RENARD
	Art Unit	
	Examiner Name	
	Attorney Docket Number	21063.0018USC1

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	104412542	CN	A	2015-03-11		Corresponds to US9722986	
	2	2015011679	JP	A	2015-01-19		With English translation	☒
	3	2016178422	JP	A	2016-10-06		With English translation	☒
	4	106412683	CN	A	2017-02-15		With English machine translation	☒
	5	1879143	EP	A1	2008-01-16			☐
	6	3099009	EP	A1	2016-11-30			☐
	7	2013037980	WO	A2	2013-03-21			☐
	8	2008080107	WO	A2	2008-07-03			☐

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17742166
	Filing Date	2022-05-11
	First Named Inventor	Gauthier RENARD
	Art Unit	
	Examiner Name	
	Attorney Docket Number	21063.0018USC1

	1	Office Action issued in Chinese Application No. 201880084464.1, dated January 26, 2022, with machine tranlation	☒
	2	Notice of Reason for Refusal issued in corresponding Japanese Application No. 2020-536065, dated November 4, 2021, with English translation	☒
	3	Office Action issued in European Patent Application No. 18833045.0, dated June 28, 2021	☐
	4	International Search Report in corresponding PCT/EP2018/086537 dated April 10, 2019.	☐
	5	Written Opinion in corresponding PCT/EP2018/086537 dated April 10, 2019.	☐
	6	International Preliminary Report on Patentability in corresponding PCT/EP2018/086537 dated November 21, 2019.	☐
	7	Barco - Clickshare Brochure, November 2018 (20 pages).	☐
	8	Communication issued in European Application No. 18 833 045.0, dated March 14, 2022	☐
	9	Wireless USB, from Wikipedia page, last edited on 22 December 2017, 11 pages provided	☐
	10	Written Opinion issued in corresponding Singapore Application No. 11202005201Y, dated May 23, 2022	☐

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17742166
	Filing Date	2022-05-11
	First Named Inventor	Gauthier RENARD
	Art Unit	
	Examiner Name	
	Attorney Docket Number	21063.0018USC1

EXAMINER SIGNATURE			
Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	Art Unit	
	Examiner Name	
	Attorney Docket Number	21063.0018USC1

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2022-07-11
Name/Print	Thomas Lee	Registration Number	66396

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Bibliographic data: CN104412542 (A) — 2015-03-11

Electronic tool and methods for meetings

Inventor(s): BRANDS JOHANNES WILLEM; DEWAELE RONNY RUDY ± (BRANDS JOHANNES WILLEM, ; DEWAELE RONNY RUDY)

Applicant(s): BARCO NV ± (BARCO N.V)

Classification: - international: ***H04L12/18***
- cooperative: **H04L12/1818 (EP, US); H04L12/1822 (GB); H04L63/08 (US); H04L65/403 (US); H04L65/4046 (GB); H04N7/15 (GB);** H04L12/1822 (EP, US); H04L12/1827 (EP, US)

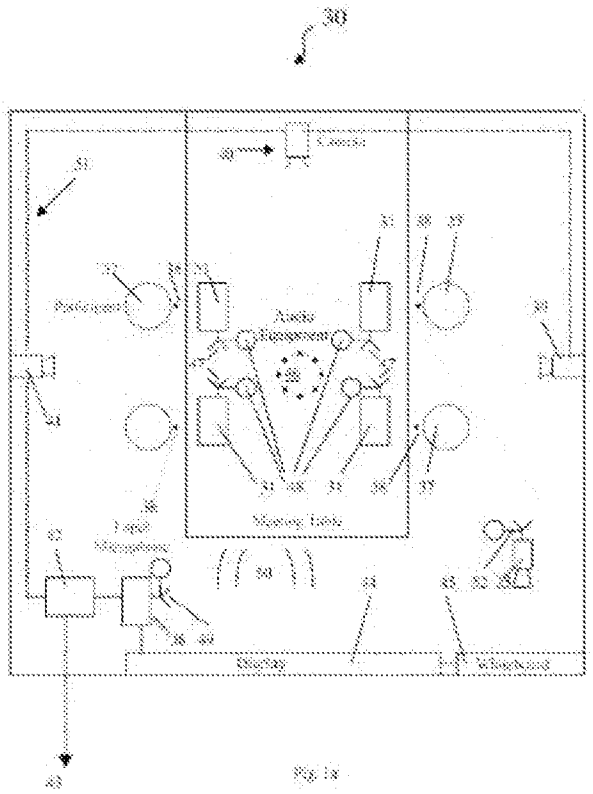
Application number: CN20128074077 20120914 Global Dossier

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Abstract of CN104412542 (A)

An electronic meeting tool and method for communicating arbitrary media content from users at a meeting is described. These can include a node configuration means adapted to operate a display node of a communications network, the display node being coupled to a first display. The node configuration means is adapted to receive user selected arbitrary media content and to control display of the user selected arbitrary media content on the first display. At least one peripheral device adapted to communicate the user selected arbitrary media content via the communications network is provided, wherein the peripheral device is a connection unit comprising: (e) a connector adapted to couple to a port of a processing device having a second display, a memory and an operating system; and (f) a transmitter for communicating with the communications network, A program is provided that is adapted to be loaded onto the processing device and to run on the operating system of the processing device, said program being adapted to obtain user selected arbitrary media content, said program leaving a zero footprint on termination. An input device is provided to allow the user to carry out a user action that triggers transfer of said user selected arbitrary media content to said transmitter through said port.



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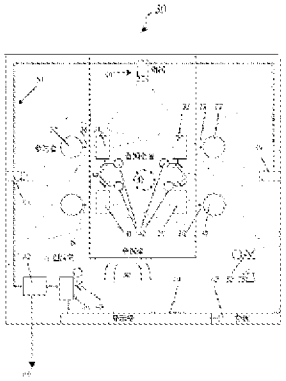
权利要求书9页 说明书34页 附图11页

(54)发明名称

用于会议的电子工具和方法

(57)摘要

描述了一种电子会议工具和用于传递来自参会用户的任意媒体内容的方法。这些可包括适配成操作通信网络的显示节点的节点配置装置，该显示节点耦合到第一显示器。节点配置装置适配成接收用户所选的任意媒体内容并控制用户所选的任意媒体内容在第一显示器上的显示。提供了适配成经由所述通信网络传递用户所选的任意媒体内容的至少一个外围设备，其中所述外围设备是连接单元，包括：(a)适配成耦合到具有第二显示器、存储器、以及操作系统的处理设备的端口的连接器；以及(b)用于与所述通信网络通信的发射机。提供了适配成被加载到所述处理设备上并且在所述处理设备的操作系统上运行的程序，所述程序适配成获得用户所选的任意媒体内容，所述程序在终止时留下零足迹。提供了一种输入设备，所述输入设备允许所述用户执行触发所述用户所选的任意媒体内容通过所述端口向所述发射机的传送的用户动作。



CN 104412542 A

1. 一种用于在具有多个参与者的会议中在显示设备上显示从处理设备获得的任意媒体内容的方法，所述媒体内容是通过通信网络传送的，所述处理设备具有存储器和显示器，所述方法包括：

使用外围设备来提供令牌，所述令牌在被传送到所述通信网络时，内在地或分立地提供认证或许可来在所述显示设备上显示所述任意媒体内容，所述令牌还提供到所述显示设备的链接；

将来自所述处理设备的所述任意媒体内容路由通过所述通信网络；

获得对所述显示设备的单方电子访问权；以及

显示所述任意媒体内容。

2. 如权利要求 1 所述的方法，其特征在于，通过对来自所述处理设备的数据进行屏幕抓取来获得所述任意媒体内容。

3. 一种用于在具有多个参与者的会议中在显示设备上显示从处理设备获得的任意媒体内容的方法，所述媒体内容是通过通信网络传送的，所述处理设备具有存储器和显示器，所述方法包括：

使用外围设备来提供令牌，所述令牌在被传送到所述通信网络时，内在地或分立地提供认证或许可来在所述显示设备上显示所述任意媒体内容，所述令牌还提供到所述显示设备的链接；

通过对来自所述处理设备的数据进行屏幕抓取来获得所述任意媒体内容；

将来自所述处理设备的经屏幕抓取的任意媒体内容路由通过所述通信网络；

获得对所述显示设备的电子访问权；以及

显示所述任意媒体内容。

4. 如任何前述权利要求所述的方法，其特征在于，还包括将所述处理设备连接到所述通信网络，所述处理设备具有带有至少一个预安装通用驱动程序的操作系统，所述至少一个预安装通用驱动程序提供用于处理设备与标准类型外围设备之间的通信的通用通信协议，所述方法包括以下步骤：

a) 将外围设备耦合到所述处理设备，所述外围设备具有收发机；

b) 通过所述操作系统的所述预安装的通用驱动程序，设置用于所述外围设备与所述处理设备之间的通信的手段；

c) 经由所述外围设备将所述处理设备耦合到通信网络；

d) 经由所述用于通信的手段在所述处理设备与所述通信网络之间路由经屏幕抓取的数据，其中所述通用通信协议被用于在所述处理设备与所述外围设备之间传送经屏幕抓取的数据。

5. 如权利要求 4 所述的方法，其特征在于，步骤 b) 包括将所述外围设备呈现给所述处理设备作为人类接口设备，并且其中所述预安装的通用驱动程序是人类接口设备驱动程序。

6. 如权利要求 4 所述的方法，其特征在于，步骤 b) 包括将所述外围设备呈现给所述处理设备作为大容量存储设备，并且其中所述预安装的通用驱动程序是大容量存储设备驱动程序。

7. 如权利要求 4 所述的方法，其特征在于，步骤 b) 包括将所述外围设备呈现给所述

处理设备作为复合设备，并且其中所述预安装的通用驱动程序独立地驱动各不同的设备接口。

8. 如权利要求4到7中的任一项所述的方法，其特征在于，客户机应用被存储在所述外围设备上，当所述客户机应用在所述处理设备上运行时获得经屏幕抓取的数据。

9. 如权利要求8所述的方法，其特征在于，所述客户机应用是便携式应用。

10. 如任何前述权利要求所述的方法，其特征在于，还包括操作所述通信网络的显示节点，所述显示节点耦合到第一显示器、接收用户所选的任意媒体内容并控制用户所选的任意媒体内容在所述第一显示器上的显示；以及

将外围设备连接到处理设备的端口并经由所述通信网络传递用户所选的任意媒体内容，

将程序加载到所述处理设备上并且在所述处理设备的操作系统上运行所述程序以获得用户所选的任意媒体内容，所述程序在终止时留下零足迹，以及

在输入设备上的用户动作之后，触发所述用户所选的任意媒体内容通过所述端口传送到所述发射机。

11. 如权利要求1到10中的任一项所述的方法，其特征在于，还包括设置通信网络，所述通信网络处于所述通信网络的基节点与耦合到所述处理设备的外围设备之间；

在所述处理设备和所述外围设备之间传送媒体内容，

将所述媒体内容从所述外围设备传送到所述通信网络，

在所述基节点处接收来自所述通信网络的媒体内容，并且根据一组规则在显示器上显示所述媒体内容。

12. 如权利要求1到11中的任一项所述的方法，其特征在于，所述外围设备与所述处理设备配对。

13. 一种用于在具有多个参与者的会议中在显示设备上显示从处理设备获得的任意媒体内容的系统，所述媒体内容是通过通信网络传送的，所述处理设备具有存储器和显示器，所述系统包括：

用于提供令牌的外围设备，所述令牌在被传送到所述通信网络时，内在地或分立地提供认证或许可来在所述显示设备上显示所述任意媒体内容，所述令牌还提供到所述显示设备的链接；

用于将来自所述处理设备的所述任意媒体内容路由通过所述通信网络的装置；

用于获得对所述显示设备的单方电子访问权的装置；以及

用于显示所述任意媒体内容的装置。

14. 如权利要求13所述的系统，其特征在于，所述用于获得所述任意媒体的装置包括用于对来自所述处理设备的数据进行屏幕抓取的装置。

15. 一种用于在具有多个参与者的会议中在显示设备上显示从处理设备获得的任意媒体内容的系统，所述媒体内容是通过通信网络传送的，所述处理设备具有存储器和显示器，所述系统包括：

用于提供令牌的外围设备，所述令牌在被传送到所述通信网络时，内在地或分立地提供认证或许可来在所述显示设备上显示所述任意媒体内容，所述令牌还提供到所述显示设备的链接；

用于通过对来自所述处理设备的数据进行屏幕抓取来获得所述任意媒体内容的装置；

用于将来自所述处理设备的经屏幕抓取的任意媒体内容路由通过所述通信网络的装置；

用于获得对所述显示设备的电子访问权的装置；以及

用于显示所述任意媒体内容的装置。

16. 如权利要求 13 到 15 中的任一项所述的系统，其特征在于，还包括用于将所述处理设备连接到所述通信网络的装置，所述处理设备具有带有至少一个预安装通用驱动程序的操作系统，所述至少一个预安装通用驱动程序提供用于处理设备与标准类型外围设备之间的通信的通用通信协议，所述系统包括：

a) 用于将外围设备耦合到所述处理设备的装置，所述外围设备具有收发机；

b) 用于通过所述操作系统的所述预安装的通用驱动程序，设置用于所述外围设备与所述处理设备之间的通信的手段的装置；

c) 用于经由所述外围设备将所述处理设备耦合到通信网络的装置；

d) 用于经由所述用于通信的手段在所述处理设备与所述通信网络之间路由经屏幕抓取的数据的装置，其中所述通用通信协议被用于在所述处理设备与所述外围设备之间传送经屏幕抓取的数据。

17. 如权利要求 16 所述的系统，其特征在于，还包括用于将所述外围设备呈现给所述处理设备作为人类接口设备的装置，并且其中所述预安装的通用驱动程序是人类接口设备驱动程序。

18. 如权利要求 16 所述的系统，其特征在于，还包括用于将所述外围设备呈现给所述处理设备作为大容量存储设备的装置，并且其中所述预安装的通用驱动程序是大容量存储设备驱动程序。

19. 如权利要求 16 所述的系统，其特征在于，还包括用于将所述外围设备呈现给所述处理设备作为复合设备的装置，并且其中所述预安装的通用驱动程序独立地驱动各不同的设备接口。

20. 如权利要求 14 到 19 中的任一项所述的系统，其特征在于，客户机应用被存储在所述外围设备上，当所述客户机应用在所述处理设备上运行时获得经屏幕抓取的数据。

21. 如权利要求 20 所述的系统，其特征在于，所述客户机应用是便携式应用。

22. 如权利要求 13 到 21 中的任一项所述的系统，其特征在于，还包括用于操作所述通信网络的显示节点的装置，所述显示节点耦合到第一显示器、接收用户所选的任意媒体内容并控制用户所选的任意媒体内容在所述第一显示器上的显示；以及

用于将外围设备连接到处理设备的端口并经由所述通信网络传递用户所选的任意媒体内容的装置，

将程序加载到所述处理设备上并且在所述处理设备的操作系统上运行所述程序以获得用户所选的任意媒体内容，所述程序在终止时留下零足迹，以及

用于在输入设备上的用户动作之后，触发所述用户所选的任意媒体内容通过所述端口传送到所述发射机的装置。

23. 如权利要求 13 到 22 中的任一项所述的系统，其特征在于，还包括用于设置通信网

络的装置，所述通信网络处于所述通信网络的基节点与耦合到所述处理设备的外围设备之间；

用于在所述处理设备和所述外围设备之间传送媒体内容的装置，

用于将所述媒体内容从所述外围设备传送到所述通信网络的装置，

用于在所述基节点处接收来自所述通信网络的媒体内容，并且根据一组规则在显示器上显示所述媒体内容的装置。

24. 如权利要求 13 到 24 中的任一项所述的系统，其特征在于，所述外围设备与所述处理设备配对。

25. 一种用于与权利要求 13 到 24 中的任一项所述的系统一起使用且用于传递来自与会用户的任意媒体内容的电子会议工具，包括：

适配成操作通信网络的显示节点的节点配置装置，所述显示节点耦合到第一显示器，所述节点配置装置适配成接收用户所选的任意媒体内容且控制用户所选的任意媒体内容在所述第一显示器上的显示；以及

适配成经由所述通信网络传递用户所选的任意媒体内容的至少一个外围设备，其中所述外围设备是连接单元，包括：

c) 适配成耦合到具有第二显示器、存储器、以及操作系统的处理设备的端口的连接器；以及

d) 用于与所述通信网络通信的发射机，

适配成被加载到所述处理设备上并且在所述处理设备的操作系统上运行的程序，所述程序适配成获得用户所选的任意媒体内容，所述程序在终止时留下零足迹，以及

输入设备，所述输入设备允许所述用户执行触发所述用户所选的任意媒体内容通过所述端口向所述发射机的传送的用户动作。

26. 如权利要求 25 所述的电子会议工具，其特征在于，所述程序被存储在所述外围设备上。

27. 如权利要求 25 或 26 所述的电子会议工具，其特征在于，所述发射机是无线发射机或收发机。

28. 如权利要求 25 到 27 中的任一项所述的电子会议工具，其特征在于，所述外围设备是即插即用设备。

29. 如权利要求 25 到 28 中的任一项所述的电子会议工具，其特征在于，所述程序适配成对所述第二显示器的内容进行屏幕抓取。

30. 如权利要求 25 到 29 中的任一项所述的电子会议工具，其特征在于，所述输入设备是耦合到所述外围设备的物理致动器。

31. 如权利要求 30 所述的电子会议工具，其特征在于，所述物理致动器具有 100 和 14400 平方毫米之间的表面积。

32. 如权利要求 25 到 31 中的任一项所述的电子会议工具，其特征在于，所述输入设备是显示在所述第二显示器上的键。

33. 如权利要求 33 所述的电子会议工具，其特征在于，显示在所述第二显示器上的所述键不被所述程序进行屏幕抓取。

34. 一种与如权利要求 13 到 24 中的任一项所述的系统一起使用并且用于将处理设备

连接到通信网络的方法，所述处理设备具有存储器、显示器、带有至少一个预安装通用驱动程序的操作系统，所述至少一个预安装通用驱动程序提供用于处理设备与标准类型外围设备之间的通信的通用通信协议，所述方法包括以下步骤：

a) 将外围设备耦合到所述处理设备，所述外围设备具有收发机；

b) 通过所述操作系统的所述预安装的通用驱动程序，设置用于所述外围设备与所述处理设备之间的通信的手段；

c) 经由所述外围设备将所述处理设备耦合到通信网络；

d) 经由所述用于通信的手段在所述处理设备与所述通信网络之间路由经屏幕抓取的数据，其中所述通用通信协议被用于在所述处理设备与所述外围设备之间传送经屏幕抓取的数据。

35. 如权利要求 34 所述的方法，其特征在于，步骤 b) 包括将所述外围设备呈现给所述处理设备作为人类接口设备，并且其中所述预安装的通用驱动程序是人类接口设备驱动程序。

36. 如权利要求 34 所述的方法，其特征在于，步骤 b) 包括将所述外围设备呈现给所述处理设备作为大容量存储设备，并且其中所述预安装的通用驱动程序是大容量存储设备驱动程序。

37. 如权利要求 34 所述的方法，其特征在于，步骤 b) 包括将所述外围设备呈现给所述处理设备作为复合设备，并且其中所述预安装的通用驱动程序独立地驱动各不同的设备接口。

38. 如权利要求 34 到 37 中的任一项所述的方法，其特征在于，客户机应用被存储在所述外围设备上，当所述客户机应用在所述处理设备上运行时获得经屏幕抓取的数据。

39. 如权利要求 38 所述的方法，其特征在于，所述客户机应用是便携式应用。

40. 一种与如权利要求 13 到 24 中的任一项所述的系统一起使用并且用于提供到处理设备的通信连接性的外围设备，所述处理设备提供有存储器、显示器、带有至少一个预安装通用驱动程序的操作系统，所述至少一个预安装通用驱动程序提供用于所述处理设备与标准类型外围设备之间的通信的通用通信协议，所述外围设备包括其中储存有可执行软件代码以供在所述处理设备上执行的存储器，所述可执行软件代码包括：

用于通过所述操作系统的所述预安装的通用驱动程序，设置用于所述外围设备与所述处理设备之间的通信的手段的第一软件代码部分；

用于经由所述外围设备将所述处理设备连接到通信网络的第二软件代码部分，所述外围设备具有收发机；

用于对来自所述处理设备的数据进行屏幕抓取的第三软件代码部分；以及

用于通过所述用于通信的手段在所述处理设备与所述通信网络之间路由经屏幕抓取的数据的第四软件代码，其中所述第一软件代码部分适配成使用所述通用通信协议在所述处理设备与所述外围设备之间传送经屏幕抓取的数据。

41. 如权利要求 40 所述的外围设备，其特征在于，所述第一软件代码部分适配成将所述外围设备呈现给所述处理设备作为人类接口设备，并且其中所述预安装通用驱动程序是人类接口设备驱动程序。

42. 如权利要求 40 所述的外围设备，其特征在于，所述第一软件代码部分适配成将所

述外围设备呈现给所述处理设备作为大容量存储设备，并且其中所述预安装通用驱动程序是大容量存储设备驱动程序。

38. 如权利要求 15 所述的外围设备，其特征在于，所述第一软件代码部分适配成将所述外围设备呈现给所述处理设备作为复合设备，并且其中所述预安装通用驱动程序独立地驱动各不同的设备接口。

43. 如权利要求 40 到 42 中的任一项所述的外围设备，其特征在于，所述可执行软件代码包括用于提供用于连接到包括基节点的所述通信网络的手段的第五代码。

44. 如权利要求 40 到 43 中的任一项所述的外围设备，其特征在于，所述可执行软件代码包括用于提供用于捕捉所述处理设备的视频帧缓冲区的手段的第六代码。

45. 如权利要求 40 到 44 中的任一项所述的外围设备，其特征在于，所述可执行软件代码包括用于提供用于编码、压缩、以及可任选地加密经屏幕抓取的数据并通过所述通信网络发送经屏幕抓取的数据的手段的第七代码。

46. 如权利要求 40 到 44 中的任一项所述的外围设备，其特征在于，所述可执行软件代码包括用于提供用于处理所述外围设备的手段的第八代码。

47. 如权利要求 43 到 46 中的任一项所述的外围设备，其特征在于，所述可执行软件代码包括用于提供用于发起连接到所述基节点的手段的第九代码。

48. 如权利要求 40 到 47 中的任一项所述的外围设备，其特征在于，所述可执行软件代码包括用于在所述外围设备上接收来自输入设备的输入的第十代码。

49. 如权利要求 40 到 48 中的任一项所述的外围设备，其特征在于，所述可执行软件代码包括用于提供用于向所述外围设备上的视觉指示器发送状态变化的手段的第十一代码。

50. 如权利要求 40 到 49 中的任一项所述的外围设备，其特征在于，所述可执行软件代码包括用于提供用于向所述用户呈现 GUI 的手段的第十二代码。

51. 如权利要求 40 到 50 中的任一项所述的外围设备，其特征在于，所述可执行软件代码包括用于呈现 GUI 以供在所述可执行软件代码作为便携式应用执行时管理所述可执行软件代码的第十三代码。

48. 如权利要求 35 到 47 中的任一项所述的外围设备，其特征在于，所述可执行软件代码包括用于提供用于在所述客户机处理设备的显示器上显示并激活键以允许用户输入将来自所述处理设备的数据开始传送到所述基节点的手段的第十四代码。

52. 一种与如权利要求 13 到 24 中的任一项所述的系统一起使用并且用于提供到处理设备的通信连接性的外围设备，所述处理设备提供有存储器、显示器、带有至少一个预安装通用驱动程序的操作系统，所述至少一个预安装通用驱动程序提供用于所述处理设备与标准类型外围设备之间的通信的通用通信协议，所述外围设备包括其中储存有可执行软件代码以供在所述处理设备上执行的存储器，所述可执行软件代码包括：

用于通过所述操作系统的所述预安装的通用驱动程序，设置用于所述外围设备与所述处理设备之间的通信的手段的第一软件代码部分；

用于经由所述外围设备将所述处理设备连接到通信网络的第二软件代码部分，所述外围设备具有收发机；以及

用于通过所述用于通信的手段在所述处理设备与所述通信网络之间路由数据的第三处理软件代码，其中所述第一软件代码部分适配成使用所述通用通信协议在所述处理设备

与所述外围设备之间传送所述数据，以及

耦合到所述外围设备的输入设备，所述输入设备适配成对用户动作作出反应以触发所述数据从所述处理设备到所述外围设备的传送。

53. 如权利要求 52 所述的外围设备，其特征在于，所述第一软件代码部分适配成将所述外围设备呈现给所述处理设备作为人类接口设备，并且其中所述预安装通用驱动程序是人类接口设备驱动程序。

54. 如权利要求 52 所述的外围设备，其特征在于，所述第一软件代码部分适配成将所述外围设备呈现给所述处理设备作为大容量存储设备，并且其中所述预安装通用驱动程序是大容量存储设备驱动程序。

55. 如权利要求 52 所述的外围设备，其特征在于，所述第一软件代码部分适配成将所述外围设备呈现给所述处理设备作为复合设备，并且其中所述预安装通用驱动程序独立地驱动各不同的设备接口。

56. 如权利要求 52 到 55 中的任一项所述的外围设备，其特征在于，所述输入设备是耦合到所述外围设备的物理致动器。

57. 如权利要求 56 所述的外围设备，其特征在于，所述物理致动器具有 100 和 14400 平方毫米之间的表面积。

58. 如权利要求 52 到 57 中的任一项所述的外围设备，其特征在于，所述输入设备是用于显示在所述显示器上的键。

59. 如权利要求 52 到 58 中的任一项所述的外围设备，其特征在于，所述可执行软件代码包括用于提供用于连接到包括基节点的所述通信网络的手段的第四代码。

60. 如权利要求 52 到 59 中的任一项所述的外围设备，其特征在于，所述可执行软件代码包括用于提供用于捕捉所述处理设备的视频帧缓冲区的手段的第五代码。

61. 如权利要求 60 所述的外围设备，其特征在于，所述可执行软件代码包括用于提供用于编码、压缩、以及可任选地加密所述视频帧并通过安全链路将它们发送到所述基节点的手段的第六代码。

62. 如权利要求 52 到 61 中的任一项所述的外围设备，其特征在于，所述可执行软件代码包括用于提供用于处理所述外围设备的手段的第七代码。

63. 如权利要求 61 或 62 所述的外围设备，其特征在于，所述可执行软件代码包括用于提供用于发起到所述基节点的连接的手段的第八代码。

64. 如权利要求 52 到 63 中的任一项所述的外围设备，其特征在于，所述可执行软件代码包括用于在所述外围设备上接收来自输入设备的输入的第九代码。

65. 如权利要求 52 到 64 中的任一项所述的外围设备，其特征在于，所述可执行软件代码包括用于提供用于向所述外围设备上的视觉指示器发送状态变化的手段的第十代码。

66. 如权利要求 52 到 65 中的任一项所述的外围设备，其特征在于，所述可执行软件代码包括用于提供用于向所述用户呈现 GUI 的手段的第十一代码。

67. 如权利要求 52 到 66 中的任一项所述的外围设备，其特征在于，所述可执行软件代码包括用于呈现 GUI 以供在所述可执行软件代码作为便携式应用执行时管理所述可执行软件代码的第十二代码。

68. 如权利要求 59 到 67 中的任一项所述的外围设备，其特征在于，所述可执行软件代

码包括用于提供用于在所述客户机处理设备的显示器上显示并激活键以允许用户输入将来自所述处理设备的数据开始传送到所述基节点的手段的第十四代码。

69. 一种与如权利要求 13 到 24 中的任一项所述的系统一起使用并且用于提供到处理设备的通信连接性的外围设备，所述处理设备提供有存储器、显示器、带有至少一个预安装通用驱动程序的操作系统，所述至少一个预安装通用驱动程序提供用于所述处理设备与标准类型外围设备之间的通信的通用通信协议，所述外围设备包括其中储存有可执行软件代码以供在所述处理设备上执行的存储器，所述可执行软件代码包括：

用于通过所述操作系统的所述预安装的通用驱动程序，设置用于所述外围设备与所述处理设备之间的通信的手段的第一软件代码部分；

用于经由所述外围设备将所述处理设备连接到通信网络的第二软件代码部分，所述外围设备具有收发机；

用于接收来自所述网络的媒体内容以及用于根据一组规则在所述显示器上显示所述媒体内容的第三软件代码部分；其中所述第一软件代码部分适配成使用所述通用通信协议在所述外围设备与所述处理设备之间传送所述媒体内容。

70. 如权利要求 69 所述的外围设备，其特征在于，所述可执行软件代码包括用于提供用于正确地配置接收机作为接入点的手段的第四代码。

71. 如权利要求 69 或 70 所述的外围设备，其特征在于，所述可执行软件代码包括用于提供用于监听尝试连接在特定端口上的连接单元的输出的手段的第五代码。

72. 如权利要求 69 到 71 中的任一项所述的外围设备，其特征在于，所述可执行软件代码包括用于提供用于用作管理目的的 GUI 的手段的第六代码。

73. 如权利要求 69 到 72 中的任一项所述的外围设备，其特征在于，所述可执行软件代码包括用于提供用于使用 zeroconf 协议通过所述网络发布其存在的手段的第七代码。

74. 如权利要求 69 到 73 中的任一项所述的外围设备，其特征在于，所述可执行软件代码包括用于提供用于接受并安装软件更新的手段的第八代码。

75. 如权利要求 69 到 74 中的任一项所述的外围设备，其特征在于，所述可执行软件代码包括用于提供用于提供用作将连接单元配对到所述处理设备的设施的手段的第九代码。

76. 如权利要求 69 到 75 中的任一项所述的外围设备，其特征在于，所述可执行软件代码包括用于提供用于自动合成不同的传入任意媒体流并在显示器上渲染合成图像的手段的第十代码。

77. 如权利要求 69 或 76 中的任一项所述的外围设备，其特征在于，所述可执行软件代码包括用于提供用于接收、解密、以及解码传入的任意媒体内容的手段的第十一代码。

78. 如权利要求 69 或 77 中的任一项所述的外围设备，其特征在于，所述可执行软件代码包括用于缩放传入的任意媒体流的第十二代码。

79. 如权利要求 69 到 78 中的任一项所述的外围设备，其特征在于，所述可执行软件代码包括用于提供用于根据一组规则显示传入的任意媒体内容的手段的第十三代码。

80. 一种用于与权利要求 13 到 24 中的任一项所述的系统一起使用且用于传递与会用户的任意媒体内容的方法，包括：

操作通信网络的显示节点，所述显示节点耦合到第一显示器、接收用户所选的任意媒体内容并控制用户所选的任意媒体内容在所述第一显示器上的显示；以及

将外围设备连接到处理设备的端口并经由所述通信网络传递用户所选的任意媒体内容，

将程序加载到所述处理设备上并且在所述处理设备的操作系统上运行所述程序以获得用户所选的任意媒体内容，所述程序在终止时留下零足迹，以及

在输入设备上的用户动作之后，触发所述用户所选的任意媒体内容通过所述端口传送到所述发射机。

81. 一种与如权利要求 13 到 24 中的任一项所述的系统一起使用的外围设备，包括：

基节点

用于连接到主机处理设备的即插即用端口的连接器，

所述基节点与所述连接器之间的用于传送数据信号和功率的灵活连接，

所述基节点上的用于致动信号且用于将所述信号传送到所述连接器以供传送到所述端口的致动器，其中所述基节点具有包括用于存储便携式应用的持久存储、处理引擎、收发机以及视觉指示器的电子装置。

82. 一种用于与如权利要求 13 到 24 中的任一项所述的系统一起使用并且用于提供自处理设备的通信连接性的方法，

设置通信网络，所述通信网络处于所述通信网络的基节点与耦合到所述处理设备的外围设备之间；

在所述处理设备和所述外围设备之间传送媒体内容，

将所述媒体内容从所述外围设备传送到所述通信网络，

在所述基节点处接收来自所述通信网络的媒体内容，并且根据一组规则在显示器上显示所述媒体内容。

83. 上述权利要求中的任一项作为存储在非瞬态存储介质上的软件代码。

用于会议的电子工具和方法

[0001] 本发明涉及用于会议的电子工具，包括用于提供到通信网络的连接的方法或设备、网络或操作网络的方法、用于显示媒体内容的方法或设备、以及用于执行这些方法中的任一种方法的软件。

技术背景

[0002] 用于协作的工具

[0003] 允许人员的自组织群体彼此通信是协作、问题解决、协商、教育等的各基本方面之一。为了帮助通信，电子通信工具出现了爆发，如电子会议工具，例如，同步和异步会议、在线聊天、即时消息收发、音频会议、视频会议、数据会议、应用共享、远程桌面共享、电子会议系统、协作式管理（协调）工具、项目管理系统、知识管理系统、以及社交软件系统。

[0004] 一种经典方法是通常涉及使用演示软件的演示的讲座或研讨会。在很大程度上，传统单人演示或演讲是在听众处于相当被动的模式下被维护的，所关心的只是确定、构造、扩充或修改要被呈现的信息。

[0005] 与其他业务过程一样，会议正在变成数字式的。在实际会议之前及期间，人们日益增加地单独并结合宽带网络使用计算机技术来支持它们的会议目标。例如，电子邮件被用来分发文件以供人们在会议之前阅读。

[0006] 协作网络中以及因特网上的协作式工作空间向地理上分散的各协作者提供用于与项目或会议相关的文档的虚拟储存库。诸如交互式网络连接白板及视频会议设备等电子会议支持系统可供用于共享同一房间以及在远程位置处的人的利益。

[0007] AMIDA最终公开报告描述了会议支持技术的开发背后的总体方法体系。它报告说多个研究确认会议主导了人们工作的方式。即，根据MCI Worldcom在2003年进行的研究，商务人士每月参与60个会议。人们出于多种原因而成群会面。他们以多种可预测和不可预测的方式交互并且他们的交互结果随着参与的人以及他们协作或交流的项目而变化。业务过程的研究还揭示与项目或过程相关联的约80％的“工作负荷”发生在会议的准备中。换言之，许多人将“实况”会议看做他们可调整步调并测量他们的生产力以及其同事的生产力的里程碑或最终期限。不幸的是，对于许多信息管理者而言，参与不断的会议降低了他们为下一会议充分地进行准备的能力，从而陷入恶性且负面的循环。

[0008] 然而，Marc Al-Hames等人在“Audio-Visual Processing in Meetings:Seven Questions and Current AMI Answers(会议中的音频-视频处理：七个问题及当前AMI答案)”中报告说，虽然大部分工作已被会议和会晤消耗，但不幸的是，它们中的许多既不高效也不特别成功。他们报告了其中要求人们选择他们认为在会议中频繁体验到的情绪词汇的研究。最高答案——三分之二以上的参与者提到——是“厌烦”，此外，近三分之一提到“烦恼”作为频繁感受到的情绪。

[0009] 结论是尽管对会议的电子辅助过多，但处理会议的基本问题尚未被解决。事实上，在业务上下文中组织并进行会议涉及大量因素。

[0010] 参与

[0011] 会议效率的缺失在 IBM 的 IP.com 号为 IPCOM000011711D 的发布日期为 2003 年 3 月 12 日的文章“Mood indicators on electronic meeting tools(电子会议工具上的心情指示符)”中得到解决。这一文章解决了缺少直接反馈使得会议拙劣、不高效且通常效果不佳的问题。它提出了“心情指示符”以及“我想要提问”指示符,这允许演示者选择适当的时间来暂停、改变音轨或回答问题。它提到打断充满激情的演示者是不方便的;然而,有时在许多不同的人尝试发言时难以得到提问或发表意见的机会。以类似的脉络,US6966035 提出了显示“私语框架”以供参与者表达观点。为了提高用户参与度,US 2010/0087139 公开了一种用于向另一计算机发送选择的系统,且 US 2006/0095376 公开了一种用于安全投票的系统。评论、投票、或选择需要中央权威机构提供要被选择或评论或投票的信息。因此,这些建议仍然留下了中心人物,如处于主导位置的演示者,并且会议的其他成员很大程度上是具有有限的选择或投票或参与权的听众。

[0012] 会议的进一步问题是有人常常迟到或不得不早退。对于迟到的人,必须决定该会议是否被中断并且直到此时的会议录的概要是否被给出。对于早退的人(通常是高级人员),后续讨论可能缺失。如果存在记录人员,这提供了会议的个人概要——但并不是客观的概要。

[0013] 现有系统没有提供最优解决方案。

[0014] 法律和安全问题

[0015] 会议的法律要求是演示、评论、以及提交需要是完全可再现的——在一些情况下,例如,在股份持有者会议中,会议中的事件应当可以完全召回。计算机支持的协作式工作技术,尤其是捕捉除在会议期间生成的文本和图像以外的人类语言和非语言交流(音频和视频交互)的那些技术,对人们将如何准备和在会议期间以及会议后将如何作为肯定具有长期影响。另外,连接到网络带来了在任一方向上的病毒、恶意软件或间谍软件传输的危险,并且存在复制机密信息的危险。

[0016] 实际困难

[0017] 可扩展性和易于使用性

[0018] 对于将电子工具用于会议中而言,甚至存在更多基本问题。如果两个人想要作两个演示,则通常这两个演示必须都被置于一个机器上,或者需要在这两个演示者的机器之间切换。为了将计算机的显示内容带到投影仪,最常见的方式是使用将图形卡的显示适配器连接到投影仪的视频输入的电缆[方法 1]或使用捕捉显示内容并通过有线或无线网络将其发送给连接到投影仪的远程基本单元的软件[方法 2]。这通常称为“远程桌面”且大部分被用于远程管理或远程 IT 辅助目的。

[0019] 较不常见但也被实施的方法是使用连接到图形卡的显示适配器的特殊设备,所述特殊设备通过有线或无线网络捕捉、编码、以及流传输显示内容[方法 3]。

[0020] 方法 1 具有若干实际问题和缺点。在其中人们想要从他们自己的计算机贡献内容(例如将图像投影到显示器上)的会议中,通常诸如 VGA 电缆等视频电缆被用于将各 PC 一次一个地连接到投影仪。这不仅不可扩展,而且还可能且通常是相当麻烦的过程,该过程通常浪费宝贵的会议时间且使会议失去活力。连接可能更加困难且耗时,例如在计算机必须被重新引导以检测投影仪或者在 PC 的格式与投影仪的格式不同的情况下。另外,改变格式可为计算机留下与其自己的屏幕不兼容的新格式,从而在 PC 自己的重新引导时,没有什么

被显示在计算机屏幕上。在没有可见屏幕图像的情况下，必要的重新配置可能是困难的。这些问题因多个因素而恶化：

[0021] - 许多不同视频适配器的使用，如 VGA、DVI、DP、HDMI……

[0022] - 所及范围取决于电缆长度：过长会在会议室中留下乱成一团的电缆“色拉”，过短会降低灵活性，通常使人们在想要演示一些东西时必须在会议室中四处移动。

[0023] - 电缆连接是点对点的或需要进行冗长且昂贵的电缆敷设以及使用复杂且昂贵的视频交换机。

[0024] - 找出计算机和显示器或投影仪两者所支持的正确显示分辨率和刷新率通常是困难且耗时的。

[0025] 方法 2 也具有许多缺点。如果作出到企业 LAN 的连接，则存在在任一方向上的病毒、恶意软件或间谍软件传输的危险，存在机密信息的复制的危险，以及存在作出所述连接的困难，例如用户代码和口令的录入以及这些口令和用户代码的管理。

[0026] 方法 3 的优点是计算机无需使用它自己的处理能力以按易于通过网络传输的形式带来显示内容。随着计算机处理能力的增长，这一优点变得较没有意义。方法 3 的缺点是方法 1 通常遇到的连接到显示适配器的相同问题依然存在。另一缺点是所引用的特殊设备需要大量处理能力，这意味着这一设备将消耗许多功率、相对很大、且当然相对昂贵。

[0027] 当今在发展中的另选方法是使用计算机的公知 USB 接口来提取计算机的显示内容。US 2009/0198839 公开了这种可插拔电缆安排。US 2011/0115689 公开了用于无线连接到投影仪的类似 USB 解决方案。相应地，使用标准 USB 端口将投影仪连接到计算机可能随时间进展而变得常见。然而，这通常需要特殊驱动程序以及甚至特殊硬件。使用标准 USB 端口将投影仪连接到计算机因此可能变得常见……但甚至在这一点发生时，在若干年内也将仍然存在新机器与传统机器的混合。

[0028] 防火墙

[0029] 防火墙可发生附加问题。通常，会议的访客将携带计算机，如针对不同企业联网环境设置并且因此具有不同或不兼容的联网设置的膝上型计算机。防火墙的设置可能是复杂的，并且如果这没有被正确地完成，必须穿过防火墙的电信软件可能被阻塞。为了解决与防火墙相关联的问题，打开端口或者标识或甚至添加例外列表中的程序可能是必要的。在网络（硬件）防火墙以及操作系统防火墙之外，如果存在任何基于软件的第三方防火墙，如 Zonealarm、CA 因特网安全套件或 McAfee 防火墙，则遵循该软件开发者的文件编制以将程序置于安全列表上或将例外添加到防火墙规则是必要的。这样的活动超出了普通用户的能力。过分讲究计算机设置或必须要求 IT 支持浪费了宝贵的会议时间并且使会议失去活力。

[0030] 结语

[0031] 当前，使用高级电子工具主持面对面会议仍然存在以下问题：

[0032] - 联网基础结构的复杂性。

[0033] - 对被假定为设计成支持非专家用户的每天使用的当前系统中对用户的技术专家能力的高要求。

[0034] - 在会议中使用复杂技术的障碍。

[0035] - 大量各种可能的协作式软件解决方案——它们中没有一个看起来解决了主持成功会议的基本问题。

[0036] - 对会议的成员而言，会议令人厌烦或烦恼。

[0037] - 在企业网络中采用的防火墙以及其他安全措施的复杂性。

[0038] - 会议成员的参与度的缺失或受限。

[0039] - 准备用于会议的演示所花的时间。

[0040] - 在不会超出所需地加重会议负担的情况下，按正确的时序记录会议中事件的需求。

[0041] 虽然某些工具有效地解决这些问题中的一些问题，但没有电子会议工具解决了全部问题。

发明概要

[0042] 本发明的目标是提供包括用于会议的电子工具以及用于提供到通信网络的连接的设备的网络解决方案，操作所述网络的方法，显示媒体内容的方法，以及用于执行这些方法中的任一种方法或用于实现这些系统的软件。

[0043] 在本发明的一方面，提供了一种用于在显示设备上显示从处理设备（例如，数字处理设备）获得的任意媒体内容的方法，该媒体内容是通过通信网络传送的，该处理设备具有存储器和显示器，该方法包括：

[0044] 使用外围设备来提供令牌，该令牌内在地或分立地提供认证以在显示设备上显示内容并提供到该显示设备的链接。

[0045] 具体而言，本发明提供了一种用于在具有多个参与者的会议中在显示设备上显示从处理设备（例如，数字处理设备）获得的任意媒体内容的方法，该媒体内容是通过共享资源通信网络传送的，该处理设备具有存储器和显示器，该方法包括：

[0046] 使用外围设备来提供令牌，该令牌在被传送到通信网络时内在地或分立地提供认证或许可来在显示设备上显示任意媒体内容，该令牌还提供到显示设备的链接；

[0047] 将来自处理设备的任意媒体内容路由通过通信网络；

[0048] 获得对显示设备的单方电子访问权；以及

[0049] 显示该任意媒体内容。

[0050] 该任意媒体内容是优选地通过对来自该处理设备的数据进行屏幕抓取来获得的。

[0051] 在另一方面，本发明提供了一种用于在具有多个参与者的会议中在显示设备上显示从处理设备获得的任意媒体内容的方法，该媒体内容是通过共享资源通信网络传送的，该处理设备具有存储器和显示器，该方法包括：

[0052] 使用外围设备来提供令牌，该令牌在被传送到通信网络时内在地或分立地提供认证或许可来在显示设备上显示任意媒体内容，该令牌还提供到显示设备的链接；

[0053] 通过对来自处理设备的数据进行屏幕抓取来获得该任意媒体内容；

[0054] 将来自处理设备的经屏幕抓取的任意媒体内容路由通过通信网络；

[0055] 获得对显示设备的电子访问权；以及

[0056] 显示该任意媒体内容。

[0057] 获得用户所选的任意媒体内容优选地不是通过应用共享而是通过屏幕抓取的过程来获得的。虽然提供屏幕抓取的软件包需要安装在目标设备上，或至少需要安装专用和/或自定义驱动程序，但本发明的各实施例使用加载到外围设备上的软件，当该软件在处理

设备上运行时允许屏幕抓取但在终止时留下零足迹。本发明的各实施例能以20fps对全HD视频进行屏幕抓取，而不需要在处理设备上安装任何程序也不需要配置它们在其上运行以用于到网络的连接性的诸如PC等处理设备，从而满足“零足迹”要求。

[0058] 在外围设备上提供大容量存储设备，该大容量存储设备存储要在处理设备上运行的软件。一旦软件已被读取并加载且从处理设备中的RAM运行，该大容量存储设备就可在逻辑上关闭。在外围设备上还提供了另一设备，如捕捉用户输入并提供用户反馈的HID（人类接口设备）。在本发明的各实施例中，外围设备包含组合在一起的多个内部逻辑设备：

[0059] 用于捕捉用户输入（例如，在诸如按下或激活按钮等用户动作之后）并提供用户反馈（例如通过诸如围绕按钮的光环（例如LED环）等光指示器）、并且用于将经屏幕抓取的视频内容流传输到网络并从而传送到基单元和显示器的HID（人类接口设备），

[0060] 用于存储应用的大容量存储设备，以及可任选地

[0061] 使用通用驱动程序（如UAC1或UAC2设备驱动程序）通过USB担当客户机PC的虚拟声卡的音频设备。

[0062] 屏幕抓取能够以中性的方式捕捉所有材料，而不受专用应用的限制。此外，屏幕抓取器应用在终止时是零足迹，而非被完全安装在处理设备上。

[0063] 本发明的各实施例可以向会议室提供任意“全内容”且各参与者可以实时显示，

[0064] 实时内容被示出在中央显示器上，而非被广播给各单独的参与者或被存档。

[0065] 本发明的各实施例在中央显示器或屏幕上“自动合成”任意用户数据，从而向有意共享这一内容的多个会议参与者提供全实时内容，以使该会议更加有效和高效，

[0066] 本发明的各实施例实现“民主屏幕共享”的原理，其中各会议参与者在对等的基础上自己决定在何时以及在何处共享什么内容。对等数据共享与其中要显示的内容由演示者或会议主持者来确定的系统不同。用户确定他的内容要被路由到何处且可以在无需用户处理设备上的任何软件配置的情况下这样做。

[0067] 在又一方面，本发明提供了一种用于在会议处传递来自用户的任意媒体内容的电子会议工具，包括：

[0068] 适于操作通信网络的显示节点的节点配置装置，该显示节点耦合到第一显示器，该节点配置装置适配成接收用户所选的任意媒体内容且控制用户所选的任意媒体内容在该第一显示器上的显示；以及

[0069] 适配成经由通信网络传递用户所选的任意媒体内容的至少一个外围设备，其中该外围设备是连接单元，包括：

[0070] (a)适配成耦合到具有第二显示器、存储器、以及操作系统的处理设备的端口的连接器；以及

[0071] (b)用于与通信网络通信的发射机，

[0072] 适配成被加载到处理设备上并且在处理设备的操作系统上运行的程序，所述程序适配成获得用户所选的任意媒体内容，所述程序在终止时留下零足迹，以及

[0073] 输入设备，该输入设备允许用户执行触发所述用户所选的任意媒体内容通过所述端口向所述发射机的传送的用户动作。

[0074] 该程序可被存储在外围设备上。发射机可以是无线发射机或收发机。外围设备可以是即插即用设备。该程序可适配成对该第二显示器的内容进行屏幕抓取。

[0075] 输入设备可以是耦合到外围设备的物理致动器。该物理致动器优选地具有 100 和 14400 平方毫米之间的表面积。或者，输入设备可以是显示在第二显示器上的键。显示在第二显示器上的键可以是不被程序进行屏幕抓取的键。

[0076] 在另一方面，本发明提供了一种将处理设备连接到通信网络的方法，该处理设备具有存储器、显示器、带有至少一个预安装通用驱动程序的操作系统，该至少一个预安装通用驱动程序提供用于处理设备与标准类型外围设备之间的通信的通用通信协议，该方法包括以下步骤：

[0077] a) 将外围设备耦合到处理设备，该外围设备具有收发机；

[0078] b) 通过操作系统的预安装的通用驱动程序，设置用于外围设备与处理设备之间的通信的手段；

[0079] c) 经由外围设备将处理设备耦合到通信网络；

[0080] d) 经由用于通信的手段在处理设备与通信网络之间路由经屏幕抓取的数据，其中通用通信协议被用于在处理设备与外围设备之间传送经屏幕抓取的数据。

[0081] 经屏幕抓取的数据的路由可以去往所定义的网络节点，如显示节点，而无需用户输入配置细节。因而，路由可以专用于特定网络节点，如显示节点、基站等。在通过在通信开始之前将外围设备配对到相关节点来实现。

[0082] 根据本发明的各实施例，用户启动来自外围设备（如 USB 加密狗 (dongle)）的应用，从而按 3 步过程进行连接：(1) 连接，例如将外围设备插入处理设备，(2) 启动屏幕抓取应用，(3) 执行用户动作，如点击外围设备上的按钮以允许内容被显示在中央屏幕或显示器上。为了实现步骤 2，Autorun（自动运行）或 AutoPlay（自动播放）可以与某些 Windows 操作系统一起使用，但基于操作系统版本以及安装了哪些补丁，存在着许多不同的变型。此外，这一机制一般被认为有安全危险，这是大多数 IT 部门将禁用 Autorun/Autoplay 的原因。其他操作系统提供者已禁用这一功能，例如自 Snow Leopard（雪豹操作系统）以来，Apple 从其 OS/X 中完全移除了类似功能。

[0083] 在本发明的一实施例中，提供了需要安装在处理设备（如膝上型计算机）上的非常小的服务——在某些操作系统中也被称为 daemon（守护进程）。这一服务被预安装在处理设备上。这一安装只需在每一处理设备（如膝上型计算机）上安装一次。这一安装的角色是提供持续监视根据本发明的外围设备是否提出连接到处理设备的持久运行服务。在这样的外围设备被连接时，该服务将检测这一点并启动驻留在外围设备的大容量存储区域中的客户机应用软件。一旦该服务被安装，与外围设备的连接性变成 2 步过程：连接，例如将外围设备插入处理设备，(2) 执行用户动作，如点击外围设备上的按钮以允许内容被显示在中央屏幕或显示器上。从处理设备加载的应用在终止时仍然留下零足迹。

[0084] 步骤 b) 可包括将外围设备呈现给处理设备作为人类接口设备，并且其中预安装的通用驱动程序是人类接口设备驱动程序。

[0085] 作为替换或补充，步骤 b) 可包括将外围设备呈现给处理设备作为大容量存储设备，并且其中预安装的通用驱动程序是大容量存储设备驱动程序。

[0086] 作为替换或补充，步骤 b) 包括将外围设备呈现给处理设备作为复合设备，并且其中预安装的通用驱动程序独立地驱动各不同的设备接口。

[0087] 客户机应用可被存储在外围设备上，当该客户机应用在处理设备上运行时获得经

屏幕抓取的数据。这样的客户机应用可以是便携式应用并且在终止时不留下足迹。

[0088] 在又一方面，本发明提供了一种用于提供到处理设备的通信连接性的外围设备，该处理设备提供有存储器、显示器、带有至少一个预安装通用驱动程序的操作系统，该至少一个预安装通用驱动程序提供用于处理设备与标准外围设备类之间的通信的通用通信协议，该外围设备包括其中储存有可执行软件代码以供在处理设备上执行的存储器，所述可执行软件代码包括：

[0089] 用于通过操作系统的预安装的通用驱动程序，设置用于外围设备与处理设备之间的通信的手段的第一软件代码部分；

[0090] 用于经由外围设备将处理设备连接到通信网络的第二软件代码部分，该外围设备具有收发机；

[0091] 用于对来自处理设备的数据进行屏幕抓取的第三软件代码部分；以及

[0092] 用于通过用于通信的手段在处理设备与通信网络之间路由经屏幕抓取的数据的第四软件代码，其中第一软件代码部分适配成使用通用通信协议在处理设备与外围设备之间传送经屏幕抓取的数据。

[0093] 第一软件代码部分可适配成将外围设备呈现给处理设备作为人类接口设备，并且其中预安装的通用驱动程序是人类接口设备驱动程序。第一软件代码部分可适配成将外围设备呈现给处理设备作为大容量存储设备，并且其中预安装的通用驱动程序是大容量存储设备驱动程序。第一软件代码部分可适配成将外围设备呈现给处理设备作为复合设备，并且其中预安装的通用驱动程序独立地启动各不同的设备接口。可执行软件代码可包括用于提供用于连接到包括基节点的通信网络的手段的第五代码。可执行软件第三代码可包括用于提供用于捕捉处理设备的视频帧缓冲区的手段的第六代码。

[0094] 可执行软件代码可包括用于提供用于编码、压缩、以及可任选地加密经屏幕抓取的数据并通过通信网络发送经屏幕抓取的数据的手段的第七代码。该可执行软件代码可包括用于提供用于处理外围设备的手段的第八代码。该可执行软件代码可包括用于提供用于发起到基节点的连接的手段的第九代码。该可执行软件代码可包括用于在外围设备上接收来自输入设备的输入的第十代码。该可执行软件代码可包括用于提供用于向外围设备上的视觉指示器发送状态变化的手段的第十一代码。该可执行软件代码可包括用于提供用于向用户呈现 GUI 的手段的第十二代码。该可执行软件代码可包括用于呈现 GUI 以供在可执行软件代码作为便携式应用执行时管理所述可执行软件代码的第十三代码。该可执行软件代码可包括用于提供用于在客户机处理设备的显示器上显示并激活键以允许用户输入将来自处理设备的数据开始传送到基节点的手段的第十四代码。

[0095] 在又一方面，本发明提供一种用于提供到处理设备的通信连接性的外围设备，该处理设备提供有存储器、显示器、带有至少一个预安装通用驱动程序的操作系统，该至少一个预安装通用驱动程序提供用于处理设备与标准类型外围设备之间的通信的通用通信协议，该外围设备包括其中储存有可执行软件代码以供在处理设备上执行的存储器，所述可执行软件代码包括：

[0096] 用于通过操作系统的预安装的通用驱动程序，设置用于外围设备与处理设备之间的通信的手段的第一软件代码部分；

[0097] 用于经由外围设备将处理设备连接到通信网络的第二软件代码部分，该外围设备

具有收发机；以及

[0098] 用于通过用于通信的手段在处理设备与通信网络之间路由数据的第三处理软件代码，其中第一软件代码部分适配成使用通用通信协议在处理设备与外围设备之间传送数据，以及

[0099] 耦合到外围设备的输入设备，该输入设备适配成对用户动作作出反应以触发数据从处理设备到外围设备的传送。

[0100] 该第一软件代码部分可适配成将外围设备呈现给处理设备作为人类接口设备，并且其中该预安装的通用驱动程序是人类接口设备驱动程序。该第一软件代码部分可适配成将外围设备呈现给处理设备作为大容量存储设备，并且其中该预安装的通用驱动程序是大容量存储设备驱动程序。该第一软件代码部分可适配成将外围设备呈现给处理设备作为复合设备，并且其中预安装的通用驱动程序独立地启动各不同的设备接口。

[0101] 该输入设备优选地是耦合到外围设备的物理致动器。该物理致动器优选地具有100和14400平方毫米之间的表面积。该输入设备可以例如是用于显示在显示器上的键。可执行软件代码可包括用于提供用于连接到包括基节点的通信网络的手段的第四代码。该可执行软件代码可包括用于提供用于捕捉处理设备的视频帧缓冲区的手段的第五代码。该可执行软件代码可包括用于提供用于编码、压缩、以及可任选地加密视频帧并通过安全链路将它们发送到基节点的手段的第六代码。该可执行软件代码可包括用于提供用于处理外围设备的手段的第七代码。该可执行软件代码可包括用于提供用于发起到基节点的连接的手段的第八代码。该可执行软件代码可包括用于在外围设备上接收来自输入设备的输入的第九代码。该可执行软件代码可包括用于提供用于向外围设备上的视觉指示器发送状态变化的手段的第十代码。该可执行软件代码可包括用于提供用于向用户呈现GUI的手段的第十一代码。该可执行软件代码可包括用于呈现GUI以供在可执行软件代码作为便携式应用执行时管理该可执行软件代码的第十二代码。该可执行软件代码可包括用于提供用于在处理设备的显示器上显示并激活键以允许用户输入将来自处理设备的数据开始传送到基节点的手段的第十三代码。

[0102] 在本发明的又一方面，提供了一种用于提供到处理设备的通信连接性的外围设备，该处理设备提供有存储器、显示器、带有至少一个预安装通用驱动程序的操作系统，该至少一个预安装通用驱动程序提供用于处理设备与标准类型外围设备之间的通信的通用通信协议，该外围设备包括其中储存有可执行软件代码以供在处理设备上执行的存储器，该可执行软件代码包括：

[0103] 用于通过操作系统的预安装的通用驱动程序，设置用于外围设备与处理设备之间的通信的手段的第一软件代码部分；

[0104] 用于经由外围设备将处理设备连接到通信网络的第二软件代码部分，该外围设备具有收发机；

[0105] 用于接收来自网络的媒体内容以及用于根据一组规则在显示器上显示媒体内容的第三软件代码部分；其中第一软件代码部分适配成使用通用通信协议在外围设备与处理设备之间传送媒体内容。

[0106] 该可执行软件代码可包括用于提供用于将接收机正确地配置成接入点的手段的第四代码。该可执行软件代码可包括用于提供用于监听尝试连接在特定端口上的连接单元

的输出的手段的第五代码。该可执行软件代码可包括用于提供用作管理目的的GUI的手段的第六代码。该可执行软件代码可包括用于提供用于使用zeroconf协议通过网络发布其存在的手段的第七代码。该可执行软件代码可包括用于提供用于接受并安装软件更新的手段的第八代码。该可执行软件代码可包括用于提供用于提供连接单元到处理设备的配对的设施的手段的第九代码。该可执行软件代码可包括用于提供用于自动合成不同的传入任意媒体流并在显示器上渲染合成图像的手段的第十代码。该可执行软件代码可包括用于提供用于接收、解密、以及解码传入的任意媒体内容的手段的第十一代码。该可执行软件代码可包括用于缩放传入的任意媒体流的第十二代码。该可执行软件代码可包括用于提供用于根据一组规则显示传入的任意媒体内容的手段的第十三代码。

[0107] 本发明还提供一种用于在会议上传递来自用户的任意媒体内容的方法，包括：

[0108] 操作通信网络的显示节点，该显示节点耦合到第一显示器、接收用户所选的任意媒体内容并控制用户所选的任意媒体内容在第一显示器上的显示；以及

[0109] 将外围设备连接到处理设备的端口并经由通信网络传递用户所选的任意媒体内容，

[0110] 将程序加载到处理设备上并且在处理设备的操作系统上运行该程序以获得用户所选的任意媒体内容，所述程序在终止时留下零足迹，以及

[0111] 在输入设备上的用户动作之后，触发所述用户所选的任意媒体内容通过所述端口传送到所述发射机。

[0112] 本发明还提供一种外围设备，包括：

[0113] 基节点

[0114] 用于连接到主机处理设备的即插即用端口的连接器，

[0115] 基节点与连接器之间的用于传送数据信号和功率的灵活连接，

[0116] 基节点上的用于致动信号且用于将该信号传送到连接器以供传送到端口的致动器，其中该基节点具有包括用于存储便携式应用的持久存储、处理引擎、收发机以及视觉指示器的电子装置。

[0117] 本发明还提供一种用于提供自处理设备的通信连接性的方法，

[0118] 设置通信网络，该通信网络处于通信网络的基节点与耦合到处理设备的外围设备之间；

[0119] 在处理设备和外围设备之间传送媒体内容，

[0120] 将媒体内容从外围设备传送到通信网络，

[0121] 在基节点处接收来自通信网络的媒体内容，并且根据一组规则在显示器上显示媒体内容。

[0122] 上述任一软件代码存储在非瞬态存储介质上。

[0123] 定义

[0124] “单方”意味着显示过程是只通过会议中涉及的一个参与者的动作来获得的，而无需另一个或多个参与者的同意。术语“单方”暗示供显示的数据被允许盖写或替换由会议的同一或另一参与者显示在屏幕上的任何数据。

[0125] “即插即用”是用于描述计算机总线或设备规范的特性的术语，它促进系统中硬件组件的发现，而无需物理设备配置或用户干预来解决资源冲突。即插即用设备可被添加到

计算系统的总线（在运行时或在关闭时），并且新添加的设备以及可能计算系统的其余设备被自动配置成使新添加的设备从硬件以及从软件观点两者来看都工作。

[0126] 即插即用接口包括例如（非穷尽性列表）：火线（IEEE-1394）、PCI、Mini PCI、PCI Express、Mini PCI Express、PCMCIA、PC卡、通用串行总线（USB）、SDIO卡。

[0127] “自动配置”是设备的自动配置，无需手动干预、无需设置任何开关或跳转、并且无需任何软件配置。自动配置设备的一个示例：USB设备。

[0128] 自动配置协议的示例：DHCP、Zeroconf、Bonjour。

[0129] 即插即用设备默认具有自动配置软件，以使其即插即用。示例：USB设备通过包括正确自动配置软件（例如，主机驱动程序、主机栈、应用软件）而被使得成为即插即用。自动配置也可以仅指软件并且不限于物理设备。

[0130] “热交换和热插拔”是用于描述替换计算机系统组件而无需关闭该系统的功能的术语。更具体而言，热交换描述在无需显著中断系统的情况下替换组件，而热插拔描述在无需显著中断系统的操作的情况下添加将扩展该系统的组件。这一功能的公知示例是允许用户添加或移除外围组件（如鼠标、键盘或打印机）的通用串行总线（USB）。其他示例是例如eSATA、PCIe、火线。

[0131] “便携式应用”（便携式app），有时也称为独立应用，是被设计成在无需安装在目标机器上的情况下运行的计算机软件程序。这一类型的应用被存储在可移动存储设备上，如CD、USB闪存驱动器、闪存卡、或软盘——只在该存储介质上存储其程序文件、配置信息以及数据。它是可被存储在诸如USB闪存驱动器、iPOD、存储卡、便携式硬盘驱动器或其他便携式电子设备等电子设备上并且在耦合到该电子设备的计算机或其他处理设备上运行而无需对主机计算机作出持久配置改变的程序。所有这样的程序具有零足迹，意味着所有临时文件、注册表项、以及对机器的任何其他改变只在该程序运行时存在。

[0132] 出于本发明的目的，为了被认为是便携式应用，软件程序必须：

[0133] 不需要在计算机的持久存储设备上执行任何类型的正式安装，并且可被存储在可移动存储设备上，如USB闪存驱动器、iPOD、存储卡、便携式硬盘驱动器或其他便携式电子存储设备，从而使得它能够在多个计算机上使用。

[0134] 各设置与该软件一起存储，并且可优选地与它一起携带（即，它们被写入电子设备，如USB驱动器）。各设置不被存储在计算机的注册表或任何其他中央系统数据库中。

[0135] 在被使用之后在所运行的任何PC上留下零（或接近零）“足迹”，即，一旦该程序已经存在，所有临时文件/注册表设置应当被避免或至少被移除，且用户创建的文件可被直接保存到与其上存储有该应用的可移动介质相同的可移动介质。

[0136] 便携式应用没有在所运行的主机计算机上留下其文件或设置。例如，该应用不写入Windows注册表或将其配置文件（如INI文件）存储在用户的简档中；相反，它将其配置文件存储在该程序的目录中。因为文件路径通常将由于Windows驱动器字母指派的变化而因不同的计算机而不同，所以另一要求是需要应用将它们存储成相关格式。优选地，这样的程序在该应用启动时不需要启动器程序将必要的设置和文件复制到主机计算机，并且在它关闭时不需要将它们移回该应用的目录，因为这在电源故障的情况下可能会在硬盘驱动器上留下残余。

[0137] “电子会议系统”（EMS）需要一方面与传统群件区分开，另一方面与web会议系统

区分开。实际上，所命名类别的产品的少量特征之间存在某种重叠。与群件的主要差异是协作的强度。EMS 应当与可能在同时具有多个用户的远程显示器上示出单独计算机屏幕的内容的系统区分开。

[0138] “群件”支持在群内的协作，其中各单独贡献保持是可标识的。相反，EMS 使得该群能够协作式地产生该群作为整体对其负责的结果。在业务过程中，群件和电子会议系统彼此互补：当在 EMS 会话之前研究和创建文档时或当实现这种会话的结果时，群件支持团队。

[0139] “web 会议系统”和“电子会议系统”在在线会议或研讨会中彼此互补：EMS 通过提供用于产生并存档群结果的交互式工具来扩展 web 会议系统。另一方面，“web 会议系统”用同步在线会议中所需的且不存在于 EMS 中的屏幕共享和语音会议功能对 EMS 进行补充。

[0140] “数据会议”指的是实时共享计算机数据的两个或更多个参与者之间的通信会话。诸如屏幕、键盘、鼠标、相机等交互和演示设备可被共享。它是用来区分视频会议和音频会议的术语。数据可包括可被会议的参与者看到的屏幕、文档、图形、绘图、以及应用。

[0141] “应用共享”是使得两个或更多个用户能从他们相应的计算机同时实时访问共享应用或文档的远程访问的元素，囊括在协作式软件下。一般而言，共享应用或文档将在主机计算机上运行，并且对共享内容的远程访问将由主机用户提供给其他用户。应用共享应当与以下系统区分开：其中不同用户之间对该应用的协作是不可能的，但各单独的计算机屏幕的内容可被同时投影到具有多个用户的远程显示器上。

[0142] 术语“任意媒体内容”指的是用户可生成、创建或选择适于显示的任何媒体内容的事实。这与客户机对由会议或演示中的另一人所显示的媒体内容进行投票或选择不同。这一术语指的是用于显示内容的面向客户机的分布式权限和特权，而非提供呈现给会议成员的内容的中心演示者。

[0143] 在本文的意义上，“屏幕抓取”指的是读取视频帧缓冲区并处理它们，而非指示将它们渲染在显示器上。屏幕抓取以用于演示在 Slobodin 等人的 US2002/0196378 中描述，它通过援引纳入于此。

[0144] “自动合成”或“自动布局”指的是其中多个图形 / 视频源被渲染在中央显示器上的自动性质，无需用户干预且以用户将直观地认为它将发生的方式。

[0145] “无线”和“无线通信网络”可以是节点之间不使用电缆链路的任何网络，例如使用 RF、光或红外来用于通信目的，如 IrDA、散射红外、WLAN、WiMax、WiFi、WiFi 直连、蓝牙或本领域技术人员已知的任何其他无线通信网络。

[0146] “计算机”一般指的是处理设备，即具有能进行各种类型的数字处理的处理引擎，如渲染图形图像以供显示。计算机可以是工作站、个人计算机、膝上型计算机、掌上计算机、PDA、智能电话、平板等等的形式。一般而言，计算机具有诸如易失性 RAM 等存储器。诸如硬盘、光盘、或固态存储器等非易失性存储器可被包括在计算机中或可以是外围设备。当前，大多数计算机是电子装置，但术语“计算机”也包括基于光学器件的计算设备。

[0147] 术语“预安装的通用驱动程序”旨在意指安装在诸如计算机等处理设备上作为标准驱动程序的驱动程序，例如随操作系统的安装而安装的标准驱动程序。这样的驱动程序对操作系统而言是标准的且可驱动耦合到或连接到处理设备的标准类型外围设备。针对这样的外围设备的特定驱动程序的安装是不需要的。这样的通用驱动程序可以是人类接口驱动程序 (HID) 或大容量存储设备驱动程序，它已将预定软件组件配置成用于驱动大容量存

储、CD-ROM、键盘等、或它们的组合。这样的设备可以是可读且可写的计算机外围存储器设备，如 USB 存储棒、闪存、外部硬盘驱动器、或其他。

[0148] 附图简述

[0149] 图 1a 示出可以与本发明的各实施例一起使用的会议室。图 1b 示出根据本发明的一实施例的客户机处理设备、连接单元、基节点以及显示器的组合。

[0150] 图 2 示出根据本发明的一实施例的屏幕显示。

[0151] 图 3 到 5 示出根据本发明的各实施例的基节点和外围设备以及客户机处理设备。

[0152] 图 6 示出根据本发明的一实施例的显示器。

[0153] 图 7 示出根据本发明的一实施例的外围设备。

[0154] 图 8 示出根据本发明的一实施例的客户机处理设备。

[0155] 图 9 示出根据本发明的一实施例的又一客户机处理设备。

[0156] 图 10 示出根据本发明的一实施例的外围设备的实施例。

[0157] 图 11 示出使用平板的实施例。

[0158] 图 12 示出了本发明的又一实施例。

[0159] 图 13 到 15 示出根据本发明的一实施例使用 QR 码进行远程访问。

[0160] 图 16 示出根据本发明的一实施例的配对。

具体实施方式

[0161] 将针对具体实施例且参考特定附图来描述本发明，但是本发明不限于此而仅由权利要求书定义。所描述的附图只是示意性的和非限制性的。

[0162] 此外，本说明书和权利要求书中的术语第一、第二、第三等等用于在类似的元件之间进行区分，而不一定用于描述顺序次序或时间次序。这些术语可在适当环境中互换，并且本发明的实施例可以不同于本文中描述或示出的其他顺序操作。

[0163] 此外，本说明书和权利要求书中的术语顶部、底部、上方、下方等用于描述性目的，而不一定用于描述相对位置。这样使用的术语可在适当的环境中互换，并且本文中所述的本发明的实施例可以不同于本文中描述或示出的其他取向操作。

[0164] 权利要求中所使用的术语“包括”不应被解释为限于此后列出的装置；它不排除其他元件或步骤。它需要被解释为指定存在如所引用的所述特征、整体、步骤或组件，但并不排除存在或附加一个或多个其他特征、整体、步骤或组件、或者其组合。因此，表述“包含装置 A 和 B 的设备”的范围不应当仅限于仅由组件 A 和 B 构成的设备。这意味着相对于本发明而言，设备的相关组件是 A 和 B。

[0165] 类似地，应注意如说明书或权利要求书中所使用的术语“耦合”不应当被解释为仅限于直接连接。因此，表述“设备 A 耦合至设备 B”的范围不应受限于设备 A 的输出直接连接至设备 B 的输入的设备或系统。它表示在 A 的输出与 B 的输入之间存在路径，该路径可以是包括其它设备或装置的路径。

[0166] 所描述的设备的各元件或部分可包括编码在介质中的用于执行任何种类的信息处理的逻辑。逻辑可包括编码在盘中或其他计算机可读介质中的软件和 / 或编码在专用集成电路 (ASIC)、现场可编程门阵列 (FPGA) 或者其他处理器或硬件中的指令。

[0167] 对软件的引用可涵盖用任何语言编写的可由处理器直接或间接执行的任何类型

的程序。

[0168] 对逻辑、硬件、处理器、或电路系统的引用可涵盖任何种类的逻辑或模拟电路系统，可以集成到任何程度，且不限于通用处理器、数字信号处理器、ASIC、FPGA、分立组件或晶体管逻辑门等。

[0169] 本发明的各实施例提供对会议的三个主要问题的解决方案：

[0170] a) 准备会议所花的时间。这主要通过允许任何可显示信息的“进行中”演示来实现。这一信息不必被链接到任何特定演示软件，也不必与任何这样的演示软件兼容，

[0171] b) 使用电子会议工具进行会议所花的时间。这通过缩短将计算机连接到显示器或投影系统的时间来实现。

[0172] c) 反映并审阅以及会后存档所花的时间。这通过提供以与进行会议相同的时序记录会议进程的可能性以及能够存储所呈现的所有数据以及谁呈现了该数据的可能性来实现。

[0173] 其中在显示器或投影仪上呈现视觉信息的会议一般遭受独占效应的损害：单个演示者确定显示内容并且因此具有影响会议活力以及由此影响其结果的不均衡能力。允许多个个人同时示出他们的信息的系统是已知的。

[0174] 不同地，大多数会议由某一类邀请系统（Outlook、WebEx、GoToMeeting 等）发起，它们在会议室系统的外部（通常经由电子邮件）并且由此是混淆的且不灵活的。

[0175] 尽管以上问题可能在高度结构化且熟练管理的集会（如，董事会议）中没有呈现出妨碍，但它们确实对大多数自组织会议（尤其是没有结构化议程和与会人员列表的那些会议）造成混淆和频繁延迟。

[0176] 图 1a 是可以与本发明的各实施例一起使用的具有会议桌的通用会议室 30 的示意表示。参与者 37 具有诸如膝上型计算机、平板、PDA 等某种形式的处理设备 31。处理设备 31 中的每一个可以是主机设备且具有相耦合的第一连接单元 47。第一连接单元 47 提供对网络 50 的接入，在这一情况下网络 50 是无线网络，但可以是有线网络。网络是共享资源通信网络，因为不同设备和参与者可通过该网络传送数据。每一连接单元 47 可耦合到输入设备 48，这将在下文更详细地描述。用户 37 通常将处于距处理设备 37 的在人体工学上令人满意的某一距离处。这一人体工学边界通常是约 1000 平方厘米到 4000 平方厘米的面积。这一人体工学边界通常将使用户处于该边界的一侧，并且手臂的舒适伸展将确定落在该人体工学边界内的处理设备的左侧和右侧上的区域，且该处理设备的边界的远边（通常由显示屏来定界）将确定该人体工学边界的另一侧。由该人体工学边界所限定的区域将与处理设备 31 本身重叠或包括该处理设备 31。处理设备也将具有外侧物理边界。输入设备 48 优选地被安排成在处理设备 31 的边界之外、但在人体工学边界之内操作。优选地，输入设备被安排成在它平放在桌子上时工作。输入设备优选地具有 1 和 144 平方厘米之间的激活面积的大小。

[0177] 优选地，网络 50 是局域网，即共享资源通信网络且出于安全原因优选地在会议室本地，但网络 50 可能能够访问其他局域网或广域网（如 51）或较大企业网络或因特网 43，例如经由路由器 42。网络 50 的另一节点是基节点或显示节点 36。这一节点 36 可任选地是无线接入点。基节点 36 也可以是处理设备或主机计算机，并且可耦合到提供对网络 50 的接入的第二连接单元 49，由此将所有处理设备 31、36 链接在一起。连接单元可具有上述

输入设备。或者，可以使用安装在基节点 36 上的网络连接。音频装备 46 可被提供，例如允许会议的其他成员从远程目的地呼入的电话。

[0178] 显示节点 36 耦合到并适配成允许在某一种类的显示器 44 上显示媒体。在本发明的各实施例中，显示节点是通信网络 50 的基节点。显示器 44 可以是投影仪或屏幕，该投影仪耦合到基节点 36。可任选地提供白板 45，白板 45 可任选地耦合到显示器 44 和 / 或基节点 36，例如在白板可电子地记录它上面写了什么时。可任选地，相机 35 可被提供以记录白板 45 上的条目。相机 35 可具有用于将相机 35 连接到网络 50 的第三连接单元 52，从而来自白板的数据可被记录并存储或经由路由器 42 传送到其他网络。连接单元 52 可具有输入设备，如以上参考连接单元 47 描述的。

[0179] 可任选装备可以是用于记录会议的进展的相机 39、40、41。这些相机可通过网络 51（例如，电缆网络）链接到路由器 42 和 / 或基节点 36。另一可任选项目是可被用来例如向处理设备 31 以及向附连到基节点 36 或显示器 44 的一部分的扬声器（未示出）传送音频的一个或多个话筒 38。

[0180] 处理设备 31、相机、白板等的输出中的任一个或全部可被记录并数字地存储，例如存储在节点 36 中或其他地方，以提供具有正确时序的完整记录。

[0181] 综上所述，本发明提供了一种用于在不同用户 37（具有他们自己的处理设备 31，例如 PC、移动电话、或平板）与会议室 30 中一个显示器或投影仪或者多个显示器或投影仪 44 之间传递任意媒体内容的电子会议工具。

[0182] 参考图 1a 和 1b，本发明的各实施例包括作为处理设备的基节点或显示节点 36，例如适配成接收用户所选的任意媒体内容的主机计算机，基节点 36 耦合到中央显示器 44，中央显示器 44 可以是固定格式显示器或投影仪或类似设备。该任意媒体内容可以从用户处理设备 31 中的任一个提供。基节点 36 可适配成根据一组规则（例如 FIFO、自动、根据请求或批准、强制显示、根据优先级，等等）显示接收到的用户所选的任意媒体内容。可任选地，基节点 36 适配成强制显示接收到的用户所选的任意媒体内容，即允许单独用户独立于名义上负责给出演示或主持会议的人在显示器 44 上显示自己的所选内容来参与会议强制显示也可被认为是一规则。短语“对显示设备的单方电子访问权”将这一种类的规则限定为“单方”意味着显示过程是只通过会议涉及的一个参与者的动作来获得的，无需另一个或其他参与者的同意。术语“单方”暗示显示的数据被允许盖写或替换由会议的同一或另一参与者显示在屏幕上的任何数据。该会议工具也可适配成允许优先级设置。这意味着用户可为要显示的媒体设定优先级设置。例如，优先级“1”可被基节点解释为强制显示，优先级“2”可被基节点解释为尽快显示，优先级“3”可被基节点解释为置于队列中并到时显示，等等。设置并使用显示优先级也被认为是按规则工作。为了执行规则，基节点 36 可以具有决策模块。基节点 36 可以是具有诸如微处理器和存储器等处理引擎的主机计算机。优选地，基节点 36 适配成按平等的方式来对待从连接单元 47 中的任一个或全部传递给基节点 36 的媒体内容。基节点 36 可适配成在相连接的中央显示器 44 上自动合成媒体内容，例如来自一个或多个处理设备 31 的媒体内容。

[0183] 本发明的独立方面是至少一个连接单元 47（可任选地用于接收的 49 或单元 52）适配成将用户所选的任意媒体内容传递给所述基节点 36。优选地，连接单元 47 和 / 或可任选地 49 或 52 是物理即插即用设备。连接单元的示例在图 10 中示意性地示出。

[0184] 连接单元 47 可被集成到用户处理设备 31，例如作为内部外围设备或可优选地是包括适配成耦合到用户处理设备 31 的端口的连接器的外部外围设备。处理设备 31 可具有客户机显示器、诸如微处理器等处理引擎、存储器以及操作系统。可任选连接单元 49 可被集成到基节点 36，例如作为内部外围设备或可以是包括适配成耦合到基节点 36 的端口的连接器的外部外围设备。连接单元 49 可完全集成到基节点 36，例如作为基节点 36 的内部网络接口。基节点 36 可具有处理引擎，如微处理器、存储器以及操作系统。

[0185] 用户处理设备 31、连接单元 47（可任选地 49 或 52）以及基节点 36 协作来形成用于多个处理设备 31、36 中的至少一个与中央显示设备 44 之间的链接的通信网络 50。通信网络 50 适配成接收来自多个处理设备 31 中的至少一个的任意媒体内容并将该多个处理设备 31 中的至少一个的任意媒体内容传送到中央显示设备 44。

[0186] 本发明的独立方面是适配成加载到客户机处理设备 31 上并在客户机处理设备 31 的操作系统上运行的便携式应用 60。便携式应用 60 作为客户机处理设备 31 上的进程来运行，它适配成响应于施加到输入设备 48 的用户动作来将来自客户机处理设备 31 的任意媒体内容递送给通信网络 50，该进程在终止时在处理设备 31 上留下零足迹。网络 50 是共享资源通信网络，因为不同设备和参与者可通过该网络传送数据。可任选地，便携式应用 60 被存储在每一连接单元 47 以及可任选地 49 或 52 上。优选地，便携式应用 60 适配成对客户机处理设备 31 的客户机显示器的内容进行“屏幕抓取”。可任选地，便携式应用 60 当在处理设备 31 上运行时适配成对这一客户机处理设备 31 的客户机显示器上的内容进行“屏幕抓取”并经由连接单元 47 来传送它。可任选地，便携式应用 60 当在处理设备上运行时适配成对客户机处理设备 31 的客户机显示器上的内容进行“屏幕抓取”并经由处理设备 31 的网络接口来传送它，例如在连接单元 47 不具有发射机的情况下。

[0187] 用于与所述基节点 36 通信的连接单元 47 具有网络接口，例如包括发射机 62。发射机 62 优选地是收发机。可任选地，发射机 / 接收机可以是无线发射机 / 接收机。

[0188] 用于与连接单元 47 通信的基节点 36 具有可被包括在连接单元 49 或集成到基节点 36 的接收机 63。该接收机优选地是收发机。可任选地，发射机 / 接收机可以是无线发射机 / 接收机。

[0189] 输入设备 48 允许与连接单元 47 的用户交互。优选地，输入设备 48 是耦合到连接单元 47 的物理致动器。施加到输入设备 48 的用户动作生成可触发从（与连接单元 47 相耦合的）处理设备 31 到网络 50 的数据传送的信号。优选地，输入设备 48 具有处于 100 与 14400 平方毫米之间的激活表面。任选地，输入设备 48 可以是显示在客户机处理设备 31 的客户机显示器 1 上的键。这一键可被激活，例如通过使用诸如鼠标等定点设备触发从处理设备 31 到网络 50 的数据传输。

[0190] 连接单元 47 优选地提供有视觉指示器 61，例如用于允许来自连接单元 47 的对任何活动的状态的用户反馈。

[0191] 该系统还可包括适配成被加载到基节点 36 的服务器程序 64，所述程序 64 适配成通过所述连接单元 47（可任选地 49）接收来自一个或多个客户机处理设备 31 的任意媒体内容并将该多个任意媒体内容流示出在一个或多个显示器 44 上。服务器程序 64 可适配成允许根据一个或多个规则（例如 FIFO、自动、根据请求、强制、根据优先级，等等）的显示。强制规则可被描述为允许参与者“对显示设备的单方电子访问权”。“单方”意味着显示过程

是只通过会议涉及的一个参与者的动作来获得的，而无需另一个或多个参与者的同意。术语“单方”暗示供显示的数据被允许盖写或替换由会议的同一或另一参与者显示在屏幕上的任何数据。为了执行规则，服务器程序 64 可以具有决策模块。

[0192] 优选地，服务器程序 64 适配成按平等的方式来对待从连接单元 47 中的任一个或全部传递给它的媒体内容。服务器程序64可适配成在中央显示器44上自动合成媒体内容。

[0193] 服务器程序 64 可以是适配成被加载到基节点 36 上并在基节点 36 的操作系统上运行的便携式应用。便携式应用 64 在适配成显示经由通信网络 50 从客户机处理设备 31 接收到的任意媒体内容的基节点 36 上运行进程，该进程在终止时在基节点 36 上留下零足迹。可任选地，便携式应用 64 被存储在每一连接单元 49 以及可任选地 7 上并可从中安装。

[0194] 该系统还可包括中央显示设备 44 并且可任选地包括白板 45 或其他显示装置，如打印机。显示器 44 适配成接收用户所选的任意媒体内容，并且可适配成允许根据一个或多个规则（例如 FIFO、自动、强制、根据请求或批准、根据优先级，等等）来显示接收到的用户所选的任意媒体内容。强制规则可被描述为允许参与者“对显示设备的单方电子访问权”。“单方”意味着显示过程是只通过会议涉及的一个参与者的动作来获得的，而无需另一个或多个参与者的同意。术语“单方”暗示供显示的数据被允许盖写或替换由会议的同一或另一参与者显示在屏幕上的任何数据。

[0195] 可任选地，连接单元 47 之一可适配成作为主机连接单元。这样的主机连接单元可适配成指令基节点何时可显示来自客户机处理设备 31 的媒体内容或处理设备中的哪一个可被允许发送内容以供显示。

[0196] 在本发明的各实施例中，至少一个便携式应用被用作例如客户机处理设备 31 上的或可任选地基节点 36 上的客户机软件。在这些实施例中，相关计算机设备 31、36 上的操作系统的预安装的通用驱动程序之一被用于经由连接单元 47（可任选地 49 或 52）建立从计算机设备 31、36 到网络 50 的通信。该通用驱动程序结合作为外围设备来操作的连接单元 47（可任选地 49 或 52）使用，但该使用可超出该通用驱动程序所预期的标准类型外围设备。在一些实施例中，作为外围设备来操作的连接单元 47（可任选地 49 或 52）通过使用预安装的通用驱动程序所提供的通用通信协议与相关处理设备 31、36 通信。预安装的 USB 驱动程序是示例。优选地，使用连接单元 47（可任选地 49）建立网络 50 的通信不更改或影响相关处理设备 31、36 的联网能力。例如，如果浏览器是在客户机处理设备 31 上启动的，则这一浏览器可以使用处理设备 31 上的标准网络接口。这意味着经由连接单元 47（可任选地 49）的数据传输独立于经由处理设备 31 或 36 的网络接口的数据传输。这具有以下优点：每一用户可以独立于要在会议期间显示的数据的传输来执行诸如搜索因特网以收集数据或接收邮件等等的处理。

[0197] 使用便携式应用具有可避免对注册表中或一般在操作系统中的设置的任何修改的优点，从而在任何形式的终止（例如，将电子设备断开连接，系统崩溃）之际，不留下痕迹。这一般称为“零足迹”。

[0198] 本发明具有可扩展性的优点。它可提供供会议中的多个用户使用的显示系统。会议中的每一用户因而可具有用于耦合到连接单元 47 的客户机处理设备 31。第一用户动作将客户机处理设备 31 连接到基节点 36，例如通过将连接单元 47 插入到处理设备 31 上的相关接口连接器，例如 USB 接口。包括激活输入设备上的按钮或键（例如，通过按下它）的第

二用户动作随后启动将任意媒体内容从客户机处理设备 31 传送到基节点 36 的进程。这一进程优选地包括对来自处理设备的数据进行屏幕抓取。使用屏幕抓取避免了在基节点 36 上安装特殊程序来执行从处理设备 31 发送的图形命令。在基节点 36 接收到多个任意媒体内容时，它可以允许在相连接的中央显示器上自动合成该媒体内容。

[0199] 现在将参考某些更具体实施例来进一步描述本发明。

[0200] 在一些实施例中，本发明提供了一种系统和 / 或方法，其中在一方面，在来自一个以上的源处理设备（如膝上型计算机、PDA、智能电话、计算机、平板，等等）的任意材料被呈现在显示设备上时可覆盖所有当前显示的材料。在一个方面，本发明通过与谈话类似的方法（即，全双工且具有中断或获得对显示设备的单方电子访问的选项）来控制视觉通信和信息的显示。

[0201] 本发明的一个实施例可以通过可连接外围设备（如兼容 USB 的设备）来实现，以使得在该外围设备连接到被用来提供诸如文本、视频、图片等任意信息的处理设备时，具有处理设备的每一单独用户可以获得对显示器（例如，屏幕）的访问权。通过出席会议，用户可以通过插入该外围设备来将该外围设备与处理设备配对。用户还可以将该外围设备与控制会议室中的显示器且可通过诸如有线或无线通信网络等通信网络连接到该外围设备的基节点或基单元配对。网络是共享资源通信网络，因为不同设备和参与者可通过该网络传送数据。为了实现这一点，该外围设备具有能够经由基节点将来自处理设备的任意数据传送给显示器的收发机。在一个选项中，显示在处理设备的本地显示器上的信息是经屏幕抓取的且被传送。为了允许这一点，该外围设备可包括能够在外围设备上执行且在终止时留下零足迹的便携式应用。虽然物理可连接的外围设备是方便的，但该外围设备也可经由无线连接（例如，经由蓝牙协议）耦合到处理设备。

[0202] 对于具有远程参与者的会议，不可能依赖于相同的硬件可连接的外围设备来直接提供从远程位置对会议室中的显示器的访问权。通常，在家中或在宾馆中，参与者只具有电话和膝上型计算机或某一其他种类的便携式计算设备上的因特网接入。远程参与者缺少上下文（例如，非语言交流）并且具有不及理想的音频 / 视频连接并且因此遭受权力不对称。通常，远程参与者也没有方法将他们的内容‘推送’在屏幕上，因为会议由组织演示的序列的会议组织者或主持者来控制。

[0203] 本发明的一个关键优点是提供远程协作，同时维持某种类型的‘环境意识’。这意味着所看到的与内心意识图具有直接关系。这允许跟踪多个信息流并且能够将其与任何其他信息快速相关，例如与在本地计算设备上执行的搜索进行快速相关。

[0204] 在本发明的另一方面，通过以下来避免混淆和挫折：

[0205] 1. 保留从任何位置发送到一个会议室中的一个显示器或多个会议室中的多个显示器的任何图像的高宽比（例如，长的事物还是长的事物）

[0206] 2. 在会议室中的显示设备中的任一个上不重叠图像和 / 或窗口（例如，永不必猜测或记住什么被隐藏）

[0207] 3. 在每一屏幕上示出相同的图像安排（每个人看到相同的事物并且可以引用它们），这意味着在多个屏幕中的每一屏幕上的图像拓扑安排是相同的，

[0208] 4. 最大化屏幕有效面积的使用（例如，所呈现的图像不具有包含无用信息的边界），同时优选地，不允许图像的重叠

[0209] 5. 允许缩放和平摇的局部操纵，但允许返回以上项目 3 的默认布局

[0210] 6. 将本地显示器特性纳入考虑来在每一显示器上安排各图像，这些特性诸如分辨率、像素密度、高宽比中的任一个，

[0211] 7. 可任选地，还允许所有参与者听到正在进行的音频连接，例如，语音通信将被用来更改屏幕的内容。

[0212] 在各实施例中，本发明的各组件优选地是：

[0213] 共享（例如，虚拟、数字）画布，其上存储有所有视觉信息。该画布被映射到一个或多个地理位置处的一个或多个物理显示器上并且可至少与最大显示器一样大。会议参与者可以添加或删除视觉信息，例如本地参与者可以使用根据本发明的各实施例的外围设备，他们的操作是：一个点击将用户屏幕添加到画布，另一点击移除它。可任选地，长点击只使用该用户的屏幕来替换当前画布内容。该画布被维护在所有会议参与者可电子地访问（例如，虚拟、数字）的位置，但各参与者只可在具有“令牌”的情况下才能改变该画布。通过使用单个画布，向所有参与者给予对这一画布的访问权并向其他位置广播该画布上的信息，任何参与者可以作出对该画布的可控且一致的修改。

[0214] 同时，令牌是改变画布上的信息以及作出这些改变的权限的手段。令牌是信任的符号；它们只从个人传送到其他个人。只有具有令牌的参与者可以向其他人给出附加令牌。在本地使用的硬件外围设备是令牌的示例。用户将该外围设备与处理设备以及基节点或单元配对。用户因为对该外围设备的选择以及它与处理设备的配对而与它相关联。这一过程固有地提供信任……与授予要出席会议的用户相同的信任。根据本发明的一方面，远程参与者具有与拥有令牌的任何其他人相同的权限，但物理令牌没有被远程地传递给用户。在一个方面，各会议参与者之间的第一联系是使用语音通信。语音通信是传送令牌的良好介质。它适于信任传送，因为 a. 通过知晓某人的电话号码（个人蜂窝电话号码或用户当前所处位置（如宾馆或家中）的号码），存在着个人联系的暗示以及 b. 人类语音是相当好的标识手段。

[0215] 本实施例中的令牌通过语音指令来传送并且需要传达对画布作出贡献的手段。实现令牌的一种方式是会议的 URL 加唯一会话 ID 与隐式地一个或多个会议室的组合。在一个方面，这两者的组合给出对用作两个目的的会议专用网站的访问权：1. 可任选地下载并安装屏幕捕捉软件程序以及 2. 给出对共享画布的访问权。1. 和 2. 的组合向使用诸如膝上型计算机、PDA 或智能电话等便携式处理的远程参与者提供了与本地参与者相同的功能。因为语音指令需要简洁，所以类似于 tinyURL.com（或 1ilURL 或 TightURL）的服务可被用来组合网站 + 会话 ID。为了避免错误，缩短的 URL 将使用易于发音的字符子集并且避免语言混淆（如 G&J 或 I&E 之间）。一个示例是仅限十六进制字符。

[0216] 一种用于传送令牌的另选方法是使用消息收发服务，诸如如通过短信息服务 (SMS)。这不是语音联系，但它包括与已知个人使用的移动电话号码相同的信任水平。如果有必要提高安全性，则可首先通过电话来联系该人并且只在这之后才发送 SMS 消息。如果需要，可以使用口令，由此可以使用第二口令来指示该人是被迫的，以使得 SMS 消息不应被发送。

[0217] 会议会话 ID 指示画布、令牌与屏幕之间的临时连接。在一个方面，会话 ID 是在第一物理外围设备被插入会议室中的处理设备并作出与基节点或单元的连接时自动生成的。

随后可使得这一会话ID对拥有外围设备的每一个人可见。这可以通过以下来实现：a. 改变由该外围设备实现的大容量存储设备的名称，或 b. 改变该外围设备上大容量存储设备卷上的文本文件的名称或内容或 c. 外围设备上的显示（如果提供了这样的显示器），或 d. 会议室中的中央显示设备上的显示。会议 ID 或媒体会议代码使得可处于不同位置处的多个参与者易于参与媒体会议。

[0218] 例如，在会议室的显示器上，显示数字或字母数字媒体会议代码。为了共享内容，各参与者可以通过在他们的处理设备上输入媒体会议代码，例如在网页中或专用软件客户端中，将他们的诸如膝上型计算机等处理设备经由网络与会议室连接。

[0219] 会话 ID 执行以下功能：

[0220] • 访问控制：只有亲临会议室的人才能够看到该代码。这确保只有会议室中的人或从会议室中的某人（例如，通过电子邮件或电话）接收到该代码的人才能与该会议室连接。这提供了信任。

[0221] • 会议室位置：输入该代码的远程人员自动与正确的会议室连接并且不必劳烦在可能会议室的列表中搜索会议室或者输入会议室的地址（IP、电话号码、……）。参与者甚至不必知晓他们在哪一会议室中。

[0222] 媒体会议可以在一个人连接到中央显示器时就开始。可任选地，只要没有人连接到中央显示器，ID 或媒体会议代码就以特定频率（例如，每分钟一次）变化。在新代码出现时，先前代码不再可使用。这确保在实际会议开始之前可能的侵入者不能偷窥媒体会议代码。ID 或代码在媒体会议的整个持续时间期间保持不变。在最后参与者断开连接时，媒体会议结束。此后，该 ID 或代码将再次改变。

[0223] ID 在单个易于使用的代码中提供多个目的（访问控制和会议室位置）的组合。当前市售产品需要分开的会议室位置代码（例如，电话号码、电子邮件地址、IP 地址、……）以及分开的控制对媒体会议的访问的手段（例如，口令、由会议主持人手动接受传入呼叫、……）。例如，为了加入 WebEx 会议，参与者需要知道会议号（＝位置）以及会议口令（＝访问控制）两者。视频会议设备需要远程参与者知道电话号码 /IP 地址（＝位置）以及需要本地参与者接受传入呼叫（＝访问控制）。

[0224] 在一实施例中，会议会话的开始优选地是不对称的，因为远程参与者不能发起会话。会议必须由拥有物理外围设备的人来开始。

[0225] 在所有令牌（本地和远程）已切断它们与画布的连接时，即所有物理外围设备被拔出并且所有远程会话与会议网站断开连接，会话结束。因为远程用户可能偶然地或秘密地保持连接，所以另选的结束会话的方式是：在所有外围设备被拔出且预设时间已过去或者会议基站或基单元上的复位按钮已被按下时，会话结束。

[0226] 画布是存储被或可以被显示在一个或多个显示器或投影仪上的视觉位图的共享存储器。画布是可容易且便宜地实现的简单二维结构。一个另选实现是将画布存储为可由浏览器渲染的 HTML5 页面。

[0227] 画布的大小（其宽度、高度或色彩深度）优选地至少是最大显示器的大小。这确保最大显示器以其最大能力来被使用。画布映射功能优化较小显示器上的易读性。

[0228] 画布通过优化其在每一特定显示器上的视觉外观的变换函数（例如，内插、（解）交织、大小重新采样、缩放，等等）被映射到显示器上。画布映射功能首先确定它映射到的

显示器的类型，并随后选择用于典型会议室环境中的最优易读性的分辨率、帧率、色彩深度、以及色彩映射功能（伽马、亮度、对比度），并且还在显示多个图像时维持图像的拓扑安排——这意味着远程参与者可以一致地引用图像，例如“左上”。

[0229] 画布映射跨各显示器保留边界和高宽比（即，它没有拉伸也没有裁剪）。在大型固定格式显示器（如 LCD 显示器）或投影仪屏幕上的映射的典型实现中，画布优选地被调整大小以适合屏幕的完整高度或宽度。在用于智能电话的实现中，这一相同方法被使用，但最终用户可以例如通过捏合 / 拉伸来缩放各细节。

[0230] 多个贡献者可以修改画布的矩形、非重叠部分。通过将布局限于简单的矩形部分，通过语音来引用特定内容在屏幕上的位置（“请看左上图片”）以将注意力吸引到该特定内容是可能的。各画布部分可由它们的贡献者的标识来标记（如用户名或计算机名）。

[0231] 对画布的贡献的大小和位置在自动算法的控制之下。该算法是一种简单的规则，如：1. 第一贡献填充整个画布，2. 第二贡献将屏幕水平地分成两个相等部分，其中第一贡献显示在左侧，3. 第三贡献垂直地划分画布，其中前两个贡献在顶部，以此类推。这一规则的简单性以及直接贡献者对算法定位的影响的缺失允许会议参与者预测内容将显示在何处，从而最小化（远程）参与者之间的混淆。

[0232] 画布的一个实现是具有用于更新且映射其内容的（远程）访问功能的存储在一个物理位置上的存储器。本地高速缓存结合脏分块 (dirty-tiling) 或感兴趣区域编码技术可被用来最小化通信有效载荷。或者，如在 www.shared-canvas.org 中，基于 web 的技术可被使用。

[0233] 画布的一个实现是按 XML、HTML 或类似格式的画布布局及其所有组件的逻辑描述，其中画布的物理实例化只在会话中的参与端点处发生。对画布内容和 / 或画布分辨率、会话 id、令牌、令牌与会话之间的关系的维护可作为外部服务提供给该解决方案的用户。

[0234] 一种用于传送令牌的另选方法是可由相机（如 web 相机或者智能电话或平板中的相机）拾取的视觉代码。令牌可以是代码的形式，如 2D 条形码。这样的代码是“QR”码——参见图 13 到 15。该代码可以显示在处理设备的显示器上，如计算机、膝上型计算机等。

[0235] QR（图 13）用作方便用于电子屏幕与智能电话的组合的秘密代码。该代码中的秘密（即，QR 代码的内容）信息是哪一屏幕属于哪一会议。

[0236] 所以，本地会议室基站知道它连接到哪一屏幕。它不知道它属于哪一会议。可以提供一种机制，像在物理外围设备首次被插入本地处理设备时，可任选地在发起会议并由此作出中央显示器与会议之间的关联的合适的超时时段（见上）之后。随后可生成 QR 码。QR 码包含会议 ID 和 URL 以（在优选实施例中，间接经由共享画布）访问中央显示器。

[0237] 这一 QR 码被显示并且可由任何会议参与者拾取。这些参与者随后不需要外围设备，而是可以使用 QR 码中列出的资源来连接到他们可在其上显示其数据的在线画布。

[0238] 图 14 示出来自两个参与者的处理设备的图像，如在本地显示器或中央显示器上看到的。

[0239] 在图像中央的用户标记可在每一改变之后的几秒内可见（例如，在新处理设备被添加会议或从会议移除时）。

[0240] 用户的令牌是画布服务所知的事物，在连接到源时，它向用户 / 资源服务询问与关联于从中知晓用户标记的令牌的源相关联的用户的公共用户名。

[0241] 这在远程会话中尤其重要，因为它允许所有用户与源相关联并且因此将屏幕上的各区域与用户相关联，现在他们可以说‘我不同意 Piet 给出的数字，即使 Piet 是远程的且不在会议室中……’。

[0242] 在图 15 中示出的图像可以在任何时刻示出，以允许其他参与者获得对会话 QR 码的访问权，从而开始共享内容（如果他们在会议开始时错过机会的话）。

[0243] 对于远程参与者，提供了一种用以传递秘密（会议 ID 和 URL）的方法。如上所述，这可以是语音指令，或 SMS 消息。

[0244] 本发明的一方面是以下实现：语音通信可以是总体系统的集成组件。语音含义与视觉含义交织，并非只在演示是多媒体事件（幻灯片和讲话）的意义上，而是会议的管理可以说语音和（电子）视觉协作。例如：

[0245] • 传送令牌的一种方式是将它们口头传递给远程参与者。这假定在任何事物之前存在音频链路，并且需要短且简单的令牌串来将通信误差保持为最小。

[0246] • 通过为所有会议参与者维护单个布局（拓扑结构），易于通过语音指令来引用屏幕上的元素。相反，不能以简单语言描述的所有屏幕管理被禁止。

[0247] • 在这一场景中，因为总是可以依赖音频信道的存在，所以也可以使用这一基础结构来消除或减少硬件物理外围设备和 / 或虚拟屏上按钮的数量。可以使用语音命令，结合语音识别，来更改屏幕布局。‘虚拟按钮’可以是类似 Siri 的界面：

[0248] • “显示我的屏幕”

[0249] • “放大我的屏幕”

[0250] • “隐藏我的屏幕”

[0251] • “移除右上屏幕”

[0252] • “移除所有屏幕”

[0253] 如上所述，用户可以用各种方式获得对令牌的访问权，通过语音通信、通过消息收发（如 SMS）、或通过使用相机（例如，在他们的智能电话或平板中）扫描 QR 码。根据本发明的又一方面，最后缺失的一环是将用户内容与令牌连接。

[0254] 例如，用户可具有该用户想要用作会议会话中的内容源的处理设备，诸如膝上型计算机、PC、智能电话、或平板，但该用户正在使用移动电话来检索他的令牌。用户可能尝试将令牌从电话移至便携式处理设备 PC，例如通过简单地复制它并将它输入在便携式处理设备 PC 上的网页上，但因为这是重复动作，即用户在每次他 / 她参与会议时都必须这样做。

[0255] 本发明的另一方面还提供一种用于这一问题的解决方案，如图 11 所示。在一个实施例中，本发明的系统或方法允许在用户选择的情况下在一个或多个移动设备上下载并安装应用的可能性。用户随后在中央服务处注册他 / 她自己，其中用户被分配 ID。用户可以从该应用将计算机源（用户处理设备、他的 PC 或可能多个处理设备，如 PC 或平板计算机）与用户 ID 配对。

[0256] 将处理设备计算机源配对的过程可以像从该处理设备在网页上冲浪一样简单，这将示出唯一的源 ID（例如，通过再次示出 QR 码）。参考图 16，通过用移动设备从处理设备的 PC 本地屏幕读取 QR 码，PC 本地处理设备被链接到用户 ID。该信息以 cookie 的形式或类似方法被存储在处理设备 PC 上。如果用户源处理设备 PC 不能存储永久数据，则一种另选方式是用户将他的处理设备 PC 指向 web 位置，其中用户登录到中央服务，此时源处理设

备 PC 再次与用户 ID 自动关联。

[0257] 另一实现可以是扮演与处理设备 PC 上的移动电话应用相同角色且会在用户激活时连接到中央服务的浏览器应用（示例实现可以是 Chrome 浏览器应用）。

[0258] 在用户随后使用用户移动电话应用检索令牌以参与会话时，该应用将允许用户共享计算源或选择他的本地计算源之一来添加到画布或从画布移除，该画布是用令牌所连接到的会话来引用的。

[0259] 图 11 示出平板如何连接，留下到企业网络或因特网的连接，并且没有集成无线网络来用于企业 IT 中的显示。它只需要基站的外出连接，例如可以直接引导到公司 DMZ 中的路由器。

[0260] 在此，存在从平板到会话的配对。该应用可以用于最强、非连接的无线网络。'会话'可以是静态且命名的，例如显示的会话 ID，或通过分析屏幕上的内容，例如基站可以向服务器发送内容的指纹，该指纹可由该应用或云服务通过发送当前屏幕的图像来计算。因为存在应用，所以可以伴有与如何实现配对有关的指令。如果基站具有音频输入，则可以通过云服务所请求的合适的音频消息来完成。

[0261] 参考图 12，即插即用外围设备 1 中的存储储存在该即插即用设备经由第一即插即用接口 1a 连接到第一处理设备时由第一处理设备自动执行的代码。在即插即用设备上的按钮 2 被首次按下（第一用户动作）时，代码由第一处理设备 L11 执行以发起第一处理设备与第二计算设备（即，基单元或节点）之间的显示数据交换。该数据交换优选地无线地（例如，蓝牙、IEEE 802.11/ Wi-Fi® WiFi、IEEE 802.15.4 以及 ZigBee、……）来完成，但可以经由有线连接来完成。处理设备 L11 与接收设备 B1 之间的数据交换可以独立于因特网（例如，这两个计算设备之间的直接无线通信）或通过因特网以及中间存储设备 C 来完成。存储设备 C 通常具有从例如数据分组提取信息、对它进行排序、重新安排它、创建数据文件、写入文件、擦除文件中的特定元素、……的计算能力。除非另外指明或通过上下文显而易见的，将讨论其中现实世界在如 L11 等计算处理设备、如 B1 等基节点以及存储设备 C 之间交换的情况。在这种情况下，显示数据通过处理设备 L11 的通常可用的通信接口（Wifi、以太网……）被发送给存储设备 C。诸如路由器、LAN 硬件、因特网提供者硬件、陆线、对 GPRS 和 / 或移动电话网络的接入等支持设备被假定是可用的，且不是对本发明的限制，并且将不进一步讨论。基单元 B1 例如是配备有如下以及其他事物的计算机：图形卡，硬盘存储器，以及例如 AMD® Sempron™150（2.9Ghz，1MB 高速缓存）、AMD Athlon™ II X2250（3.0GHz，1MB 高速缓存）、AMD® Athlon™ II X4645（3.1GHz，2MB 高速缓存）等处理器，例如 Windows® 7Professional，64 位等处理系统，例如 1333Mhz 的 6GB 双通道 DDR3SDRAM-3D1MM 硬盘 1000GB SATA 等存储器，用于读取 CD ROM 的光学站，例如 ATI Radeon™ HD4200 集成图形卡、512MB NVIDIA® GeForce G405 图形卡、1GB DDR3 AMD® Radeon™ HD 6450 图形卡或可现货购得的类似图形卡等等视频卡，系统卡上的 10/100/1000 以太网 -LAN；例如 Dell Wireless 1525802.11n PCIe- 网卡、VGA- 连接和 / 或 HDMI™ 连接等用于连接到显示器 D1 的无线通信接口。中央存储设备 C 也可以是与已被配置成服务器的 B1 相同或相似的计算机。

[0262] 来自第一处理设备 L11 的"经屏幕抓取"的显示数据 3 被发送给中央存储设备

C(直接由L11发送,或在另一实施例中,通过基单元B1发送)。该信息按例如HTML5来编码,包括标识经屏幕抓取的信息的来源(在该示例中是L11)的标识符id。存储设备C随后被基单元B1咨询以在显示器D1上显示该显示数据。

[0263] 在按钮2被第二次按下时,处理设备L11通知中央存储C经屏幕抓取的显示数据3必须被擦除。在第一实施例中,中央存储C通知基单元B1显示数据已经被更改。B1随后咨询中央存储C并上传显示数据,直至在C上可用并在D1上显示它。在以上给出的简单示例中,假定在首次按下按钮2之前没有显示数据在C上可用,没有显示数据将保留在C上且没有数据将显示在D1上(例如空白屏幕,如果D1是液晶显示器的话)。标识符可以是可被编码在由作为L11的处理设备发送的数据分组中的任何实际标记。这可以是IP地址、MAC地址、即插即用设备中记录的唯一标识符(例如,在通过对闪存编程、设置变光开关……来装配时分配给该即插即用设备的号码)。在本说明书中进一步描述的智能电话P31的情况下,唯一标识符可以是电话号码本身。生物测定也可被用来标识用户并向用户分配标识符id。

[0264] 在第二实施例中,L11与基单元B1通信,基单元B1进而通知C它必须从其存储器擦除显示数据3。在一特定情况下,与基单元B1的通信是通过配备有RF接口的即插即用设备1完成的。

[0265] 在本说明书的其余部分,除非另外指明,按下按钮(或进一步描述的等效动作)以及对显示在D1上/在存储器设备C上可用的数据的最终影响将被称为"事件"。

[0266] 即插即用设备可被例如在处理设备L11上运行的代码替换。在这种情况下,按钮2被(良好定义的)触摸屏区域(智能电话的情况)或膝上型计算机的键盘上的键替换。将触发事件的触摸屏区域可以由所显示的图标来指示。或者,将不显示图标,并且事件将通过"刷扫"触摸屏来触发。其他另选方法包括连接到计算设备的相机作出的姿势识别、语音识别及激活、指纹感测、……。

[0267] 分别配备有计算设备(例如,"膝上型计算机")L11、L12或像P13等智能电话的若干用户(例如,U11、U12、U13)聚集在配备有基单元B1和显示器D1的第一会议室R1中。第一处理设备L11配备有外围设备d11,而另一处理设备L12将依赖其键盘(或另选的传感器)上的键来触发事件,而智能电话P13将依赖其触摸屏。

[0268] 在地理上远离R1的另一会议室R2中,用户U21、U22、U23……配备有计算设备L21、L22、L23……,这些计算设备配备有即插即用设备d21、d22、d23……或触发事件的另选方案之一。

[0269] 在又一位置,例如,宾馆房间、车……,"商旅达人"U31使用智能电话P13与用户U11、U12、……U23……通信。

[0270] 事件将由一组索引i、j以及k来标识。索引i和j表示事件的起源处的用户(示例:i=2且j=1表示由用户U21触发的事件)。索引k是1(即插即用设备d21的按钮2被首次按下且在例如处理设备L21上经屏幕抓取的显示数据被发送C给并存储在C上、且显示在D1、D2以及P31上)或2(按钮2被第二次按下并且显示数据d21从C擦除且从显示器D1、D2、P31消失)。

[0271] 所提出的设置允许用户中的任一个通过触发第一事件来在显示器D1和D2上以及在例如P31等智能电话的显示器上与所有其他用户同时共享显示数据。该设置允许任何用

户通过触发第二事件来撤消他 / 她对显示在 D1、D2 以及 P31 上的数据的贡献。

[0272] 显示在 D1、D2 以及 P31 上的数据依赖于 (a) 计算设备中的任一个发送给存储设备 C 并存储在 C 中的显示数据以及 (b) 在每一事件时更新并存储在 C 上的配置文档 CD。

[0273] 在本说明书中，存储在 C 中且由配置文档结构化的显示数据可被称为画布。

[0274] 对于事件 Eij1，来自处理设备 Lij（或 Pij）的显示器的经屏幕抓取的显示数据与标识符 idij 一起被发送给存储设备 C。

[0275] 存储设备 C 接收到显示数据的时间顺序在时间索引 m 的形式下记录。时间顺序通过例如在接收到显示数据 ddij 之际 C 处的本地时钟的时间来确定。或者，事件 Eij 的时间索引通过用 GMT 或世界时间表达的 Lij 的本地时钟的时间来确定。

[0276] 如果存储设备 C 接收到来自一个以上处理设备 Lij（或 Pij）的贡献，则配置文档被更新以反映这一点。

[0277] 在第一示例中（对于配置文档而言），配置文档将向来自处理设备 Lij/Pij 的接收到的显示数据 DDij 分配 (a) 标识符 idij (b) 时间索引 mij 以及 (c) 与源有关的元数据（例如，用户 Uij 的名称或标识符）。该元数据可叠加到显示器 D1、D2……上的对应显示数据。

[0278] 基于贡献的数量，配置文档将确定经组合的显示数据的布局。示例：如果接收到来自 2 个计算设备 Lij/Pij 的贡献，则配置文档将 D1 和 D2 上的显示空间的一半分配给每一显示数据 ddij。

[0279] 如果接收到来自 3 或 4 个计算设备 Lij/Pij 的贡献，则配置文档将 D1 和 D2 上的显示空间的四分之一分配给每一显示数据 ddij。

[0280] 如果接收到来自 4 个以上计算设备的贡献，则配置文档将 D1 和 D2 上的显示空间的四分之一分配给具有最新近时间索引 mij 的四个显示数据 ddij。

[0281] 对于事件 Eij2，来自处理设备 Lij/Pij 的显示数据从存储设备 C 擦除，对应的标识符 idij 和时间索引 mij 从配置文档 CD 消失且显示在 D1 和 D2 上的数据将例如根据以上给出的示例相应地修改。

[0282] 显示器 D1 和 D2 可具有不同的特性（分辨率、有效显示面积的尺寸……）。为了使所有用户能访问（尽可能接近）相同的视觉数据，显示器 D1 和 D2（具有或不具有来自它们的基单元的支持）使用配置文档来确定显示数据 ddij 是否必须被调整大小以填充屏幕的全高或全宽。

[0283] 更一般而言，要显示的显示数据 ddij 通过变换函数 TFi 来被映射，该变换函数根据用户 Uij 在他们的会议室 Ri 中的需求通过例如内插、解交织、大小重新采样；分辨率、帧率、色彩深度、伽马、亮度、对比度……等的选择来优化每一特定显示器上的视觉外观。高宽比和各贡献 ddij 之间的边界被保留。

[0284] 配置文档包含要显示的图像的带标签的标记语言描述。

[0285] 如果显示数据 DDij 是可变的，则对应的时间索引 mij 保持不变且等于其最早值（例如，在接收到第一数据分组之际）。

[0286] 配置文档可以是或可包含要显示的图像的带标签的标记语言描述。例如，诸如 SGML、XML、SVG 等语言 / 格式 / 样式可被使用。

[0287] 配置文档可包括要显示的图像内容的完整描述。该完整描述可通过显示数据 ddij

的网络地址被定义在文档中。

[0288] SVG 绘图的相关属性是它们可以是动态的且可交互的。对各元素的基于时间的修改可以用 SMIL(同步多媒体集成语言)来描述,或可以用脚本语言(例如,ECMAScript 或 JavaScript)来编程。W3C 明确地推荐 SMIL 作为 SVG 中动画的标准。每当事件 Eij 要求时,SVG 绘图可例如根据早先开发的示例来被编辑或变换。本说明书中所指的画布的相关示例是在被发送给“客户机”(例如,基单元)以供显示 / 渲染在客户机侧上运行的浏览器上之前由服务器侧脚本(如 PHP、Perl、JSP、或 ASP.NET)创建的动态网页。

[0289] 存储在存储设备 C 上的显示数据可被如何分发给远程显示器 D1 和 D2 的更详细示例在 Geert Nuyttens 和 Ronny Dewaele 的公开号为 US20070033289“Network displays and method of their operation(网络显示器和它们的操作方法)”的美国专利申请 11/487,357 中给出。显示 C 所发送的图形信息所需的硬件的示例也在美国专利申请 S/N.11/487,357 中给出。

[0290] 在例如会议室 1 中的显示器 D1 包括两个(或更多个)分开的显示屏(例如,并排安装的两个 82”LCD 屏幕)时,美国专利申请 S/N.11/487,357 中描述的技术尤其相关。在 C 处生成的配置文档将确定画布会如何在两个显示器上分布。在早先示例上继续,其中最大 4 个贡献被显示在(并随后单个屏幕抓取的)D1 上,具有最近时间索引 mij 的显示数据 ddij 可被显示在会议室 1 中的第一个独立显示器上,并且这样做使得最近贡献对各参与者而言更加可见,同时其他贡献 ddij 将被显示在会议室 1 中的第二独立显示器上。在会议室 2 中也这样做,假定第二屏幕也在会议室 2 中可用。US 11/487,357 中描述的技术被用来将以下因素纳入考虑:例如同一会议室中的两个或更多个显示器中的一个出现故障,并且允许在尽可能少的中断的情况下继续会议。

[0291] 在处理设备 Lij 在即插即用接口 1 的支持下通过基单元 Bi 与其他处理设备共享数据时,需要一些调适来设置 / 起草配置文档。

[0292] (1) 显示数据 ddij 被发送给基站 Bi。数据显示 dij 按 Lij 的本地时钟或 Bi 的本地时钟加时间戳。时间戳 tij 被表达为 GMT 或世界时间。

[0293] (2) 显示数据 ddij 被基站 Bi 发送给存储设备 C,其中时间索引 mij 是基于时间戳 tij 来确定的。这保证用户和他们在不同会议室中触发的事件将得到相同的优先级,而不管各会议室与存储设备 C 之间的传输时间的差异。

[0294] (3) 画布是基于显示数据 ddij 和时间索引 mij 来组装的,如在计算设备 Lij 与存储设备 C 直接通信(即,不使用 Bi 作为中介)时所完成的。

[0295] 在需要基站来访问存储设备 C 时,需要特定过程来允许“商旅达人”U31 与用户 U11、U12……、U21……共享显示数据。

[0296] 令牌(即,更改存储在 C 上的显示数据 ddij 的授权和手段)需要通过语音指令来传送并且需要传达对画布作出贡献的手段。实现令牌的一种方式是 URL 加唯一会话 ID 的组合。这两者的组合给出对用作两个目的的会议专用网站的访问权:(1) 下载并安装屏幕捕捉软件程序以及 (2) 给出对共享画布的访问权。(1) 和 (2) 的组合向使用膝上型计算机或智能电话的商旅达人 U31 等远程参与者提供与具有对基单元 B1 或 B2 的访问权的参与者相同的功能。因为语音指令需要简洁,所以类似于 tinyURL.com(或 lilURL 或 TightURL)的服务将被用来组合网站 + 会话 ID。为了避免错误,缩短的 URL 将使用易于发音的字符子

集并且避免语言混淆（如 G&J 或 I&E 之间）。一个示例是仅限十六进制字符。在 P31 的电话号码被用作 U31 的标识符时，它可以通过下载的屏幕捕捉软件程序来验证或由网站本身来访问。在后一种情况下，电话号码可被用来授权通过网站对画布 C 的访问。

[0297] 不能访问显示器 D1 或 D2 的商旅达人 U31 将必须依赖本地显示装置来查看对用户 U1j 和 U2j 可见的显示数据 dij。智能电话的屏幕远小于会议室中使用的像 D1 和 D2 的显示器的屏幕，配置文档被有利地与变换函数一起使用。例如，认识到智能电话 P31 的屏幕（地理上远离显示器 D1 和 D2）具有较小尺寸和分辨率，像时间索引等信息可被用来在智能电话 P31 的屏幕上一次只显示一个贡献 ddij。从最大 4（在以上示例中）个数据显示 ddij 之一切换到另一个可以由商旅达人 U31 通过滚动、点击他 / 她的智能电话上的特定键、或在 P31 的触摸屏上“刷扫”来完成。

[0298] 代替通过电话由语音来完成，加入参与者 U11、U12……、U21……、U31 之间的虚拟会议的邀请可通过电子邮件通过社交媒体发送。用户 U31 仅必须点击邀请中指示的 url，网站将验证 P31 的电话号码且 U31 将能够看到且与其他参与者共享显示数据。

[0299] 用户 Uij 发出的语音命令与显示数据的集成改进了参与者 Uij 的焦点，且尤其是像只能访问他 / 她的智能电话 P31 上的小显示屏的“商旅达人”U31 等特定参与者。

[0300] 为此，计算设备 Lij 配备有现货语音识别软件。在用户（例如，U12）发出语音命令时，数字信息 VC 作为语音识别软件的结果被生成。该数字信息可通过例如查找表链接到可由服务器侧脚本来解释并触发对画布（例如，上述动态网页）的实时修改的指令。示例 1：像“放大左上角”等语音命令将造成画布的左上角（在发出语音命令之前是可见的）被放大并占据显示器 D1、D2 的全屏，且更重要地，占据智能电话 P31 的屏幕。示例 2：如果数据显示的布局被限于最大 4 个贡献（如上所述），语音命令可以是“左上”、“右上”、“左下”、以及“右下”。基于这些信息，服务器侧脚本将裁减智能电话 P31 上所显示的数据，并且只有左上或……或右下贡献将填充在智能电话 P31 的屏幕中。

[0301] 返回图 2，在基节点 36 上运行的基节点软件 (6) 可被适配成在中央显示器上显示启动画面 (21)，示出其准备就绪来通过其接收机接收任意媒体内容。这一启动画面 (21) 还可示出与如何使用该系统有关的指令以及到达基节点 36 的配置参数（见下）。这些配置参数也在中央显示器 (22) 的底部处的透明画布中示出。

[0302] 想要使其任意媒体内容显示在连接到基节点 36 的中央显示器上的客户机处理设备 31 连接到连接单元 47。便携式应用 60 将在作为主机设备的客户机处理设备 31 上执行。第一用户交互使用连接单元 47 中的发射机和基节点 36 中的接收机创建便携式应用 60 与基节点 36 之间的连接。第二用户交互（这一次在输入设备 48 上）激活便携式应用对来自客户机处理设备显示器的任意媒体内容的屏幕抓取，这随后通过连接器单元 47 发送给基节点。

[0303] 基节点 36 接收来自一个或多个连接单元 47 的多个任意媒体内容，并将该媒体内容自动合成以渲染在中央显示器上。

[0304] 连接单元 47 上的视觉指示器 61 向用户以及会议中的其他参与者指示媒体内容正被该连接单元 47 发送给基节点 36 以供显示。

[0305] 在连接单元 47 的输入设备 48 上重复第二用户交互解除来自该连接单元 47 的媒体内容与基节点 36 的耦合。基节点 36 从中央显示器上的合成图像移除该媒体内容并在中

央显示器上重新合成其余内容。

[0306] 中央显示器/投影仪上的内容被自动安排，如图2所示。在用户1添加内容时，他/她的显示器将被缩放以尽可能多地填充可用中央显示器画布，但不影响高宽比。在用户2加入时，他的内容被添加到第一图像的旁边。在用户3添加他的内容时，排列是三角形。添加用户4，图像变成2乘2分块，这是可用的最大值。在附加用户尝试添加内容时，他将被阻塞。在用户发起移除他/她的内容的动作时，他/她的媒体内容从中央显示器移除且在合成序列中向后移动，如图2所示。

[0307] 基节点软件

[0308] 基节点软件具有以下特征中的一个或多个：

[0309] -用于提供用于正确地配置基节点的接收机的手段或方法步骤的第一代码。

[0310] -用于提供用于监听尝试连接在特定端口上的连接单元的输出的手段或方法步骤的第二代码。

[0311] -可任选地，用于提供用于管理目的的GUI(例如，通过web接口提供)的手段或方法步骤的第三代码。

[0312] -可任选地，用于提供用于使用zeroconf协议通过网络发布其存在的手段或方法步骤的第四代码。

[0313] -可任选地，用于提供用于接受并安装基节点的软件更新以及连接单元的便携式应用软件的软件更新的手段或方法步骤的第五代码。

[0314] -用于提供用于提供将连接单元配对到基节点的设施的手段或方法步骤的第六代码。

[0315] -用于提供用于在显示器或投影仪屏幕上自动合成不同传入任意媒体流并渲染经合成的图像的手段或方法步骤的第七代码。

[0316] -用于提供用于接收、解密、并解码传入的任意媒体内容的手段或方法步骤的第八代码。

[0317] -可任选地，用于提供用于缩放传入的任意媒体流的手段或方法步骤的第九代码。

[0318] -可任选地，用于提供用于根据一组一个或多个规则来显示传入的任意媒体内容的手段或方法步骤的第十代码。

[0319] 以上代码中的任一个可被存储在非瞬态机器可读存储介质上，如光盘、磁盘、磁带、固态存储器，等等。

[0320] 用于客户机处理设备的便携式应用

[0321] 便携式应用包括用于屏幕抓取的算法。屏幕抓取算法包括VNC和RDP，诸如此类。该算法可包括诸如针对不同内容(例如，静态文本或视频)来优化的VNC和RDP等算法的组合。便携式应用具有以下特征中的一个或多个：

[0322] -用于提供用于连接到包括基节点的网络的手段或方法步骤的第十一代码。

[0323] -用于提供用于捕捉客户机处理设备(即，计算机(C))的视频帧缓冲区(也称为屏幕抓取)的手段或方法步骤的第十二代码。

[0324] -用于提供用于编码、压缩以及可任选地加密这些视频帧并通过安全链路将它们发送到基节点的手段或方法步骤的第十三代码。只有屏幕的矩形或三角形等改变的区域需要被传送，并且不同类型的矩形或三角形可以用不同的方式(例如，RLE、JPEG……)来编码

以优化性能。

[0325] -用于提供用于处理连接单元的手段或方法步骤的第十四代码。

[0326] -用于提供用于发起到基节点的连接的手段或方法步骤的第十五代码。

[0327] -用于接收来自连接单元上的输入设备的输入的第十六代码。

[0328] -用于提供用于向连接单元上的视觉指示器发送状态改变的手段或方法步骤的第十七代码。

[0329] -可任选地，用于提供用于向用户呈现GUI(18)的手段或方法步骤的第十八代码。

[0330] -可任选地，用于呈现用于管理便携式应用的GUI的第十九代码。

[0331] -可任选地，用于提供用于在客户机处理设备的显示器上显示并激活键以允许用户输入将来自客户机设备的数据开始传送到基节点的手段或方法步骤的第二十代码。

[0332] 以上代码中的任一个可被存储在非瞬态机器可读存储介质上，如光盘、磁盘、磁带、固态存储器，等等。

[0333] 在这一实施例中，便携式应用被存储在连接单元上，且在客户机处理设备上的执行上下文中执行。便携式应用不需要被复制到或安装在计算机上。它可以直接从连接单元执行。它将只被临时复制到客户机处理设备上的执行上下文中。也没有对客户机处理设备中的配置或设置的改变。这意味着在连接单元被移除时，没有什么将留在客户机处理设备上。它还暗示便携式应用将在客户机处理设备上运行，其中用户不必具有安装软件的访问权。

[0334] 便携式应用按如下方式设计：

[0335] -不需要在客户机处理设备上安装特定驱动程序。

[0336] -预安装驱动程序被用于例如多类外围设备。

[0337] -它与供应商专用图形硬件无关。

[0338] -它在至少一个且优选地在各种不同的客户机处理设备上运行，包括Windows、Mac OS/X、Linux、Android、iOS以及许多其他。

[0339] 优点

[0340] 本申请具有以下优点中的一个或多个：

[0341] -会议中不需要主持人角色

[0342] -连接单元到基节点的标准即插即用连接性

[0343] -采用简单且公知的用户动作

[0344] -客户机处理设备的自有联网设施不被阻塞

[0345] -客户机处理设备上没有配置改变

[0346] -输入设备易于访问；例如，很大的大小

[0347] -便携式应用和服务器程序的程序更新可在本地执行

[0348] -便携式应用被使用，无需安装、多平台、无供应商专用

[0349] -由便携式应用完成的屏幕抓取的特定实现避免供应商专用图形设备

[0350] -标准驱动程序被使用，因此没有必须安装的驱动程序

[0351] -客户机处理设备上没有配置改变

[0352] -客户机处理设备上的零足迹应用——没什么要清除或调整或复位

[0353] -客户机处理设备的自有联网设施不被阻塞

[0354] - 用户计算机上没有配置改变

[0355] - 低病毒、恶意软件和间谍软件风险

[0356] 便携式应用可被存储在非瞬态机器可读存储介质上，如光盘、磁盘、磁带、固态存储器、USB 大容量存储，等等。

[0357] 第二实施例

[0358] 在第二实施例中，参考图 2 到 5，基节点是称为基单元 (B) 的单独的物理处理设备，包括永久存储、存储器、处理引擎、无线接入点 (4)、即插即用接口 (如 USB 端口 (11))、图形显示输出适配器 (5) (如 VGA/DP/DVI/HDMI)、以及可任选的视频输出适配器 (27)。具有诸如按钮 13 等致动器和视觉指示器 14 的输入设备是可任选的。

[0359] 连接单元是外部外围设备 (在附图中被示为“软件狗 (dongle)”D) 形式的物理设备，包括存储便携式应用 (7) 和配置参数 (12) 的持久存储、存储器、处理引擎 (例如，CPU、FPGA)、无线发射机 (如 WiFi(3))、即插即用接口 (如 USB 接口 (2))、按钮 (作为输入设备 (9))、LED 环 (作为视觉指示器 (10))。便携式应用存储在外围设备 (7) 上。

[0360] 客户机处理设备是主机设备，例如计算机或膝上型计算机，包括显示器、即插即用接口 (如 USB 端口 (2))、存储器、以及处理引擎 (如微处理器)。

[0361] 该系统因而包括 :

[0362] - 在一端上具有即插即用接口 (如 USB 接口 (2)) 且在另一端上具有通信接口 (如配置成客户端 (3) 的无线接口) 的外部外围设备 (D)。

[0363] - 在一端 (4) 具有通信接口 (如配置成接入点的无线接口) 且在另一端具有视频卡适配器 (5) (如 VGA、DVI、DP 或 HDMI) 的基单元 (B)。

[0364] - 存储在外围设备 (D) 上但在客户机处理设备 (C) 上执行的便携式应用 (7)

[0365] - 在基单元 (B) 上存储并执行的基节点软件 (6)

[0366] 外部外围设备 (D) 还优选地具有以下中的任何一个或任何组合 :

[0367] - 作为用于输入设备 (9) 的致动器的大型按钮，从而允许用户与该外围设备交互。该按钮优选地具有 100 和 14400 平方毫米之间的致动表面积。

[0368] - 视觉指示，如 LED(10)，从而允许来自外围设备的用户反馈

[0369] 本发明的各实施例的优点是以在很大程度上与操作系统无关且不留下足迹 (零足迹) 的方式经由诸如任何处理设备 (如计算机) 上的 USB 接口等外围接口提供到外围设备的数据传输。驱动程序和 / 或应用在诸如计算机等的处理设备上的安装在存在预安装通用驱动程序的情况下不是必须的。诸如计算机等处理设备上的管理员权限优选地不是必须的。为了避免对管理员权限的需要，本发明的各实施例使用其他外围设备预安装驱动程序，如所支持的 USB 类驱动程序，而无需任何额外安装。本发明的各实施例经由外围设备 (如 USB 设备) 至少将在处理设备上运行的客户机软件所呈现以供传送的经屏幕抓取的数据路由到通信网络。这绕过处理设备的任何网络接口 (并且因此绕过许多防火墙)，但只针对特定客户机软件。其他应用不受影响，且可以使用标准网络接口，即来自 / 去往 TCI/IP 栈的分组正常传送到网络设备。客户机软件从诸如 USB 合成设备或存储设备等外围设备上作为便携式应用来启动，这可避免在主机 OS 上留下任何轨迹。

[0370] 第二实施例的基本使用场景

[0371] 基节点软件 (6) 在投影仪上显示启动画面——图 5 中的 (21)，从而示出它准备就

绪来通过其接收机 (4) 接收任意媒体内容。这一启动画面 (21) 还示出与如何使用该系统有关的指令以及到达基节点的配置参数 (见下)。这些配置参数也在中央显示器 (22) 的底部处的透明画布中示出。

[0372] 为了避免用于配置外围设备与基单元之间的连接的用户交互，使用配对过程。这一配对过程向外围设备 (即，连接单元) 提供设置本地网络所需的网络参数。作为示例，外围设备可简单地插入基单元 (B) 的 USB 端口 (11)。基单元随后可任选地进行软件有效性检查，可任选地进行对存储在外围设备上的便携式应用的软件更新，并且将外围设备和基单元找到彼此所需的连接参数写到外围设备 (D) 上的永久存储 (8)。例如，在使用 WiFi 时，这将是 SSID、WEP/WPA2 密钥以及基单元接收机的 IP 地址，以及基节点软件所使用的端口号，但并非所有这些都必须被交换。

[0373] 想要使其任意媒体内容显示在连接到基节点 (5) 的中央显示器上的客户机处理设备将外围设备 (D) 经由 (2) 连接到其 USB 端口。外围设备通过接口 (2) 将自己显现给计算机作为包括大容量存储设备和键区的合成设备。这具有不需要特定驱动程序的主要优点，因为所有这些设备在具有 USB 端口的每一个人计算机系统中都得到本机支持。如果启用了自动运行，则计算机将自动执行存储在外围设备上的大容量存储 (8) 中的客户机软件 (7)。在一般情况下提到的第一用户交互则只是外围设备到 USB 端口的连接。如果安全措施禁用自动运行，则用户需要探索外围设备的大容量存储上的大容量存储并手动启动便携式应用。

[0374] 便携式应用将使用外围设备的无线 (例如 WiFi) 接口 (3) 连接到正确的基节点。为了知道要连接的正确基单元，在上述配对过程期间，作出这一连接所需的配置参数被存储在大容量存储设备 (8) 上的数据库 (12) 中。

[0375] 一旦作出连接，外围设备就进入连接模式。这意味着现在存在从外围设备到基单元的至少一个信道。内容尚未示出。外围设备上的 LED(10) 现在转成白色以给出这一新状态的视觉指示。

[0376] 在计算机 (C) 处的用户想要示出她的内容时，她按下按钮 (9)。在按钮先前处于“连接”状态 (参见图 6) 时，它将检查基单元 (P) 的状态。如果基单元没有处于“充满”状态，则外围设备将经屏幕抓取的任意媒体内容发送到基单元 (B)，该基单元 (B) 将该媒体内容添加到中央显示器上的合成中。外围设备 LED(10) 现在转成红色以指示“示出”状态 (图 6)。

[0377] 按钮 (9) 担当触发器。在用户再次按下该按钮时，计算机显示内容将从投影仪移除。LED(10) 变回白色。

[0378] 使用自动运行特征是在可能且在计算机 (C) 上启用的情况下是可任选的，以便一旦外围设备被插入就启动客户机软件 (7)。在 Windows 上，例如，这意味着将外围设备装载为大容量存储设备并使用存储在外围设备上的 autorun.inf 文件。

[0379] 然而，在许多情况下，这一自动运行特征将出于安全原因而被禁用。在这种情况下，如果可能且在计算机 (C) 上启用，将使用自动播放特征来在计算机的桌面上示出所连接的外围设备的标识。用户随后需要双击该标识来启动客户机软件。

[0380] 如果上述自动播放特征也是不可能的或没有启用的，则用户必须浏览所连接的外围设备的文件系统并手动启动该应用。这意味着双击 Windows 上的 client.exe 文件、Mac

OS/X 上的 client.app、或者轻击平板或具有触摸屏的任何移动设备上的适当应用图标。

[0381] 第三实施例：便携式应用存储在标准固态存储器上，如 USB 棒。

[0382] 在第三实施例中，便携式应用被存储在固态存储器上，如常规 USB 存储器棒（图 7）。

[0383] 对于诸如常规 USB 存储器棒等固态存储器而言，不存在以上针对连接单元描述的各类输入设备、视觉指示器或发射机。这意味着该系统需要：

[0384] - 使用来自客户机处理设备的发射机 / 接收机。

[0385] - 使用客户机处理设备上的键或按钮作为输入设备，如键盘上的物理键、特殊鼠标按压、触摸屏上的按钮区、显示在屏幕上的要用鼠标指针点击的按钮。

[0386] - 在客户机处理设备的显示器上呈现视觉指示器。

[0387] 客户机处理设备随后看起来像图 8。

[0388] 这一实施例以在很大程度上与操作系统无关的方式提供担当主机设备（如计算机）的任何处理设备上的诸如 USB 接口等外围接口。驱动程序和 / 或应用在诸如计算机等存在预安装通用驱动程序的处理设备上的安装不是必须的。诸如计算机等处理设备上的管理员权限优选地不是必须的。为了避免对管理员权限的需要，这一实施例使用其他外围设备预安装驱动程序，如所支持的 USB 类驱动程序，而无需任何额外安装。本发明的这一实施例经由处理设备的网络连接至少将在处理设备上运行的客户机软件所呈现以供传送的经屏幕抓取的数据路由到通信网络。客户机软件从外围设备（如 USB 设备）作为便携式应用来启动。

[0389] 第一用户操作随后包括：

[0390] - 插入固态设备，如 USB 存储器棒，

[0391] - 启动便携式应用（如果自动运行被禁用）

[0392] - 使用中央显示器上示出的配置参数 (22) 来配置客户机处理设备上的发射机来连接到正确的基节点

[0393] - 触发便携式应用与基节点的连接，例如通过与呈现在客户机处理设备的显示器上的便携式应用的 GUI(18) 上的元素进行交互。

[0394] 在这一实施例中，呈现对用户动作的视觉反馈也是使用客户机操作设备的显示器的 GUI 中的元素来完成的。

[0395] 在这一实施例中，零足迹的优点通过便携式应用在以下意义上部分地实现：没有软件被安装或复制到客户机操作设备，但需要配置改变来将客户机操作设备的发射机与基节点连接，这需要之后撤消。

[0396] 可任选地，便携式应用可为用户作出对发射机的配置改变。

[0397] 在这一实施例中损失的优点

[0398] - 便携式应用的零足迹性质的部分损失

[0399] - 更复杂的第一用户交互

[0400] - 用户需要更多专业知识

[0401] - 客户机操作设备显示器上需要的 GUI，这可能也在中央显示器上示出

[0402] - 在将物理键用于第二用户动作时，需要找出客户机操作设备上的空闲键

[0403] - 网络接口被便携式应用阻塞而不能用于其他用途。

[0404] 可任选地，最后一点可通过使用基单元作为到客户机操作设备想要通过其自己的接口连接到的网络的网关来避免。

[0405] 优点是：

[0406] - 通过基单元上的设置，对用户到企业网络的连接性的紧密控制

[0407] - 即使在发射机现在也被用于显示目的时，也保持网络连接性完好

[0408] 缺点是该系统的较高脆弱性，因为显示连接现在可能是进入企业网络的通道。

[0409] 剩下的优点是

[0410] - 将便携式应用分发给用户的物理介质的可用性

[0411] - 不需要将软件安装或复制到客户机操作设备

[0412] - 经由基单元维护连接单元（在此：存储器棒）上的软件更新的容易方式

[0413] - 通过基单元在连接单元上写入配置数据的可能性，例如以可由客户机操作设备读取并使用的配置简档的形式

[0414] 第四实施例：安装在客户机处理设备上的仅限软件客户机

[0415] 这一实施例类似于第三实施例，唯一差别是软件被复制在客户机操作设备上（图9）。在这种情况下，客户机操作设备上不需要即插即用端口（如USB端口）。

[0416] 这一实施例通常被用于平板PC和移动设备。在这种情况下

[0417] - 通常不存在可用的USB端口

[0418] - 通过应用商店的应用分发是容易且广泛接受的

[0419] 第五实施例：原始制造到投影仪或显示设备的基节点软件

[0420] 在这一实施例中，基节点没有被实现为单独的物理盒，而是集成到显示器或投影仪内部的处理单元。所有其他细节与前述相同。

[0421] 第六实施例

[0422] 在这一实施例中，基节点没有被实现为单独的物理盒，而是集成到视频会议设备的编解码器。所有其他细节与前述相同。

[0423] 第七实施例：远程会议参与者

[0424] 在这一实施例中，一个或多个客户机操作设备不在基节点的直接邻近区内，而是在远程位置。

[0425] 为了适应这一情况，需要以下适配：

[0426] - 进一步压缩和/或缩放任意媒体内容以允许使用低带宽连接

[0427] - 将基节点的连接参数传递给远程用户的可能性

[0428] - 基节点到远程用户连接到的WAN网络的连接性

[0429] 所有其他细节与前述相同。

[0430] 第八实施例：多个基节点

[0431] 在这一实施例中，使用多个基节点。这可以出于不同目的来完成：

[0432] - 多个中央显示器的连接性

[0433] - 中央显示器的实际显示面积的扩展

[0434] - 不同远程位置中的基节点的连接性

[0435] 这提供了可以从单个外围设备存在于多个基单元上的优点。这对多种情况而言是有用的：

[0436] 个人外围设备：用户可以具有与他通常使用的多个会议室配对的个人外围设备

[0437] 在具有多个基单元的会议室中使用，每一基单元控制该同一会议室中的不同显示器

[0438] 该建议使用该外围设备的称为多基外围设备的特殊变型。多基外围设备配备有围绕圆形中央“show me（给我看）”按钮的滚轮。这可以是机械滚动多位置开关或像 iPod 经典上的触摸轮那样的事物。

[0439] 外围设备的这一多基变型的配对：

[0440] 滚轮被置于对应基单元的位置。

[0441] 外围设备按正常方式与基节点配对

[0442] 配置参数被存储在永久存储位置；滚轮的每一位置具有对应的连接参数集合（例如，表中的不同各行），每一集合与特定基单元相对应

[0443] 外围设备的连接如下：

[0444] - 多基外围设备 X 被插入 PC

[0445] - 外围设备 X 上的滚轮被置于位置 A

[0446] - 外围设备 X 读取其内部存储器的位置 A 中的配置参数

[0447] - 外围设备 X 连接到基节点 A

[0448] - 基节点 A 在中央显示屏上指示多基外围设备 X 的连接

[0449] - 外围设备 X 上的滚轮被置于位置 B

[0450] - 外围设备 X 读取其内部存储器的位置 B 中的配置参数

[0451] - 外围设备 X 连接到基节点 B

[0452] - 基节点 B 在屏幕上指示多基外围设备 X 的连接

[0453] - 继续，直至用滚轮选择了正确基节点

[0454] - 点击外围设备输入设备，例如按钮，以在基节点的中央显示器上示出内容

[0455] - 滚动滚轮总是首先从最后位置的基节点点离内容

[0456] 第九实施例

[0457] 图 10 示出根据本发明的一独立实施例的包括输入设备的外围设备 47。这一实施例可以由上述实施例中的任一个一起使用。

[0458] 该外围设备被配置成连接单元并且是用于用户处理设备作为主机计算机的即插即用端口的连接器形式的物理设备，如 USB 连接、连接到连接器和基单元的灵活数据和功率连接，基单元具有致动器，例如配置成具有上述功能的输入设备的按钮。

[0459] 基单元和 / 或致动器优选地大小很大，例如具有 100 和 14400 平方毫米之间的表面积。基单元可以是方形、矩形、圆形、六边形、椭圆形、多边形的形状或任何其他适于人体工学的形状。致动器优选地是圆形的，但可以是方形、矩形、圆形、六边形、椭圆形、多边形等形状，一个基单元上可以存在一个以上致动器。

[0460] 灵活数据和功率连接（例如电缆）的长度优选地适配成将外围设备（在处于连接状态时，处于其操作位置），尤其是基单元和致动器，放置于所连接的用户处理设备的边界与如上定义的人体工学边界之间的区域中。另外，灵活数据和功率连接应当被适配成使得基单元独立于所需连接器的定向来平放在会议桌上，以将连接器插入即插即用接口。

[0461] 基单元优选地包括电子装置，如具有用于存储便携式应用和网络配置参数的永久

存储、存储器、处理引擎（例如 CPU、FPGA）、无线发射机 / 接收机（如用于 WiFi）、即插即用接口（如 USB 接口）、LED 环（作为视觉指示器）。便携式应用可被存储在外围设备上，即基单元中。视觉指示器用于允许来自连接单元的对任何活动的状态的用户反馈。

[0462] • 可以与本发明的实施例中的任一个一起使用的致动器的激活的一些示例：

[0463] o 声音激活（拍手、语音识别、计算机声音、音乐、……）

[0464] o 经由无线连接的设备的远程控制（IR、蓝牙、WiFi、……）

[0465] o 光激活

[0466] o 压力激活，例如用手指或手压下。

[0467] o 触摸激活

[0468] o 邻近度（‘接近接触’致动器或使致动器靠近某一物体）

[0469] o 生物测定阅读器，如指纹阅读器、虹膜扫描仪、DNA 分析仪

[0470] o 键区，例如用于输入密码，例如口令

[0471] 替换实施例

[0472] 在以上实施例中，一旦作出连接设备与主机计算机之间的连接，外围设备就进入连接模式。这意味着存在从外围设备到基节点的至少一个信道。根据本发明的实施例中的任一个，可在连接设备与基节点之间设置多个信道。这些信道可以是逻辑信道。

[0473] 这样的多信道安排的一些示例可包括第一信道和附加信道中的一个或多个：

[0474] o 第一信道用于所抓取的图像流（XDS）

[0475] o 第二信道用于 GPU 命令（OpenGL、DirectX）

[0476] o 第三信道用于鼠标指针坐标（绝对、相对）

[0477] o 第四信道用于鼠标指针图标

[0478] o 第五信道用于图像数据文件（JPEG、PNG、GIF、……）

[0479] o 第六信道用于多媒体数据文件或流（MPEG2、MPEG4、OGG、H.26x、……）

[0480] o 第七信道用于音频数据文件或流（MP3、MP4、AAC、WMA、……）

[0481] o 第八信道用于文本或文档数据文件（DOC、DOCX、PPT、PPTX、ODT、ODS、PDF、……）

[0482] o 第九信道用于传输上述优先级值 1、2、3、……。

[0483] 在以上实施例中，描述了将外围设备与基节点配对的特定方法。本发明的实施例中的任一个可包括以下给出其一些示例的其他配对机制。

[0484] • 配对的一些示例

[0485] o 将外围设备插入通用外围设备端口，如基节点或其他启用 USB 的设备的 USB 端口。配对信息通过通用外围接口（如 USB）传送。

[0486] o 到基节点的无线信道的信号强度被用来标识要使用哪一基节点

[0487] o 该无线信道或任何其他信道的信号强度。示例是 NFC/RFID 发射机可在会议室桌下提供。将用户处理设备（如膝上型计算机）和所插入的外围设备置于这一桌上将该外围设备与这一会议室的基节点自动配对。

[0488] o 手动配对（例如，通过输入 IP 地址、主机名、无线 ID（如 WiFi 上的 SSID））

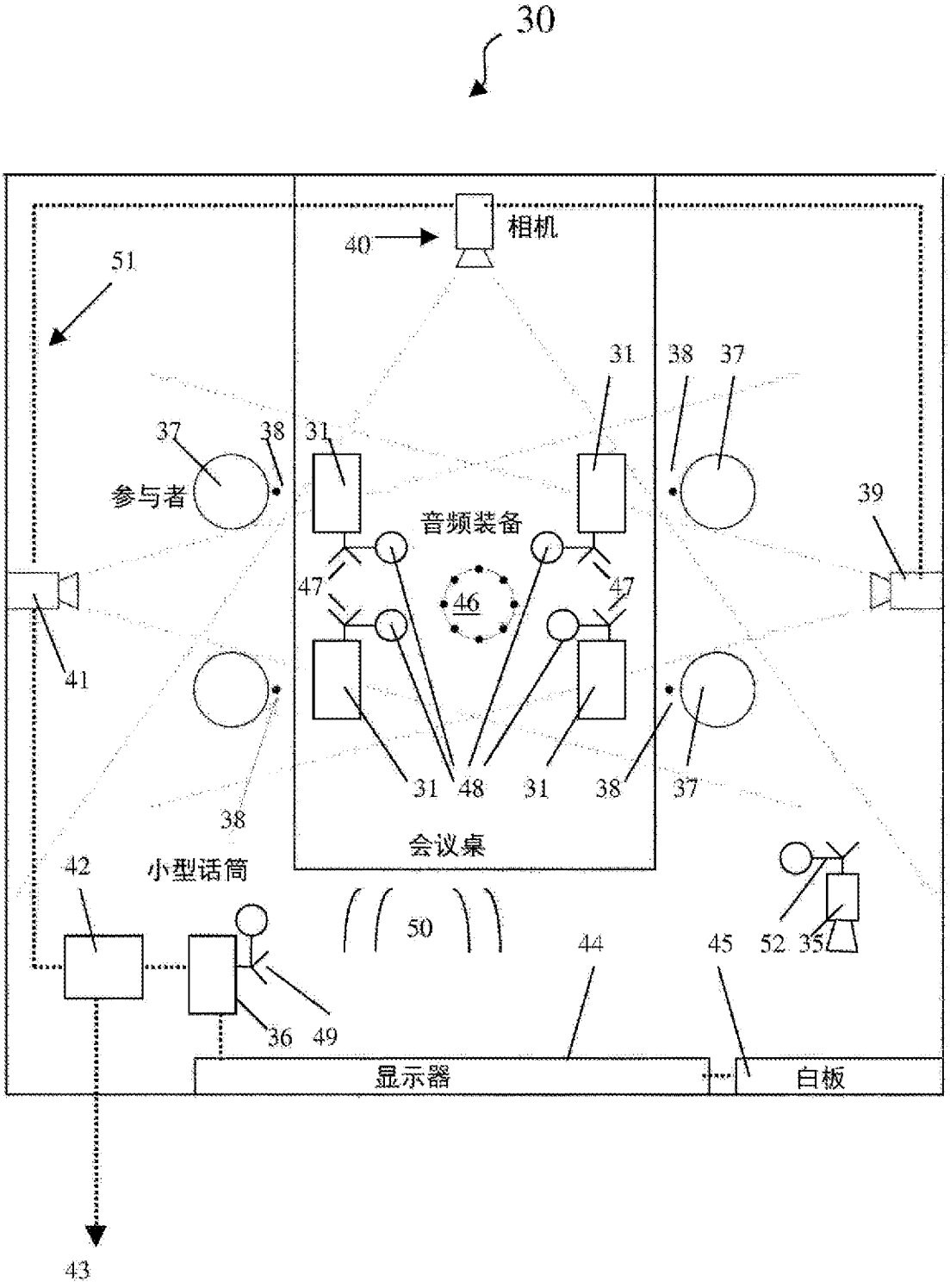

30
相机
40
51
31
38
37
参与者
音频装备
39
47
46
41
48
会议桌
42
小型话筒
50
44
45
52
35
36
49
显示器
白板
43

图 1a

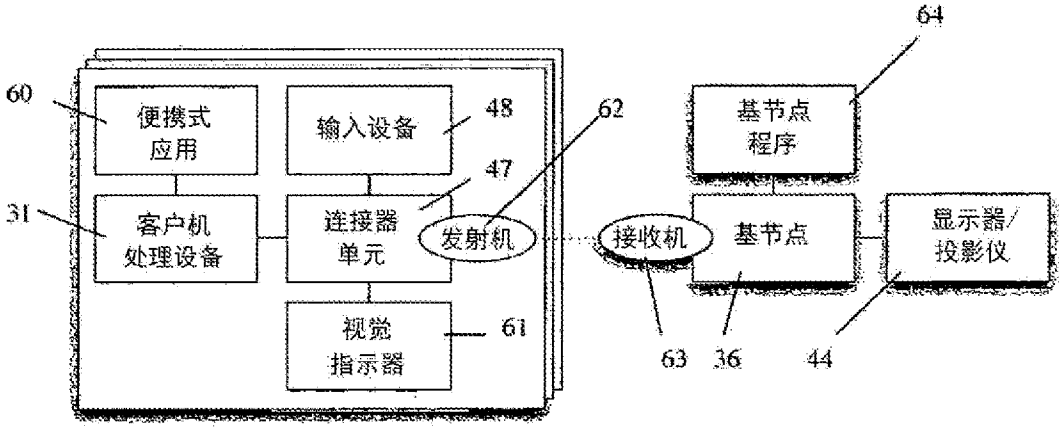

60
便携式
应用
输入设备
48
62
64
基节点
程序
47
31
客户机
处理设备
连接器
单元
发射机
接收机
基节点
显示器/
投影仪
视觉
指示器
61
63
36
44

图 1b

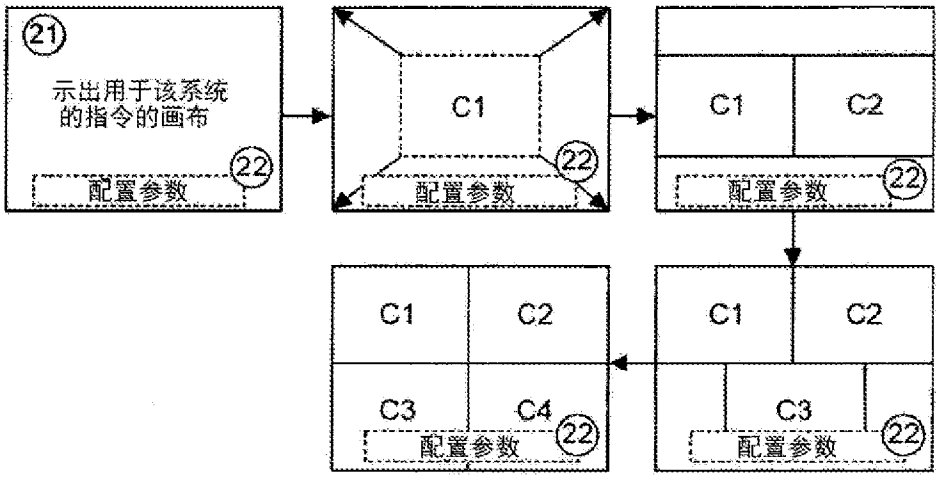

21
示出用于该系统
的指令的画布
22
配置参数
C1
C2
C3
C4

图 2

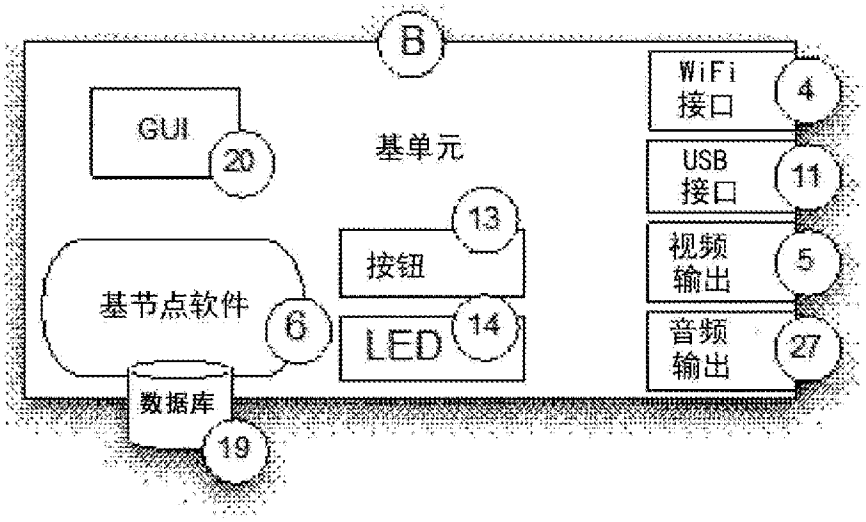

B
GUI
20
基单元
WiFi
接口
4
USB
接口
11
13
按钮
视频
输出
5
基节点软件
6
LED
14
音频
输出
27
数据库
19

图 3

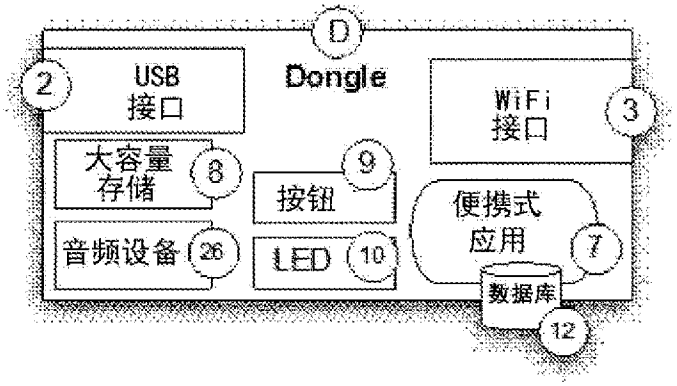

D
2
USB
接口
Dongle
WiFi
接口
3
大容量
存储
8
9
按钮
便携式
应用
7
音频设备
26
LED
10
数据库
12

图 4

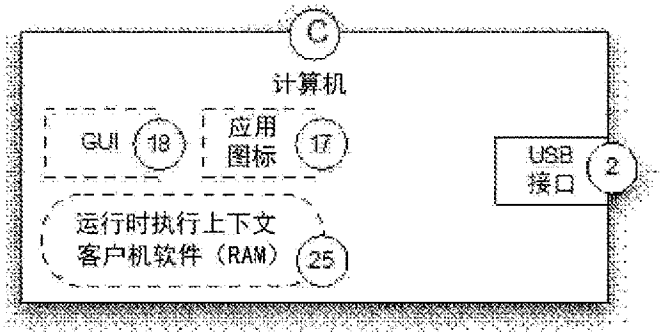

C
计算机
GUI
18
应用
图标
17
USB
接口
2
运行时执行上下文
客户机软件（RAM）
25

图 5

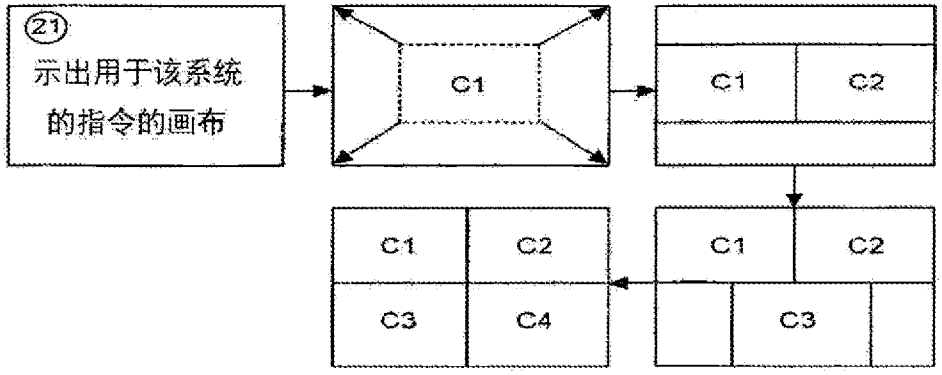

21
示出用于该系统的指令的画布
C1
C1
C2
C1
C2
C3
C4
C1
C2
C3

图 6

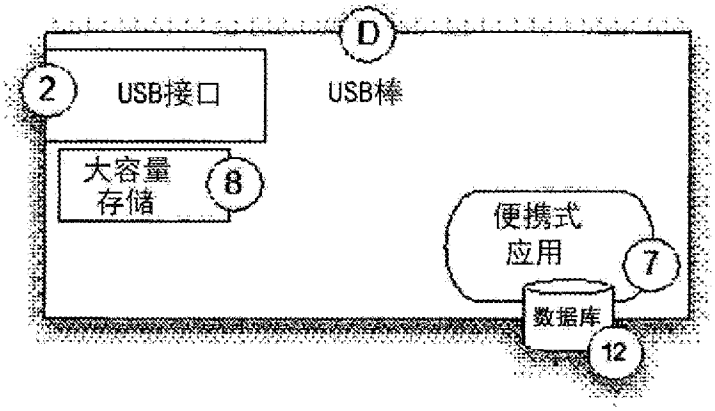

D
2
USB接口
USB棒
大容量存储
8
便携式应用
7
数据库
12

图 7

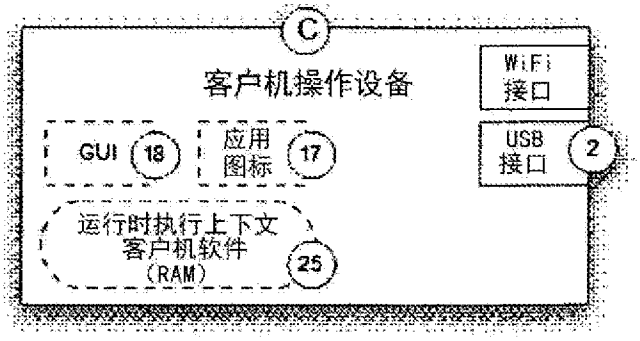

C
客户机操作设备
WiFi接口
GUI
18
应用图标
17
USB接口
2
运行时执行上下文客户机软件(RAM)
25

图 8

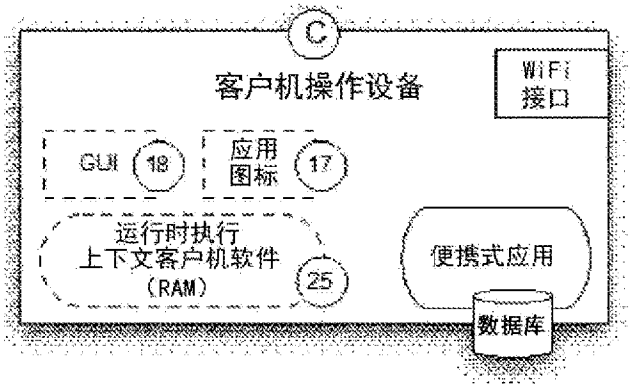

C
客户机操作设备
WiFi
接口
GUI
18
应用
图标
17
运行时执行
上下文客户机软件
(RAM)
25
便携式应用
数据库

图 9

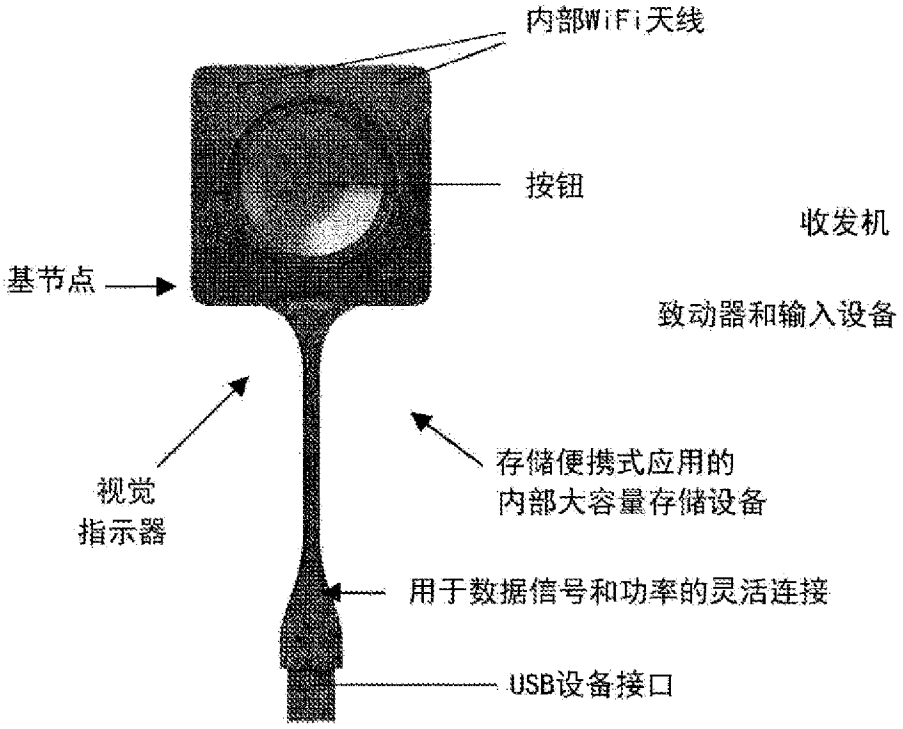

内部WiFi天线
按钮
收发机
基节点
致动器和输入设备
视觉
指示器
存储便携式应用的
内部大容量存储设备
用于数据信号和功率的灵活连接
USB设备接口

图 10

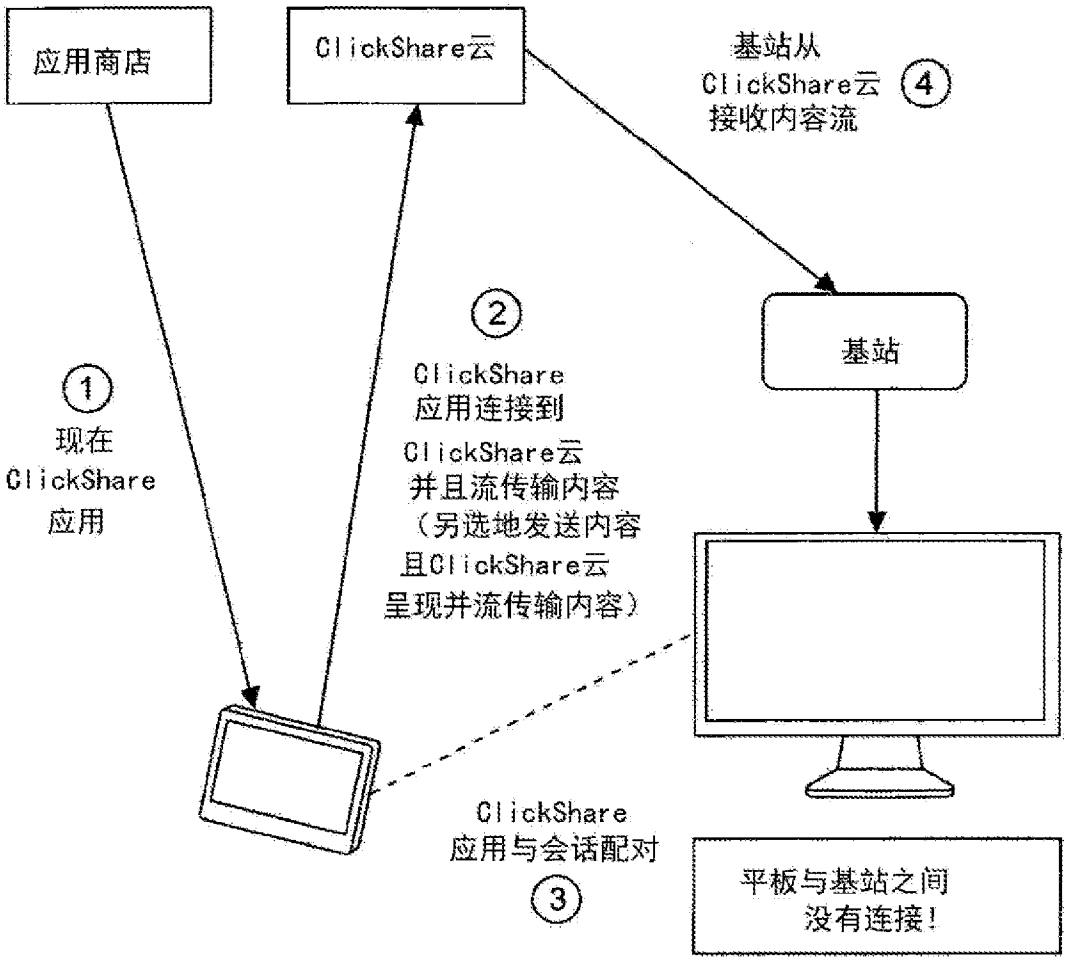

应用商店
ClickShare云
基站从
ClickShare云
接收内容流
4
基站
2
ClickShare
应用连接到
ClickShare云
并且流传输内容
（另选地发送内容
且ClickShare云
呈现并流传输内容）
1
现在
ClickShare
应用
ClickShare
应用与会话配对
3
平板与基站之间
没有连接！

图 11

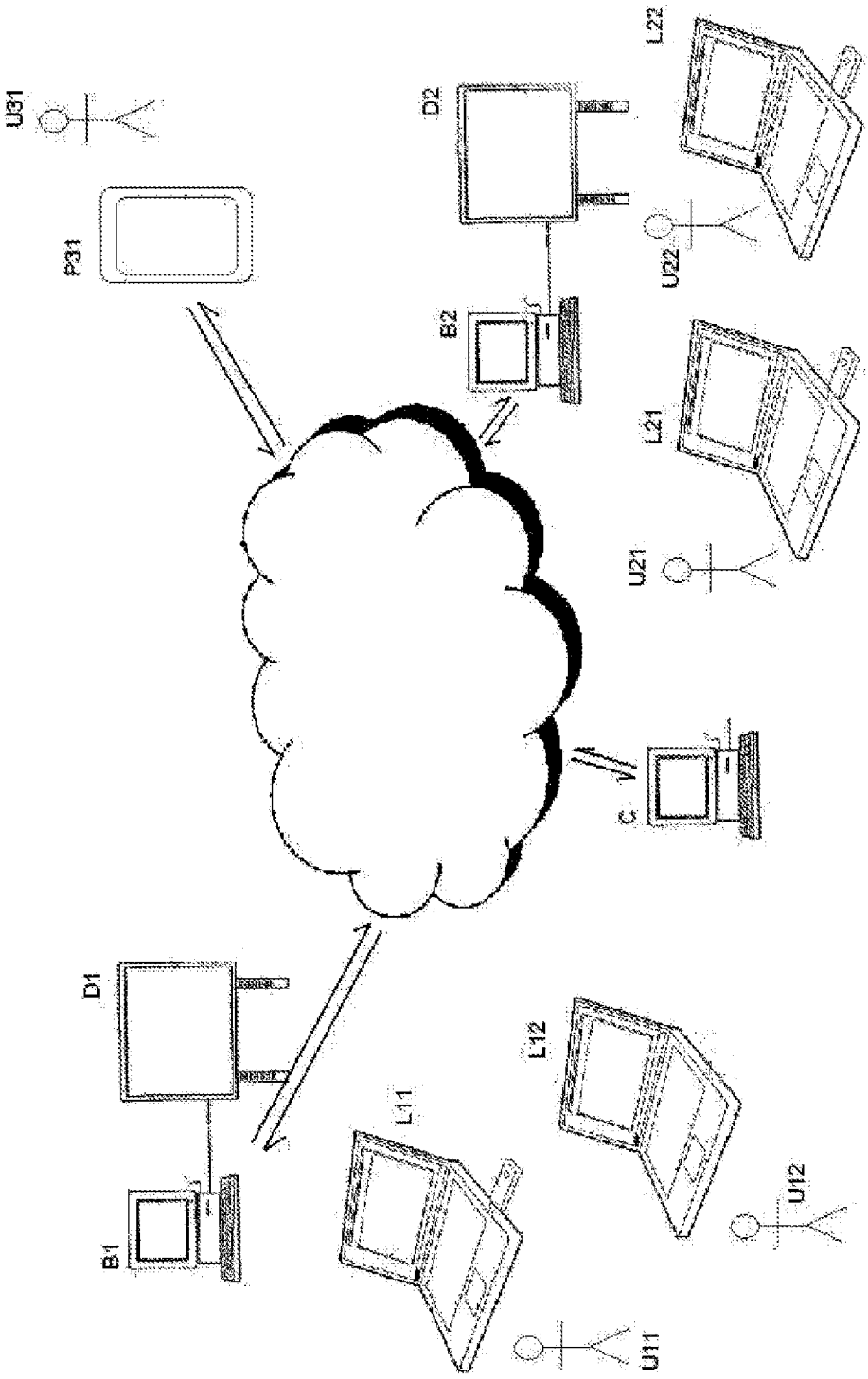


图 12



图 13

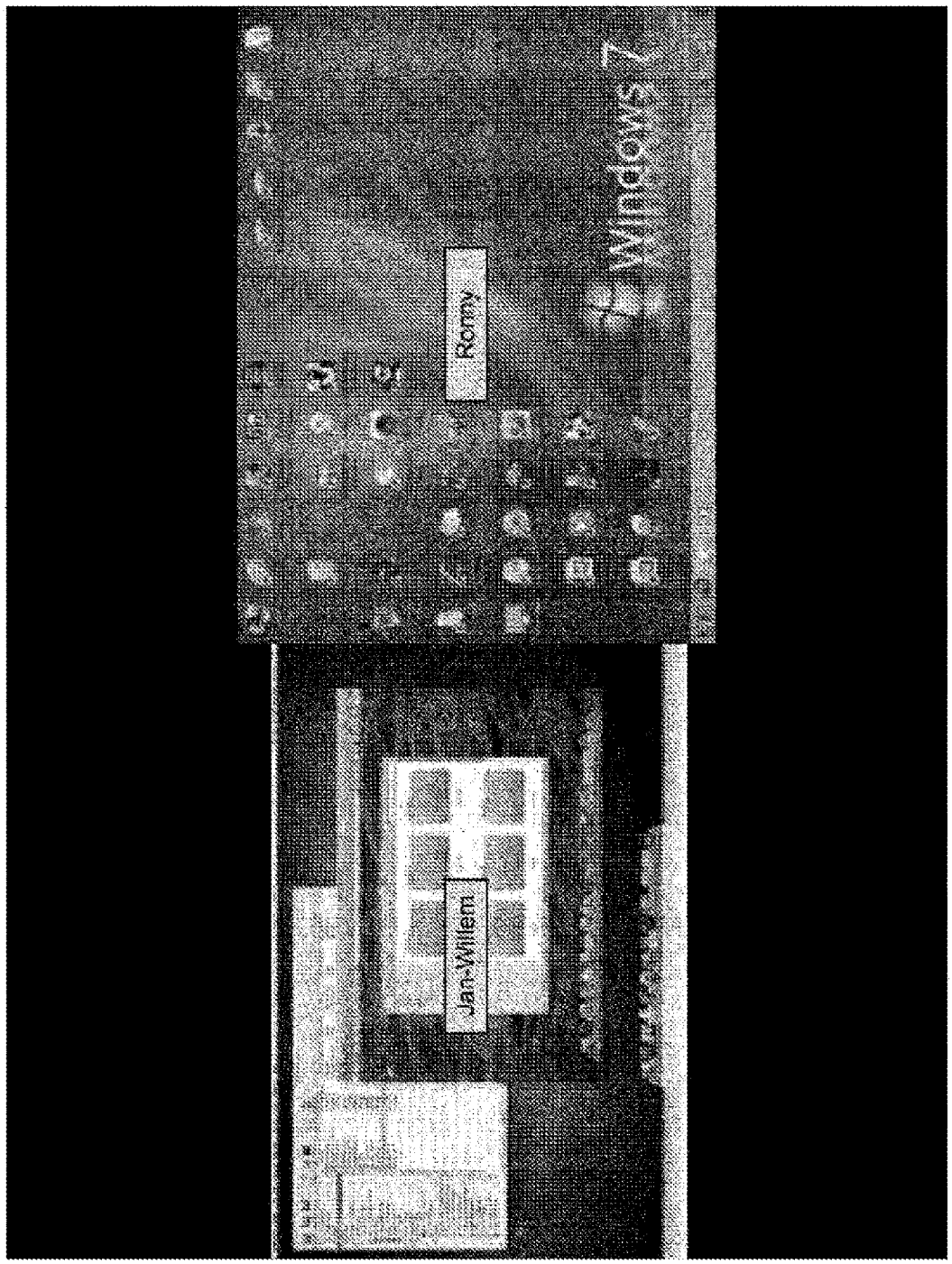


图 14

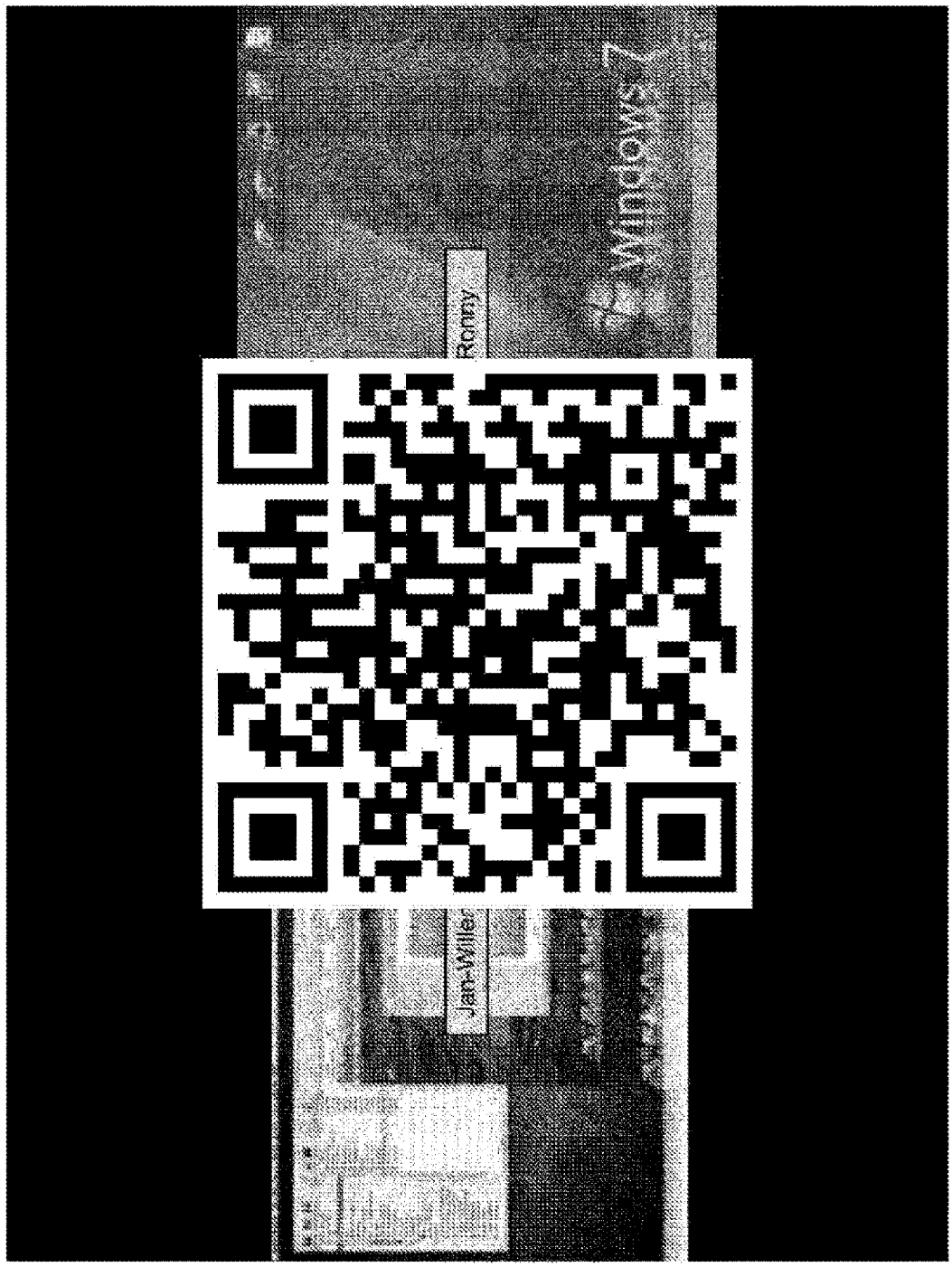


图 15

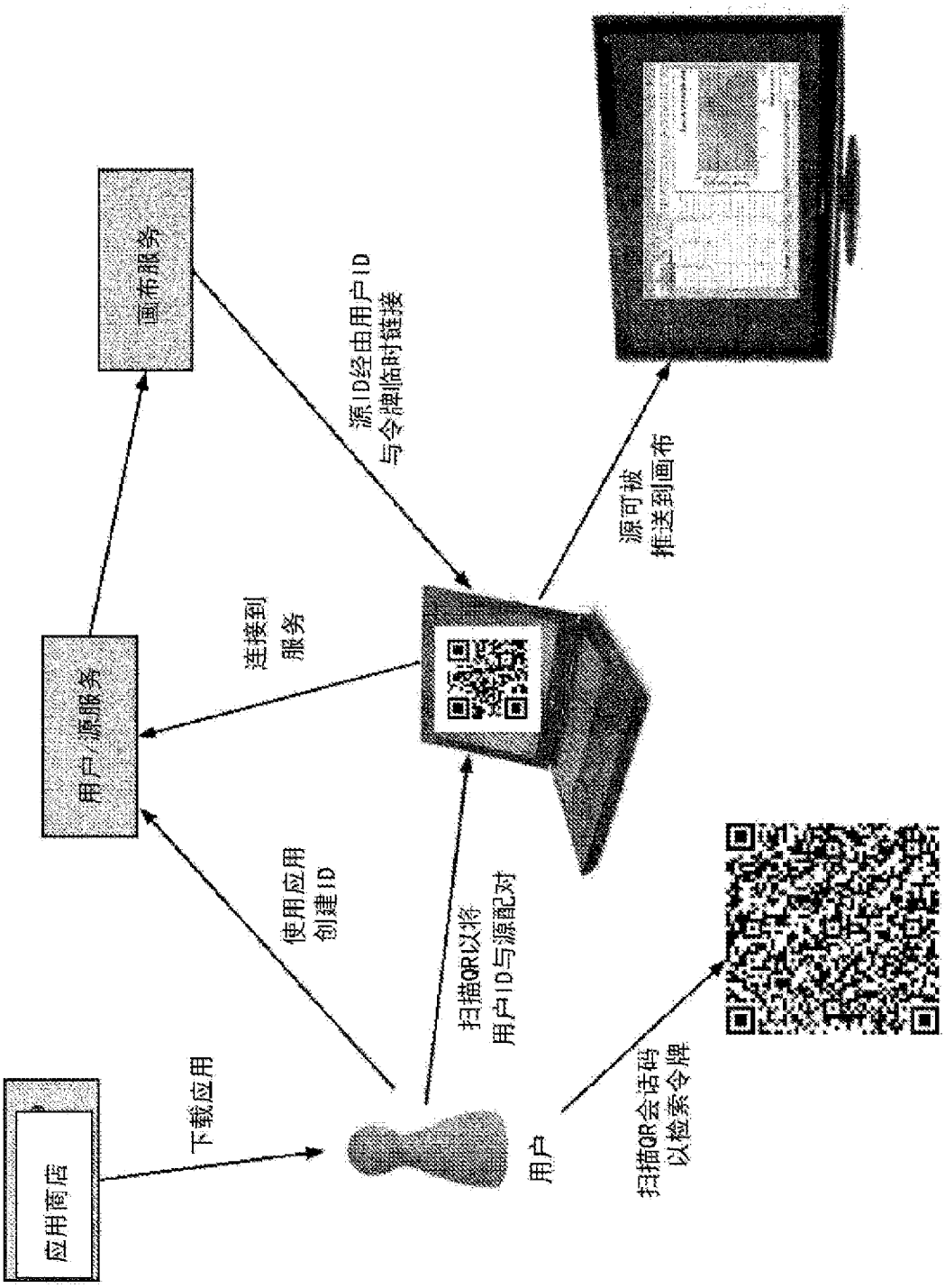

画布服务
源ID经由用户ID
与令牌临时链接
源可被
推送到画布
连接到
服务
用户/源服务
使用应用
创建ID
扫描QR以将
用户ID与源配对
下载应用
应用商店
用户
扫描QR会话码
以检索令牌

图 16

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(54) Title: ENHANCED WIRELESS USB PROTOCOL AND HUB

(57) Abstract: The present invention provides a method for improving data throughput for a wireless USB system that includes wire adapters that wirelessly transmit data between a host system and a wired USB device. The invention also provides a Wireless USB hub that acts as a proxy for the wired USB devices and presents them to a host either as unique WUSB devices with their own addresses or as separate functions on an already existing WUSB device.

WO 2008/080107 A2

ENHANCED WIRELESS USB PROTOCOL AND HUB

TECHNICAL FIELD

The present invention relates generally to Certified Wireless Universal Serial Bus (WUSB) interfaces. More specifically, the present invention is related to improving the throughput of Certified Wireless USB Wire Adapter systems.

BACKGROUND

Universal Serial Bus (USB) is a serial bus standard for attaching electronic peripheral devices to a host computing device. It was designed for personal computers, but its popularity has prompted it to also become commonplace on video game consoles, PDAs, portable DVD players, mobile phones, and other popular electronic devices. The goal of USB is to replace older serial and parallel ports on computers, since these were not standardized and called for a multitude of device drivers to be developed and maintained.

USB was designed to allow peripherals to be connected without the need to plug expansion cards into the computer's expansion bus and to improve plug-and-play capabilities by allowing devices to be hot-swapped, wherein devices are connected or disconnected without powering down or rebooting the computer. When a device is first connected, the host enumerates and recognizes it, and loads the device driver needed for that device.

USB can connect peripherals such as mouse devices, keyboards, scanners, digital cameras, printers, external storage devices, etc., and has become the standard connection method for many of these devices.

The Wireless Universal Serial Bus Specification, revision 1.0 (published May 12, 2005; available from the USB Implementers Forum, Inc.) describes and specifies extensions to wired USB which enable the use of wireless links in extended USB/WUSB systems. These wireless extensions to the USB specification are referred to as Certified Wireless Universal Serial Bus or simply Wireless USB (WUSB). The extensions build on existing wired USB specifications and WiMedia Alliance MAC and PHY ultra-wide-band (UWB) wireless technology.

The WUSB Specification includes descriptions and specifications of devices known as Wire Adapters (WA). These devices are wired-USB-to-Wireless-USB adapters which allow "legacy" wired USB hosts and devices to be interconnected with WUSB devices in extended USB systems containing both wired and wireless links.

There are two types of Wire Adapters: Host Wire Adapter (HWA) and Device Wire Adapter (DWA) which work in conjunction with each other. HWAs have a wired "upstream" USB port and a wireless "downstream" WUSB port, allowing a wired USB host to communicate with WUSB devices.

DWAs have a wireless "upstream" WUSB port and one or more wired "downstream" USB ports, allowing wired USB devices to communicate with a Wireless USB host.

The WUSB Specification Wire Adapter Protocol is used to transfer data through WAs and to control and manage WAs. Unfortunately, the Wire Adapter Protocol as specified in the WUSB Specification in typical situations is very inefficient, resulting in unacceptably low throughput. The inefficiency of the protocol is primarily attributable to two factors: the protocol is "chatty" in that a number of non-data messages conveying control and transfer complete status information are exchanged for each block of data transferred. In addition, the protocol does not lend itself well to "pipelining" of data flow through the system, resulting in high latency during transfer of data and therefore low throughput.

Therefore, it would be desirable to have a method for improving throughput for devices in USB systems containing both wired and wireless USB devices.

BRIEF DESCRIPTION OF THE DRAWINGS

Aspects of the present disclosure are best understood from the following detailed description when read with the accompanying figures, in which:

Figure 1 shows the standard configuration of a wired USB system in accordance with the prior art;

Figure 2 shows a configuration for a Wireless USB system with a "native" WUSB device directly attached to a WUSB host;

Figure 3 shows a Device Wire Adapter connected to two wired USB devices;

Figure 4 shows a system incorporating Device Wire Adapters and a Host Wire Adapter to provide wireless USB functionality to legacy wired USB devices in accordance with the prior art;

Figure 5 shows the sequence of data packets used to communicate over the wireless USB system depicted in Figure 4;

Figures 6A and 6B are sequence diagrams illustrating the process flow for an IN request using the standard wire adapter protocol in accordance with the prior art;

Figures 7A and 7B are sequence diagrams illustrating the process flow for an OUT request using the standard wire adapter protocol in accordance with the prior art;

Figure 8 is a sequence diagram illustrating the process flow for an IN request using the enhanced wire adapter protocol as an embodiment in accordance with the present invention;

Figure 9 is a sequence diagram illustrating the process flow for an OUT request using the enhanced wire adapter protocol as an embodiment in accordance with the present invention; and

Figure 10 shows a Wireless USB hub as an embodiment in accordance with the present invention.

Figure 11 shows a diagram illustrating packet flow and processing for an OUT Transfer Request forwarding in an embodiment of the present invention.

Figure 12 shows a diagram illustrating packet flow and processing for an IN Transfer Request forwarding in an embodiment of the present invention.

DETAILED DESCRIPTION

An embodiment of the present invention provides an enhanced Wire Adapter Protocol for improving data throughput for a wireless USB system that includes wire adapters that wirelessly transmit data between a host system and a wired USB device. Using this protocol, wire adapters automatically segment incoming data transfers into smaller segments, wherein a wire adapter uses its buffer status to determine how much data to fetch. Data is transferred downstream without waiting to receive a complete data segment when a wire adapter receives a specified minimum amount of data from upstream. The enhanced protocol also dispenses with Transfer Complete messages and instead determines when a data transfer has completed by polling downstream for a transfer result. The wire adapters also employ forward pipe descriptors in conjunction with remote pipe descriptors to forward transfer requests downstream.

Another embodiment of the present invention provides a Wireless USB (WUSB) hub that allows wireless communication between wired USB devices and a host system. The WUSB hub acts as a proxy for the wired USB devices and presents them to the host system as if they were native WUSB devices. The WUSB hub presents an attached wired USB device as a unique WUSB device with its own device address or as a separate function on an already existing device (the WUSB hub for instance, which may enumerate as a Device Wire Adapter).

Embodiments of the present invention include improving the throughput of WUSB Wire Adapter systems. One embodiment includes streamlining the Wire Adapter Protocol to improve the throughout of WUSB Wire Adapter systems. Another embodiment, includes presenting wired USB devices plugged into a WUSB hub as if they are "native" WUSB devices. This embodiment is referred to as a USB Device Proxy WUSB Hub, or simply WUSB hub.

Figure 1 shows the standard configuration of a wired USB system in accordance with the prior art. In this configuration, the host system 100 includes the USB root hub hardware 101, USB root hub driver 102, and a device driver 103. The external USB device 110 includes adapter hardware of its own 111 and software 112 related to its functions. The host 100 and external device 110 are connected by a wired USB connection 120 which plugs into the respective USB adapters 101, 111.

Figure 2 shows a configuration for a Wireless USB system with a "native" WUSB device directly attached to WUSB host. The system depicted in Figure 2 is similar in layout to that depicted in Figure 1, with the major difference being that both the host 200 and the external USB device 210 have built-in wireless adapters 201, 211, respectively. These adapters 201, 211 communicate over a wireless signal provided by antennae 220, 221 instead of via a wired cable. The native Wireless USB system in Figure 2 represents the goal which much of the computer/electronics industry is attempting to reach. Currently,

however, very few devices have native wireless capability. Therefore, it is desirable for the industry to accommodate systems containing both wired and wireless USB devices and hosts.

The current solution for connecting wired USB devices into WUSB systems is to plug them into a Device Wire Adapter (DWA), depicted in Figure 3. Wired USB devices 310, 320 are plugged into the DWA 300 using standard USB cables 311, 321. The DWA 300 in turn provided a wireless antenna 301 that provides a wireless link to a USB host.

A corresponding Host Wire Adapter (HWA) may be used by the host system to communicate with the DWA, or the DWA may communicate with the host system through a "native" WUSB host adapter.

Figure 4 shows a system incorporating Device Wire Adapters and a Host Wire Adapter to provide wireless USB functionality to legacy wired USB devices. This example shows the Host Wire Adapter (HWA) 410 connected to the host 400 as an external device, which is typical of current designs. Eventually, the HWA 410 will be replaced by a native WUSB host adapter embedded inside the host 400 system.

Because the HWA 410 and DWAs 410, 420 are recognized as USB devices, the host system 400 incorporates multiple software driver layers to enable communication with wired external USB devices 421, 422, 431, 432 via the HWA 410 and DWAs 420, 430.

The host 400 has a wired USB root hub 401 to which the HWA 410 is connected (whether external or internal to the host housing). Next is the root hub driver 402. The host has a separate HWA driver 403 as well as a DWA driver 404. On top of these are device drivers 405-408 that are specific to the external USB devices 421, 422, 431, 432 at the end of the chain. Each of the device drivers 405-408 attaches to and communicates with the DWA driver 404.

Data is communicated from the host 400 to the HWA 410 through a wired connection. The HWA 410 then uses a wireless protocol to transmit the data to one of the DWAs 420, 430, which in turn sends the data to the specified USB device 421, 422, 431, or 432 over a wired connection.

Figure 5 shows the sequence of packets used to communicate over the wireless USB system depicted in Figure 4. Due to the presence of the HWA and DWA in the system, the packet sequence 500 includes control packets inserted ahead of the data to tell the DWA which port to route the data through and get an acknowledgement. This occurs for each HWA and DWA in the system between the external device and the host.

In the example shown in Figure 5, the data packet 504 is preceded by Transfer Request 503, while Transfer Request 502 is preceded by Transfer Request 501. Transfer Requests 501 and 503 direct the HWA to send Transfer Request 502 and data packet 504 to the DWA. Transfer Request 502 directs the DWA to send data packet 504 to the USB device. A transfer request only appears as such to its

intended device. For example, the DWA transfer request 502 looks like data to the HWA but looks like a transfer request to the DWA.

As explained above, the current wireless USB systems use control packets (Transfer Requests) which are generated by multiple layers of drivers between the external device and its specific driver in the host in order to direct the flow of data to or from the target USB device. Unfortunately, this design dramatically hampers throughput.

Figures 6A and 6B are sequence diagrams illustrating the process flow for an IN request using the standard wire adapter protocol. Figures 7A and 7B are sequence diagrams illustrating the process flow for an OUT request using the standard wire adapter protocol. These sequence diagrams graphically illustrate the large number of Transfer Requests necessary under the standard protocol in order to transfer data between the external USB device and its driver. Much of this complexity comes from the fact the transfer requests intended for one layer of the system are seen as data by other layers, thereby invoking acknowledgements for data receipt at each layer of the system before finally delivering the data itself to the destination.

An embodiment of the present invention includes an Enhanced Wire Adapter Protocol that improves throughput by reducing the number of messages that are exchanged as a part of data transfer, thereby reducing processing time and transfer time of the messages over the wired USB interfaces and wireless medium. Throughput is also increased by improving "pipelining" of data flow through the system, which reduces transfer latency.

The enhanced Wire Adapter Protocol eliminates the Transmit Complete message and instead uses polling for Transfer Result to determine when a transfer has completed. IN data transfers may be automatically segmented ("auto-segmentation") into smaller transfers by Wire Adapters. This pushes the intelligence functions onto the Wire Adapters and away from the host software (i.e. the DWA manages the buffer). During the auto-segmentation the size of each segment may vary, whereby the Wire Adapter dynamically and adaptively adjusts the segment size in order to maximize throughput for a given situation. The Wire Adapter automatically manages its available buffers by issuing IN tokens for pending transfers based on buffers being available to accept the IN data.

In an embodiment of the present invention, a Wire Adapter driver segments a transfer request and submits all of these at once. The DWA automatically manages memory to complete each segment. For IN data, the Wire Adapter checks for memory before starting the IN transfers and for OUT data, negative acknowledgements are used to backpressure a segment for which the Wire Adapter does not have enough memory.

In an embodiment of the present invention, multiple transfers between a USB host and an HWA over the upstream USB interface may be aggregated into a single USB transfer in order to reduce transfer latency. In particular, a USB host may aggregate multiple OUT transfers targeted for an HWA, and an

HWA may aggregate multiple IN transfers targeted for a USB host. The receiver of aggregated transfers (HWAs in the case of OUT transfers and USB hosts in the case of IN transfers) de-aggregates aggregated transfers before further processing of the data. Receivers determine data boundaries in aggregated frames by parsing the content of aggregated transfers.

For example, a USB host may aggregate an OUT Transfer Request with the following OUT transfer data. The HWA receiving the aggregated transfer expects the next transfer to be a Transfer Request. It examines the first byte of the aggregated transfer in order to determine the length of the Transfer Request contained in the aggregated transfer. The wRPipe field in the Transfer Request is used to locate the associated wRPipe Descriptor, which is then used to determine that the Transfer Request is an OUT Transfer Request. Because the Transfer Request is an OUT request, the HWA treats the data in the aggregation transfer following the Transfer Request as OUT Transfer Data.

Hosts and HWAs may aggregate transfers up to a maximum length of *wMaxPacketSize* as expressed in the Standard Endpoint Descriptor for the endpoint over which the transfer occurs. Hosts and HWAs using aggregation must be prepared for every transfer to receive up to *wMaxPacketSize* bytes. For IN transfers hosts must issue an input request for wMaxPacketSize bytes. HWAs may de-aggregate "on-the-fly" as complete Control Transfers and data transfers are received,. "On-the-fly" de-aggregation can help with buffer management and dataflow and may reduce end-to-end latency.

The decision of when to aggregate and how many transfers to aggregate is implementation dependant. Typically "opportunistic" algorithms are used to make aggregation decisions. A host or HWA aggregates available transfers up to *wMaxPacketSize*.

For OUT transfer data packets the enhanced Wire Adapter Protocol uses packets that "cut-through" rather than being passed using "store and forward" transfer. Using this new approach, whenever some minimum amount of OUT data is received from the upstream port, the Wire Adapter may transfer the data on the downstream port, rather than wait until a complete segment of data is received. Conversely, the Wire Adapter automatically manages its available data buffers by putting "backpressure" on the upstream port by issuing negative acknowledgments (NAKs) when data buffers are not available to hold incoming data.

The enhanced Wire Adapter Protocol allows forwarding of Transfer Requests by a Wire Adapter, thereby reducing the number of messages used to complete data transfer. Referring back to the example in Figure 5, under the enhanced protocol the DWA Transfer Request 502 looks like a Transfer Request to the HWA and not data. Thus the HWA realizes that the incoming Transfer Request is really for the DWA and forwards it to the DWA. Forwarding Pipe (FPipe) descriptors are used in conjunction with Remote Pipe (RPipe) descriptors to control forwarding of Transfer Request packets.

Referring to Figure 11, diagram 1100 illustrates packet flow and processing for an OUT Transfer Request forwarding in an embodiment of the present invention. Diagram 1100 focuses on DWA behavior

for completing a transfer when Transfer Request forwarding is implemented and the Transfer Complete message has been eliminated as discussed above. A USB application on the host presents to the DWA driver a request to transfer data that is targeted for a USB device 1102 attached to the DWA 1104. The data 1106 to be transferred is provided with the transfer request 1108. The DWA and HWA host drivers generate a Transfer Request OUT packet and en-queue the Transfer Request and Transfer Data for transfer to the HWA 1110 over the wired USB bus. The Transfer Request 1108 contains in the wRPipe field 1112 an FPipe Descriptor number 1114 (0x8001) which references the FPipe Descriptor 1116 in the HWA 1110 to be used to forward the Transfer Request 1108.

The HWA 1110 receives the Transfer Request OUT packet 1108, followed by the Transfer Data 1106, from the upstream wired USB bus. The HWA parses the Transfer Request 1108 and locates the wRPipe field 1112 in the Transfer Request 1108. In this particular example, the wRPipe field 1112 contains 0x8001.

The HWA 1110 determines that the wRPipe number 1114 refers to an FPipe descriptor 1116 because the most significant bit of the wRPipe number 1114 is a one. This indicates to the HWA 1110 that the corresponding pipe descriptor is found in the FPipe Descriptor table 1118 (rather than the RPipe Descriptor table), and that the Transfer Request 1108 should be forwarded. In this particular example, since the wRPipe number 1114 is 0x8001, the index of the FPipe Descriptor 1116 in the FPipe Descriptor Table 1118 is 0x0001. The HWA 1110 locates FPipe Descriptor 1116 0x0001 in the FPipe descriptor table 1118.

The wRPipeIndex field 1120 in FPipe Descriptor 0x0001 (1116) is used to locate the Transfer Request RPipe Descriptor 1122. In this particular example the RPipe Descriptor index 1124 is 0x0001. The HWA 1110 determines the transfer request target device address, device endpoint and direction using the bDeviceAddress and bEndpintAddress 1126 in the RPipe Descriptor 1122. In this example, the Transfer Request 1108 is an OUT, which indicates to that the HWA 1110 to expect Transfer Data 1106 following the Transfer Request 1108 on the upstream USB bulk IN endpoint 1128, and the HWA should use OUT RPipe Descriptor 0x0001 (1122) for delivering both the forwarding Transfer Request 1130 and the Transfer Data 1132.

The HWA 1110 uses the received Transfer Request 1108 to generate a forwarding Transfer Request 1130 by replacing the wRPipe field 1112 in the received Transfer Request 1108 with the wForwardRPipe value 1134 in the FPipe Descriptor 1116.

The HWA 1110 en-queues on the downstream wireless interface 1136 for transfer to the DWA 1104 the forwarding Transfer Request 1130 and the Transfer Data 1132 (once the data has been received on the upstream USB Bulk OUT endpoint 1128). The HWA adds the two byte WUSB header to the beginning of the Transfer Request packet and to the beginning of each data packet in the transfer before en-queuing them on the downstream wireless interface 1136.

Once the forwarding Transfer Request 1130 and Transfer Data 1132 have been transferred to the DWA 1104, the HWA 1110 examines the bControl field 1138 in the OUT RPipe descriptor 1122 (0x0001, which was used to deliver the Transfer Request 1108 and Data 1106) and determines that the Automatic Request and Forwarding of Transfer Results and Transfer Data option is enabled (bit zero in the bControl field). The HWA 1110 then uses the wTransferRPipe field 1140 in the OUT RPipe Descriptor 1122 in order to locate the RPipe Descriptor 1142 associated with the bulk IN pipe 1144 of the downstream DWA 1104. Associated with the IN RPipe Descriptor 1142 is a Pending Transfer list (not shown in the diagram 1100). The HWA 1110 adds an entry in the Pending Transfer list that indicates that a Transfer Result for an OUT transfer is expected from the downstream DWA bulk IN pipe 1144.

Because of the entry in the IN RPipe Pending list indicating that a Transfer Result 1146 is expected, the HWA 1110 begins issuing IN tokens to the bulk IN endpoint 1144 on the downstream DWA 1104 in order to receive the expected Transfer Result 1146.

When the Transfer Result 1146 is received from the DWA 1104, the HWA 1110 uses the SrcAddr field in the packet MAC header and the Endpoint Number field in the WUSB header in order to locate the RPipe descriptor associated with the device and endpoint from which the Transfer Result was received. In this particular example, the device is the DWA 1104, the endpoint is the DWA bulk IN endpoint, and the corresponding RPipe in the HWA for the DWA endpoint is RPipe Descriptor 0x0002 (1148).

The HWA 1110 locates in the RPipe Pending Transfer list the entry corresponding with the received Transfer Result 1146, based on matching Transfer IDs in the Transfer Result 1146 and Pending Transfer list. The HWA 1110 determines that from the Pending Transfer list entry that the Transfer Result 1146 is for an OUT transfer and therefore no data follows the Transfer Result 1146.

The HWA 1110 examines the bControl field 1150 in IN RPipe descriptor 0x0002 (1142) and determines that the Automatic Request and Forwarding of Transfer Results and Transfer Data option is enabled (bit zero in the bControl field). Based on this option being enabled, the HWA 1110 automatically en-queues the Transfer Result packet 1146 on the upstream USB interface bulk IN endpoint 1152 for transfer to the host. The HWA 1110 then deletes the entry in the RPipe Descriptor 0x0002 (1142) Pending Transfer list corresponding to the expected Transfer Result 1146.

The HWA host driver maintains pending transfer records similar to the Pending Transfer list in the HWA 1110. Based on the pending transfer records the HWA driver expects a Transfer Result 1146 for the previously transmitted Transfer Request 1108, and therefore the HWA driver requests an IN transfer which causes IN tokens to be sent to the HWA wired USB interface bulk IN endpoint 1152. The HWA sends the Transfer Result to the host as soon as the Transfer Result 1146 comes to the top of the bulk IN queue and an IN token is received. When the Transfer Result 1146 is passed to the HWA driver

the HWA 1110 updates its records based on the information in the Transfer Result 1146, and the WUSB transfer is complete.

Referring to Figure 12, diagram 1200 illustrates packet flow and processing for an IN Transfer Request forwarding in an embodiment of the present invention. The packet flow and processing for the IN Transfer Request forwarding is similar to the packet flow and processing for the OUT Transfer Request forwarding. The differences are as follows:

The wRPipe field 1202 (0x8002) in the IN forwarding Transfer Request 1204 references an FPipe Descriptor 1206 (0x0002) containing a wRPipeIndex field 1208 (0x0002) that references an IN RPipe 1210. Because the RPipe in this case is for an IN, the HWA 1212 does not expect Transfer Data to follow the Transfer Request 1204, and therefore forwards the Transfer Request 1204 with no following data.

The HWA 1212 uses wTransferRPipe field 1211 in the IN RPipe 1210 (0x0002) to locate the OUT RPipe 1214 that is used to deliver the Transfer Request 1204. After the Transfer Request 1204 is transferred to the DWA 1216, the HWA 1212 adds an entry in the Pending Transfer list that indicates that a Transfer Result 1218 for an IN transfer is expected from the downstream DWA bulk IN pipe 1219.

When the HWA 1212 receives the Transfer Result 1218, it then attempts to read from the downstream DWA bulk IN endpoint 1219 the number of bytes indicated in the dwTransferLength field of the received Transfer Result 1218. The HWA 1212 expects the data because the corresponding entry in the Pending Transfer list indicates an IN transfer.

After the HWA 1212 receives the expected data, it en-queues the Transfer Result 1218 and Transfer Data 1220 on the upstream wired USB bulk IN endpoint 1222, for transfer to the host. If automatic segmentation is enabled, the HWA 1212 may segment the data and en-queue a Transfer Result with each data segment. The bTransferSegment field in each Transfer Result is set to the segment number.

For Transfer Request forwarding the Wire Adapter host driver maintains an association between Transfer IDs in a Transfer Request accepted from another Wire Adapter host driver and the resulting transfer generated by the Wire Adapter. It then uses this association to modify the Transfer ID in Transfer Request and Transfer Result packets.

Transfer IDs are 32 bit values used by Wire Adapter drivers and Wire Adapters to uniquely identify transfers and to associate packets with specific transfers. For each transfer initiated by a HWA or DWA host driver, a unique Transfer ID is generated and placed in the corresponding Transfer Request. When generating Transfer Result packets, HWAs and DWAs place in the Transfer Result the Transfer ID from the Transfer Request for the transfer.

With the standard Wire Adapter Protocol, Transfer IDs are unique in the context of a DWA or HWA driver instance and corresponding Wire Adapter. Take for example the case of a DWA attached to

an HWA which in turn is attached to a host. When the DWA driver generates a Transfer Request it selects a unique Transfer ID to place in the Transfer Request. The HWA driver and HWA deliver the DWA drive Transfer Request to the DWA without examining the content of the Transfer Request (as far as the HWA sub-system is concerned, the Transfer Request is data to be transferred). When the Transfer Request is delivered to the DWA the DWA parses the Transfer Request in order to determine what to do, and uses the Transfer ID in the resulting Transfer Response.

However, in order for the HWA driver to deliver the DWA Transfer Request, the HWA driver generates its own Transfer Request for the HWA. The Transfer ID placed in the HWA Transfer Request that is used to deliver the DWA Transfer Request is unrelated to the Delivery ID in the DWA Transfer Request. Stated differently, each Wire Adapter driver "layer" maintains its own set of unique Transfer IDs and is unaware of the Transfer IDs generated and used by other Wire Adapter drivers.

However, when Enhanced Wire Adapter Protocol Transfer Request Forwarding is being used handling of Transfer IDs is necessarily different than with the standard protocol. When a Transfer Request is forwarded from one Wire Adapter to another, the Transfer Request is processed by both the forwarding and target Wire Adapters, and the Transfer ID is used by both Wire Adapters. In this case both Wire Adapters are working with the same set of Transfer IDs. The same is true of forwarded Transfer Result packets, the same Transfer ID is used by one or more Wire Adapters.

Forwarding does not require special handling of Transfer IDs by the Wire Adapters, but does require specific processing by the host drivers. If forwarding is being used by a host driver and its corresponding Wire Adapter, then when the host driver accepts a Transfer Request from another ("upstream") host driver it parses the Transfer Request to locate the Transfer ID. The host driver then generates a new Transfer ID that is unique within the scope of the driver and Wire Adapter and places the new Transfer ID in the Transfer Request before forwarding it to the next driver. The host driver also creates a record that provides the association between the Transfer ID provided by the upstream Wire Adapter and the Transfer ID generated by the host driver.

Then, when the host driver receives a Transfer Result, it looks up the Transfer Result Transfer ID it its Transfer ID association table and determines that the corresponding Transfer Request was forwarded. It then replaces the Transfer ID with the value from the Transfer ID association table (i.e. with the original Transfer ID) before passing the Transfer Result to the original requesting driver. In this way the effect of forwarding on Transfer IDs by a "downstream" driver is made transparent to a host "upstream" driver.

Alternately, implementations are possible where a single host driver manages two or more serially connected Wire Adapters (for example a DWA connected to a HWA). In this case the single host driver is fully aware of the effect of forwarding and can account for it by generating Transfer IDs that are used by both the DWA and HWA.

Under the enhanced protocol a Wire Adapter automatically polls a downstream Wire Adapter for Transfer Result packets based on a previous Transfer Request to that downstream Wire Adapter. Similarly, the Wire Adapter forwards any received Transfer Result to the upstream interface rather than generating and forwarding a Transmit Complete and new Transfer Result.

Rather than the poll for downstream data initiated by receiving a Transfer Request from the host driver, the Wire Adapter automatically polls a downstream device for IN data based on previously receiving a Transfer Result for an IN data transfer. Similarly, rather than generating and forwarding a Transmit Complete and new Transfer Result, the Wire Adapter simply forwards IN Transfer Data to the upstream interface after reception.

In one embodiment of the present invention Multiple Wire Adapter drivers (HWA and DWA) may be combined into a single Wire Adapter driver in order to reduce the number of Application Programming Interfaces (APIs) and therefore the latency incurred by passing of messages across the APIs. In addition, combining multiple Wire Adapter drivers allows consolidation in the assignment of Transfer IDs, such that when Transfer Request forwarding is being used the need to maintain the association between Transfer IDs in Transfer Request presented from an upstream driver and the Transfer IDs in issued Transfer Request is eliminated.

Figure 8 is a sequence diagram illustrating the process flow for an IN request using the enhanced wire adapter protocol as an embodiment in accordance with the present invention. Figure 9 is a sequence diagram illustrating the process flow for an OUT request using the enhanced wire adapter protocol as an embodiment in accordance with the present invention. Figures 8 and 9 illustrate the reduction in control overhead provided by the enhanced Wire Adapter Protocol in comparison to the sequence diagrams shown in Figures 6A, 6B, 7A, and 7B depicting the existing protocol.

Figure 10 shows a Wireless USB hub as an embodiment in accordance with the present invention. As explained above, the current Wire Adapter protocol is relatively inefficient, whereas the WUSB protocol for "native" WUSB devices is relatively efficient. The Proxy WUSB Hub 1000 takes advantage of this efficiency by presenting wired USB devices 1010, 1020 as if they are "native" WUSB devices.

The Proxy WUSB Hub 1000 is similar to a DWA in that it has a wireless upstream port 1001 and one or more wired USB downstream ports 1002, 1003, wherein wired USB devices 1010, 1020 may be plugged into the downstream wired USB ports. The WUSB Hub differs from a DWA in that the wired USB devices 1010, 1020 appear to the host system as if they are native WUSB devices. This is accomplished by having the WUSB Hub 1000 "proxy" the attached downstream wired devices on the wireless interface. Therefore, the WUSB hub 1000 appears to the host as one or more WUSB devices, not a DWA, which eliminates much of the control packet overhead used by the standard Wire Adapter Protocol.

An attached wired USB device either 1) is presented as a unique WUSB device with its own device address, or 2) is presented as a separate function on an already existing device (the WUSB hub for instance, which may enumerate as a DWA). With this latter approach the wired device endpoints are mapped into WUSB hub endpoints.

The WUSB Hub uses various mechanisms in order to properly proxy a USB device to the host as if it is a WUSB device. The following description applies to the case when the WUSB hub presents downstream USB devices as WUSB devices, rather than as functions on the DWA.

Each WUSB device maintains a security connection context. The connection context is negotiated during first-time connection. The WUSB Hub negotiates the security connection context for the USB devices without the knowledge or involvement of the downstream devices and stores the security connection context. A sufficient number of unique security connection contexts are negotiated and maintained in order to support the maximum number of downstream USB devices that the WUSB hub is capable of simultaneously proxying. A specific connection context is not tied to a particular downstream USB device, rather the connection contexts are applied as needed when USB devices are attached.

The WUSB hub maintains a unique WUSB device address for each attached proxy USB device, and it participates in the WUSB protocol as if it were the WUSB devices it is proxying, rather than appearing as an intervening device (like a DWA).

The WUSB Hub detects USB attachment either directly or by intercepting interrupt packets from attached downstream hubs. Upon detecting attachment of downstream devices the WUSB hub does not forward interrupt packets to the host or directly inform the host of USB attachment. Instead, the WUSB hub performs a WUSB device connection procedure on behalf of the USB device.

The WUSB hub reads the descriptors of the USB devices and modifies them so that they are consistent with descriptors for WUSB devices. For example, the maximum packet size field in the Standard Endpoint Descriptor is modified so that it is consistent with WUSB packet sizes. The bmAttributes field in the Standard Configuration Descriptor is set to indicate that the device is self-powered.

For some USB devices which do not use zero-packet-length semantics to indicate the end of transfers, the lengths of IN transfers are used so that the correct number of bytes are read. However, in the case of a WUSB hub, the length of IN transfers is not available with the WUSB protocol. Without transfer requests, there is no previously declared limit on the amount of data to read. Fortunately, the upstream wireless device is provided with the expected length of transfers.

The WUSB protocol is modified slightly in order to support the WUSB hub. Two options are available. In the first option, the maximum packet size field in IN Channel Time Allocation (CTE), Information Elements (IEs) sent in WUSB host Micro-scheduled Management Control (MMC) can be

used to indicate the expected transfer length. Alternatively, a field may be added to CTAs to indicate the expected transfer length.

In an embodiment of the present invention, the WUSB hub includes a controller 1004 to perform the functions and operations of the WUSB hub, discussed above.

For the case in which a WUSB hub proxies one or more downstream USB devices as functions on the WUSB hub/DWA, the above description generally applies, except that the security connection context and WUSB device address is shared with the WUSB hub. In addition, when a USB device attaches, the WUSB hub maps WUSB hub wireless endpoints one-for-one for USB device endpoints and treats the collection of endpoints associated with a particular USB device as a function on the WUSB hub. The WUSB hub informs the host that a new function needs to be enumerated in order to activate support for a newly attached device.

Although embodiments of the present disclosure have been described in detail, those skilled in the art should understand that they may make various changes, substitutions and alterations herein without departing from the spirit and scope of the present disclosure.

WHAT IS CLAIMED IS:

1. A method for increasing throughput for a wireless USB system having a first USB enabled device and a second USB enabled device, comprising:

aggregating a plurality of packets in said first USB enabled device;

transferring said aggregated plurality of packets from said first USB enabled device to said second USB enabled device; and

disaggregating said aggregated plurality of packets in said second USB enabled device after said transferring.

2. The method of claim 1,

including configuring said first USB enabled device as a USB enabled host device;

including configuring said second USB enabled device as a host wire adapter; and

wherein said aggregating said plurality of packets includes aggregating a plurality of OUT transfers targeted to said host wire adapter, said OUT transfers including a control message and data.

3. The method of claim 1,

including configuring said first USB enabled device as a host wire adapter;

including configuring said second USB enabled device as a USB enabled host device; and

wherein said aggregating said plurality of packets includes aggregating a plurality of IN transfers targeted to said USB enabled host device, said IN transfers including a control message and data.

4. A method for increasing throughput for a wireless USB system having a wire adapter and a USB enabled device, comprising:

determining an availability of a data buffer associated with said wire adapter for receiving a transfer from said USB enabled device;

generating a message based on said availability of said data buffer;

providing said message to said USB enabled device indicating whether said data buffer is available to receive said transfer.

5. The method of claim 4,

wherein said USB enabled device is downstream from said wire adapter; and

wherein said message includes a token that indicates said data buffer is available to receive said transfer from said USB enabled device.

6. The method of claim 5, including configuring said wire adapter as a device wire adapter.

7. The method of claim 5, including:

configuring said USB enabled device as a device wire adapter; and

configuring said wire adapter includes a host wire adapter.

8. The method of claim 5, including:

segmenting said transfer into a plurality of transfer segments; and

transferring said plurality of transfer segments from said USB enabled device to said wire adapter.

9. The method of claim 5, including:

transferring said transfer from said USB enabled device to said wire adapter; and

segmenting said transfer into a plurality of transfer segments.

10. The method of claim 9, wherein said plurality of transfer segments vary in size.

11. The method of claim 9, wherein said segmenting includes dynamically and adaptively adjusting the size of at least one of said plurality of transfer segments to maximize throughput for a given situation.

12. The method of claim 4,

wherein said USB enabled device is upstream from said wire adapter; and

wherein said message includes a negative acknowledgement that indicates said data buffer is unavailable to receive said transfer from said USB enabled device.

13. The method of claim 12, including:

configuring said USB enabled device as a host wire adapter; and

configuring said wire adapter as a device wire adapter.

14. The method of claim 12, including:

configuring said USB enabled device as a USB enabled host device; and

configuring said wire adapter as a host wire adapter.

15. The method of claim 12, including:

sending said transfer from said USB enabled device to said wire adapter;

receiving said transfer from said USB enabled device on an upstream port of said wire adapter; and

forwarding said transfer from said upstream port of said wire adapter to a downstream port of said wire adapter when a minimum amount of data is received from said upstream port of said wire adapter.

16. A method for increasing throughput for a wireless USB system having a wire adapter and a downstream wire adapter, comprising:

polling said downstream wire adapter for a packet;

receiving said packet from said downstream wire adapter on a downstream interface of said wire adapter; and

forwarding said packet to an upstream interface of said wire adapter after said receiving said packet.

17. The method of claim 16,

wherein said packet includes a transfer result packet; and

wherein said polling said downstream wire adapter for said transfer result packet is based on previously transmitting a transfer request packet to said downstream wire adapter.

18. The method of claim 16,

wherein said packet includes an incoming data packet; and

wherein said polling said downstream wire adapter for said incoming data packet is based on receiving a transfer request packet from said downstream wire adapter.

19. A method for increasing throughput for a wireless USB system having a first wire adapter and a second wire adapter, comprising:

generating a transfer request to include a descriptor indicating a data transfer type;

sending said transfer request to said first wire adapter; and

forwarding said transfer request from said first wire adapter to said second wire adapter based on said descriptor.

20. The method of claim 19, including forwarding transfer data along with said transfer request when said data transfer type is an OUT transfer.

21. A method for increasing throughput for a wireless USB system having a forwarding wire adapter and a target wire adapter, comprising:

transferring a transfer request packet from said forwarding wire adapter to said target wire adapter; and

polling said target wire adapter for a transfer result packet based on said transfer request packet.

22. A method for communicating between a wired USB enabled device and a first wireless USB enabled device in a wireless USB system, comprising:

detecting said wired USB enabled device; and

presenting said wired USB enabled device as a second wireless USB enabled device to said first wireless USB enabled device.

23. The method of claim 22, further comprising:

reading a device descriptor from said wired USB enabled device;

modifying said device descriptor so that it is consistent with a device descriptor for any wireless USB enabled device as specified by a predetermined wireless USB standard;

determining an expected amount of data to be transferred from said wired USB enabled device to said first wireless USB enabled device;

modifying a predetermined wireless USB protocol to include said expected amount of data; and

providing said expected amount of data to said first wireless USB enabled device.

24. The method of claim 23, wherein,

said device descriptor includes a standard endpoint descriptor, and

said modifying said device descriptor includes setting a maximum packet size field in said standard endpoint descriptor to be consistent with wireless USB packet sizes.

25. The method of claim 23, wherein,

said predetermined wireless USB protocol includes a predetermined wireless USB wire adapter protocol, and

said modifying said predetermined wireless USB protocol includes adding a field in a channel time allocation portion of said predetermined wireless USB wire adapter protocol, said field specifying said expected amount of data.

26. The method of claim 23, wherein,

said predetermined wireless USB protocol includes a predetermined wireless USB wire adapter protocol, and

said modifying said predetermined wireless USB protocol includes setting a maximum packet size field in a channel time allocation portion of said predetermined wireless USB wire adapter protocol, said field specifying said expected amount of data.

27. The method of claim 22, further comprising:

negotiating and maintaining a wireless USB security connection context for communication with said wireless USB enabled device; and

applying said wireless USB security connection context after detecting said wired USB enabled device.

28. The method of claim 22, further comprising maintaining a unique wireless USB device address for said wired USB enabled device, and wherein presenting said wired USB enabled device includes presenting said wired USB enabled device having said unique wireless USB device address.

29. The method of claim 22, further comprising:

mapping a first endpoint associated with said wired USB enabled device to a second endpoint associated with said first wireless USB enabled device; and

informing said first wireless USB enabled device that a new function needs to be enumerated, wherein said new function is associated with said first wireless USB enabled device.

30. The method of claim 23, further comprising:

intercepting a read descriptor request from said first wireless USB enabled device; and

providing said first wireless USB enabled device with a response to said read descriptor request after said modifying said device descriptor.

31. A wireless USB enabled hub that facilitates communication between a wired USB enabled device and a first wireless USB enabled device, comprising:

a first port configured to communicate with said wired USB enabled device;

a second port configured to communicate with said first wireless USB enabled device; and

a controller configured to:

detect said wired USB enabled device;

present said wired USB enabled device as a native wireless USB enabled device to said first wireless USB enabled device.

32. The wireless USB enabled hub of claim 31, wherein,

said controller is configured to present said hub as a device wire adapter to said first wireless USB enabled device, and

said first wireless USB enabled device includes a wireless USB enabled host.

33. The wireless USB enabled hub of claim 31, wherein the controller is configured to present said wired USB enabled device to said first wireless USB enabled device as a unique wireless USB enabled device having its own address.

34. The wireless USB enabled hub of claim 31, wherein the controller is configured to present said wired USB enabled device as a separate function on the wireless USB enabled hub by mapping a wired USB enabled device endpoint to a wireless USB enabled hub endpoint.

35. The wireless USB enabled hub of claim 31, wherein said controller is configured to:

maintain a wireless USB address for each of a plurality of downstream wired USB enabled devices; and

respond to a wireless USB packet directed to one of said plurality of downstream USB enabled devices.

36. The wireless USB enabled hub of claim 31, wherein said controller is configured to:

intercept a device descriptor request from said first wireless USB enabled device;

read a device descriptor from said wired USB enabled device;

modify said device descriptor so that it is consistent with a device descriptor for any wireless USB enabled device as specified by a predetermined wireless USB standard; and

present said wired USB enabled device as said native wireless USB enabled device by providing said modified device descriptor to said first wireless USB enabled device.

37. The wireless USB enabled hub of claim 36, wherein,

said device descriptor includes a standard endpoint descriptor, and

said controller is configured to modify said device descriptor by setting a maximum packet size field in said standard endpoint descriptor to be consistent with wireless USB packet sizes.

38. The wireless USB enabled hub of claim 31, wherein said controller is configured to:

determine an expected amount of data to be transferred from said wired USB enabled device to said first wireless USB enabled device; and

modify a predetermined wireless USB protocol to include said expected amount of data.

39. The wireless USB enabled hub of claim 38, wherein,

said predetermined wireless USB protocol includes a predetermined wireless USB wire adapter protocol, and

said controller is configured to modify said predetermined wireless USB wire adapter protocol by setting a maximum packet size field in a channel time allocation portion, said maximum packet size field specifying said expected amount of data.

40. The wireless USB enabled hub of claim 38, wherein,

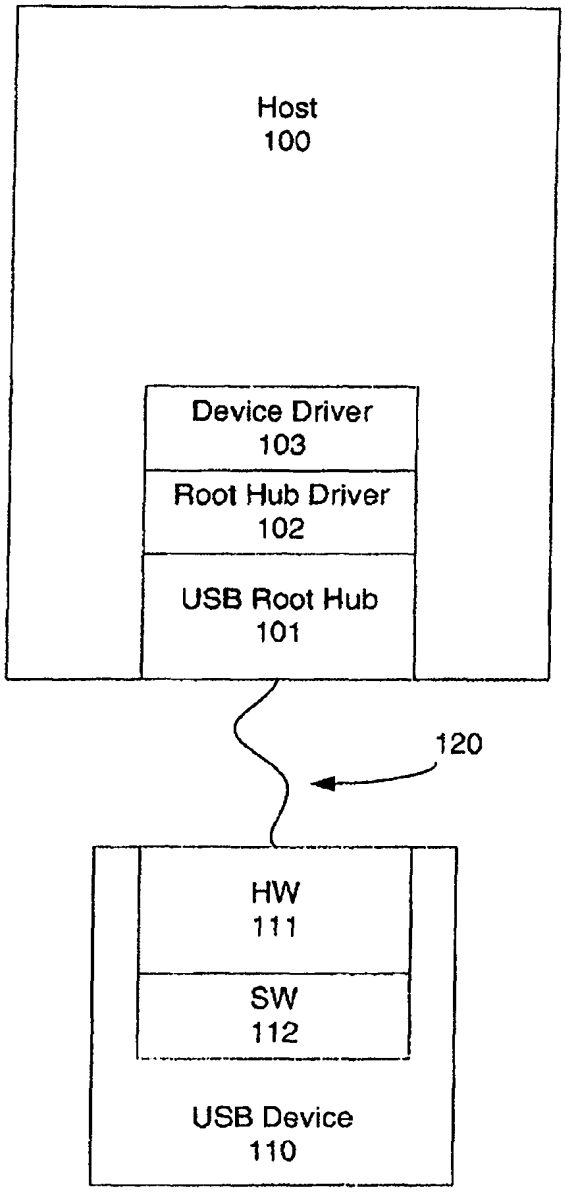
said predetermined wireless USB protocol includes a predetermined wireless USB wire adapter protocol, and

said controller is configured to modify said predetermined wireless USB wire adapter protocol by adding a field in a channel time allocation portion of said predetermined wireless USB protocol, said field specifying said expected amount of data.

41. The wireless USB enabled hub of claim 31, wherein said controller is configured to:

negotiate and maintain a wireless USB security connection context for communication with said wireless USB enabled device; and

apply said wireless USB security connection context after said controller detects said wired USB enabled device.



(Prior Art)

Fig. 1

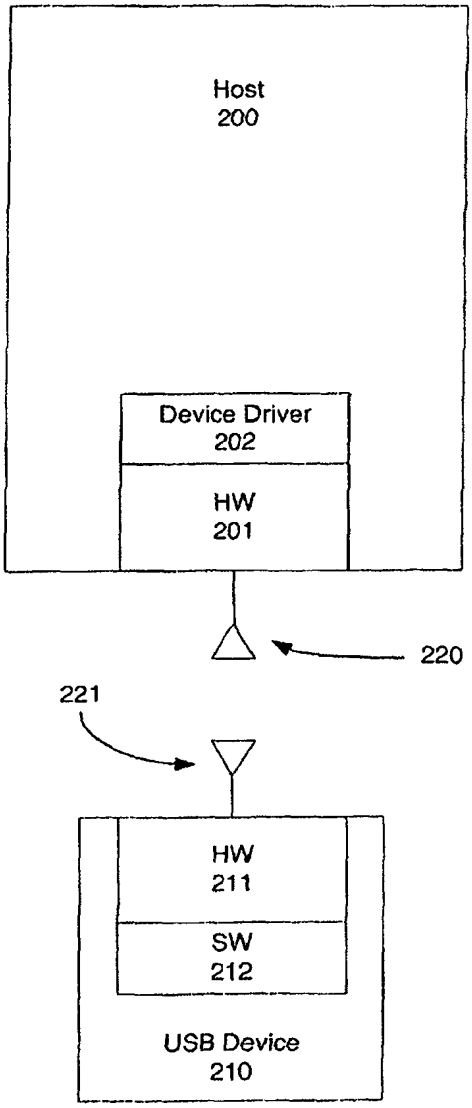

Host
200
Device Driver
202
HW
201
220
221
HW
211
SW
212
USB Device
210

Fig. 2

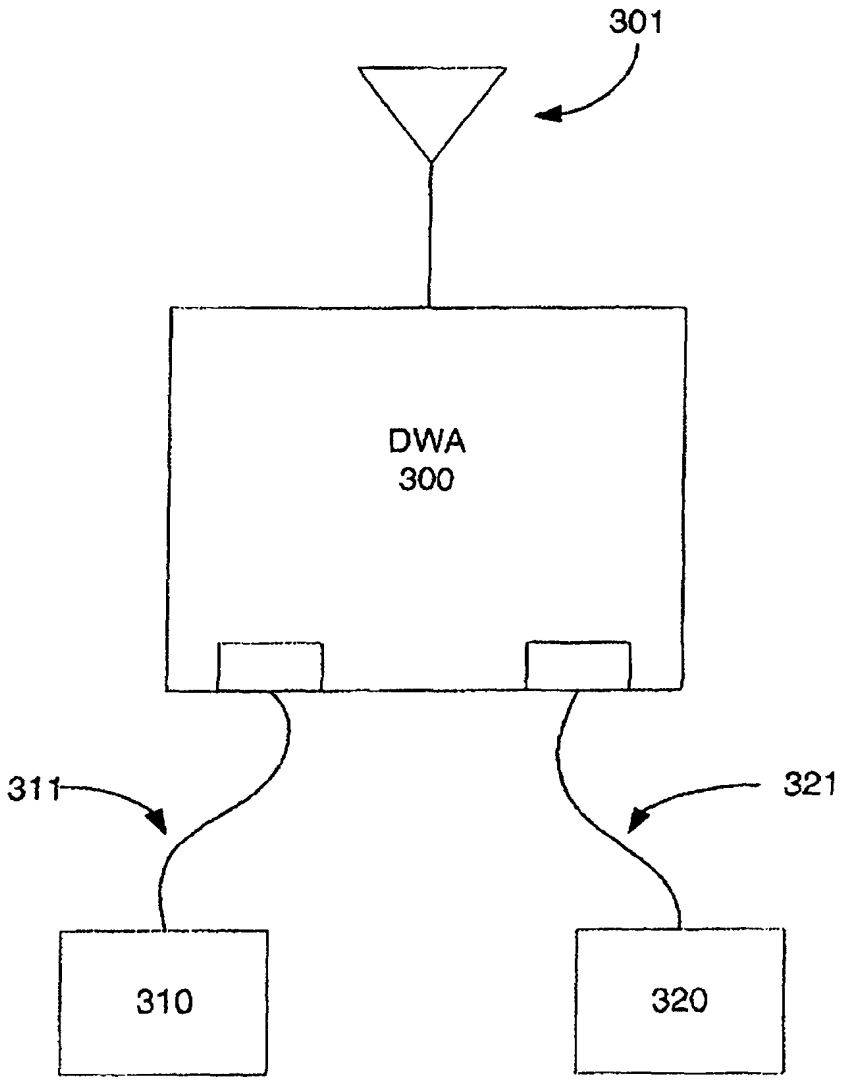


Fig. 3

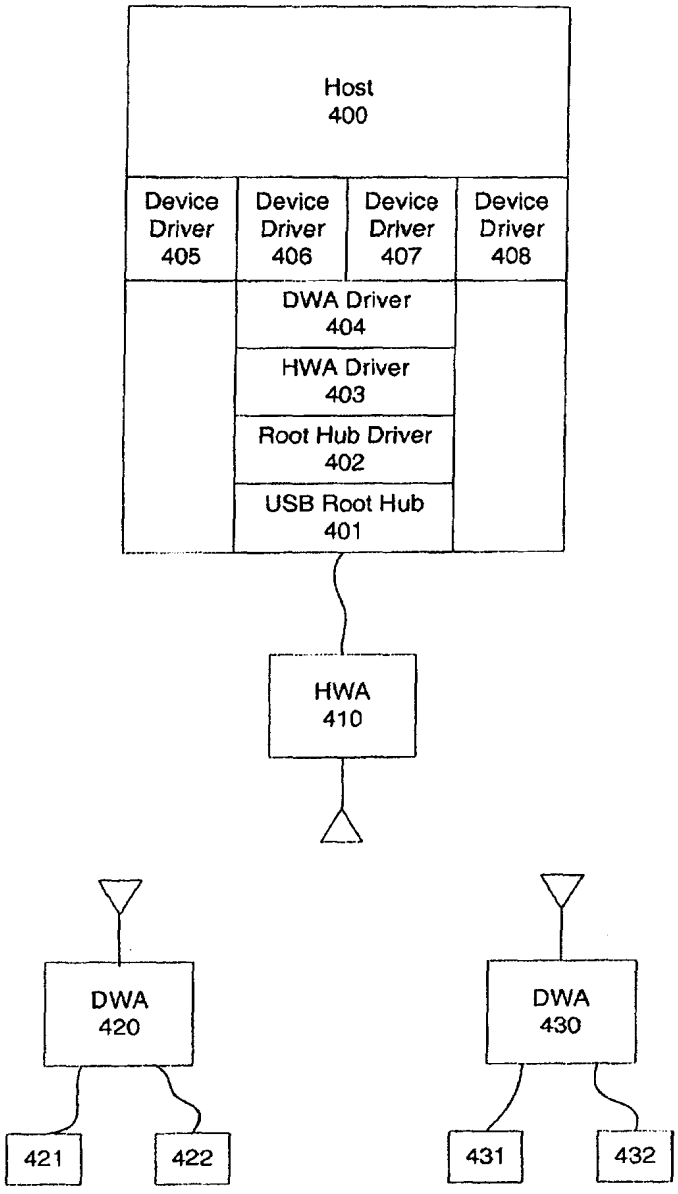

Host
400
Device Driver 405
Device Driver 406
Device Driver 407
Device Driver 408
DWA Driver 404
HWA Driver 403
Root Hub Driver 402
USB Root Hub 401
HWA 410
DWA 420
DWA 430
421
422
431
432

Fig. 4

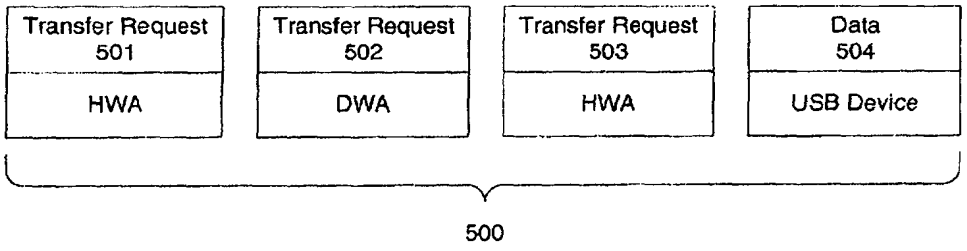

Transfer Request
501
HWA
Transfer Request
502
DWA
Transfer Request
503
HWA
Data
504
USB Device
500

Fig. 5

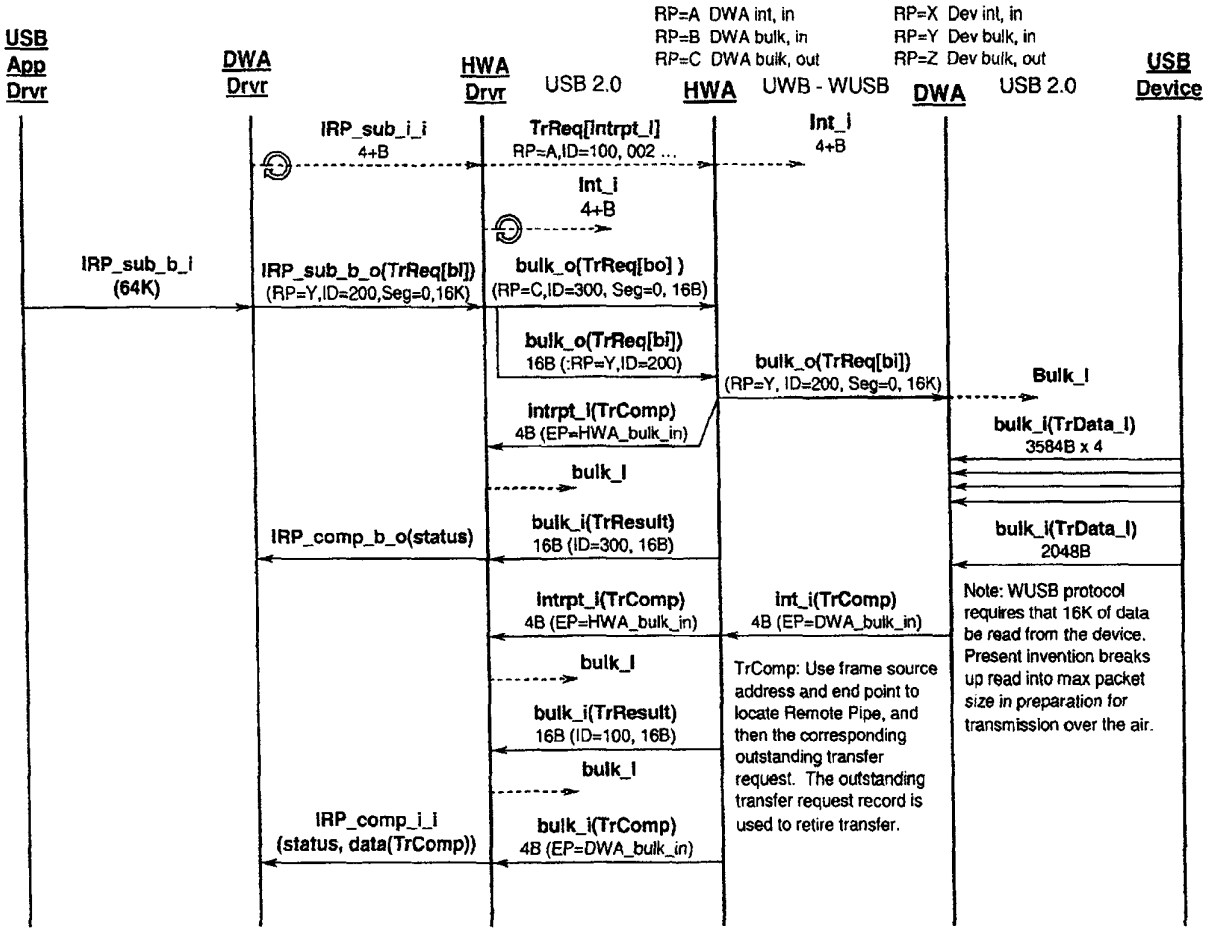

WUSB HWA+DWA IN - Message Sequence Chart
Example – Standard Protocol - 64K IN request, 4 x 16K segments
RP=A DWA int, in
RP=B DWA bulk, in
RP=C DWA bulk, out
RP=X Dev int, in
RP=Y Dev bulk, in
RP=Z Dev bulk, out
USB App Drvr
DWA Drvr
HWA Drvr
USB 2.0
HWA
UWB - WUSB
DWA
USB 2.0
USB Device
IRP_sub_i_i
4+B
TrReq[intrpt_i]
RP=A,ID=100, 002 ...
Int_i
4+B
Int_i
4+B
IRP_sub_b_i
(64K)
IRP_sub_b_o(TrReq[bi])
(RP=Y,ID=200,Seg=0,16K)
bulk_o(TrReq[bo])
(RP=C,ID=300, Seg=0, 16B)
bulk_o(TrReq[bi])
16B (:RP=Y,ID=200)
bulk_o(TrReq[bi])
(RP=Y, ID=200, Seg=0, 16K)
Bulk_I
intrpt_I(TrComp)
4B (EP=HWA_bulk_in)
bulk_i(TrData_I)
3584B x 4
bulk_I
IRP_comp_b_o(status)
bulk_i(TrResult)
16B (ID=300, 16B)
bulk_i(TrData_I)
2048B
intrpt_i(TrComp)
4B (EP=HWA_bulk_in)
int_i(TrComp)
4B (EP=DWA_bulk_in)
Note: WUSB protocol requires that 16K of data be read from the device. Present invention breaks up read into max packet size in preparation for transmission over the air.
bulk_I
TrComp: Use frame source address and end point to locate Remote Pipe, and then the corresponding outstanding transfer request. The outstanding transfer request record is used to retire transfer.
bulk_i(TrResult)
16B (ID=100, 16B)
bulk_I
IRP_comp_i_i
(status, data(TrComp))
bulk_i(TrComp)
4B (EP=DWA_bulk_in)

Fig. 6A

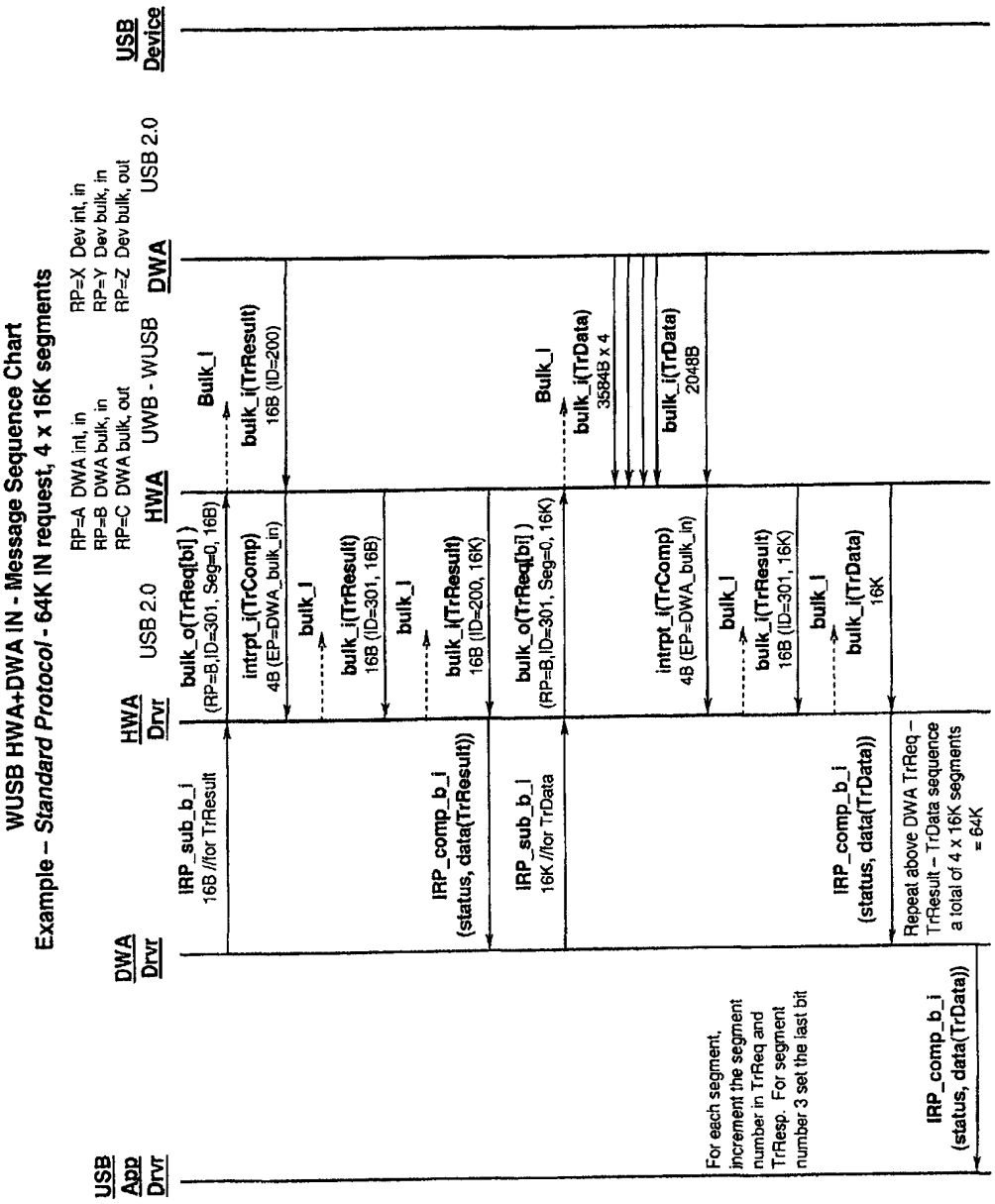

WUSB HWA+DWA IN - Message Sequence Chart
Example – Standard Protocol - 64K IN request, 4 x 16K segments
RP=A DWA int, in
RP=B DWA bulk, in
RP=C DWA bulk, out
RP=X Dev int, in
RP=Y Dev bulk, in
RP=Z Dev bulk, out
USB App Drvr
DWA Drvr
HWA Drvr
USB 2.0
HWA
UWB - WUSB
DWA
USB 2.0
USB Device
IRP_sub_b_i
16B //for TrResult
bulk_o(TrReq[bi])
(RP=B,ID=301, Seg=0, 16B)
Bulk_I
intrpt_i(TrComp)
4B (EP=DWA_bulk_in)
bulk_i(TrResult)
16B (ID=200)
bulk_I
bulk_i(TrResult)
16B (ID=301, 16B)
bulk_I
IRP_comp_b_i
(status, data(TrResult))
bulk_i(TrResult)
16B (ID=200, 16K)
IRP_sub_b_i
16K //for TrData
bulk_o(TrReq[bi])
(RP=B,ID=301, Seg=0, 16K)
Bulk_I
bulk_i(TrData)
3584B x 4
intrpt_i(TrComp)
4B (EP=DWA_bulk_in)
bulk_i(TrData)
2048B
bulk_I
bulk_i(TrResult)
16B (ID=301, 16K)
bulk_I
IRP_comp_b_i
(status, data(TrData))
bulk_i(TrData)
16K
For each segment, increment the segment number in TrReq and TrResp. For segment number 3 set the last bit
Repeat above DWA TrReq – TrResult – TrData sequence a total of 4 x 16K segments = 64K
IRP_comp_b_i
(status, data(TrData))

Fig. 6B

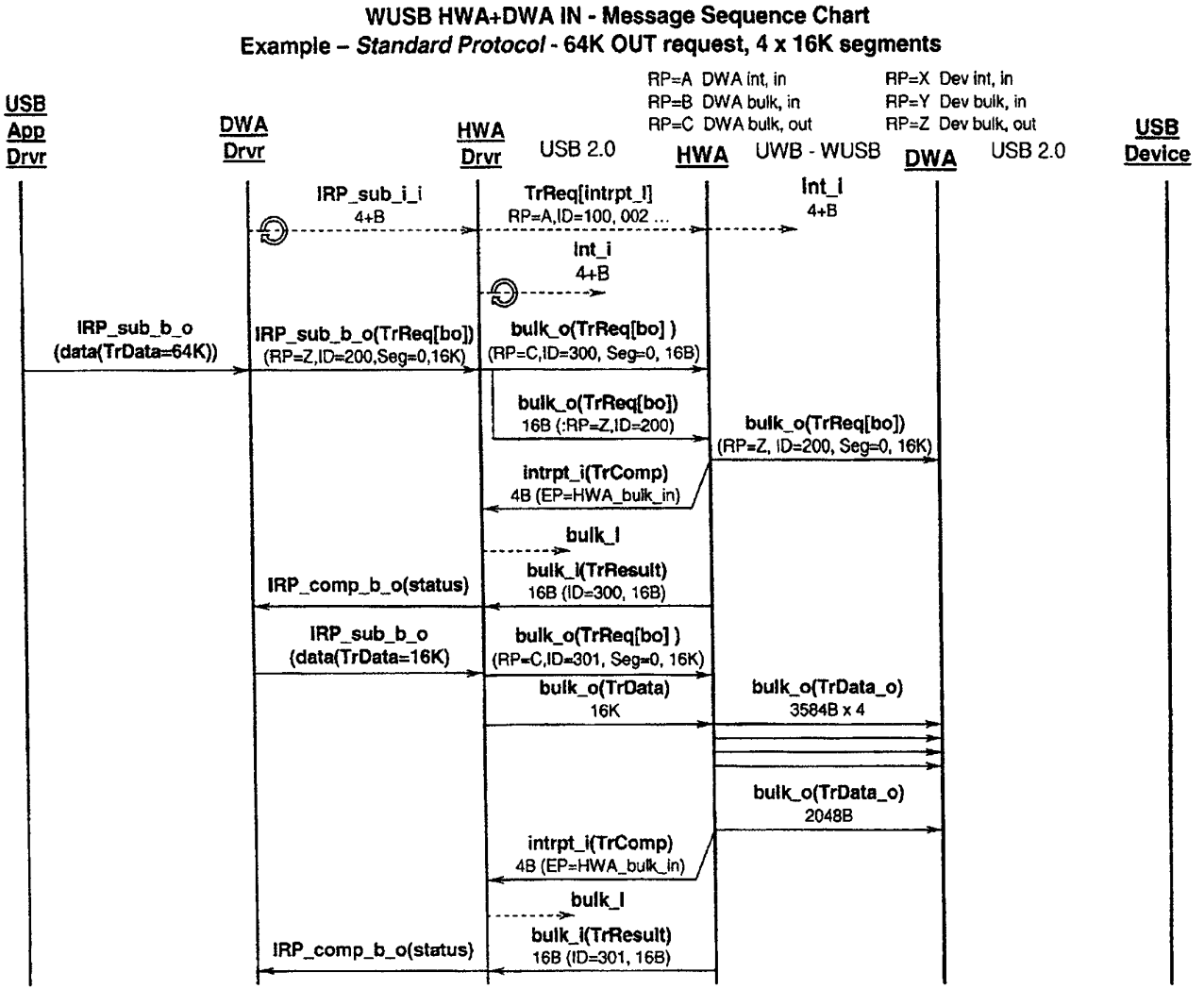

WUSB HWA+DWA IN - Message Sequence Chart
Example – Standard Protocol - 64K OUT request, 4 x 16K segments
RP=A DWA int, in
RP=B DWA bulk, in
RP=C DWA bulk, out
RP=X Dev int, in
RP=Y Dev bulk, in
RP=Z Dev bulk, out
USB App Drvr
DWA Drvr
HWA Drvr
USB 2.0
HWA
UWB - WUSB
DWA
USB 2.0
USB Device
IRP_sub_i_i
4+B
TrReq[intrpt_I]
RP=A,ID=100, 002 ...
Int_I
4+B
Int_i
4+B
IRP_sub_b_o
(data(TrData=64K))
IRP_sub_b_o(TrReq[bo])
(RP=Z,ID=200,Seg=0,16K)
bulk_o(TrReq[bo])
(RP=C,ID=300, Seg=0, 16B)
bulk_o(TrReq[bo])
16B (:RP=Z,ID=200)
bulk_o(TrReq[bo])
(RP=Z, ID=200, Seg=0, 16K)
intrpt_i(TrComp)
4B (EP=HWA_bulk_in)
bulk_I
bulk_i(TrResult)
16B (ID=300, 16B)
IRP_comp_b_o(status)
IRP_sub_b_o
(data(TrData=16K)
bulk_o(TrReq[bo])
(RP=C,ID=301, Seg=0, 16K)
bulk_o(TrData)
16K
bulk_o(TrData_o)
3584B x 4
bulk_o(TrData_o)
2048B
intrpt_i(TrComp)
4B (EP=HWA_bulk_in)
bulk_I
bulk_i(TrResult)
16B (ID=301, 16B)
IRP_comp_b_o(status)

Fig. 7A

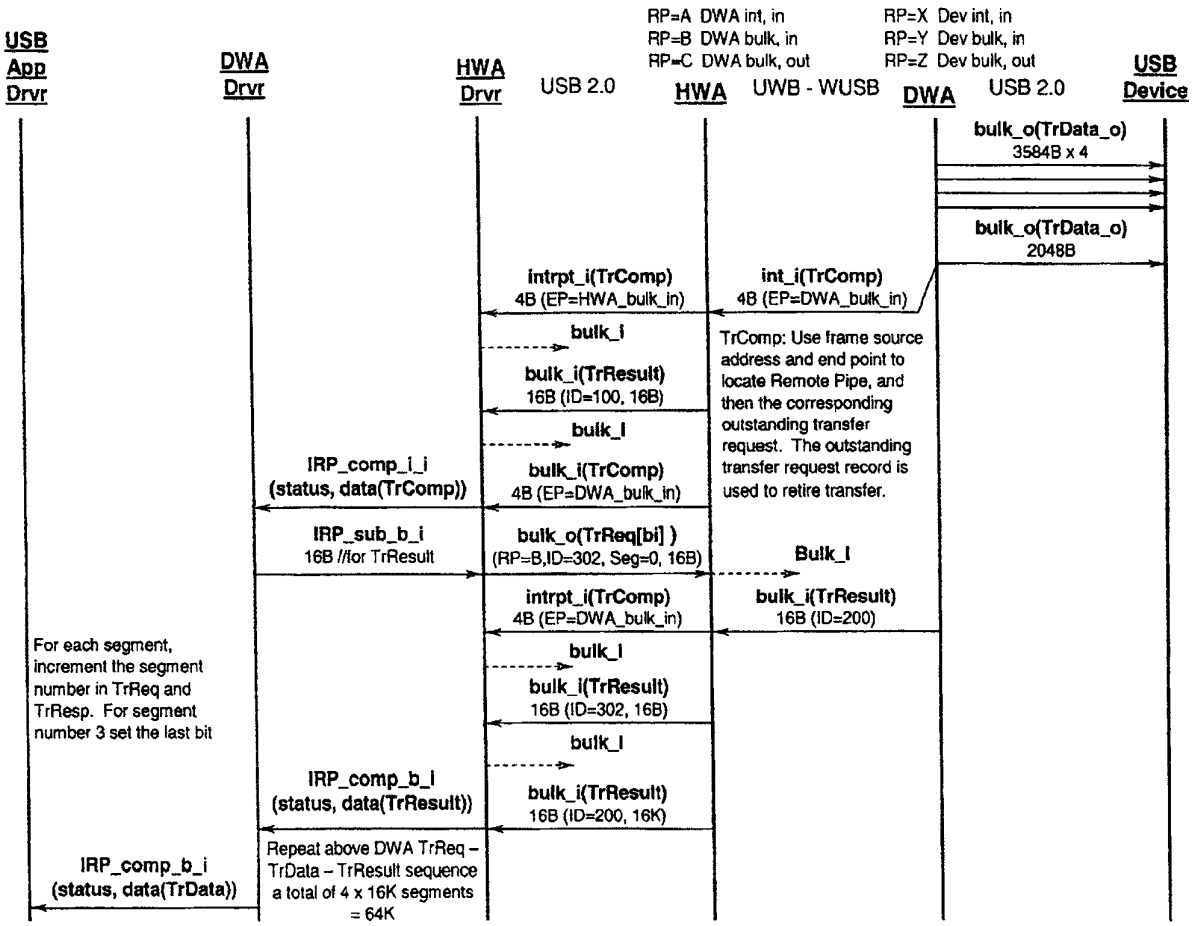

WUSB HWA+DWA IN - Message Sequence Chart
Example – Standard Protocol - 64K OUT request, 4 x 16K segments
RP=A DWA int, in
RP=B DWA bulk, in
RP=C DWA bulk, out
RP=X Dev int, in
RP=Y Dev bulk, in
RP=Z Dev bulk, out
USB App Drvr
DWA Drvr
HWA Drvr
USB 2.0
HWA
UWB - WUSB
DWA
USB 2.0
USB Device
bulk_o(TrData_o) 3584B x 4
bulk_o(TrData_o) 2048B
intrpt_i(TrComp) 4B (EP=HWA_bulk_in)
int_i(TrComp) 4B (EP=DWA_bulk_in)
bulk_i
bulk_i(TrResult) 16B (ID=100, 16B)
TrComp: Use frame source address and end point to locate Remote Pipe, and then the corresponding outstanding transfer request. The outstanding transfer request record is used to retire transfer.
bulk_i
IRP_comp_i_i (status, data(TrComp))
bulk_i(TrComp) 4B (EP=DWA_bulk_in)
IRP_sub_b_i 16B //for TrResult
bulk_o(TrReq[bi]) (RP=B,ID=302, Seg=0, 16B)
Bulk_I
intrpt_i(TrComp) 4B (EP=DWA_bulk_in)
bulk_i(TrResult) 16B (ID=200)
For each segment, increment the segment number in TrReq and TrResp. For segment number 3 set the last bit
bulk_i
bulk_i(TrResult) 16B (ID=302, 16B)
bulk_i
IRP_comp_b_i (status, data(TrResult))
bulk_i(TrResult) 16B (ID=200, 16K)
IRP_comp_b_i (status, data(TrData))
Repeat above DWA TrReq – TrData – TrResult sequence a total of 4 x 16K segments = 64K

Fig. 7B

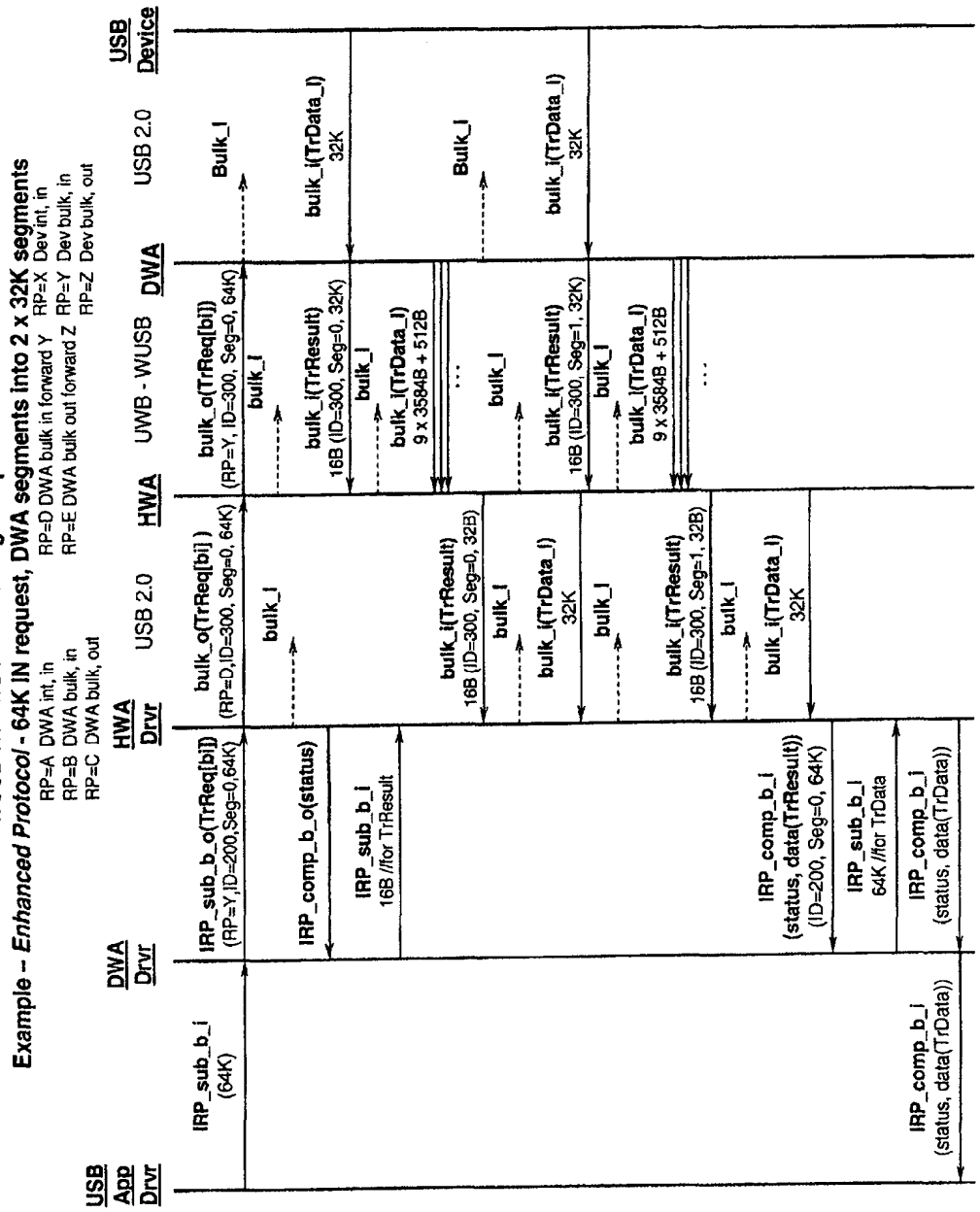

WUSB HWA+DWA - Message Sequence Chart
Example -- Enhanced Protocol - 64K IN request, DWA segments into 2 x 32K segments
RP=A DWA int, in
RP=B DWA bulk, in
RP=C DWA bulk, out
RP=D DWA bulk in forward Y
RP=E DWA bulk out forward Z
RP=X Dev int, in
RP=Y Dev bulk, in
RP=Z Dev bulk, out
USB App Drvr
DWA Drvr
HWA Drvr
USB 2.0
HWA
UWB - WUSB
DWA
USB 2.0
USB Device
IRP_sub_b_i (64K)
IRP_sub_b_o(TrReq[bi]) (RP=Y,ID=200,Seg=0,64K)
bulk_o(TrReq[bi]) (RP=D,ID=300, Seg=0, 64K)
bulk_o(TrReq[bi]) (RP=Y, ID=300, Seg=0, 64K)
Bulk_I
bulk_I
IRP_comp_b_o(status)
bulk_I
bulk_I
bulk_I(TrData_I) 32K
IRP_sub_b_i 16B //for TrResult
bulk_i(TrResult) 16B (ID=300, Seg=0, 32B)
bulk_I(TrResult) 16B (ID=300, Seg=0, 32K)
bulk_I
bulk_I(TrData_I) 9 x 3584B + 512B
...
bulk_I
Bulk_I
bulk_I
bulk_i(TrData_I) 32K
bulk_i(TrResult) 16B (ID=300, Seg=1, 32K)
bulk_I
bulk_I
bulk_I(TrData_I) 32K
bulk_I
bulk_I
bulk_I(TrData_I) 9 x 3584B + 512B
...
bulk_i(TrResult) 16B (ID=300, Seg=1, 32B)
bulk_I
IRP_comp_b_i (status, data(TrResult)) (ID=200, Seg=0, 64K)
bulk_i(TrData_I) 32K
IRP_sub_b_I 64K //for TrData
IRP_comp_b_i (status, data(TrData))
IRP_comp_b_i (status, data(TrData))

Fig. 8

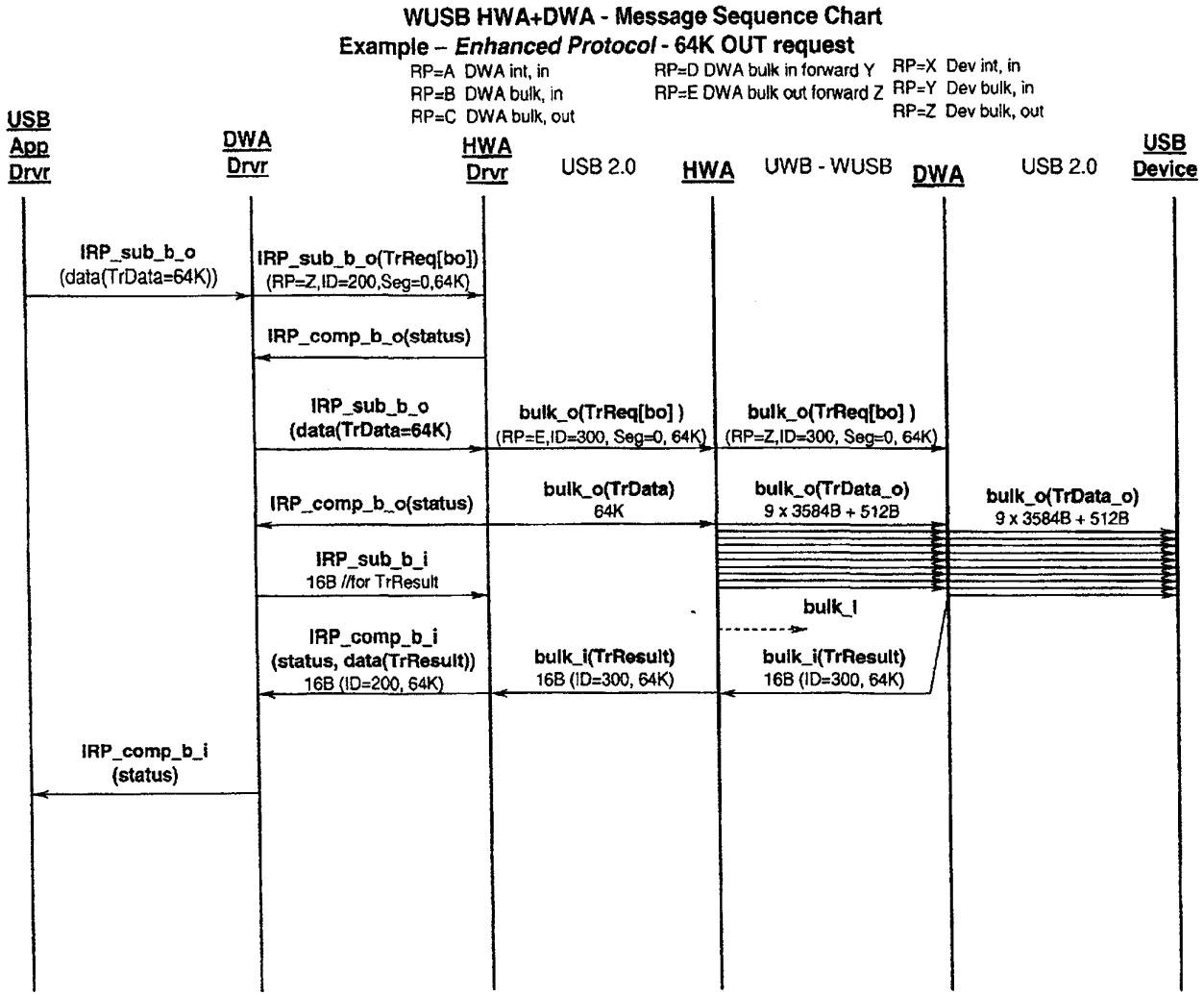

WUSB HWA+DWA - Message Sequence Chart
Example – Enhanced Protocol - 64K OUT request
RP=A DWA int, in
RP=B DWA bulk, in
RP=C DWA bulk, out
RP=D DWA bulk in forward Y
RP=E DWA bulk out forward Z
RP=X Dev int, in
RP=Y Dev bulk, in
RP=Z Dev bulk, out
USB App Drvr
DWA Drvr
HWA Drvr
USB 2.0
HWA
UWB - WUSB
DWA
USB 2.0
USB Device
IRP_sub_b_o (data(TrData=64K))
IRP_sub_b_o(TrReq[bo]) (RP=Z,ID=200,Seg=0,64K)
IRP_comp_b_o(status)
IRP_sub_b_o (data(TrData=64K)
bulk_o(TrReq[bo]) (RP=E,ID=300, Seg=0, 64K)
bulk_o(TrReq[bo]) (RP=Z,ID=300, Seg=0, 64K)
IRP_comp_b_o(status)
bulk_o(TrData) 64K
bulk_o(TrData_o) 9 x 3584B + 512B
bulk_o(TrData_o) 9 x 3584B + 512B
IRP_sub_b_i 16B //for TrResult
bulk_i
IRP_comp_b_i (status, data(TrResult)) 16B (ID=200, 64K)
bulk_i(TrResult) 16B (ID=300, 64K)
bulk_i(TrResult) 16B (ID=300, 64K)
IRP_comp_b_i (status)

Fig. 9

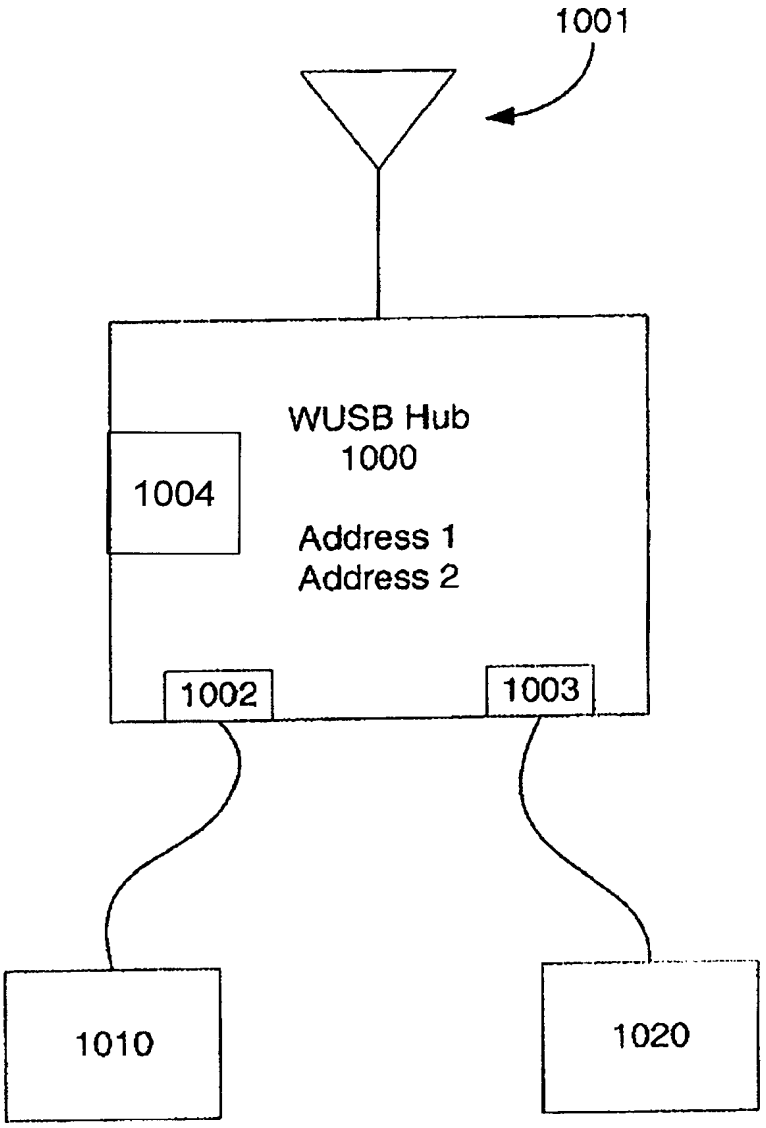

1001
WUSB Hub
1000
1004
Address 1
Address 2
1002
1003
1010
1020

Fig. 10

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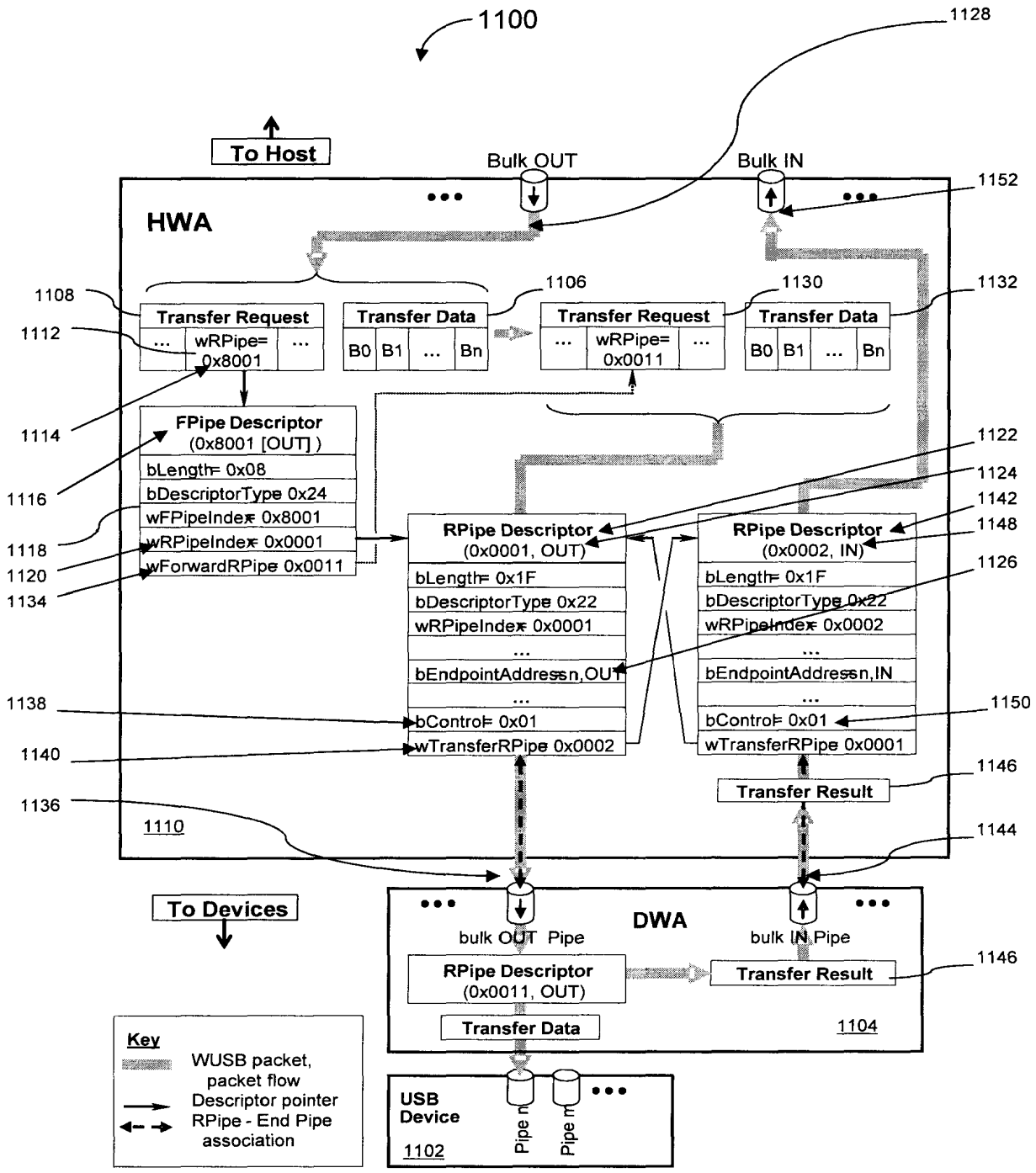

1100
1128
To Host
Bulk OUT
Bulk IN
1152
HWA
1108
1106
1130
1132
Transfer Request
Transfer Data
Transfer Request
Transfer Data
1112
... wRPipe= 0x8001 ...
B0 B1 ... Bn
... wRPipe= 0x0011 ...
B0 B1 ... Bn
1114
FPipe Descriptor (0x8001 [OUT])
1122
1116
bLength= 0x08
bDescriptorType 0x24
1124
1142
wFPipeIndex= 0x8001
RPipe Descriptor (0x0001, OUT)
RPipe Descriptor (0x0002, IN)
1148
1118
wRPipeIndex= 0x0001
1120
wForwardRPipe 0x0011
1126
1134
bLength= 0x1F
bDescriptorType 0x22
wRPipeIndex= 0x0001
...
bEndpointAddress n,OUT
bLength= 0x1F
bDescriptorType 0x22
wRPipeIndex= 0x0002
...
bEndpointAddress n,IN
1138
...
...
1150
bControl= 0x01
bControl= 0x01
1140
wTransferRPipe 0x0002
wTransferRPipe 0x0001
1146
Transfer Result
1136
1110
1144
To Devices
DWA
bulk OUT Pipe
bulk IN Pipe
RPipe Descriptor (0x0011, OUT)
Transfer Result
1146
Transfer Data
1104
Key
WUSB packet, packet flow
Descriptor pointer
RPipe - End Pipe association
USB Device
1102
Pipe n
Pipe n

Fig. 11

14/14

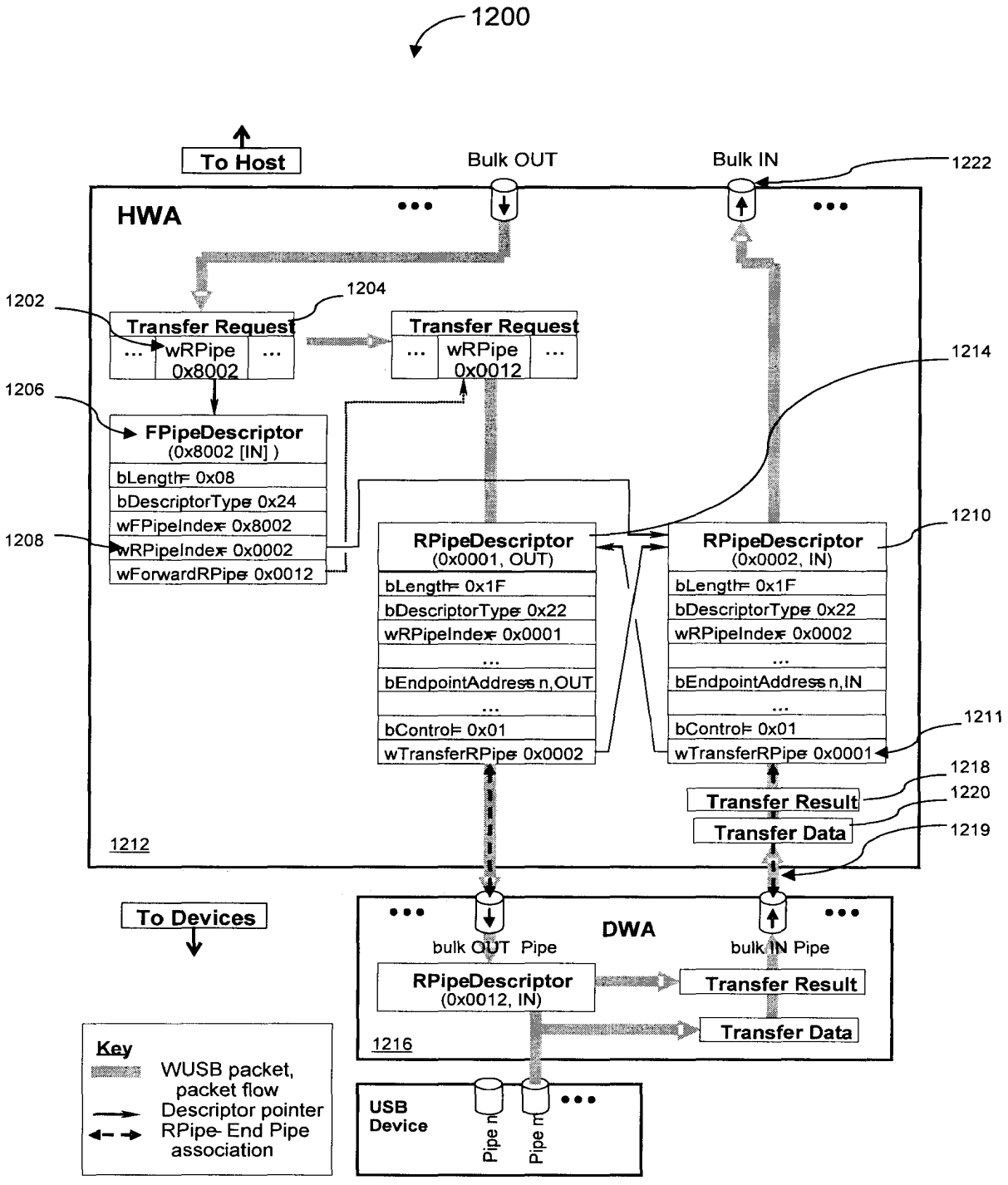

1200
To Host
Bulk OUT
Bulk IN
1222
HWA
1202
1204
Transfer Request
... wRPipe 0x8002 ...
Transfer Request
... wRPipe 0x0012 ...
1214
1206
FPipeDescriptor
(0x8002 [IN])
bLength= 0x08
bDescriptorType= 0x24
wFPipeIndex= 0x8002
1208
wRPipeIndex= 0x0002
wForwardRPipe= 0x0012
RPipeDescriptor
(0x0001, OUT)
bLength= 0x1F
bDescriptorType= 0x22
wRPipeIndex= 0x0001
...
bEndpointAddress n,OUT
...
bControl= 0x01
wTransferRPipe= 0x0002
RPipeDescriptor
(0x0002, IN)
1210
bLength= 0x1F
bDescriptorType= 0x22
wRPipeIndex= 0x0002
...
bEndpointAddress n,IN
...
bControl= 0x01
1211
wTransferRPipe= 0x0001
1218
Transfer Result
1220
Transfer Data
1219
1212
To Devices
DWA
bulk OUT Pipe
bulk IN Pipe
RPipeDescriptor
(0x0012, IN)
Transfer Result
Transfer Data
1216
USB Device
Pipe n
Pipe m
Key
WUSB packet, packet flow
Descriptor pointer
RPipe- End Pipe association

Fig. 12

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventorship:	RENARD et al.	Examiner:	Unknown
Serial No.:	17/742166	Group Art Unit:	Unknown
Filed:	May 11, 2022	Docket No.:	21063.0018USC1
Title:	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS		

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By: /Jessica A. Sun/
Name: Jessica A Sun

COMMUNICATION UNDER 37 C.F.R. §1.98(d)

Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Dear Commissioner:

With regard to the above-identified application, the items of information listed on the enclosed Form SB08 are brought to the attention of the Examiner. In accordance with 37 C.F.R. §1.98(d), a copy of each document or other information listed on the enclosed Form SB08 is not provided for those that were previously cited by or submitted to the U.S. Patent and Trademark Office in parent application, U.S. Serial No. 16/771068 filed on June 9, 2020.

Respectfully submitted,

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 S. 7th St., Suite 2700
Minneapolis, MN 55402
(612) 455-3800

Dated: July 11, 2022

By: ____/Thomas Lee/_____
Thomas Lee
Reg. No.: 66,396
TL/ylc

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DESCRIPTION CN106412683A

10 System and method for realizing audio and video transmission and interactive signaling through USB interface

[0001]

14 technical field

[0002]

18 The invention relates to a system and method for audio and video transmission and interactive signaling, in particular to a system and method for realizing audio and video transmission and interactive signaling through a USB interface.

[0003]

24 Background technique

[0004]

28 With the technological progress in wireless transmission bandwidth, wireless chips, codec algorithms, PC performance, decoding chips, etc. in recent years, wireless transmission methods have emerged.

30 Various types of sources such as PC, mobile phone or tablet can transmit and display the screen content to the terminal display device on the same screen through wireless means.

[0005]

35 The disadvantages of this method are:

[0006]

1、The real-time performance of audio and video transmission is not as good as wired, and there is a delay.

[0007]

2、Because of the bandwidth factor, wireless transmission basically needs to process the audio and video data through encoding and decoding before transmission. Therefore, the content displayed by the terminal will be different from that of the source.

[0008]

3、The stability and confidentiality of wireless transmission are not as good as wired ones.

[0009]

All in all, the wireless transmission method solves the inherent shortcomings of wired, and brings great convenience to users.

If the wireless transmission method can also improve the above-mentioned shortcomings, optimize the performance to be close to the wired performance, and make the operation simple, then the wireless transmission method can bring a very good user experience to the user.

[0010]

At present, the mainstream wireless audio and video transmission technology is based on Wi-Fi, because Wi-Fi is widely used, there are many manufacturers of chips, the technology is mature, and the cost is low.

And with the commercial use of 802.11n and 802.11ac protocols, the Wi-Fi transmission bandwidth has been greatly improved. In theory, there is enough bandwidth to support the simultaneous transmission of multiple encoded high-definition videos.

[0011]

However, most of the products on the market that use Wi-Fi-based technology to realize wireless audio and video transmission have poor user experience. These products more or less have the following shortcomings:

[0012]

1、The software needs to be installed on the PC. The software operation is very complicated, and the operation experience brought to the user is very poor. The user needs to have a certain IT background knowledge to use this type of product.

[0013]

2、Occupying the wireless network card of the PC makes it impossible to surf the Internet or surf the Internet very smoothly during wireless transmission on the same screen, which limits the user's Internet access needs.

[0014]

3、Incomplete support for various types of terminals, including Windows PC, MAC OS X PC, Android mobile terminal and iOS mobile terminal.

[0015]

4、There is insufficient support for multi-channel video transmission. When multi-channel video is transmitted and displayed on the same screen at the same time, there will be delays and freezes.

[0016]

The present invention adopts the technology based on Wi-Fi to realize wireless audio and video transmission. However, the one-key system solves the above shortcomings well by adopting innovative technology and advanced chips.

[0017]

SUMMARY OF THE INVENTION

[0018]

In order to overcome the above-mentioned existing problems, the present invention discloses a system and method for realizing audio and video transmission and interactive signaling through a USB interface. of users can use it proficiently within 10 minutes, and the user experience is very good.

Greatly improve the efficiency and pleasure of the meeting.

[0019]

In order to solve the above problems, the technical scheme adopted in the present invention is:

[0020]

A method for realizing audio and video transmission and interactive signaling through a USB interface, comprising the following steps:

[0021]

S101, the transmitter maps a general USB HID interface on the host, and pairs with the host through the

interface;

[0022]

126 S102, the transmitter establishes a wireless network connection with the host, and maps a general USB HID interface on the PC of the source to perform video and audio data transmission and signaling interaction with the PC;

[0023]

132 S103, after receiving the request from the transmitter, the host sends a corresponding processing instruction to the terminal.

134 Or the touch command input by the terminal is sent back to the transmitter, and then the transmitter sends the corresponding processing command to the source.

[0024]

139 Preferably, the S101 includes:

[0025]

143 S1011, the host side judges whether the transmitter is inserted according to the device insertion event of the USB HOST interface;

[0026]

148 S1012, when the host side detects that the transmitter is plugged in, it will send a pairing request to the transmitter;

[0027]

153 S1013, after receiving the pairing request from the host, the transmitter will reply to the host with a pairing response;

[0028]

158 S1014, after receiving the pairing response from the transmitter, the host sends pairing data to the transmitter to start pairing;

[0029]

163 S1015, the transmitter starts to verify after receiving the pairing data. When the verification is correct, the

pairing data is written into the Flash, and a pairing success response is returned to the host;

[0030]

168 S1016, when the verification fails, discard the pairing data, and reply a pairing failure response to the host.

[0031]

172 Preferably, the step S101 further includes: if the pairing fails or times out, the pairing operation is terminated, and the pairing operation needs to be performed again.

[0032]

177 Preferably, the step S102 includes:

[0033]

181 S1021, the transmitter establishes a wireless network connection with the host, and the application program stored in the U disk or CD disk mapped by the transmitter starts to run automatically at the source;

[0034]

186 S1022, the transmitter sends a key command, which is divided into a short-press event or a long-press event according to the duration of pressing the key;

[0035]

191 S1023, when it is a long-press event, the transmitter sends a full-screen request to the source, and the source returns a full-screen request response to the transmitter;

[0036]

196 S1024, when it is a short press event, the transmitting end judges the current state: if the current is the screen push state, it sends a screen exit request to the source end; if the current is the screen exit state, it sends a push screen request to the source end; the source end sends the The server replies with the request response.

[0037]

202 S1025, determine whether the video is being pushed; when the video is not being pushed on the screen, it cannot be pushed by sound alone; when it is in the push state, the source end sends a voice push instruction to the transmitter, starts to sample the sound, and then sends audio data to the transmitter .

[0038]

208 S1026, the transmitter receives the voice push instruction from the source, and receives the audio data transmitted from the PC; at the same time, sends a voice push request to the host; after establishing an audio transmission connection with the host, the transmitter sends the received audio data to the host. Send it to the host to complete the voice push operation.

[0039]

215 S1027, when it is an exit operation, the source end sends a voice exit command to the transmitter end, stops sampling the sound, and stops sending audio data to the transmitter; the transmitter end receives the sound exit command from the source end, and stops receiving the audio transmitted from the PC end data; send a voice exit request to the host; then disconnect the audio transmission connection with the host to complete the voice exit operation.

[0040]

223 A system for realizing audio and video transmission and interactive signaling through a USB interface, comprising:

[0041]

228 The pairing module is used for the transmitter to map a general USB HID interface on the host, and pair with the host through the interface;

[0042]

233 The network connection module is used to establish a wireless network connection between the transmitter and the host;

[0043]

238 The source-side interaction module is used for the transmitter-side to map a general USB HID interface on the source-side PC side, and to perform video and audio data transmission and signaling interaction with the PC side;

[0044]

244 The return module is used for the host end to return the touch command input by the terminal to the transmitter end, and then the transmitter end sends the corresponding processing command to the source end.

[0045]

250 Preferably, the pairing module includes:

[0046]

254 The insertion event judgment unit is used for the host terminal to judge whether it is the transmitter insertion according to the device insertion event of the USB HOST interface;

[0047]

259 The pairing request unit is used to send a pairing request to the transmitter when the host detects that it is inserted into the transmitter;

[0048]

264 The pairing response unit is used to reply the pairing response to the host after the transmitter receives the pairing request from the host;

[0049]

269 The data sending unit is used for the host to send pairing data to the transmitter after receiving the pairing response from the transmitter to start pairing;

[0050]

274 The verification module is used for the transmitter to start verification after receiving the pairing data. When the verification is correct, the pairing data is written into the Flash, and a pairing success response is returned to the host;

[0051]

280 The error handling module is used to discard the pairing data and reply the pairing failure response to the host when the verification fails.

[0052]

285 The source interaction module includes:

[0053]

289 The key judgment unit is used for the transmitter to send key commands, and is divided into short press

events or long press events according to the length of time the key is pressed;

[0054]

294 The long-press processing unit is used to send a full-screen request to the source when it is a long-press event, and the source responds to the full-screen request to the transmitter;

[0055]

299 The short press processing unit is used for the transmitter to judge the current state when it is a short press event: if the current is the screen push state, it will send a screen exit request to the source; if the current is the screen exit state, it will send a push request to the source ; The source replies the request response to the transmitter;

[0056]

306 The sound push unit is used for the source end to send the sound push command to the transmitter end, start to sample the sound, and then send the audio data to the transmitter end;

[0057]

311 The sound exit unit is used for the source to send the sound exit command to the transmitter, stop sampling the sound, and stop sending audio data to the transmitter; the transmitter receives the sound exit command from the source, and stops receiving the audio data transmitted from the PC; Send a voice exit request to the host; then disconnect the audio transmission connection with the host to complete the voice exit operation.

[0058]

318 A system for realizing audio and video transmission and interactive signaling through a USB interface, comprising:

[0059]

323 A transmitter, which can push the screen, push the screen and operate the full screen through the short press and long press of the button on the transmitter;

[0060]

328 A host side, through the USB HOST interface on the host side, performs data transmission and signaling interaction with the transmitter, and connects the touch USB interface of the touch screen through the USB HOST interface, collects the touch control signaling of the touch screen terminal, and returns the Send it to the transmitter and the source to realize the reverse control of the touch screen;

[0061]

335 The transmitter includes:

[0062]

339 The mapping storage module is used to map out a U disk or CD disk to store the application program that needs to be run on the source end;

[0063]

344 The interactive transmission module is used for signaling interaction with the source end and transmission of audio and video data;

[0064]

349 The signal return module is used to return the reverse control signal of the touch display terminal to the PC terminal

[0065]

354 The wireless module module is used to connect the host network without occupying the source network;

[0066]

358 Key state monitoring module, used to collect key state operations in real time;

[0067]

362 LED light display module 1, used to display the power-on status of the transmitter in real time, the status of connecting with the host, the successful connection with the host but no screen push status, the successful connection with the host and the screen push status, etc.;

[0068]

368 The host side includes:

[0069]

372 Built-in web page module, log in to the built-in WEB page through wireless network or wired network, and set the wireless parameters and output parameters of the host;

[0070]

377 The external touch module is used to collect the touch control signaling of the touch screen terminal and send it back to the transmitter and the source end;

[0071]

382 Pairing module, automatically paired with the transmitter through the USB HOST interface;

[0072]

386 The upgrade module is used to upgrade the file to realize the automatic upgrade of the host through the USB HOST interface;

[0073]

391 LED light display module 2 is used to display the power-on and startup status of the host, the connection status with the terminal, the screen push status, and the upgrade status in real time;

[0074]

396 The resolution adaptive module identifies the best resolution of the terminal display device by reading the EDID, and outputs with the best display resolution.

[0075]

401 Preferably, the system may further include: a plurality of transmitters and a host terminal.

[0076]

405 The beneficial effects of the present invention are as follows:

[0077]

409 1) Insert the transmitter device, and then the source PC application stored in the transmitter device will automatically run, whether it is a Windows system or a MAC OS X system;

[0078]

414 2) The transmitter automatically establishes a Wi-Fi connection with the host, and there are icon prompts and LED light prompts for successful connection;

[0079]

3) Then press the button to realize wireless push screen sharing;

[0080]

4) Multiple users can join and quit independently, as well as full-screen display, all with a single button on the transmitter.

[0081]

5) The installation of the host is also very simple, just connect it to the display terminal through HDMI or VGA, and then connect the power to the host to start it.

[0082]

Description of drawings

[0083]

Figure 1 is the function diagram of the PC-side application program;

[0084]

Figure 2 is a functional diagram of the transmitter;

[0085]

Figure 3 is a functional diagram of the host side;

[0086]

Fig. 4 is a pairing flow chart;

[0087]

Figure 5 is a flow chart of the operation of pushing the screen, exiting the screen and full screen;

[0088]

Fig. 6 is the operation flow chart of voice push and exit;

[0089]

461 Fig. 7 is the main flow chart of the present invention;

[0090]

465 FIG. 8 is a flowchart of an upgrade operation.

[0091]

469 detailed description

[0092]

473 It should be understood that the specific embodiments described herein are only used to explain the present invention, but not to limit the present invention.

[0093]

478 As shown in FIG. 1 , an embodiment of a transmission method and transmission system for realizing audio, video and interactive signaling through a USB interface of the present invention is shown.

[0094]

483 The system for realizing audio and video transmission and signaling interaction through the USB interface of this embodiment includes:

[0095]

488 The application program running on the source PC is used for audio and video data transmission and signaling interaction with the transmitter through the USB interface;

[0096]

493 The host side performs audio and video data transmission and signaling interaction with the terminal display device through the wireless network;

[0097]

498 The transmitter performs audio and video data transmission and signaling interaction with the host through a wireless wireless network;

[0098]

503 The source-side PC-side application program performs audio and video data transmission and signaling interaction with the transmitter through the USB interface.

[0099]

508 The source-side PC-side application program is designed as green software and does not need to be installed. The program is stored in the U disk or CD disk mapped by the transmitter, and it runs automatically after inserting the transmitter.

[0100]

514 The source-side PC-side application includes two versions, one for Windows PC and one for MAC OS X PC.

[0101]

518 The main functions implemented are to capture screen content, mouse click commands, screen zoom processing, screen encoding, sound sampling and audio sampling rate conversion, and USB HID communication, etc.

521 The function diagram is shown in Figure 1.

[0102]

525 The technical principle used to realize the above functions on Windows is basically different from that on MAC OS X.

[0103]

530 For the Windows version, the components and interface drivers provided by Windows are used to realize the sampling of screen, mouse and sound, as well as the communication of USB HID.

532 The video encoding module adopts the H.264 algorithm, and the screen scaling processing and audio sampling rate conversion are implemented using the library provided by FFmpeg.

[0104]

537 For the MAC OS X version, the components and interface drivers provided by OS X are used to implement screen, mouse and sound sampling, as well as USB HID communication.

539 The video encoding module adopts the H.264 algorithm, and the screen scaling processing and audio sampling rate conversion are implemented using the library provided by OS X.

[0105]

The transmitter can be connected to Windows PC and MAC OS X and can run without driver installation. The functional diagram of the transmitter is shown in Figure 2.

[0106]

The transmitter is connected to the source PC through the USB 2.0 interface, and is mapped as a USB CompositeDevice on the source PC. The USB enumeration type is standard. No need to install the driver whether it is a Windows PC or a MAC OS X PC. Drive-free plug and play.

[0107]

The function diagram of the host side is shown in Figure 3:

[0108]

The host side includes the following functional modules:

[0109]

1) Built-in WEB page module, you can log in to the built-in WEB page through wireless wireless or wired LAN, and set the wireless parameters and output parameters of the host.

[0110]

2) The return module, the USB HOST interface of the host is connected to the touch USB interface of the touch screen, collects the touch control signaling of the touch screen, and sends it back to the transmitter and the source PC, so that the reverse control of the touch screen can be realized. Function.

[0111]

3) Pairing module, plug the transmitter into the USB HOST interface of the host, and realize the automatic pairing function of the transmitter.

[0112]

4) Upgrade module, save the upgrade file of the host into the U disk, and then insert the U disk into the USB HOST interface of the host to realize the automatic upgrade function of the host.

[0113]

5) Display module, LED lights display the working status of the host in real time. The working status includes power-on and startup status, connection status with the terminal, screen push status and upgrade status.

[0114]

6) Resolution adaptive module, the best resolution adaptive function of terminal display device, can identify the best resolution of terminal display device by reading EDID, and then output at the best display resolution.

[0115]

Audio and video data transmission and signaling interaction include the following steps:

[0116]

Start the host and let it enter the normal operation state;

[0117]

Step S101, mapping a general USB HID interface on the host side, and pairing with the host side through the interface;

[0118]

As shown in Figure 4, insert the transmitter into the USB HOST interface of the host for pairing operation. At this time, the transmitter maps a general USB HID interface on the host, and performs pairing interaction with the host through this interface.

[0119]

When the transmitter is inserted into the host, the host will judge whether the transmitter is inserted according to the device insertion event of the USB HOST interface. When it is detected that the transmitter is inserted, it will send a pairing request to the transmitter.

[0120]

After the transmitter receives the pairing request from the host, it will reply to the host with a pairing response.

[0121]

After the host receives the pairing response from the transmitter, it starts to send pairing data to the transmitter.

[0122]

628 Pairing data includes the wireless network's SSID, key, frequency band, channel, and IP address, among others.

[0123]

633 After the transmitter receives the pairing data from the host: if the verification is correct, it will write the pairing data to the Flash, and then reply the host with a successful pairing response.

[0124]

638 If the verification fails, the pairing data will be discarded, and a pairing failure response will be returned to the host.

[0125]

643 If the pairing fails or times out, the pairing operation is terminated.

644 The transmitter then needs to be unplugged and plugged back in to restart the pairing operation.

[0126]

648 When the pairing is successful, the pairing operation is implemented.

[0127]

652 In step S102, the transmitter establishes a wireless network connection with the host, and maps a general USB HID interface on the PC of the source to perform video and audio data transmission and signaling interaction with the PC.

[0128]

658 After the transmitter and the host are paired successfully, unplug the transmitter and insert it into the source PC.

660 A general USB HID interface is mapped on the source PC, and the transmitter and the source PC use this interface to communicate signaling, and transmit video and audio data using the proprietary protocol of Baojiang.

[0129]

666 As shown in Figure 5, the transmitter establishes a wireless network connection with the host, and the application program stored in the U disk or CD disk mapped by the transmitter starts to run automatically on

the source PC.

[0130]

672 Press the transmitter button, and the transmitter recognizes it as a short-press event or a long-press event according to the length of time the button is pressed.

[0131]

677 When it is a long press event, the transmitter sends a full screen request to the source PC.

[0132]

681 If the transmitter was in the off-screen state before, it starts to prepare to receive the video data transmitted from the source PC; at the same time, the transmitter sends a full screen request to the host.

683 After the transmitter establishes a video transmission connection with the host, it transmits the received video data transmitted from the source PC to the host, and then the host transmits it to the terminal.

[0133]

688 If the launcher was in the push-screen state before, you only need to send a full-screen request to the host to implement a full-screen operation.

[0134]

693 When it is a short press event, the transmitter needs to determine its current state:

[0135]

697 If it is currently in the screen exit state, send a screen push request to the source PC.

698 The source PC responds to the push screen request to the transmitter, starts screen recording and encoding, and then sends video data to the transmitter.

700 The transmitter receives the screen push response from the source PC and begins to prepare to receive the video data transmitted from the source PC; at the same time, the transmitter sends a screen push request to the host.

[0136]

706 After the transmitter establishes a video transmission connection with the host, it transmits the received video data transmitted from the source PC to the host to realize the screen push operation.

[0137]

711 If it is currently in the push screen state, send a screen exit request to the source PC;

[0138]

715 The source PC responds to the push screen request to the transmitter, and stops screen recording and encoding.

717 If you are pushing sound before, stop sound sampling at the same time, and then stop sending audio and video data to the transmitter.

719 The transmitter receives the screen exit response from the source PC, and stops receiving the audio and video data transmitted from the source PC; at the same time, the transmitter sends a screen exit request to the host.

721 Then disconnect the audio and video transmission connection with the host to realize the screen exit operation.

[0139]

726 As shown in Figure 6, the voice push or exit operation is controlled on the source PC program.

[0140]

730 Since the sound cannot be pushed alone, it is first necessary to judge whether there is a video being pushed. When the video is not being pushed, the sound operation menu is grayed out and cannot be controlled, that is, it cannot be pushed by the sound alone without pushing the video.

[0141]

736 If the current voice push status is the push status, the exit operation can be performed;

[0142]

740 If the current voice push status is the exit status, the push operation can be performed.

[0143]

744 When in the push state, the PC sends a voice push command to the transmitter, starts to sample the sound, and then sends audio data to the transmitter.

[0144]

749 The transmitter receives the voice push command from the PC and begins to prepare to receive the audio data transmitted from the PC; at the same time, it sends a voice push request to the host.

[0145]

754 After the transmitter establishes an audio transmission connection with the host, it transmits the received audio data transmitted from the PC to the host to complete the voice push operation.

[0146]

759 When it is in the exit state, the PC end sends a voice exit command to the transmitter, stops sampling the sound, and then stops sending audio data to the transmitter.

[0147]

764 The transmitter receives the voice exit command from the PC, and stops receiving the audio data transmitted from the PC; at the same time, it sends a voice exit request to the host.

766 Then disconnect the audio transmission connection with the host to realize the sound exit operation.

[0148]

770 Step S103, after the host receives the transmitter request, it sends a corresponding processing instruction to the terminal.

772 Or the touch command input by the terminal is sent back to the transmitter, and then the transmitter sends the corresponding processing command to the source.

[0149]

777 The USB HOST interface of the host is connected to the touch USB interface of the touch screen, and the touch control signaling of the touch screen is collected and sent back to the transmitter and the source PC, so that the reverse control function of the touch screen can be realized.

[0150]

783 The transmitter realizes the function of returning the reverse control signal of the touch display end to the source end PC end through the standard USB HID mouse and keyboard protocol.

[0151]

788 The above are only preferred embodiments of the present invention, and are not intended to limit the scope of the present invention. Any equivalent structure or equivalent process transformation made by using the contents of the description and drawings of the present invention, or directly or indirectly applied in other related technical fields , are similarly included in the scope of patent protection of the present invention.

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CLAIMS CN106412683A

1.

13 A method for realizing audio and video transmission and interactive signaling through a USB interface, comprising the following steps:

15 S101, the transmitter maps a general USB HID interface on the host, and pairs with the host through the interface;

17 S102, the transmitter establishes a wireless network connection with the host, and maps a general USB HID interface at the source to perform video and audio data transmission and signaling interaction with the source;

19 S103, after receiving the request from the transmitter, the host sends a corresponding processing instruction to the terminal; or returns the touch command input by the terminal to the transmitter, and the transmitter sends the corresponding processing instruction to the source.

2.

25 The method according to claim 1, wherein the S101 comprises:

26 S1011, the host side judges whether the transmitter is inserted according to the device insertion event of the USB HOST interface;

28 S1012, when the host side detects that the transmitter is plugged in, it will send a pairing request to the transmitter;

30 S1013, after receiving the pairing request from the host, the transmitter will reply to the host with a pairing response;

32 S1014, after receiving the pairing response from the transmitter, the host sends pairing data to the transmitter to start pairing;

34 S1015, the transmitter starts to verify after receiving the pairing data. When the verification is correct, the pairing data is written into the Flash, and a pairing success response is returned to the host;

36 S1016, when the verification fails, discard the pairing data, and reply a pairing failure response to the host.

3.

The method according to claim 1, wherein the step S101 further comprises: if the pairing fails or times out, the pairing operation is terminated, and the pairing operation needs to be performed again.

4.

The method according to claim 1, wherein the step S102 comprises:

S1021, the transmitter establishes a wireless network connection with the host, and the application program stored in the U disk or CD disk mapped by the transmitter starts to run automatically at the source;

S1022, the transmitter sends a key command, and according to the length of time the key is pressed, it is determined as a short press event or a long press event;

S1023, when it is a long-press event, the transmitter sends a full-screen request to the source, and the source returns a full-screen request response to the transmitter;

S1024, when it is a short press event, the transmitter first determines the current state: when it is currently in a screen push state, it sends a screen exit request to the source end to perform a screen push operation; when it is currently in a screen exit state, it sends a message to the source end Push screen request, perform push screen operation;

S1025, when receiving the voice operation instruction, determine whether the video is being pushed;

When the video is not pushed, the sound operation cannot be performed;

When the video is in the push state, determine whether the voice operation instruction is a push instruction or an exit operation instruction;

When it is a push operation instruction, perform a push operation; when it is an exit operation instruction, perform an exit operation;

A system for realizing audio and video transmission and interactive signaling through a USB interface, comprising:

The pairing module is used for the transmitter to map a general USB HID interface on the host, and pair with the host through the interface;

The network connection module is used to establish a wireless network connection between the transmitter and the host;

The source-side interaction module is used for the transmitter-side to map a general USB HID interface on the source-side PC side, and to perform video and audio data transmission and signaling interaction with the PC side;

The return module is used for the host end to return the touch command input by the terminal to the transmitter end, and then the transmitter end sends the corresponding processing command to the source end.

5.

The system of claim 1, wherein the pairing module comprises:

The insertion event judgment unit is used for the host terminal to judge whether it is the transmitter insertion according to the device insertion event of the USB HOST interface;

The pairing request unit is used to send a pairing request to the transmitter when the host detects that it is

inserted into the transmitter;

81 The pairing response unit is used to reply the pairing response to the host after the transmitter receives the pairing request from the host;

83 The data sending unit is used for the host to send pairing data to the transmitter after receiving the pairing response from the transmitter to start pairing;

85 The verification module is used for the transmitter to start the verification after receiving the pairing data. When the verification is correct, the pairing data is written into the Flash, and the pairing success response is returned to the host;

88 The error handling module is used to discard the pairing data and reply the pairing failure response to the host when the verification fails.

6.

93 The source interaction module includes:

94 The key judgment unit is used for the transmitter to send key commands, and is divided into short press events or long press events according to the length of time the key is pressed;

96 The long-press processing unit is used to send a full-screen request to the source when it is a long-press event, and the source responds to the full-screen request to the transmitter;

98 The short press processing unit is used for the transmitter to judge the current state when it is a short press event: if the current is the screen push state, it will send a screen exit request to the source; if the current is the screen exit state, it will send a push request to the source ; The source replies the request response to the transmitter;

102 The sound push unit is used for the source end to send the sound push command to the transmitter end, start to sample the sound, and then send the audio data to the transmitter end;

104 The sound exit unit is used for the source to send the sound exit command to the transmitter, stop sampling the sound, and stop sending audio data to the transmitter; the transmitter receives the sound exit command from the source, and stops receiving the audio data transmitted from the PC; Send a voice exit request to the host; then disconnect the audio transmission connection with the host to complete the voice exit operation.

7.

111 A system for realizing audio and video transmission and interactive signaling through a USB interface, comprising:

113 A transmitter, which can push the screen, push the screen and operate the full screen through the short press and long press of the button on the transmitter;

115 A host side, through the USB HOST interface on the host side, performs data transmission and signaling interaction with the transmitter, and connects the touch USB interface of the touch screen through the USB HOST interface, collects the touch control signaling of the touch screen terminal, and returns the Send it to the transmitter and the source to realize the reverse control of the touch screen;

119 The transmitter includes:

120 The mapping storage module is used to map out a U disk or CD disk to store the application program that needs to be run on the source end;

122 The interactive transmission module is used for signaling interaction with the source end and transmission of audio and video data;

124 The signal return module is used to return the reverse control signal of the touch display terminal to the PC terminal

126 The wireless module module is used to connect the host network without occupying the source network;

127 Key state monitoring module, used to collect key state operations in real time;

128 LED light display module 1, used to display the power-on status of the transmitter in real time, the status of connecting with the host, the successful connection with the host but no screen push status, the successful connection with the host and the screen push status, etc.;

131 The host side includes:

132 Built-in web page module, log in to the built-in WEB page through wireless network or wired network, and set the wireless parameters and output parameters of the host;

134 The external touch module is used to collect the touch control signaling of the touch screen terminal and send it back to the transmitter and the source end;

136 Pairing module, automatically paired with the transmitter through the USB HOST interface;

137 The upgrade module is used to upgrade the file to realize the automatic upgrade of the host through the USB HOST interface;

139 LED light display module 2 is used to display the power-on and startup status of the host, the connection status with the terminal, the screen push status, and the upgrade status in real time;

141 The resolution adaptive module identifies the best resolution of the terminal display device by reading the EDID, and outputs with the best display resolution.

8.

146 The system according to claim 7, wherein the system further comprises: a plurality of transmitters and a host terminal.

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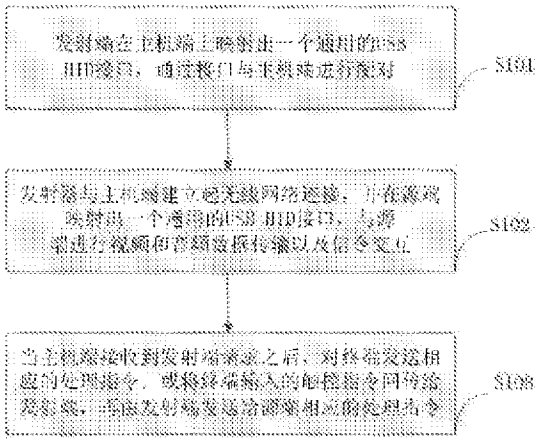
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(54)发明名称

通过USB接口实现音视频传输和交互信令的系统及方法

(57)摘要

本发明公开了一种通过USB接口实现音视频数据传输和交互信令的系统及方法，包括以下步骤：S101，发射端在主机端上映射出一个通用的USB HID接口，通过接口与主机端进行配对；S102，发射器与主机端建立起无线网络连接，并在源端PC端映射出一个通用的USB HID接口，与PC端进行视频和音频数据传输以及信令交互；S103，当主机端接收到发射端请求之后，对终端发送相应的处理指令。或将终端输入的触控指令回传给发射端，再由发射端发送给源端相应的处理指令。本发明通过技术的手段屏蔽了很多复杂的操作，使得一个没有任何IT背景知识的用户在几分钟内就能熟练的使用，用户的体验非常好。极大的提高了会议的效率和愉悦性。



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1.一种通过USB接口实现音视频传输和交互信令的方法，其特征在于，包括以下步骤：

S101，发射端在主机端上映射出一个通用的USB HID接口，通过接口与主机端进行配对；

S102，发射器与主机端建立起无线网络连接，并在源端映射出一个通用的USB HID接口，与源端进行视频和音频数据传输以及信令交互；

S103，当主机端接收到发射端请求之后，对终端发送相应的处理指令；或将终端输入的触控指令回传给发射端，再由发射端发送给源端相应的处理指令。

2.根据权利要求1所述的方法，其特征在于，所述S101包括：

S1011，主机端根据USB HOST接口的设备插入事件判断是否为发射端插入；

S1012，主机端检测到为发射端插入时，会给发射端发送配对请求；

S1013，发射端接收到主机的配对请求后，会给主机回复配对响应；

S1014，主机端接收到发射端的配对响应后，给发射端发送配对数据，开始配对；

S1015，发射端接收配对数据后开始校验，校验正确时，将配对数据写入Flash，给主机回复配对成功响应；

S1016，校验失败时，丢弃配对数据，给主机回复配对失败响应。

3.根据权利要求1所述的方法，其特征在于，所述步骤S101还包括：配对失败或超时，终止配对操作，需重新进行配对操作。

4.根据权利要求1所述的方法，其特征在于，所述步骤S102包括：

S1021，发射端与主机端建立无线网络连接，存储在发射端映射出来的U盘或CD盘中的应用程序在源端开始自动运行；

S1022，发射端发送按键指令，根据按下按键时间的长短，判断为短按事件或是长按事件；

S1023，当为长按事件时，发射端给源端发送全屏请求，源端给发射端回复全屏请求响应；

S1024，当为短按事件时，发射端首先判断当前的状态：当前是推屏状态时，则给源端发送退屏请求，进行推屏操作；当前是退屏状态时，则给源端发送推屏请求，进行推屏操作；

S1025，接收声音操作指令时，判断视频是否在推送；

当视频为未推送状态时，声音操作也不能进行；

当视频为推送状态时，判断声音操作指令为推送指令还是退出操作指令；

当为推送操作指令时，进行推送操作；当为退出操作指令时，进行退出操作；

一种通过USB接口实现音视频传输和交互信令的系统，其特征在于，包括：

配对模块，用于发射端在主机端上映射出一个通用的USB HID接口，通过接口与主机端进行配对；

网络连接模块，用于发射器与主机端建立起无线网络连接；

源端交互模块，用于发射端在源端PC端映射出一个通用的USB HID接口，与PC端进行视频和音频数据传输以及信令交互；

回传模块，用于主机端将终端输入的触控指令回传给发射端，再由发射端发送给源端相应的处理指令。

5.根据权利要求1所述的系统，其特征在于，所述配对模块包括：

插入事件判断单元，用于主机端根据USB HOST接口的设备插入事件判断是否为发射端插入；

配对请求单元，用于主机端检测到为发射端插入时，会给发射端发送配对请求；

配对响应单元，用于发射端接收到主机的配对请求后，会给主机回复配对响应；

数据发送单元，用于主机端接收到发射端的配对响应后，给发射端发送配对数据，开始配对；

校验模块，用于发射端接收配对数据后开始校验，校验正确时，将配对数据写入Flash，给主机回复配对成功响应；

错误处理模块，用于校验失败时，丢弃配对数据，给主机回复配对失败响应。

6.所述源端交互模块包括：

按键判断单元，用于发射端发送按键指令，根据按下按键时间的长短，分为短按事件或是长按事件；

长按处理单元，用于当为长按事件时，发射端给源端发送全屏请求，源端给发射端回复全屏请求响应；

短按处理单元，用于当为短按事件时，发射端判断当前的状态：当前是推屏状态，则给源端发送退屏请求；当前是退屏状态，则给源端发送推屏请求；源端给发射器回复请求响应；

声音推送单元，用于源端给发射端发送声音推送指令，开始对声音进行采样，然后给发射端发送音频数据；

声音退出单元，用于源端给发射端发送声音退出指令，停止对声音进行采样，停止给发射器发送音频数据；发射端接收到源端的声音退出指令，停止接收PC端传输过来的音频数据；给主机发送声音退出请求；然后断开与主机的音频传输连接，完成声音退出操作。

7.一种通过USB接口实现音视频传输和交互信令的系统，其特征在于，包括：

一发射器，通过发射器上按键的短按和长按两种状态实现推屏、推屏和全屏操作；

一主机端，通过主机端上的USB HOST接口与发射器进行数据传输与信令交互，并通过USB HOST接口外接触控屏的触控USB接口，采集触控屏终端的触摸控制信令，回传给发射器和源端，实现触控屏的反向控制；

发射器包括：

映射存储模块，用于映射出一个U盘或CD盘存储需在源端运行的应用程序；

交互传输模块，用于与源端进行信令交互和音视频数据的传输；

信号回传模块，用于将触摸显示终端反向控制信号的回传给PC端

无线模组模块，用于连接主机端网络，不占用源端网络；

按键状态监测模块，用于实时采集按键状态操作；

LED灯显示模块1，用于实时显示发射器的上电启动状态、与主机正在连接状态、与主机连接成功且没有推屏状态、与主机连接成功且正在推屏状态等工作状态；

所述主机端包括：

内置web页面模块，通过无线网络或有线网络登录内置WEB页面，对主机的无线参数和输出参数进行设置；

外接触控模块，用于采集触控屏终端的触摸控制信令，回传给发射器和源端；

配对模块，通过USB HOST接口与发射器自动配对；

升级模块，用于升级文件通过USB HOST接口实现主机端自动升级；

LED灯显示模块2，用于实时显示主机端的上电启动状态、与终端连接状态、推屏状态以及升级状态等工作状态；

分辨率自适应模块，通过读取EDID识别终端显示设备的最佳分辨，以最佳显示分辨率输出。

8.根据权利要求7所述的系统，其特征在于，所述系统还可以包括：多个发射器与一主机端。

通过USB接口实现音视频传输和交互信令的系统及方法

技术领域

[0001] 本发明涉及音视频传输和交互信令的系统及方法，尤其是一种通过USB接口实现音视频传输和交互信令的系统及方法。

背景技术

[0002] 随着近几年无线传输带宽、无线芯片、编解码算法、PC性能、解码芯片等等方面的技术进步，出现了无线传输的方式。PC、手机或平板等等多种类型源端通过无线方式可以把屏幕内容同屏传输显示到终端显示设备上。

[0003] 该方式的缺点是：

1、音视频传输的实时性没有有线好，有延时。

[0004] 2、无线传输因为带宽的因素，基本上都需要通过编解码的方式对音视频数据进行处理，才能传输，所以终端显示的内容与源端会有差异。

[0005] 3、无线传输的稳定性和保密性没有有线的好。

[0006] 总而言之，无线传输方式解决了有线的固有缺点，给用户带来了很大的便利性。如果无线传输方式还能把上述的缺点加以改进，优化到接近有线的性能，并且做到操作简单，那么无线传输方式就可以给用户带来非常好的使用体验。

[0007] 目前，主流的无线音视频传输技术是基于Wi-Fi的技术，因为Wi-Fi使用广阔、提供芯片的厂家多、技术成熟、成本低。并随着802.11n和802.11ac协议的商用，使得Wi-Fi传输带宽得到很大的提高，理论上有足够的带宽支持多路经过编码的高清视频同时传输。

[0008] 但是，市场上大部分的采用基于Wi-Fi的技术实现无线音视频传输的产品，用户体验都做的不好，这些产品或多或少都存在以下的缺点：

1、需要在PC上安装软件，软件操作非常复杂，给用户带来的操作体验很差，用户需要有一定的IT背景知识才能用的起来这类产品。

[0009] 2、占用PC的无线网卡，使得在无线同屏传输的时候，不能上网或者不能很流畅的上网，限制了用户的上网需求。

[0010] 3、对多种类型终端支持不全，多种类型终端包括windows PC、MAC OS X PC、Android移动端和iOS移动端。

[0011] 4、对多路视频传输支持不够，多路视频同时同屏传输显示时，有延时和卡顿。

[0012] 本发明采用基于Wi-Fi的技术来实现无线音视频传输的。但是，一键联系统通过采用创新的技术和先进的芯片，很好的解决了以上的缺点。

发明内容

[0013] 为了克服上述现有问题，本发明公开了一种通过USB接口实现音视频传输和交互信令的系统及方法，其目的在于通过技术的手段屏蔽了很多复杂的操作，使得一个没有任何IT背景知识的用户在10分钟内就能熟练的使用，用户的体验非常好。极大的提高了会议的效率和愉悦性。

[0014] 为了解决上述问题，本发明采用的技术方案是：

一种通过USB接口实现音视频传输和交互信令的方法，包括以下步骤：

S101，发射端在主机端上映射出一个通用的USB HID接口，通过接口与主机端进行配对；

S102，发射器与主机端建立起无线网络连接，并在源端PC端映射出一个通用的USB HID接口，与PC端进行视频和音频数据传输以及信令交互；

S103，当主机端接收到发射端请求之后，对终端发送相应的处理指令。或将终端输入的触控指令回传给发射端，再由发射端发送给源端相应的处理指令。

[0015] 优选地，所述S101包括：

S1011，主机端根据USB HOST接口的设备插入事件判断是否为发射端插入；

S1012，主机端检测到为发射端插入时，会给发射端发送配对请求；

S1013，发射端接收到主机的配对请求后，会给主机回复配对响应；

S1014，主机端接收到发射端的配对响应后，给发射端发送配对数据，开始配对；

S1015，发射端接收配对数据后开始校验，校验正确时，将配对数据写入Flash，给主机回复配对成功响应；

S1016，校验失败时，丢弃配对数据，给主机回复配对失败响应。

[0016] 优选地，所述步骤S101还包括：配对失败或超时，终止配对操作，需重新进行配对操作。

[0017] 优选地，所述步骤S102包括：

S1021，发射端与主机端建立无线网络连接，存储在发射端映射出来U盘或CD盘中的应用程序在源端开始自动运行；

S1022，发射端发送按键指令，根据按下按键时间的长短，分为短按事件或是长按事件；

S1023，当为长按事件时，发射端给源端发送全屏请求，源端给发射端回复全屏请求响应；

S1024，当为短按事件时，发射端判断当前的状态：当前是推屏状态，则给源端发送退屏请求；当前是退屏状态，则给源端发送推屏请求；源端给发射器回复请求响应。

[0018] S1025，判断视频是否在推送；当视频没有在推屏时，不能单独声音推送；当为推送状态时，源端给发射端发送声音推送指令，开始对声音进行采样，然后给发射端发送音频数据。

[0019] S1026，发射端接收到源端的声音推送指令，接收PC端传输过来的音频数据；同时，给主机端发送声音推送请求；发射端在与主机端建立起音频传输连接后，把接收到的音频数据传送给主机端，完成声音推送操作。

[0020] S1027，当为退出操作时，源端给发射端发送声音退出指令，停止对声音进行采样，停止给发射器发送音频数据；发射端接收到源端的声音退出指令，停止接收PC端传输过来的音频数据；给主机发送声音退出请求；然后断开与主机的音频传输连接，完成声音退出操作。

一种通过USB接口实现音视频传输和交互信令的系统，包括：

配对模块，用于发射端在主机端上映射出一个通用的USB HID接口，通过接口与主机端进行配对；

网络连接模块，用于发射器与主机端建立起无线网络连接；

源端交互模块，用于发射端在源端PC端映射出一个通用的USB HID接口，与PC端进行视频和音频数据传输以及信令交互；

回传模块，用于主机端将终端输入的触控指令回传给发射端，再由发射端发送给源端相应的处理指令。

[0021] 优选地，所述配对模块包括：

插入事件判断单元，用于主机端根据USB HOST接口的设备插入事件判断是否为发射端插入；

配对请求单元，用于主机端检测到为发射端插入时，会给发射端发送配对请求；

配对响应单元，用于发射端接收到主机的配对请求后，会给主机回复配对响应；

数据发送单元，用于主机端接收到发射端的配对响应后，给发射端发送配对数据，开始配对；

校验模块，用于发射端接收配对数据后开始校验，校验正确时，将配对数据写入Flash，给主机回复配对成功响应；

错误处理模块，用于校验失败时，丢弃配对数据，给主机回复配对失败响应。

[0022] 所述源端交互模块包括：

按键判断单元，用于发射端发送按键指令，根据按下按键时间的长短，分为短按事件或是长按事件；

长按处理单元，用于当为长按事件时，发射端给源端发送全屏请求，源端给发射端回复全屏请求响应；

短按处理单元，用于当为短按事件时，发射端判断当前的状态：当前是推屏状态，则给源端发送退屏请求；当前是退屏状态，则给源端发送推屏请求；源端给发射器回复请求响应；

声音推送单元，用于源端给发射端发送声音推送指令，开始对声音进行采样，然后给发射端发送音频数据；

声音退出单元，用于源端给发射端发送声音退出指令，停止对声音进行采样，停止给发射器发送音频数据；发射端接收到源端的声音退出指令，停止接收PC端传输过来的音频数据；给主机发送声音退出请求；然后断开与主机的音频传输连接，完成声音退出操作。

[0023] 一种通过USB接口实现音视频传输和交互信令的系统，包括：

一发射器，通过发射器上按键的短按和长按两种状态实现推屏、推屏和全屏操作；

一主机端，通过主机端上的USB HOST接口与发射器进行数据传输与信令交互，并通过USB HOST接口外接触控屏的触控USB接口，采集触控屏终端的触摸控制信令，回传给发射器和源端，实现触控屏的反向控制；

发射器包括：

映射存储模块，用于映射出一个U盘或CD盘存储需在源端运行的应用程序；

交互传输模块，用于与源端进行信令交互和音视频数据的传输；

信号回传模块，用于将触摸显示终端反向控制信号的回传给PC端

无线模组模块，用于连接主机端网络，不占用源端网络；

按键状态监测模块，用于实时采集按键状态操作；

LED灯显示模块1，用于实时显示发射器的上电启动状态、与主机正在连接状态、与主机连接成功且没有推屏状态、与主机连接成功且正在推屏状态等工作状态；

所述主机端包括：

内置web页面模块，通过无线网络或有线网络登录内置WEB页面，对主机的无线参数和输出参数进行设置；

外接触控模块，用于采集触控屏终端的触摸控制信令，回传给发射器和源端；

配对模块，通过USB HOST接口与发射器自动配对；

升级模块，用于升级文件通过USB HOST接口实现主机端自动升级；

LED灯显示模块2，用于实时显示主机端的上电启动状态、与终端连接状态、推屏状态以及升级状态等工作状态；

分辨率自适应模块，通过读取EDID识别终端显示设备的最佳分辨，以最佳显示分辨率输出。

[0024] 优选地，所述系统还可以包括：多个发射器与一主机端。

[0025] 本发明的有益效果如下：

1)插入发射器设备，然后存于发射器设备的源端PC端应用程序会自动运行，不论是windows系统还是MAC OS X系统；

2)发射器自动与主机建立Wi-Fi连接，连接成功有图标提示和LED灯提示；

3)然后按下按键即可实现无线推屏分享；

4)多用户可以自主加入和退出，以及全屏显示，全部通过发射器的一个按键即可实现。

[0026] 5)主机安装也非常简单，只需通过HDMI或VGA与显示终端连接，然后接上电源给主机上电启动即可完成。

附图说明

[0027] 图1为PC端应用程序功能图；

图2为发射器功能图；

图3为主机端功能图；

图4为配对流程图；

图5为推屏、退屏、全屏操作流程图；

图6为声音推送、退出操作流程图；

图7为本发明主要流程图；

图8为升级操作流程图。

具体实施方式

[0028] 应当理解，此处所描述的具体实施例仅仅用以解释本发明，并不用于限定本发明。

[0029] 如图1所示，示出了本发明一种通过USB接口实现音视频和交互信令的传输方法及传输系统的实施例。

[0030] 该实施例的通过USB接口实现音视频传输和信令交互的系统包括：

运行在源端PC端上的应用程序，用于通过USB接口与发射器进行音视频数据传输和信令交互；

主机端，通过无线网络与终端显示设备进行音视频数据传输和信令交互；

发射器，通过无线无线网络与主机端进行音视频数据传输和信令交互；

源端PC端应用程序，通过USB接口与发射器进行进行音视频数据传输和信令交互。

[0031] 源端PC端应用程序，设计为绿色软件，不需要安装，程序存储于发射器映射出来的U盘或CD盘中，插入发射器后自动运行。

[0032] 源端PC端应用程序包括两个版本，一个是windows PC版本，一个是MAC OS X PC版本。

[0033] 实现的主要功能为捕获屏幕内容、鼠标点击指令、屏幕缩放处理、屏幕编码、声音采样和音频采样率转换以及USB HID通讯等等。功能图如图1所示。

[0034] 在windows上与在MAC OS X上实现以上功能采用技术原理基本上不一样。

[0035] 对于Windows版本，采用windows提供的组件和接口驱动，实现屏幕、鼠标和声音的采样，以及USB HID的通讯。视频编码模块采用H.264算法，屏幕缩放处理和音频采样率转换采用FFmpeg提供的库实现。

[0036] 对于MAC OS X版本，采用OS X提供的组件和接口驱动，实现屏幕、鼠标和声音采样，以及USB HID的通讯。视频编码模块采用H.264算法，屏幕缩放处理和音频采样率转换采用OS X提供的库实现。

[0037] 发射器可接入到windows PC和MAC OS X上，不需要安装驱动即可运行。发射器的功能图如图2所示。

[0038] 发射器与源端PC端通过USB 2.0接口连接，在源端PC端上映射为USB Composite Device，USB枚举类型都是标准的，无论是windows PC还是MAC OS X PC，都不需要安装驱动，实现免驱即插即用。

[0039] 主机端的功能图如图3所示：

主机端包括以下几个功能模块：

1)内置WEB页面模块，可通过无线无线或有线LAN登录内置WEB页面，对主机的无线参数和输出参数进行设置。

[0040] 2)回传模块，主机的USB HOST接口外接触控屏的触控USB接口，采集触控屏的触摸控制信令，回传给发射器和源端PC端，从而可实现触控屏的反向控制功能。

[0041] 3)配对模块，把发射器插在主机的USB HOST接口上，实现发射器自动配对功能。

[0042] 4)升级模块，把主机的升级文件存入U盘，然后把U盘插入到主机的USB HOST接口，实现主机自动升级功能。

[0043] 5)显示模块，LED灯实时显示主机端的工作状态，工作状态包括上电启动状态，与终端连接状态，推屏状态以及升级状态。

[0044] 6)分辨率自适应模块，终端显示设备最佳分辨率自适应功能，可以通过读取EDID识别终端显示设备的最佳分辨，然后以最佳显示分辨率输出。

[0045] 音视频数据传输和信令交互包括以下步骤：

启动主机端，让其进入正常运行状态；

步骤S101，在主机端上映射出一个通用的USB HID接口，通过接口与主机端进行配对；

如图4，把发射器插入主机的USB HOST接口进行配对操作，这时发射端在主机上映射出一个通用的USB HID接口，通过这个接口与主机进行配对交互。

[0046] 当发射器插入主机时，主机会根据USB HOST接口的设备插入事件去判断是否为发射器插入，当检测到为发射器插入时，会给发射器发送配对请求。

[0047] 发射器接收到主机的配对请求后，会给主机回复配对响应。

[0048] 主机接收到发射器的配对响应后，开始给发射器发送配对数据。

[0049] 配对数据包括无线网络的SSID、密钥、频段、信道和IP地址等等。

[0050] 发射器接收到主机的配对数据后：校验如果正确，会把配对数据写入Flash，然后给主机回复配对成功响应。

[0051] 校验如果失败，会丢弃配对数据，然后给主机回复配对失败响应。

[0052] 配对失败或超时，终止配对操作。然后需要拔出发射器，重新插入，才能重启配对操作。

[0053] 配对成功时，实现配对操作。

[0054] 步骤S102，发射器与主机端建立起无线网络连接，并在源端PC端映射出一个通用的USB HID接口，与PC端进行视频和音频数据传输以及信令交互。

[0055] 发射器端和主机端配对成功后，拔出发射器，插入源端PC端。在源端PC端上映射出一个通用的USB HID接口，发射器与源端PC端通过这个接口并采用协议为宝疆私有协议进行信令交互，以及视频和音频数据传输。

[0056] 如图5，发射器与主机端建立起无线网络连接，存储在发射器映射出来U盘或CD盘中的应用程序在源端PC端开始自动运行。

[0057] 按下发射器按键，发射器根据按下按键时间的长短，识别为短按事件还是长按事件。

[0058] 当为长按事件时，发射器给源端PC端发送全屏请求。

[0059] 如果发射器之前是退屏状态，则开始准备接收源端PC端传输过来的视频数据；同时，发射器给主机发送全屏请求。发射器在与主机建立起视频传输连接后，把接收到的源端PC端传输过来的视频数据传送给主机，再由主机传输给终端。

[0060] 如果发射器之前是推屏状态，则只需要给主机发送全屏请求，实现全屏操作。

[0061] 当为短按事件时，发射器需要判断自己当前的状态：

如果当前是退屏状态，则给源端PC端发送推屏请求。源端PC端给发射器回复推屏请求响应，开始录屏和编码，然后给发射器发送视频数据。发射器接收到源端PC端推屏响应，开始准备接收源端PC端传输过来的视频数据；同时，发射器给主机发送推屏请求。

[0062] 发射器在与主机建立起视频传输连接后，把接收到的源端PC端传输过来的视频数据传送给主机端，实现推屏操作。

[0063] 如果当前是推屏状态，则给源端PC端发送退屏请求；

源端PC端给发射器回复推屏请求响应，并停止录屏和编码。如果之前在推送声音，也同时停止声音采样，然后停止给发射器发送音视频数据。发射器接收到源端PC端退屏响应，停止接收源端PC端传输过来的音视频数据；同时，发射器给主机发送退屏请求。然后断开与主机的音视频传输连接，实现退屏操作。

[0064] 如图6，声音推送或退出操作在源端PC端程序上进行控制。

[0065] 由于声音是不能单独推送的，所以首先需要判断是否有视频在推送，当视频没有在推屏时，声音操作菜单是灰色的，不能控制，也就是不能单独声音推送，而不推送视频。

[0066] 当前声音推送状态如果是推送状态，则可以实行退出操作；

当前声音推送状态如果是退出状态，则可以实行推送操作。

[0067] 当为推送状态时，PC端给发射器发送声音推送指令，开始对声音进行采样，然后给发射器发送音频数据。

[0068] 发射器接收到PC端的声音推送指令，开始准备接收PC端传输过来的音频数据；同时，给主机端发送声音推送请求。

[0069] 发射器在与主机建立起音频传输连接后，把接收到的PC传输过来的音频数据传送给主机端，完成实现声音推送操作。

[0070] 当为退出状态时，PC端给发射器发送声音退出指令，停止对声音进行采样，然后停止给发射器发送音频数据。

[0071] 发射器接收到PC端的声音退出指令，停止接收PC端传输过来的音频数据；同时，给主机发送声音退出请求。然后断开与主机的音频传输连接，实现声音退出操作。

[0072] 步骤S103，当主机接收到发射器请求之后，对终端发送相应的处理指令。或将终端输入的触控指令回传给发射器，再由发射器发送给源端相应的处理指令。

[0073] 主机的USB HOST接口外接触控屏的触控USB接口，采集触控屏的触摸控制信令，回传给发射器和源端PC端，从而可实现触控屏的反向控制功能。

[0074] 发射器通过标准的USB HID鼠标和键盘协议，实现触摸显示端反向控制信号的回传给源端PC端功能。

[0075] 以上仅为本发明的优选实施例，并非因此限制本发明的专利范围，凡是利用本发明说明书及附图内容所作的等效结构或等效流程变换，或直接或间接运用在其他相关的技术领域，均同理包括在本发明的专利保护范围内。

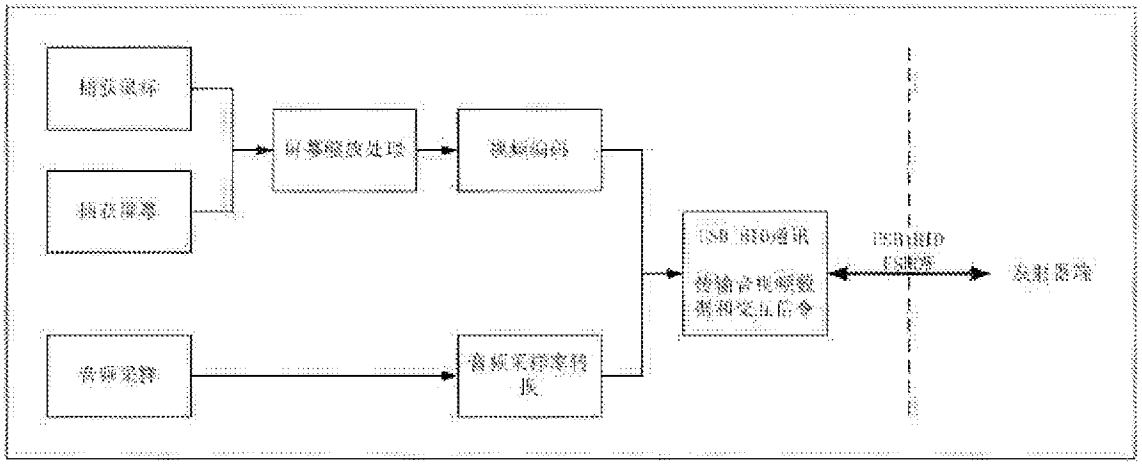


图 1

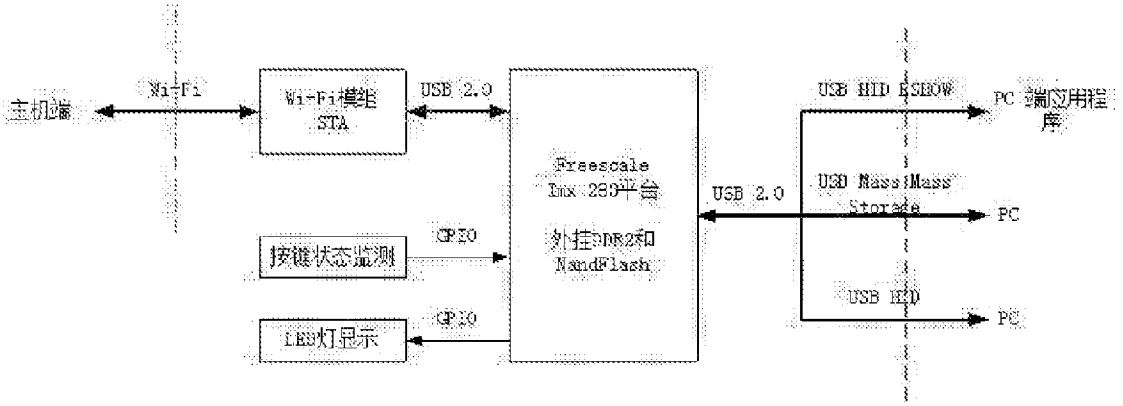

主机端
Wi-Fi
Wi-Fi模组
STA
USB 2.0
Freescale
Imx 283平台
外挂DDR2和
NandFlash
USB 2.0
USB HID ESHOW
PC 端应用程序
USB MassMass
Storage
PC
USB HID
PC
按键状态监测
GPIO
LED灯显示
GPIO

图 2

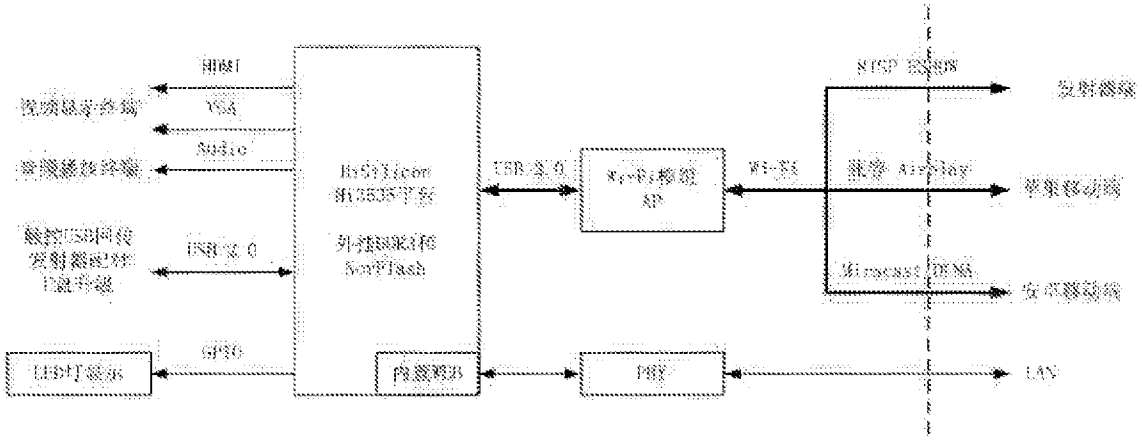

USB 2.0
Wi-Fi
AP
USB 2.0
GPIO
LAN

图 3

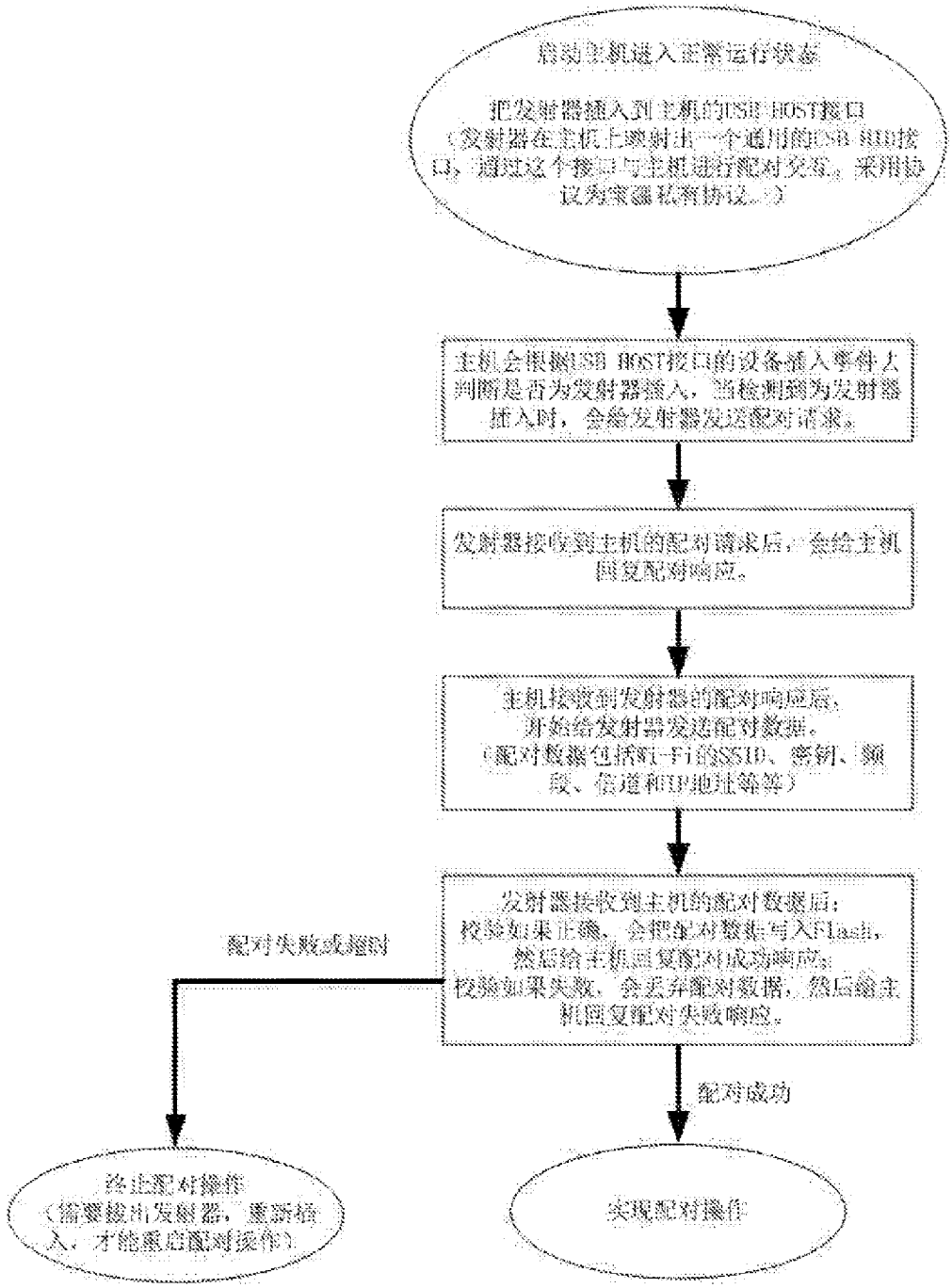

待机主机进入正常运行状态
把发射器插入到主机的USB HOST接口
（发射器在主机上映射出一个通用的USB HID接口，通过这个接口与主机进行配对交互，采用协议为宝盈私有协议。）
主机会根据USB HOST接口的设备插入事件去判断是否为发射器插入，当检测到为发射器插入时，会给发射器发送配对请求。
发射器接收到主机的配对请求后，会给主机回复配对响应。
主机接收到发射器的配对响应后，开始给发射器发送配对数据。
（配对数据包括WiFi的SSID、密钥、频段、信道和IP地址等等）
发射器接收到主机的配对数据后：
校验如果正确，会把配对数据写入Flash，然后给主机回复配对成功响应；
校验如果失败，会丢弃配对数据，然后给主机回复配对失败响应。
配对失败或超时
配对成功
终止配对操作
（需要拔出发射器，重新插入，才能重启配对操作）
实现配对操作

图 4

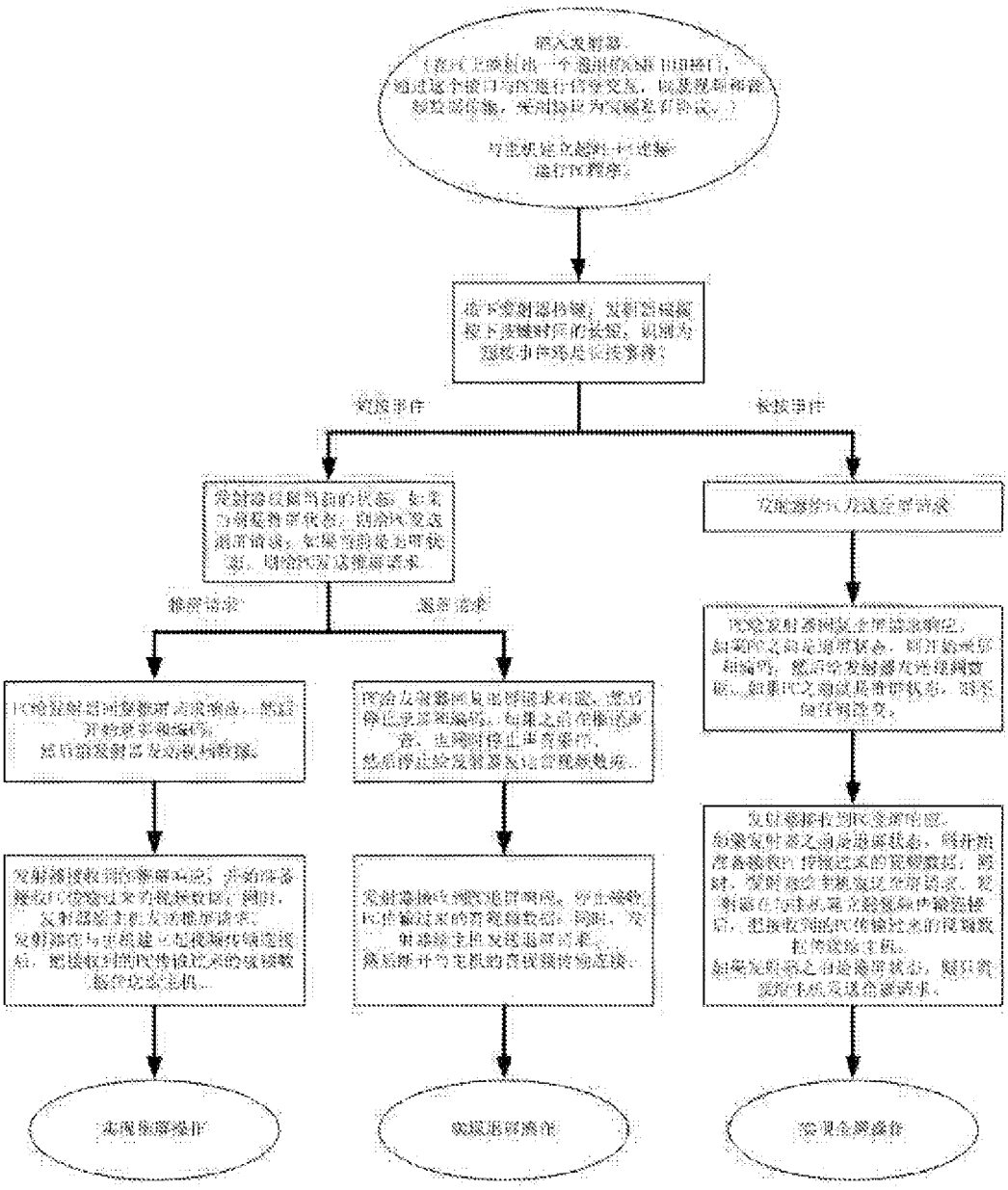


图 5

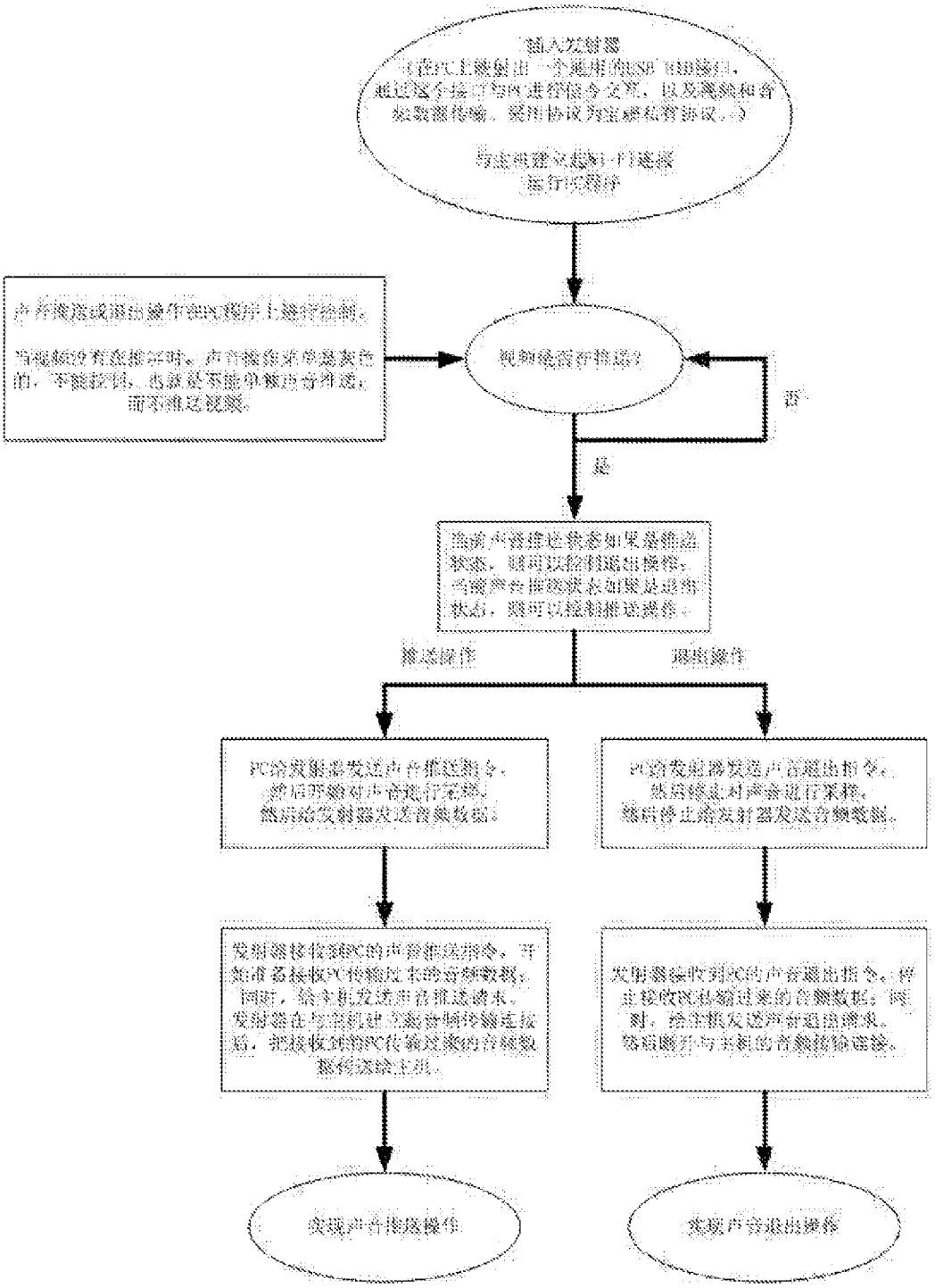

插入发射器
（在PC上能检出一个通用的USB HID接口，通过这个接口与PC进行指令交互，以及视频和音频数据传输。采用协议为定制私有协议。）
与主机建立起HID通讯
运行应用程序
声音推送或退出操作在OSD程序上进行绘制。
当视频没有连接时，声音推送菜单是灰色的，不能按钮，也就是不能单独声音推送，而不推送视频。
检测电脑有连接?
否
是
检测声音推送状态参数如果是推送状态，则可以绘制退出操作，当检测声音推送状态参数如果是退出状态，则可以绘制推送操作。
推送操作
退出操作
PC给发射器发送声音推送指令，然后开始对声音进行采样，然后给发射器发送音频数据。
PC给发射器发送声音退出指令，然后停止对声音进行采样，然后停止给发射器发送音频数据。
发射器接收到PC的声音推送指令，开始准备接收PC传输过来的音频数据，同时，给主机发送声音推送请求，发射器在与主机建立起音频传输连接后，把接收到的PC传输过来的音频数据传送给主机。
发射器接收到PC的声音退出指令，停止接收PC传输过来的音频数据，同时，给主机发送声音退出请求，然后断开与主机的音频传输连接。
实现声音推送操作
实现声音退出操作

图 6

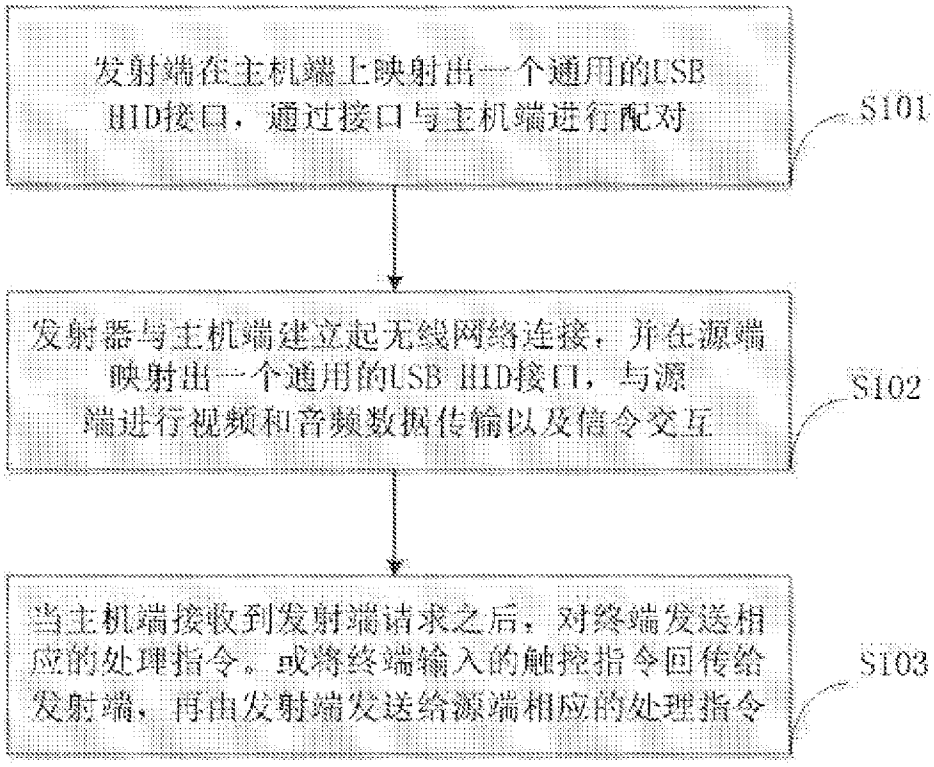

发射端在主机端上映射出一个通用的USB HID接口，通过接口与主机端进行配对
S101
发射器与主机端建立起无线网络连接，并在源端映射出一个通用的USB HID接口，与源端进行视频和音频数据传输以及信令交互
S102
当主机端接收到发射端请求之后，对终端发送相应的处理指令，或将终端输入的触控指令回传给发射端，再由发射端发送给源端相应的处理指令
S103

图7

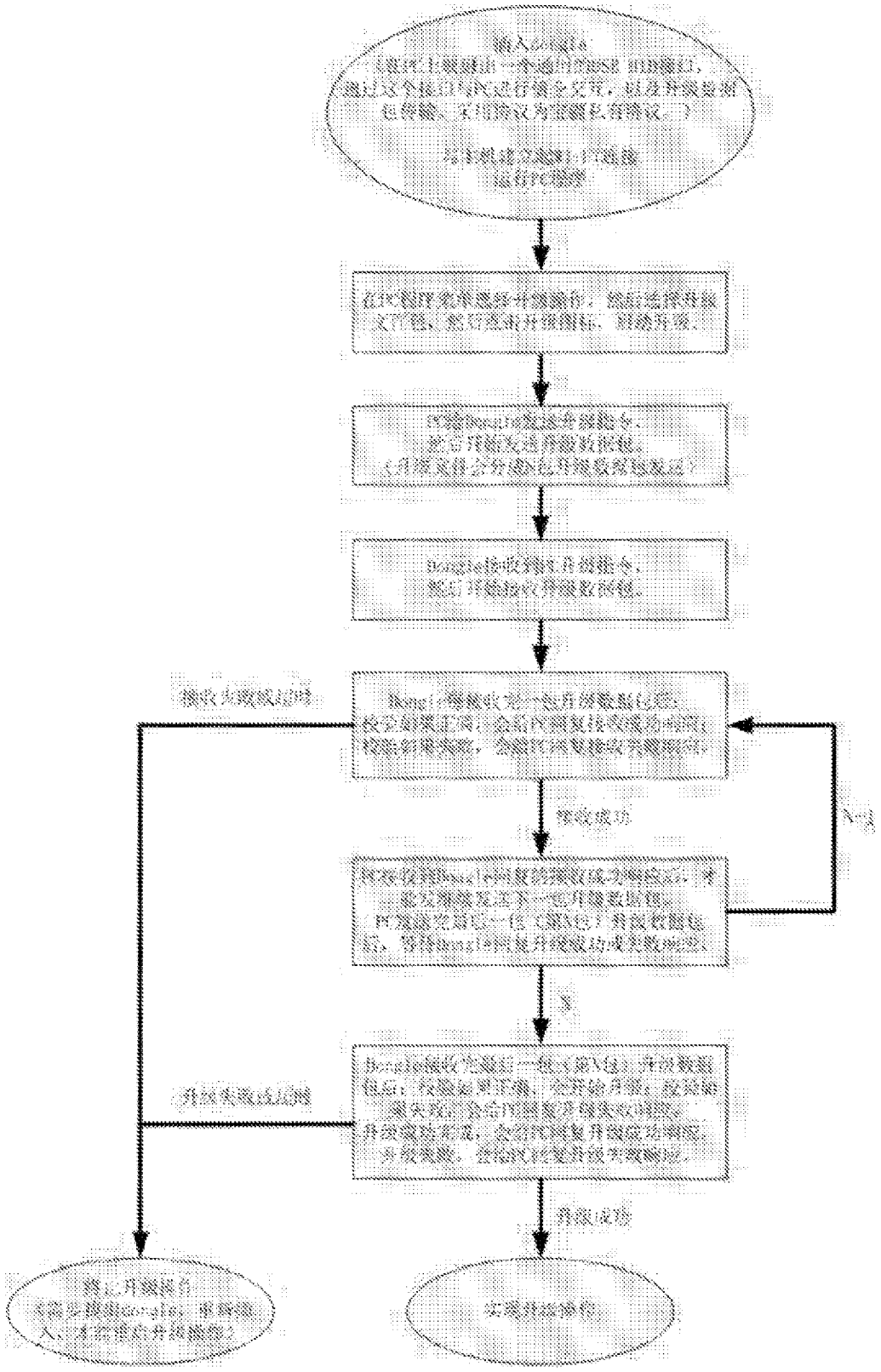


图8

Electronic Acknowledgement Receipt

EFS ID:	46159533
Application Number:	17742166
International Application Number:	
Confirmation Number:	9959
Title of Invention:	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS
First Named Inventor/Applicant Name:	Gauthier RENARD
Customer Number:	52835
Filer:	Thomas Lee/Jessica Sun
Filer Authorized By:	Thomas Lee
Attorney Docket Number:	21063.0018USC1
Receipt Date:	11-JUL-2022
Filing Date:	11-MAY-2022
Time Stamp:	15:52:46
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	SB08_0018USC1.pdf	1036696 e6987bc9d1e15d131f8724399a7e3a21ba14cd28	no	8

Warnings:

Information:					
2	Foreign Reference	FR1_CN104412542.pdf	8374226 4f4c5a7048caa2838a6631af3882f4a41f3e9a5b	no	57
Warnings:					
Information:					
3	Foreign Reference	FR8_WO2008080107A2.pdf	1718765 e9212362dddddfa528cf1549310165698dab89dc	no	36
Warnings:					
Information:					
4	Non Patent Literature	NPL8_OA.pdf	384508 edc3fa45150143b2254f29a87944c917bda4d6a0	no	9
Warnings:					
Information:					
5	Non Patent Literature	NPL9_Wireless_USB_Wikipedia.pdf	1134387 8500ba1cda32bbf9c5535def887612102e2fc6d7	no	11
Warnings:					
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6	Non Patent Literature	NPL10_WrittenOpinion.pdf	5180726 eeb78475209d0094ea626580e6e1857052ef6ce0	no	7
Warnings:					
Information:					
7	Transmittal Letter	IDScommunication.pdf	74512 8fa094263b964414aea745bc96618d5ca1dc162b	no	1
Warnings:					
Information:					
8	Foreign Reference	FR4_CN106412683.pdf	12820597 9cea6d59cfb27fdf7883a835f8fc212bf2151eb3	no	40
Warnings:					
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		Total Files Size (in bytes):	30724417		

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If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	17742166
Filing Date	2022-05-11
First Named Inventor	RENARD
Art Unit	2186
Examiner Name	
Attorney Docket Number	21063.0018USC1

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17742166
	Filing Date	2022-05-11
	First Named Inventor	RENARD
	Art Unit	2186
	Examiner Name	
	Attorney Docket Number	21063.0018USC1

	1	Office Action issued in Indian Application No. 202017017906, dated July 4, 2022, with English translation	X

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17742166
	Filing Date	2022-05-11
	First Named Inventor	RENARD
	Art Unit	2186
	Examiner Name	
	Attorney Docket Number	21063.0018USC1

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OR

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See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2022-08-10
Name/Print	Thomas Lee	Registration Number	66,396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/742,166	**08/10/2022 02:32:08 PM ET**	**21063.0018USC1**

Title of Invention

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	9959	FILED BY	Yanling Cottle
PATENT CENTER #	60860636	FILING DATE	05/11/2022
CUSTOMER #	52835	FIRST NAMED INVENTOR	Gauthier RENARD
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Thomas Lee

Documents

TOTAL DOCUMENTS: 2

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
IDS_SB08_0018USC1.pdf	4	Information Disclosure Statement (IDS) Form (SB08)	1234 KB
OA.pdf	6	Other reference-Patent/Application/Search Documents	6039 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
IDS_SB08_0018USC1.pdf	4ABCA0C0C6E4B789BD0E48254341654BD9FCCA09D83DA372

	D0F05497A134157D4E6897780EC9FBCB27F6E811B66E5109C484B63D56EB6A54AE9C1C9BA9B70208
OA.pdf	263BDAC0B965D0ABCDE9A6233D1D757230F7C931FC87DAB6B92873EC6CAF9499B017D5F3A5CA116DBBB860C8A22EAD8476D62AAA299F17EAAC9E90A5F2881585

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
17/742,166	05/11/2022	Gauthier RENARD	21063.0018USC1

CONFIRMATION NO. 9959

52835
HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 South Seventh Street
Suite 2700
Minneapolis, MN 55402-1683

PUBLICATION NOTICE

OC00000136055316

Title:METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Publication No.US-2022-0269634-A1
Publication Date:08/25/2022

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(Not for submission under 37 CFR 1.99)

Application Number	17742166
Filing Date	2022-05-11
First Named Inventor	RENARD
Art Unit	
Examiner Name	
Attorney Docket Number	21063.0018USC1

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17742166
	Filing Date	2022-05-11
	First Named Inventor	RENARD
	Art Unit	
	Examiner Name	
	Attorney Docket Number	21063.0018USC1

	1	Notice of Grounds of Rejection issued in corresponding Japanese Application No. 2020-536065, dated August 16, 2022, with English machine translation	☒
	2	"Skype for Business" Skype for Business product brochure, Microsoft Japan, October 29, 2015, with partial translation	☒
	3	Office Action in related U.S. app. 16/771068 dated July 29, 2022.	☐

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17742166
	Filing Date	2022-05-11
	First Named Inventor	RENARD
	Art Unit	
	Examiner Name	
	Attorney Docket Number	21063.0018USC1

CERTIFICATION STATEMENT

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☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

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☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2022-11-01
Name/Print	Thomas Lee	Registration Number	66,396

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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

R3/PTA: 10/29/22
RSTAT: 1/29/23

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/771,068	06/09/2020	Gauthier RENARD	21063.0018USWO	1088

52835 7590 07/29/2022

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
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EXAMINER
MISIURA, BRIAN THOMAS

ART UNIT	PAPER NUMBER
2186	

NOTIFICATION DATE	DELIVERY MODE
07/29/2022	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTOMail@hsml.com

Office Action Summary	Application No. 16/771,068	Applicant(s) RENARD et al.	
	Examiner BRIAN T MISIURA	Art Unit 2186	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 6/21/2022.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 58-80 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 58-80 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☑ The specification is objected to by the Examiner.

11)☑ The drawing(s) filed on 6/9/2020 is/are: a)☑ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date 3/29/2022 and 6/21/2022.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Detailed Action

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/21/2022 has been entered.

Response to Arguments

Applicant's arguments filed 6/21/22 have been fully considered but they are not persuasive. The rejections have been updated below to address any newly presented limitations and/or claims.

Pages 6-10 of the Remarks comprise several arguments regarding Brands teaching a “peripheral device”. Page 7 recites, “First of all it is noticeable that a first peripheral device, which is connected to the processing device is not recited in this claim. Rather, as discussed on page 34, lines 25-29 of the Specification: “In Figure 12 the processing device 60’ has no first peripheral device 130, e.g. none is available”.”

The Examiner makes note that while the Specification comprises negative language regarding a peripheral device not being present, the claims are devoid of such language or any other language that precludes a peripheral device from being present within the system of Brands.

- Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Additionally, Paragraph 126 of Brands teaches that connection unit 47 may be integrated into a user processing device 31, and therefore, would not be considered a "peripheral device". Further, Figures 11 and 12 disclose processing devices that include a table and smartphone, both of which are typically devoid of peripheral devices.

The Examiner respectfully disagrees with the arguments presented on Pages 8 and 9 of the Remarks, and maintains that the dedicated software client (**Paragraph 153**) teaches the limitations of the claimed third party software. Figure 11 further discloses downloading a "ClickShare app" onto a tablet device in order to share content between the tablet and a display device. A tablet or smartphone device can download this app and utilize their local speakers and microphones as the virtual versions of said functions presented to it via the app.

The ClickShare app is also discussed in the NPL Document titled "Barco – Clickshare Brochure", provided on 6/9/2020 (**see Pages 4 and 17**).

- Upon further review of the Specification/Drawings, several informalities have been discovered and are presented below.

Specification

The disclosure is objected to because of the following informalities:

Page 25 introduces numeral 60 are referring to "communication software".

However, the following references to a "processing device" are made using the same numeral "60" or "60' ":

Page 32 line 5; “processing device 60”

Page 34 line 25; “processing device 60' ”

Page 35 lines 1 and 19; “processing device 60' ”

Appropriate correction is required.

Claim Interpretation

The following is a quotation of 35 U.S.C. 112(f):

(f) Element in Claim for a Combination. – An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

The following is a quotation of pre-AIA 35 U.S.C. 112, sixth paragraph:

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

The claims in this application are given their broadest reasonable interpretation using the plain meaning of the claim language in light of the specification as it would be understood by one of ordinary skill in the art. The broadest reasonable interpretation of a claim element (also commonly referred to as a claim limitation) is limited by the description in the specification when 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, is invoked.

As explained in MPEP § 2181, subsection I, claim limitations that meet the following three-prong test will be interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph:

(A) the claim limitation uses the term “means” or “step” or a term used as a substitute for “means” that is a generic placeholder (also called a nonce term or a non-

structural term having no specific structural meaning) for performing the claimed function;

(B) the term "means" or "step" or the generic placeholder is modified by functional language, typically, but not always linked by the transition word "for" (e.g., "means for") or another linking word or phrase, such as "configured to" or "so that"; and

(C) the term "means" or "step" or the generic placeholder is not modified by sufficient structure, material, or acts for performing the claimed function.

Use of the word "means" (or "step") in a claim with functional language creates a rebuttable presumption that the claim limitation is to be treated in accordance with 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph. The presumption that the claim limitation is interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, is rebutted when the claim limitation recites sufficient structure, material, or acts to entirely perform the recited function.

Absence of the word "means" (or "step") in a claim creates a rebuttable presumption that the claim limitation is not to be treated in accordance with 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph. The presumption that the claim limitation is not interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, is rebutted when the claim limitation recites function without reciting sufficient structure, material or acts to entirely perform the recited function.

Claim limitations in this application (**Claim 65**) that use the word "means" (or "step") are being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, except as otherwise indicated in an Office action. Conversely, claim limitations in this application that do not use the word "means" (or "step") are not being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, except as otherwise indicated in an Office action.

Claim Rejections - 35 USC § 103

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103 are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 58-80 are rejected under 35 U.S.C. 103 as being unpatentable over **Brands** et al. U.S. PGPUB No. 2015/0121466 in view of **Beel** et al. U.S. PGPUB No. 2015/0169477.

Per Claim 58, Brands discloses:

- a system for connecting a processing device (**Paragraph 118, Processing device 31 such as a laptop computer.**) to a functional device (**Paragraphs 120-121; display 44, whiteboard 45, camera 35, microphones 38**) connected to or in a base unit (**Paragraphs 119-122; base node 36**) of a wireless network (**Paragraphs 88, 118, and 119; wireless network 50**),

- the system comprising: the base unit having a transmitter (**Paragraph 130; Base node 36 comprises a wireless transmitter/receiver.**),
- a first display device connected to or in the base unit (**Paragraphs 120 and 124, Figures 1a and 1b; "base node 36 being coupled to a central display 44"**),
- at least one functional device connected to or in the base unit (**Paragraphs 120-121; Any of the whiteboard 45, display 44, cameras 39-41, or microphones 38 can be considered a "functional device".**),
- the processing device having a memory, a second display device, and an operating system (**Paragraph 118; Devices such as laptop computers and tablet computing devices each comprise memory, displays, and OS's.**),
- a third party software for a Unified Communication call (**Paragraph 152, "multiple participants…engage in a media conference"; Paragraph 153, "a dedicated software client"**), a driver and a client software configured to interact directly with the base unit over a wireless connection (**Paragraph 128, "portable application 60"; Paragraph 138, "portable application" and "pre-installed generic drivers"**),
- wherein the base unit, via the transmitter, is configured to transmit data over the wireless connection to the processing device (**Paragraphs 128-130**),
- wherein the client software (**portable application 60**), when executed by a processor of the processing device, is configured to provide any simulations or translations, as required to allow interaction between the first display device and the processing device (**Paragraphs 128, 138-140; Paragraphs 194-196 and Figure 11 discuss a tablet connection to a base station and further discuss how a data exchange between two computing devices can be done independently of the internet (e.g. direct wireless connection between the two devices). Paragraphs 203-209 and 233, Figure 12, discuss an embodiment where a smartphone P31 can be communicably connected to and view the contents of a display D1. Smartphone P31 is capable of performing a "transform function" to transform display data received by the smartphone from other connected display devices to match an appropriate screen dimension and resolution. The smartphone further allows customization of the display. (Note: "simulations or**

translations" represents an alternative limitation scenario requiring only one of the instances listed be taught by the prior art in order to deem it unpatentable. In this instance, Brands is considered to teach at least "translations" as it is broadly presented in the claim.)),

- and the third party software for the unified communication call is presented with the virtual functional device for the unified communication call (**Paragraphs 123, 127, and 152 disclose that a media conference is conducted using the invention presented in the disclosure. Paragraph 153 discloses a "dedicated software client". The peripheral devices present within meeting room 30 will be available to participants 37 of processing devices 31 to utilize during the media conference.**),
- the processing device being configured to host the unified communication between two or more other processing devices (**Paragraphs 148-242 provide an in-depth configuration of a media conference between "multiple participants".**).

Brands discloses that base node 36 interconnects processing devices 31 with display 44, whiteboard 45, and/or other peripheral devices such as cameras, loudspeakers, and microphones. The interconnected processing and peripheral devices allow for an electronic meeting to take place by way of sharing media content from the plurality of different devices through the use of the display(s) in a meeting room 30 **(Paragraphs 119-124 and 127)**. Brands further teaches the portable application's role in coordinating the interactions between the processing devices 31 and the peripheral devices present within meeting room 30 (**Paragraphs 128 and 138-140**). Brands does not specifically disclose presenting a functional device as a virtual functional device to the processing device.

However, Beel, of common Assignee and field of endeavor, similarly teaches a media conference within a meeting room 30 comprising a client processing device 31, base unit 36, and a plurality of peripheral/functional devices (**Figure 1a, similarly labeled and referenced as Brands**). Beel further teaches that a peripheral device can be presented to the processing device as an audio out device by way of a "virtual audio

device". Upon connection to the system, the virtual audio device will be present to a user of the processing device to utilize (**Paragraphs 313 and 314**).

- It would have been obvious to one having ordinary skill in the art before the effective filing date of the claimed invention to implement the virtual device representation of Beel within the electronic meeting system of Brands because it makes it clear to the user that the audio device can now be utilized as a supplemental audio output device during the meeting.

Per Claim 59, Brands discloses the system of claim 58, wherein the client software and the driver are configured to present a simulated speakerphone to the operating system to create a virtual microphone and a virtual speakerphone (**Paragraph 121; A microphone 38 and loud speaker is provided for use by the processing devices 31.**). Similar to Claim 58, Brands does not specifically teach the virtualized devices. However, please refer to the above rejection of Claim 58 with respect to Beel teaching the virtualized presentation of the peripheral devices to the client processing system. It further would have been obvious to one having ordinary skill in the art to include the microphone and loud speakers of Brands as the virtualized devices as taught by Beel.

Per Claim 60, Brands discloses the system of claim 58, wherein the client software and the driver are configured to present a simulated videocam to the operating system to create a virtual videocam device (**Paragraph 120; camera 35**). Similar to Claim 58, Brands does not specifically teach the virtualized devices. However, please refer to the above rejection of Claim 58 with respect to Beel teaching the virtualized presentation of the peripheral devices to the client processing system. It further would have been obvious to one having ordinary skill in the art to include the video camera of Brands as the virtualized devices as taught by Beel.

Per Claim 61, Brands discloses the system of claim 58, wherein the client software is configured to provide video data, optionally obtained by screen scraping, directly to the base unit, wherein the base unit processes the video data (**Paragraph 140; Base unit**

36 receives screen scraped video data and auto composes it for the central display.).

Per Claim 62, Brands discloses the system of claim 58, wherein the processing device processes video data received from the base unit via the transmitter over the wireless connection (**Paragraphs 64 and 65; "The executable software code can comprise eleventh code for providing a means for receiving, decrypting and decoding incoming arbitrary media content." The executable software code is stored for execution on the processing device.**).

Per Claim 63, Brands discloses the system of claim 62, wherein the processing of the video data comprises decoding and compositing or decrypting the video data (**Paragraphs 64 and 65; "The executable software code can comprise eleventh code for providing a means for receiving, decrypting and decoding incoming arbitrary media content."**)

Per Claim 64, Brands discloses the system of claim 58, wherein the at least one functional device which is presented to the operating system as a virtual functional device, is one or more of a data capturing device, a microphone, a speakerphone, a speaker, another display, a touchscreen, a projector, a camera, a video camera, and a webcamera (**Paragraphs 120-122**). Please see the above rejection of Clam 58 for explanation of how Beel teaches the "virtual functional device" limitation.

Per Claim 65, Brands discloses the system according to claim 58, further comprising means for encoding, optionally encrypting the data (**Paragraphs 60, 63, and 256-259**).

Per Claim 66, Brands discloses the system according to claim 58, wherein the processing device is adapted to host a unified communication between two or more further processing devices (**Paragraph 152; Media conference featuring multiple participants**).

Per Claim 67, Beel further teaches wherein the system is configured to expose the virtual functional device to the processing device (**Paragraphs 313 and 314**).

Per Claim 68, Beel further teaches at least one fixed or a configurable endpoint of the virtual functional device, wherein the at least one fixed or a configurable endpoint is a data source or a data sink which is configured to store or emit data of the virtual functional device (**Paragraphs 313 and 314; An audio signal can be emited.**).

Per Claims 69-74 and 76-78, please refer to the above rejections of Claims 58-61, 63, 64, and 66-68, respectively, as the limitations are substantially similar and the mapping of the references is equally applicable.

Per Claim 75, Brands discloses the method of claim 69, further comprising encoding, optionally encrypting the data (**Paragraphs 60, 63, and 256-259**).

Per Claim 79, Brands teaches the method of claim 70, wherein the interaction directly with the base unit further includes presenting the first display device to the processing device (**Paragraph 196, Data exchange can be performed independently of the internet (e.g. direct wireless communication between both computing devices).**).

Per claim 80, Brands teaches the system of claim 58, wherein the client software is configured to present the first display device to the processing device (**Paragraphs 194-196 and Figure 11 discuss a tablet connection to a base station and further discuss how a data exchange between two computing devices can be done independently of the internet (e.g. direct wireless connection between the two devices). Paragraphs 203-209 and 233, Figure 12, discuss an embodiment where a smartphone P31 can be communicably connected to and view the contents of a display D1.**).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRIAN T MISIURA whose telephone number is (571)272-0889 - (Direct Fax: 571-273-0889). The examiner can normally be reached on M-F: 8-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kim Huynh can be reached on (571) 272-4174. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Brian T Misiura/
Primary Examiner, Art Unit 2186

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16771068
Filing Date	2020-06-09
First Named Inventor	RENARD
Art Unit	2186
Examiner Name	MISIURA
Attorney Docket Number	21063.0018USWO

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16771068
	Filing Date	2020-06-09
	First Named Inventor	RENARD
	Art Unit	2186
	Examiner Name	MISIURA
	Attorney Docket Number	21063.0018USWO

	1	Office Action issued in Chinese Application No. 201880084464.1, dated January 26, 2022, with machine tranlation	X

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EXAMINER SIGNATURE

Examiner Signature	/BRIAN T MISIURA/	Date Considered	07/25/2022

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16771068
Filing Date	2020-06-09
First Named Inventor	RENARD
Art Unit	2186
Examiner Name	MISIURA
Attorney Docket Number	21063.0018USWO

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

X That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

X The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2022-03-29
Name/Print	Thomas Lee	Registration Number	66396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (03-15)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16771068
Filing Date	2020-06-09
First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	MISIURA
Attorney Docket Number	21063.0018USWO

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	1	20160125838	A1	2016-05-05	Hundal et al.	
	2	20150121466	A1	2015-04-30	Brands et al.	

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Application Number	16771068
Filing Date	2020-06-09
First Named Inventor	Gauthier RENARD
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Attorney Docket Number	21063.0018USWO

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	Communication issued in European Application No. 18 833 045.0, dated March 14, 2022	
	2	Wireless USB, from Wikipedia page, last edited on 22 December 2017, 11 pages provided	
	3	Written Opinion issued in corresponding Singapore Application No. 11202005201Y, dated May 23, 2022	

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EXAMINER SIGNATURE

Examiner Signature	/BRIAN T MISIURA/	Date Considered	07/25/2022

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16771068
Filing Date	2020-06-09
First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	MISIURA
Attorney Docket Number	21063.0018USWO

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2022-06-21
Name/Print	Thomas Lee	Registration Number	66396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

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8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

拒絶理由通知書

特許出願の番号	特願２０２０－５３６０６５
起案日	令和　４年　８月　９日
特許庁審査官	富樫　明　　５８９０　５Ｃ００
特許出願人代理人	弁理士法人深見特許事務所　様
適用条文	第２９条第２項（進歩性）

この出願は、次の理由によって拒絶をすべきものです。これについて意見がありましたら、この通知書の発送の日から３か月以内に意見書を提出してください。

理由

１．（進歩性）この出願の下記の請求項に係る発明は、その出願前に日本国内又は外国において、頒布された下記の刊行物に記載された発明又は電気通信回線を通じて公衆に利用可能となった発明に基いて、その出願前にその発明の属する技術の分野における通常の知識を有する者が容易に発明をすることができたものであるから、特許法第２９条第２項の規定により特許を受けることができない。

記　　（引用文献等については引用文献等一覧参照）

●理由１（進歩性）について

・請求項　１、１２、１４、２５
・引用文献等　１－２
・備考
引用文献１には、システムにおいて、デスクトップコンピュータ等のホストデバイス（処理デバイス）が、ＵＳＢプロトコルを介してＵＦＰデバイス（第１の周辺デバイス）に接続され、ウエブカメラ等のＵＳＢデバイス（機能デバイス）が、ＵＳＢプロトコルを介してＤＦＰデバイス（親機）に接続されること、ＵＦＰデバイスとＤＦＰデバイスとが、無線通信等のネットワークを介して通信可能に接続されていることが記載されている（特に段落［００３４］－［００３５］、第３図を参照されたい。）。
ここで、デスクトップコンピュータが、メモリと、ディスプレイと、オペレーティングシステムとを有するよう構成することは、普通に行われていることである。

請求項１に係る発明と引用文献１に記載された発明とを対比すると、請求項１には、処理デバイスは、２つ以上の処理デバイス間の統一通信をホストするように構成され、第１の周辺デバイスは、前記２つ以上の処理デバイス間の統一通信に対して機能デバイスを提供するように構成されていることが記載されているのに対し、引用文献１にはそのようなことが明示されていない点で相違する。

一方、処理デバイスにおいて、２つ以上の処理デバイス間の統一通信をホストするよう構成する技術は、例えば引用文献２記載（特に第４頁を参照されたい。）のように周知であり、引用文献１のホストデバイスに当該周知技術を適用した場合に、ＵＦＰデバイスとＤＦＰデバイスとにより無線接続されたウエブカメラ等のＵＳＢデバイスを、２つ以上の処理デバイス間の統一通信に提供するよう構成することに格別な困難性は認められない。

なお、出願人は意見書において、「拒絶理由通知書における“引用文献１・・・ＤＦＰデバイス（親機）”の記載から、引用文献１のＤＦＰデバイスが本願発明の親機に相当するとのご指摘がなされていると思われます。しかしながら、引用文献１のＤＦＰデバイスは、単純な拡張デバイスであり、マスタデバイスでも親機でもありません。さらに、上記図５のように、親機１００はさまざまな種類の機能デバイス（１２６、９５、９６、９７）とともに動作しますので、親機１００の機能は、ＤＦＰデバイスが実現できる機能を遥かに超えています。また、引用文献１の場合、引用文献１の図４では、ＵＳＢデバイス３０８からホストデバイス３０２へのデータの移動は一方向です。このデータ転送経路におけるＤＦＰおよびＵＦＰのようなデバイス等の中間デバイスは、一対多の動作を可能にするデータ経路内の位置にないので、親機にはなり得ません。したがいまして、本願発明の親機に相当するものは引用文献１には記載されていないと思料致します。」と主張している。

しかしながら、上記主張は、請求項１、１２、１４、２５において親機に関して特定している技術事項に基づくものとはいえないから、上記主張は採用できない。

よって、請求項１、１２、１４、２５に係る発明は、引用文献１に記載されたものから、当業者であれば容易になし得たものであるから、特許法第２９条第２項の規定により、特許を受けることができない。

・請求項　２、１５、２７
・引用文献等　１－２
・備考

ＵＳＢプロトコルを用いて、生のまたは変更されていないフォーマットのデータを送受信することは、普通に行われていることである。

よって、請求項２、１５、２７に係る発明は、引用文献１－２に記載されたも

のから、当業者であれば容易になし得たものであるから、特許法第２９条第２項の規定により、特許を受けることができない。

・請求項　３、１６、２６
・引用文献等　１－２
・備考
引用文献１には上述のように、ＵＦＰデバイスとＤＦＰデバイスとが、無線通信等のネットワークを介して通信可能に接続されていることが記載されている。

なお、出願人は意見書において、「これら請求項では、機能デバイスが、無線通信ネットワークの親機に接続されているまたはこの親機の中にあることを、特定しています。拒絶理由通知書では、このような請求項に対して、“引用文献１には上述のように、ＵＦＰデバイスとＤＦＰデバイスとが、無線通信等のネットワークを介して通信可能に接続されていることが記載されている”と指摘なさいました。しかし、引用文献１は、上記に述べたように親機に相当する構成を記載しませんから、ＵＦＰデバイスとＤＦＰデバイスが、これら請求項に記載された“無線通信ネットワークの親機に接続されているまたはこの親機の中にある機能デバイス”を構成し得ないと思料致します。したがいまして、引用文献１は、請求項３、１６および２６に係る発明を開示しないと思料致します。」と主張している。
しかしながら、上記主張は、請求項３、１６、２６において親機に関して特定している技術事項に基づくものとはいえないから、上記主張は採用できない。

よって、請求項３、１６、２６に係る発明は、引用文献１－２に記載されたものから、当業者であれば容易になし得たものであるから、特許法第２９条第２項の規定により、特許を受けることができない。

・請求項　４、１８
・引用文献等　１－２
・備考
引用文献１には上述のように、デスクトップコンピュータ等のホストデバイスが、ＵＳＢプロトコルを介してＵＦＰデバイスに接続され、ウエブカメラ等のＵＳＢデバイスが、ＵＳＢプロトコルを介してＤＦＰデバイスに接続されることが記載されているから、露出はディスクリプタフィールドで実現されるものといえる。
よって、請求項４、１８に係る発明は、引用文献１－２に記載されたものから、当業者であれば容易になし得たものであるから、特許法第２９条第２項の規定により、特許を受けることができない。

・請求項　５、１１、１７、２４、２８
・引用文献等　１－２
・備考
引用文献１には、ホストデバイスが、論理ＵＳＢネットワークとして、ＤＦＰデバイスのポートが結合されたハブとして見ることができることが記載されている（特に段落［００４２］、第５Ｃ図を参照されたい。）。

なお、出願人は意見書において、「これら請求項では、機能デバイスをベンダ固有のドライバのみで動作させることを記載します。引用文献１の段落００４２も第５Ｃ図も、ベンダ固有のドライバは開示しておらず、これ「のみ」で使用できる機能デバイスも開示していません。請求項１１および２４は、「前記親機に接続されているものと同じタイプの機能デバイスを前記処理デバイスに対して露出する」との構成を記載します。当該請求項に係る発明における、処理デバイスに対して、親機に接続されている機能デバイスと同じタイプの機能デバイスが露出される構成は、引用文献１には記載されていないと思料致します。」と主張している。
しかしながら、一般に、機能デバイスと処理デバイスとをＵＳＢで接続するとき、直接接続する場合と、ＵＳＢハブを介して接続する場合とで異なるデバイスドライバが必要になるとはいえないから、引用文献１に記載された発明においても、機能デバイスをベンダ固有のドライバのみで動作させるよう構成すること、及び、親機に接続されているものと同じタイプの機能デバイスを処理デバイスに対して露出するよう構成するとは普通に行われることといえ、出願人の上記主張は採用できない。

よって、請求項５、１１、１７、２４、２８に係る発明は、引用文献１－２に記載されたものから、当業者であれば容易になし得たものであるから、特許法第２９条第２項の規定により、特許を受けることができない。

・請求項　７、２０
・引用文献等　１－２
・備考
例えばスピーカーホンのように、２つのエンドポイントが組み合わされて１つのエンドポイントとして露出されるよう構成することは普通に行われていることである。
よって、請求項７、２０に係る発明は、引用文献１－２に記載されたものから、当業者であれば容易になし得たものであるから、特許法第２９条第２項の規定により、特許を受けることができない。

・請求項　８－９、１３、２１－２２、２９

・引用文献等　１－２
・備考
　引用文献１には上述のように、ウエブカメラ等のＵＳＢデバイスが、ＵＳＢプロトコルを介してＤＦＰデバイスに接続されることが記載されている。
　よって、請求項８－９、１３、２１－２２、２９に係る発明は、引用文献１－２に記載されたものから、当業者であれば容易になし得たものであるから、特許法第２９条第２項の規定により、特許を受けることができない。

・請求項　１０、２３
・引用文献等　１－２
・備考
　ネットワークで伝送するデータを暗号化する技術は周知である。
　よって、請求項１０、２３に係る発明は、引用文献１－２に記載されたものから、当業者であれば容易になし得たものであるから、特許法第２９条第２項の規定により、特許を受けることができない。

・請求項　３０－３１
・引用文献等　１－２
・備考
　上述した請求項１４－１８、２０－２４の検討内容によれば、請求項３０－３１に係る発明は、引用文献１－２に記載されたものから、当業者であれば容易に想到し得たものである。
　よって、請求項３０－３１に係る発明は、引用文献１－２に記載されたものから、当業者であれば容易になし得たものであるから、特許法第２９条第２項の規定により、特許を受けることができない。

＜拒絶の理由を発見しない請求項＞
　請求項（６、１９）に係る発明については、現時点では、拒絶の理由を発見しない。拒絶の理由が新たに発見された場合には拒絶の理由が通知される。

＜引用文献等一覧＞

１．米国特許出願公開第２０１６／０１２５８３８号明細書
２．Skype for Business, Skype for Business 製品カタログ, 日本マイクロソフト株式会社, 2015年10月29日（周知技術を示す文献；新たに引用された文献）
（注）法律または契約等の制限により、提示した非特許文献の一部または全てが送付されない場合があります。

＜先行技術文献調査結果の記録＞

・調査した分野　　ＩＰＣ　Ｈ０４Ｎ　２１／００－２１／８５８

・先行技術文献　　米国特許出願公開第２０１４／０１８１３２５号明細書
特開２０１６－１７８４２２号公報
特開２０１５－０１１６７９号公報

この先行技術文献調査結果の記録は、拒絶理由を構成するものではありません。

＜補正をする際の注意＞
（１）明細書、特許請求の範囲について補正をする場合は、補正により記載を変更した個所に下線を引いてください（特許法施行規則様式第１３備考５、６）。
（２）補正は、この出願の国際出願日における国際特許出願の明細書若しくは図面（図面の中の説明に限る。）の翻訳文、国際出願日における国際特許出願の請求の範囲の翻訳文（特許協力条約第１９条（１）の規定に基づく補正後の請求の範囲の翻訳文が提出された場合にあっては、当該翻訳文）又は国際出願日における国際特許出願の図面（図面の中の説明を除く。）（以下、翻訳文等という。）（誤訳訂正書を提出して明細書、特許請求の範囲又は図面について補正をした場合にあっては、翻訳文等又は当該補正後の明細書、特許請求の範囲若しくは図面）に記載した事項の範囲内で行わなければなりません。また、意見書で、各補正事項について補正が適法なものである理由を、根拠となる翻訳文等（誤訳訂正書を提出して明細書、特許請求の範囲又は図面について補正をした場合にあっては、翻訳文等又は当該補正後の明細書、特許請求の範囲若しくは図面）の記載箇所を明確に示したうえで主張してください。
（３）特許請求の範囲について補正をする際には、特許法第１７条の２第４項に違反する補正とならないよう、注意してください。

この拒絶理由通知の内容に関するお問合せ又は面接のご希望がありましたら次の連絡先までご連絡ください。電子メール等で補正案等の送付を希望される場合は、その旨を電話でお知らせください。

審査第四部　映像システム（PA5C）　富樫　明（とがし　あきら）
ＴＥＬ．０３（３５８１）１１０１　内線３５３９

Mailed August 16, 2022

NOTICE OF GROUNDS OF REJECTION

Patent Application No. 2020-536065

Applied Provision Paragraph 2 of Article 29 (Inventive Step)

The present application is recognized as rejected on the following ground. It is required that any remarks be submitted within three months from the date on which the present NOTICE was mailed.

GROUNDS

1. (Inventive Step) It is recognized that, because the invention described in Claim(s) of SCOPE OF CLAIMS FOR PATENT of the present application could have been invented readily by a person having ordinary knowledge in the field of the art to which the present invention pertains prior to the filing of the present application based on the invention as described in the following publication(s) distributed or the invention as made available to the public through electric telecommunication lines in Japan and/or foreign countries prior to the filing of the present application, a patent cannot be granted thereto under the provision of Paragraph 2 of Article 29 of the Patent Law.

REMARKS (See the list of the cited references.)

• As to Ground 1 (Inventive Step)

- Claims 1, 12, 14, 25
- References 1, 2
- Notes:

Reference 1 discloses a system in which a host device (processing device) such

as desktop computer is connected via a USB protocol to a UFP device (first peripheral device), and a USB device (functional device) such as web camera is connected via a USB protocol to a DFP device (base unit), and the UFP device and the DFP device are communicatively connected via a network such as wireless communication (see in particular paragraphs [0034] to [0035] and Fig. 3).

It is common that a desktop computer has a memory, a display, and an operating system.

From a comparison between the invention claimed in claim 1 and the invention disclosed in Reference 1, it is seen that they differ from each other in that claim 1 specifies: the processing device is adapted to host a unified communication between two or more processing devices, and the first peripheral device is adapted to present the functional device to the unified communication between the two or more processing devices, while Reference 1 does not explicitly disclose such features.

Meanwhile, the technique of adapting a processing device to host a unified communication between two or more processing devices is well known, as disclosed for example in Reference 2 (see in particular page 4). There is no particular difficulty in applying the above-identified well-known technique to the host device of Reference 1 such that a USB device such as web camera wirelessly connected by the UFP device and the DFP device is presented to the unified communication between two or more processing devices.

In the Written Arguments, the applicant develops the arguments:

In view of the statement "Reference 1 ... DFP device (base unit)" in the Notice of Grounds of Rejection, the DFP device of Reference 1 appears to be identified as being corresponding to the base unit of the claimed invention. The DFP device, however, is a simple extension device and not a master device, nor a base unit. Further, as shown in the above-referenced Fig. 5, the base unit 100 operates with a variety of functional devices (126, 95, 96, 97), and therefore, the capability of the base unit 100 far exceeds what the DFP device can achieve. Moreover, according to

Reference 1, as shown in Fig. 4 of Reference 1, there is a one way movement of data from the USB device 308 to the host device 302. Intermediate devices such as DFP and UFP in this data transfer path cannot be base units, because they are not located at a position in a data pathway that allows a one-to-many operation. It is therefore respectfully submitted that Reference 1 does not disclose the one corresponding to the base unit of the claimed invention.

The above-referenced arguments, however, are not based on the technical features specified for the base unit in claims 1, 12, 14, and 25, and therefore, the arguments are not considered.

Thus, the invention claimed in claims 1, 12, 14 and 25 could have been made easily by those skilled in the art from the disclosure of Reference 1, and therefore cannot be granted a patent under the provision of Paragraph 2 of Article 29 of the Patent Law.

- Claims 2, 15, 27
- References 1, 2
- Notes:

It is common that data in a raw or unaltered format is transmitted/received using a USB protocol.

Thus, the invention claimed in claims 2, 15, and 27 could have been made easily by those skilled in the art from the disclosure of References 1 and 2, and therefore cannot be granted a patent under the provision of Paragraph 2 of Article 29 of the Patent Law.

- Claims 3, 16, 26
- References 1, 2
- Notes:

Reference 1 discloses, as set forth above, the UFP device and the DFP device

are communicatively connected via a network such as wireless communication.

In the Written Arguments, the applicant develops the arguments:

These claims specify that the functional device is connected to or in a base unit of a wireless communication network. The Notice of Grounds of Rejection states, regarding these claims, "Reference 1 discloses that the UFP device and the DFP device are communicatively connected via a network such as wireless communication, as set forth above." Reference 1, however, discloses no feature corresponding to the above-identified base unit, and it is respectfully submitted that the UFP device and the DFP device are never be the "functional device connected to or in a base unit of a wireless communications network". It is therefore respectfully submitted that Reference 1 does not disclose the invention claimed in claims 3, 16, and 26.

The above-referenced arguments, however, are not based on the technical features specified for the base unit in claims 3, 16, and 26, and therefore, the arguments are not considered.

Thus, the invention claimed in claims 3, 16, and 26 could have been made easily by those skilled in the art from the disclosure of References 1 and 2, and therefore cannot be granted a patent under the provision of Paragraph 2 of Article 29 of the Patent Law.

- Claims 4, 8
- References 1, 2
- Notes:

As set forth above, Reference 1 discloses that a host device such as desktop computer is connected via a USB protocol to a UFP device, and a USB device such as web camera is connected via a USB protocol to a DFP device, and therefore discloses that exposure is implemented with descriptor fields.

Thus, the invention claimed in claims 4 and 18 could have been made easily by

those skilled in the art from the disclosure of References 1 and 2, and therefore cannot be granted a patent under the provision of Paragraph 2 of Article 29 of the Patent Law.

- Claims 5, 11, 17, 24, 28
- References 1, 2
- Notes:

Reference 1 discloses that the host device can see a hub coupled to DFP ports as a logical USB network (see in particular paragraph [0042] and Fig. 5C).

In the Written Arguments, the applicant develops the arguments:

These claims specify that the functional device is run with the vendor specific driver alone. Neither paragraph 0042 nor Fig. 5C of Reference 1 discloses vendor specific drivers, and neither discloses a functional device that can be used "alone." Claims 11 and 24 specify the feature "expose the same type of functional device to the processing device as is connected to the base unit." It is respectfully submitted that Reference 1 fails to disclose the feature that the same type of functional device as the functional device connected to the base unit is exposed to the processing device.

Generally, however, when the functional device and the processing device are connected to each other by a USB, different device drivers should not be required for direct connection and connection via a USB hub. It is therefore common that the functional device is run with the vendor specific driver alone and that the same type of functional device as the one connected to the base unit is exposed to the processing device. The above-referenced arguments of the applicant are therefore not considered.

Thus, the invention claimed in claims 5, 11, 17, 24, and 28 could have been made easily by those skilled in the art from the disclosure of References 1 and 2, and therefore cannot be granted a patent under the provision of Paragraph 2 of Article 29 of the Patent Law.

- Claims 7, 20

- References 1, 2

- Notes:

It is common that two endpoints are combined and exposed as one endpoint, like speakerphone, for example.

Thus, the invention claimed in claims 7 and 20 could have been made easily by those skilled in the art from the disclosure of References 1 and 2, and therefore cannot be granted a patent under the provision of Paragraph 2 of Article 29 of the Patent Law.

- Claims 8 to 9, 13, 21 to 22, 29

- References 1, 2

- Notes:

As set forth above, Reference 1 discloses that a USB device such as web camera is connected via a USB protocol to a DFP device.

Thus, the invention claimed in claims 8 to 9, 13, 21 to 22, and 29 could have been made easily by those skilled in the art from the disclosure of References 1 and 2, and therefore cannot be granted a patent under the provision of Paragraph 2 of Article 29 of the Patent Law.

- Claims 10, 23

- References 1, 2

- Notes:

The technique of encrypting data to be transmitted over a network is well known.

Thus, the invention claimed in claims 10 and 23 could have been made easily by those skilled in the art from the disclosure of References 1 and 2, and therefore cannot be granted a patent under the provision of Paragraph 2 of Article 29 of the Patent Law.

- Claims 30, 31

- References 1, 2

- Notes:

In view of the analysis of claims 14 to 18 and 20 to 24 as set forth above, the invention claimed in claims 30 and 31 could have been made easily by those skilled in the art from the disclosure of References 1 and 2.

Thus, the invention claimed in claims 30 and 31 could have been made easily by those skilled in the art from the disclosure of References 1 and 2, and therefore cannot be granted a patent under the provision of Paragraph 2 of Article 29 of the Patent Law.

<Claims for which no grounds of rejection are found>

No grounds of rejection can be found at the present time for the inventions in claims 6 and 19. If any grounds of rejection are newly found, a Notice of Grounds of Rejection will be sent.

LIST OF CITED REFERENCES

1. US 2016/0125838 A1

2. Skype for Business, Skype for Business product brochure, Microsoft Japan, October 29, 2015 (Well-known Art; Newly Cited)

Record of Search for Prior Art Documents

*Searched Technical Field IPC H04N 21/00-21/858

*Prior Art Documents

US 2014/0181325 A1

JP 2016-178422 A

JP 2015-011679 A

This record of search for prior art documents does not form any grounds of rejection.

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PATENT AND TRADEMARK OFFICE

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/742,166	**11/01/2022 04:41:49 PM ET**	**21063.0018USC1**

Title of Invention

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	9959	FILED BY	Yanling Cottle
PATENT CENTER #	61130424	FILING DATE	05/11/2022
CUSTOMER #	52835	FIRST NAMED INVENTOR	Gauthier RENARD
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Thomas Lee

Documents

TOTAL DOCUMENTS: 4

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
NPL1_OA_JP.pdf	14	Other reference-Patent/Application/Search Documents	11513 KB
NPL2_Skype_for_Business.pdf	22	Non Patent Literature	4185 KB
NPL3_OA.PDF	21	Other reference-Patent/Application/Search Documents	3017 KB

Warning: The attached file contains comments or annotations. Comments are not recommended and may cause processing problems with the document.

SB08_0018USC1.pdf	4	Information Disclosure Statement (IDS) Form (SB08)	1234 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
NPL1_OA_JP.pdf	636410CFA89BC2E7A735B6605FCE0193A6AF4697801ADCFB2400B6102FCC658959754BAC2AF785374464FC1C2328537D6ED498AD904E099DD4A1DFD27775F3DA
NPL2_Skype_for_Business.pdf	A116394B170D442FAE6D4DD21B0EEF63BAA887B15E852210B6422BD9B38AE6A8295E6C6F91B0CAF27816C08E2519360BDD6D8F3AA8B6185B13436227937F913F
NPL3_OA.PDF	8180158F8137FBB594C7E0D8486A6DD8C099C7C72A326FE267FBF7FA5D6194B38C42C401A003C1D478728BB98A68AFABA9A6AAFC46D05DCB69CFB719F59847BE
SB08_0018USC1.pdf	5D7B2E70F0799F220ACFC92F69BA0B1DEB7983DBE65A8CED78331BFE09DD3DFE61B62A3564C7912D2C3A3457B1F32A2BAACEA51E1E5B4486C1E8FE188019386F

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

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If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/08a (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	17742166
Filing Date	2022-05-11
First Named Inventor	Gauthier RENARD
Art Unit	
Examiner Name	
Attorney Docket Number	21063.0018USC1

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	1	20040010464	A1	2004-01-15	John Boaz	cited in Office Action issued in US 17/675641

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17742166
	Filing Date	2022-05-11
	First Named Inventor	Gauthier RENARD
	Art Unit	
	Examiner Name	
	Attorney Docket Number	21063.0018USC1

	1	Office Action issued in US patent application 17/675,641, dated October 27, 2022	

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EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17742166
	Filing Date	2022-05-11
	First Named Inventor	Gauthier RENARD
	Art Unit	
	Examiner Name	
	Attorney Docket Number	21063.0018USC1

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2023-01-25
Name/Print	Thomas Lee	Registration Number	66,396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The information provided by you in this form will be subject to the following routine uses:

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3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

RS/PTA: 1/27/23
RSTAT: 4/27/23

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/675,641	02/18/2022	Koen Simon Herman BEEL	21063.0029USC1	1018

52835 7590 10/27/2022

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 South Seventh Street
Suite 2700
Minneapolis, MN 55402-1683

EXAMINER	
SUN, SCOTT C	

ART UNIT	PAPER NUMBER
2181	

NOTIFICATION DATE	DELIVERY MODE
10/27/2022	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTOMail@hsml.com

Office Action Summary	Application No. 17/675,641	Applicant(s) BEEL et al.	
	Examiner SCOTT C SUN	Art Unit 2181	AIA (FITF) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 2/18/2022.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-19 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1,7,11-12,14 and 16 is/are rejected.

8) ☑ Claim(s) 2-6,8-10,13,15 and 17-19 is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☑ The drawing(s) filed on 2/18/2022 is/are: a)☑ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date See Continuation Sheet.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

Continuation of Attachment(s) 2) Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date: 3/7/2022, 3/7/2022, 3/7/2022, 4/8/2022, 5/6/2022, 6/22/2022

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP § 2146 *et seq.* for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

3. Claims 1, 7, 11, and 16 are rejected on the ground of nonstatutory double patenting as being unpatentable over claim 1 of U.S. Patent No. 8,756,348. Although the claims at issue are not identical, they are not patentably distinct from each other because there are only minor differences in wording, and claims 11 and 16 differ in statutory category. Otherwise, the limitations are substantially the same.

Claim Rejections - 35 USC § 112

4. The following is a quotation of 35 U.S.C. 112(b):

> (b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 7, 12 and 14 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor (or for applications subject to pre-AIA 35 U.S.C. 112, the applicant), regards as the invention.

6. Claim 7 recites the limitation "the peripheral device " in line 1. There is insufficient antecedent basis for this limitation in the claim. Examiner assumes this limitation was intended to state “the at least one peripheral device”.

7. Claim 12 recites the limitation "the step of loading a program" in line 1. There is insufficient antecedent basis for this limitation in the claim.

8. Claim 14 recites the limitation "the pairing" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Allowable Subject Matter

9. Claims 2-6, 8-10, 13, 15, and 17-19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SCOTT C SUN whose telephone number is (571)272-2675. The examiner can normally be reached Monday - Friday, 12-8:30 PM.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Idriss Alrobaye can be reached on (571) 270-1023. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: https://patentcenter.uspto.gov. Visit https://www.uspto.gov/patents/apply/patent-center for more information about Patent Center and https://www.uspto.gov/patents/docx for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/SCOTT C SUN/
Primary Examiner, Art Unit 2181

Notice of References Cited	Application/Control No. 17/675,641	Applicant(s)/Patent Under Reexamination BEEL et al.	
	Examiner SCOTT C SUN	Art Unit 2181	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20040010464-A1	01-2004	Boaz, John	G06Q10/109	705/40
	B					
	C					
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
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FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
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*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
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*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	17675641
Filing Date	2022-02-18
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2181
Examiner Name	
Attorney Docket Number	21063.0029USC1

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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	Art Unit	2181
	Examiner Name	
	Attorney Docket Number	21063.0029USC1

	1	Office Action issued in the related U.S. Patent Application No. 16/990215, March 31, 2022, 89 pages	

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EXAMINER SIGNATURE

Examiner Signature	/SCOTT C SUN/	Date Considered	10/22/2022

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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	Attorney Docket Number	21063.0029USC1

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☒ See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2022-04-05
Name/Print	Thomas Lee	Registration Number	66396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

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	1	20040263636		2004-12-30	Cutler et al.	
	2	20070033289		2007-02-08	Nuyttens et al.	
	3	20110222556		2011-09-15	Shefler et al.	
	4	20100079783		2010-04-01	Naganuma et al.	
	5	20050036509		2005-02-17	Acharya et al.	

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	Examiner Name	
	Attorney Docket Number	21063.0029USC1

	6	20060101116		2006-05-11	Rittman	
	7	20110078716		2011-03-31	MacWan	
	8	20090064302		2009-03-05	Colella	

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	1	2010135894	WO		2010-12-02	ZTE Corporation		
	2	1187480	EP		2002-03-13	TeleSuite Corporation		
	3	1462998	EP		2004-09-29	Microsoft Corporation		
	4	101566940	CN		2009-10-28			
	5	2010105335	WO		2010-09-23	Banerjee et al.		

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	Brazil Office Action in corresponding Brazil Application No. BR112014026147-4, dated April 8, 2020.	
	2	Brazil Office Action in corresponding Brazil Application No. BR122015022158-7, dated April 8, 2020.	
	3	U.S. Office Action in corresponding Application No. 16/034,846, dated June 25, 2020.	
	4	European Office Action in corresponding European Application No. 12775162.6, dated April 19, 2021.	
	5	European Search Report in corresponding European Application No. 20212054.9, dated April 7, 2021.	
	6		
	7		
	8	Non-Final Office Action in related U.S. application 16/812,755 dated February 19, 2021.	
	9	Chinese Office Action in corresponding Chinese Application No. 201810229467.1, dated January 8, 2021.	
	10	U.S. Office Action in corresponding U.S. Application No. 16/852,790, dated January 14, 2021.	

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	11	European Office Action in corresponding European Application No. 16207123.7, dated February 25, 2022, 4 pages.	
	12	International Search Report (ISR) dated March 6, 2013, for PCT/EP2012/068166.	
	13	International Search Report (ISR) dated March 19, 2013, for PCT/EP2012/068167.	
	14	International Search Report (ISR) dated March 4, 2013, for PCT/EP2012/068168.	
	15	International Search Report (ISR) dated January 28, 2013, for PCT/EP2012/068169.	
	16	British Search Report dated August 28, 2012, for GB 1206841.7.	
	17	German Search Report dated November 17, 2011, for DE 102011055443.2.	
	18	Jiang et al., "A Novel Wireless Approach for Conference Projecting and Cooperating", Lecture Notes in Computer Science, Vol. 4159, pp. 688-697, 2006. (cited in GB 1206841.7 Search Report)	
	19	Martin Trautschold, iPhone 4 Made Simple, 2010, Apress, Pages 1-819.	
	20	Office Action in related U.S. Application Number 15/449,048, dated February 16, 2018.	
	21	US Office Action dated March 29, 2016, for 14/395,364.	

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	22	Marc AL-HAMES et al., Audio-Visual Processing in Meetings: Seven Questions and Current AMI Answers, 2006.	
	23	Mood indicators on electronic meeting tools" IBM, IP.com number: IPCOMOOOO1171D, Publication Date: March 12, 2003.	
	24	Final Office Action in related U.S. Application No. 14/278,442, dated June 8, 2018.	
	25	Office Action in related Chinese Application Number 201280055744.2, dated March 30, 2018.	
	26	Office Action in related U.S. Application Number 14/344,836, dated February 28, 2018.	
	27	U.S. Office Action dated October 20, 2017, for U.S. Application No. 14/344,836.	
	28	European Notice of Opposition dated September 27, 2017 for EP 2756668.	
	29	StarTech.com: USB to DVI External Dual Monitor Video Adapter/USS to VGA External Dual Monitor Video Adapter, User Manual dated May 19, 2011.	
	30	Microsoft Community, conversation on August 30, 2011 about USB2VGA Adapter, retrieved on September 7, 2017.	
	31	Webopedia Definition of Peripheral Device, retrieved on September 7, 2017.	
	32	Trulink Wireless USB2VGA Adapter, Quick Start Guide, retrieved from www.c2g.com.	

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	Examiner Name	
	Attorney Docket Number	21063.0029USC1

	33	HWebPage on Availability of Trulink, retrieved on September 7, 2017.	
	34	Chinese Office Action dated October 31, 2017, for CN 201280001542.X, and English translation thereof.	
	35	European Office Communication dated June 15, 2015, for EP 12762258.7.	
	36	European Office Action dated August 1, 2016, for EP 12762258.7.	
	37	U.S. Office Action dated June 17, 2016, for 14/278,442.	
	38	U.S. Office Action dated June 17, 2016, for 14/725,401.	
	39	Chinese Office Action dated April 5, 2017, for CN 201280055744.2, and English translation thereof.	
	40	U.S. Office Action dated May 3, 2017, for U.S. Application No. 14/344,836.	
	41	Chinese Office Action dated September 26, 2017, for CN 201280055744.2, and English translation thereof.	
	42	U.S. Office Action dated September 28, 2017, for U.S. Application No. 14/278,442.	
	43	"Quick Connect Wireless with Epson Projectors", retrieved from https://www.youtube.com/watch?v=9POz4-HyDXY, November 3, 2009.	

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	Attorney Docket Number	21063.0029USC1

	44	"Remote Framebuffer Protocol (RFB)", Internet standard IETF RFC 6143 , March 2011.
	45	Richardson & Wood, "The RFB Protocol", Cambridge: ORL, 1998.
	46	"Manual of the Epson projectors", retrieved from http://esupport.epsoneurope.com/ViewArticle.aspx?lng=sv-SE&kbid=328038&data=bOU002FRIftu7YFtMOBp2mpSKntPq1A26Wyw&cl=1, February 14, 2011.
	47	Chinese Office Action dated December 27, 2016, for CN 201280074077.2, and English translation thereof.
	48	Final Office Action in corresponding U.S. App. 14/725,401 dated January 26, 2017.
	49	Final Office Action in corresponding U.S. App. 14/278,442 dated January 26, 2017.
	50	Chinese Office Action in Chinese Application Number 201280074077.2, dated January 4, 2018.

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Examiner Signature	/SCOTT C SUN/	Date Considered	10/22/2022

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[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99**)	Application Number	17675641
	Filing Date	2022-02-18
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	
	Examiner Name	
	Attorney Docket Number	21063.0029USC1

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

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OR

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See attached certification statement.

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☒ A certification statement is not submitted herewith.

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Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2022-03-07
Name/Print	Thomas Lee	Registration Number	66396

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Application Number	17675641
Filing Date	2022-02-18
First Named Inventor	BEEL
Art Unit	
Examiner Name	
Attorney Docket Number	21063.0029USC1

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	Filing Date	2022-02-18
	First Named Inventor	BEEL
	Art Unit	
	Examiner Name	
	Attorney Docket Number	21063.0029USC1

	1	Office Action issued in corresponding Chinese Application No. 202010418639.7, mailed May 23, 2022, with machine translation	X

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Examiner Signature	/SCOTT C SUN/	Date Considered	10/22/2022

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Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2022-06-22
Name/Print	Thomas Lee	Registration Number	66,396

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	1	202334692	CN	U	2012-07-11		With English translation	X

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	1	USB Video device class, vikipedia, last edited on 11 September 2011	
	2	Wireless USB, Wikipedia, dated 29 August 2011.	
	3	Wireless Universal Serial Bus Specification, Agere Systems, Inc., Hewlett-Packard Company, Intel Corporation, Microsoft Corporation, NEC Corporation, Koninklijke Philips Electronics, N.V., Samsung Electronics Co., Ltd, May 12, 2005.	
	4	Kensington Wireless USB Docking Station, by Nicole Price Fasig, October 22, 2008.	
	5	IOGEAR Installation Guide, Wireless Audio Video Kit 2009.	
	6	Office Action issued in corresponding Chinese Application No. 202010418842.4, dated March 25, 2022, with English translation	X

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	1	International Preliminary Report on Patentability (IPRP) dated March 27, 2014, for PCT/EP2012/068166.	
	2	International Preliminary Report on Patentability (IPRP) dated March 27, 2014, for PCT/EP2012/068167.	
	3	International Preliminary Report on Patentability (IPRP) dated March 27, 2014, for PCT/EP2012/068168.	
	4	Request for Reexamination of Patent No. 8,756,348, dated February 9, 2018.	
	5	Request for Reexamination of Patent No. 9,083,769, dated February 9, 2018.	
	6	Intervention according to Art. 105 EPC in corresponding European patent 2756668, dated May 3, 2018.	
	7	Chinese Office Action dated November 4, 2016, for CN 201280001542.X, and English translation thereof.	
	8	European Office Communication dated December 21, 2015, for EP 12762258.7.	
	9	Chinese Office Action dated June 28, 2017, for CN 201280074077.2, and English translation thereof.	
	10	Chinese Office Action dated July 4, 2017, for CN 201280055667.0, and English translation thereof.	
	11	Chinese Office Action dated July 21, 2017, for CN 20128001542.X, and English translation thereof.	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17675641
	Filing Date	2022-02-18
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	
	Examiner Name	
	Attorney Docket Number	21063.0029USC1

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Examiner Signature	/SCOTT C SUN/	Date Considered	10/22/2022

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99**)	Application Number	17675641
	Filing Date	2022-02-18
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	
	Examiner Name	
	Attorney Docket Number	21063.0029USC1

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

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See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2022-03-07
Name/Print	Thomas Lee	Registration Number	66,396

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	17675641
Filing Date	2022-02-18
First Named Inventor	BEEL
Art Unit	2181
Examiner Name	
Attorney Docket Number	21063.0029USC1

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	5897644	A	1999-04-27	Nielsens	

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	1	2004112638	JP	A	2004-04-08		With English machine translation	☒
	2	H07123384	JP	A	1995-05-12		With English machine translation	☒
	3	101009806	CN	A	2007-08-01		With English machine translation	☒

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	First Named Inventor	BEEL
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	4	101542459	CN	A	2009-09-23		With English machine translation	☒
	5	101729850	CN	A	2010-06-09		With English machine translation	☒

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	Foley et al., "Computer Graphics, Principles and Practice Second Edition in C", 1996, with English translation	✕

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Examiner Signature	/SCOTT C SUN/	Date Considered	10/22/2022

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Attorney Docket Number	21063.0029USC1

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	7853535		2010-12-14	Colella	
	2	7908401		2011-03-15	Chang	
	3	6601087		2003-07-29	Zhu et al.	
	4	7584313		2009-09-01	Hay et al.	
	5	7762470		2010-07-27	Finn et al.	
	6	8069465		2011-11-29	Bartholomay et al.	
	7	8327410		2012-12-04	Andersen et al.	
	8	8521926		2013-08-27	Hsueh et al.	

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	Examiner Name	
	Attorney Docket Number	21063.0029USC1

	9	8601470		2013-12-03	Yue et al.	
	10	8717599		2014-05-06	Ochiai et al.	
	11	8896656		2014-11-25	Epstein et al.	
	12	6966035		2005-11-15	Suess et al.	
	13	8316138		2012-11-20	Chang	
	14	8346753		2013-01-01	Hayes	

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	1	20070206088		2007-09-06	Mizunashi et al.	
	2	20040012669		2004-01-22	Drell et al.	
	3	20060080707		2006-04-13	Laksono	

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	4	20100149206		2010-06-17	Shigehisa et al.	
	5	20030120849		2003-06-26	Roslak et al.	
	6	20060233191		2006-10-19	Pirzada et al.	
	7	20070162661		2007-07-12	Fu et al.	
	8	20080088634		2008-04-17	Thompson et al.	
	9	20080182518		2008-07-31	Lo	
	10	20090023475		2009-01-22	Chang et al.	
	11	20090029647		2009-01-29	Wei et al.	
	12	20090251621		2009-10-08	Ichieda	
	13	20100022274		2010-01-28	Roberts et al.	
	14	20100077021		2010-03-25	Hsueh et al.	

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	15	20100091987		2010-04-15	Takahashi et al.	
	16	20100115145		2010-05-06	Banerjee et al.	
	17	20100154014		2010-06-17	Andersen et al.	
	18	20100297964		2010-11-25	Austin et al.	
	19	20100309896		2010-12-09	Sugiyama et al.	
	20	20110010470		2011-01-13	Hulbert et al.	
	21	20110010607		2011-01-13	Raveendran	
	22	20110038005		2011-02-17	Ochiai et al.	
	23	20110210983		2011-09-01	Theimer et al.	
	24	20110179182		2011-07-21	Ravnäs	
	25	20050015719		2005-01-20	Marchon et al.	

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	26	20090092198		2009-04-09	Motoyoshi	
	27	20050122392		2005-06-09	Johansen et al.	
	28	20090300520		2009-12-03	Ashutosh	
	29	20120054372		2012-03-01	Chen et al.	
	30	20090189981		2009-07-30	Siann et al.	
	31	20110188391		2011-08-04	Sella et al.	
	32	20100064063		2010-03-11	Deforche et al.	
	33	20110092198		2011-04-21	Miyata	
	34	20060010116		2006-01-12	Yaguchi et al.	
	35	20070168481		2007-07-19	Lambert et al.	
	36	20020054044		2002-05-09	Lu et al.	

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	37	20100087139		2010-04-08	Glass	
	38	20060095376		2006-05-04	Mitchell et al.	
	39	20090198839		2009-08-06	Banerjee et al.	
	40	20110115689		2011-05-19	Sugiyama et al.	
	41	20020196378		2002-12-26	Slobodin et al.	
	42	20130067121		2013-03-14	Beel et al.	
	43	20130050254		2013-02-28	Tran et al.	
	44	20120331509		2012-12-27	Laksono	
	45	20070005809		2007-01-04	Kobayashi et al.	
	46	20100302130		2010-12-02	Kikuchi et al.	
	47	20070244970		2007-10-18	Watanabe et al.	

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	48	20060031779		2006-02-09	Theurer et al.	
	49	20050036509		2005-02-17	Acharya et al.	
	50	20040125777		2004-07-01	Doyle et al.	
	51	20090046139		2009-02-19	Cutler et al.	
	52	20110023096		2011-01-27	Xiao et al.	
	53	20110150433		2011-06-23	Alexandrov et al.	
	54	20140082227		2014-03-20	Beel et al.	
	55	20070065078		2007-03-22	Jiang	
	56	20090247006		2009-10-01	Thompson	
	57	20130054348		2013-02-28	Holsman et al.	
	58	20100302454		2010-12-02	Epstein et al.	

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	59	20110180380		2011-07-28	Lee	
	60	20130060662		2013-03-07	Carlson et al.	
	61	20020174254		2002-11-21	Kita et al.	
	62	20100332663		2010-12-30	Chang	
	63	20090235170		2009-09-17	Golden et al.	
	64	20040128354		2004-07-01	Horikiri et al.	
	65	20100066806		2010-03-18	Lyu	
	66	20070109410		2007-05-17	Siew	

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	1	101572794	CN		2009-11-04	SHENZHEN HUAWEI COMM TECH CO		

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	2	101917402	CN		2010-12-15	CHINA ELECTRIC POWER RES INST		
	3	1317112	CN		2001-10-10	SEIKO EPSON CORP		
	4	102065267	CN		2011-05-18	LG ELECTRONICS INC		
	5	1609780	CN		2005-04-27	MICROSOFT CORP		
	6	1525300	CN		2004-09-01	MICROSOFT CORP		
	7	1555197	CN		2004-12-15	SHENZHEN POSTGRADUATE INST TSI		
	8	101046952	CN		2007-10-03	NAKAYAMA		
	9	101075896	CN		2007-11-21	POLYCOM INC.		
	10	102025774	CN		2011-04-20	TPV DISPLAY TECHNOLOGY XIAMEN		
	11	102088593	CN		2011-06-08			
	12	2007148904	JP		2007-06-14	TOSHIBA CORP		

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17675641
	Filing Date	2022-02-18
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	
	Examiner Name	
	Attorney Docket Number	21063.0029USC1

	13	201012222	TW		2010-03-16	PRIMAC ELECTRONICS LTD		
	14	2006-185359	JP		2006-07-13	Eastman Kodak Co.		
	15	2009-080663	JP		2009-04-16	Brother Ind Lid.		
	16	2010-263326	JP		2010-11-18	Sumitomo Electric Ind.		
	17	2010/008866	WO		2010-01-21	Schaaf		
	18	2008-090561	JP		2008-04-17	BROTHER IND LTD		
	19	1329055	EP		2003-07-23	SONY CORP		
	20	1476242	CN		2004-02-18	SEIKO EPSON CORP		
	21	2010/105335	WO		2010-09-23	SMART TECHNOLOGIES ULC		
	22	102045864	CN		2011-05-04	NEC CASIO MOBILE COMM LTD		
	23	101631223	CN		2011-04-20	SHANGHAI HUAPING INFORMATION TECHNOLOGY CO LTD		

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	Art Unit	
	Examiner Name	
	Attorney Docket Number	21063.0029USC1

	24	101454762	CN		2013-06-12	SMART TECHNOLOGIES ULC		
	25	1550996	CN		2004-12-01	SEIKO EPSON CORP		
	26	101965609	CN		2011-02-02	SMART TECHNOLOGIES ULC		
	27	1385336	EP		2004-01-28	SEIKO EPSON CORP		
	28	2013037979	WO		2013-03-21	Barco N.V.		
	29	2008165007	JP		2008-07-17	Brother Ind Ltd		
	30	2000242257	JP		2000-09-08	Canon KK		
	31	102045864	CN		2011-05-04	NEC Casio Mobile Comm Ltd.		
	32	00/52887	WO		2000-09-08	MICROSOFT CORPORATION		
	33	1246395	EP		2002-10-02	MOTOROLA, INC.		
	34	1187480	EP		2002-03-13	TELESUITE CORP.		

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	Examiner Name	
	Attorney Docket Number	21063.0029USC1

	35	2001/089156	WO		2001-11-22	SONY CORP		
	36	2008/271265	JP		2008-11-06	MATSUSHITA ELECTRIC IND CO LTD		
	37	2107463	EP		2009-10-07	OPTION		
	38	2756668	EP		2014-07-23	BARCO NV		
	39	1499841	CN		2004-05-26	FUJI XEIOX CO LTD		
	40	101106681	CN		2008-01-16	VTRON CORP		
	41	1788494	CN		2006-06-14	TELESUIT CORP		
	42	101022529	CN		2007-08-22	LIXING INTERNAT SCIENCE & TECH		
	43	101106469	CN		2008-01-16	AWIND INC		
	44	101442500	CN		2009-05-27	XIAOTAO YIN		
	45	101828392	CN		2010-09-08	CREATIVE TECH LTD		

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	Attorney Docket Number	21063.0029USC1

	46	102023852	CN		2011-04-20	JULONG EDUCATIONAL TECHNOLOGY CO LTD		
	47	1689275	CN		2005-10-26	SONY CORP		
	48	2007/137415	WO		2007-12-06	SMART TECH INC		
	49							

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T5
	1	Office Action issued in Corresponding Chinese Application No. 201810229467.1, dated September 24, 2021, with English Translation	
	2	Office Action in related Chinese Office application 202010418842.4 dated May 28, 2021, with English translation (17 pages).	
	3	Office Action in related Chinese Office application 202010418639.7 dated May 28, 2021, with English translation (22 pages).	
	4	Office Action in related Chinese Office application 202010418675.3 dated May 28, 2021, with English translation (17 pages).	
	5	Summons to Attend Oral Proceedings in corresponding European Application No. 12762258.7, dated May 20, 2021.	

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	Attorney Docket Number	21063.0029USC1

	6	Chinese Office Action in corresponding Chinese Application No. 201810229467.1, dated April 7, 2020.	
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	8	Universal Serial Bus 3.0 Specification", Revision 1.0 Nov. 12, 2008.	
	9	Wireless Universal Serial Bus Specification 1.1", Revision 1.1 September 9, 2010.	
	10	AUSTIN et al., "Determinants and Patterns of Control over Technology in a "Computerized Meeting Room," CSCW 90 Proceedings, pp. 39-51 (Oct. 1990).	
	11	ROTH, "Building Group Decision Support Rooms Using 'Off-the-Shelf' Computing Resources: Prospects and Issues," Database, pp. 21-31 (May 1993).	
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	13	Products, components, systems, and methods in public use and/or sale related to the Epson Quick Wireless Connection USB key and Quick Wireless Connection , developed by Epson (accessed July 7, 2017)	
	14	Products, components, systems, and methods in public use and/or sale related to the OGEAR GUW2015VKIT Wireless USB to VGA Adapter Kit, developed by IOGEAR (accessed July 17, 2017).	
	15	Products, components, systems, and methods in public use and/or sale related to the I\ctionTec MyWirelessTV HDMI Transmitter, developed by ActionTec and Cavium (accessed Feb. 3, 2020).	
	16	European Search Report dated August 1, 2017, for EP 16207123.	

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	Attorney Docket Number	21063.0029USC1

	17	European Extended Search Report dated November 3, 2016, for EP 16170760.9.	
	18	Chinese Office Action dated October 14, 2016, for CN 201280055744.2.	
	19	Chinese Office Action dated October 10, 2016, for CN 201280055667.0.	
	20	Final Office Action in corresponding U.S. app. 14/395,364 dated November 2, 2016.	
	21	Office Action in related U.S. app. 14/725,401 dated December 31, 2019.	
	22	Summons to attend oral proceedings in corresponding EP 12762258.7 dated December 12, 2019.	
	23	Chinese Office Action in corresponding Chinese Application No. 201280074077.2, dated September 30, 2019.	
	24	U.S. Office Action in corresponding U.S. Application No. 14/278,442, dated September 18, 2019.	
	25	Notice on Reexamination in corresponding Chinese Application No. 201280001542.X, dated June 11, 2019.	
	26	European Office Action in corresponding European Application No. 12759440.6-1204, dated May 28, 2019.	
	27	U.S. Office Action in corresponding U.S. Application No. 15/449,048, dated April 8, 2019.	

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	Art Unit	
	Examiner Name	
	Attorney Docket Number	21063.0029USC1

	28	European Office Action in corresponding European Application No. 12775162.6-1204, dated May 21, 2019.	
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	Attorney Docket Number	21063.0029USC1

	39	EPO Office Action in corresponding app. EP 12759440.6-1204 dated August 9, 2018.	
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	42	Office Action in corresponding app. 90/014,087 dated September 4, 2018.	
	43	Office Action in corresponding app. 16/034,846 dated October 7, 2019.	
	44	Office Action in corresponding app. 14/344,830 dated September 28, 2017.	
	45	Office Action in corresponding app. 14/344,830 dated October 6, 2016.	
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	47	U.S. Office Action in corresponding U.S. Application No. 16/852,790, dated October 08, 2020.	
	48	LINQ SOFTWARE USER'S GUIDE, Smart Technologies Inc., Copyright 2004-2005, Version 1.0, pages 1-19.	
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17675641
	Filing Date	2022-02-18
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	
	Examiner Name	
	Attorney Docket Number	21063.0029USC1

	50	European Office Action in corresponding European Application No. 12775162.6, dated April 14, 2020.	

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EXAMINER SIGNATURE

Examiner Signature	/SCOTT C SUN/	Date Considered	10/22/2022

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17675641
	Filing Date	2022-02-18
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	
	Examiner Name	
	Attorney Docket Number	21063.0029USC1

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2022-03-07
Name/Print	Thomas Lee	Registration Number	66396

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/742,166	**01/25/2023 02:51:54 PM ET**	**21063.0018USC1**

Title of Invention

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	9959	FILED BY	Yanling Cottle
PATENT CENTER #	61490804	FILING DATE	05/11/2022
CUSTOMER #	52835	FIRST NAMED INVENTOR	Gauthier RENARD
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Thomas Lee

Documents

TOTAL DOCUMENTS: 2

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
OA.pdf	58	Other reference-Patent/Application/Search Documents	2830 KB
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SB08_0018USC1.pdf	4	Information Disclosure Statement (IDS) Form (SB08)	1234 KB

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(Not for submission under 37 CFR 1.99)

Application Number	17742166
Filing Date	2022-05-11
First Named Inventor	Gauthier RENARD
Art Unit	
Examiner Name	
Attorney Docket Number	21063.0018USC1

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	Filing Date	2022-05-11
	First Named Inventor	Gauthier RENARD
	Art Unit	
	Examiner Name	
	Attorney Docket Number	21063.0018USC1

	1	ICRON WiRanger Cable USB 2.0 Hub User Guide, by Icron Technologies Corporation, www.icron.com	
	2	Observations by a third party in European Application No. 18833045.0, dated February 17, 2023	
	3	Office Action issued in European Application No. 18833045.0, dated February 1, 2023	
	4	Office Action in Chinese Application No. 201880084464.1, dated January 19, 2023, with machine translation	X

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	Application Number	17742166
	Filing Date	2022-05-11
	First Named Inventor	Gauthier RENARD
	Art Unit	
	Examiner Name	
	Attorney Docket Number	21063.0018USC1

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See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2023-03-08
Name/Print	Thomas Lee	Registration Number	66,396

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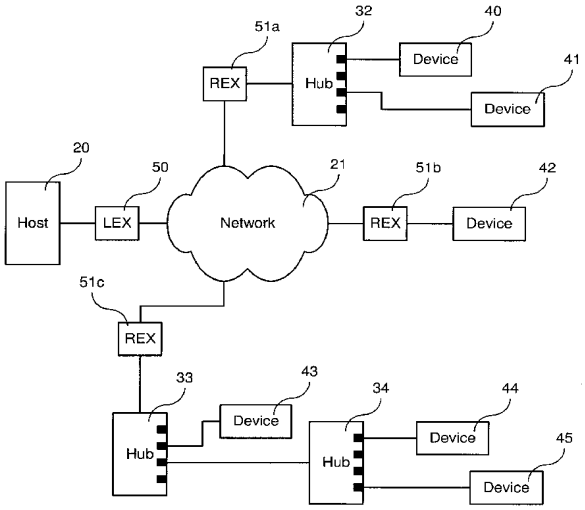
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(54) Title: METHOD AND APPARATUS FOR DISTRIBUTING USB HUB FUNCTIONS ACROSS A NETWORK



(57) Abstract: A method and related apparatuses for data transmission between a host computer and one or a plurality of USB compliant peripheral devices over a data communications network is provided which operates in the presence of transmission delays greater than that normally allowed in the USB specification. The host computer is connected to a local extender device which, in turn, is connected to one or a plurality of remote extender devices through the data communications network. The remote extender devices are, in turn, connected to a plurality of conventional USB peripheral devices. Data between the host computer and peripheral devices is stored and processed in the local and remote extender devices in order to allow the host computer and the USB peripheral devices to operate with greater than normally allowed time delays. In particular, the invention is of most utility when the round-trip transmission delay between the host computer and the USB peripheral device exceeds 1 microsecond.

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METHOD AND APPARATUS FOR DISTRIBUTING USB HUB FUNCTIONS ACROSS A NETWORK

Field of the Invention

This invention relates to methods and apparatus for transmitting signals between computers and devices using Universal Serial Bus (USB) ports, and, in particular, to a method for operating a plurality of USB peripheral devices distributed across a data communications network.

Description of the Prior Art

Universal Serial Bus (USB) is a technology designed to permit a wide range of peripherals to be attached to personal computers by the average user. The technology supports all of the common peripheral devices such as keyboards, mice, speakers, joysticks, cameras, flash drives, hard drives, DVD drives and many others, and its use in current computers is common.

USB was created by an alliance of seven of the largest companies in the computer and communication markets. Those companies were Intel, Compaq, Microsoft, NorTel, NEC, Digital and IBM. The specifications defining USB (e.g. Intel et al., Universal Serial Bus Specification, Revision 1.0, January 1996; and updated as Revision 1.1 in Sep. 23, 1998, and further updated as Revision 2.0 in April 2000, and subsequent updates, additions and modifications --hereinafter collectively referred to as the "USB Specification", which term can include future modifications and revisions) are non-proprietary and are managed by an open

industry organization known as the USB Implementers Forum (USB-IF). The USB Specification establishes a number of criteria which must be met in order to comply with USB standards. The USB Specification also defines a number of terms, which definitions are adopted for the purposes of this specification.

Under the USB specification, data communication is managed by a USB host controller unit installed, preferably, in a host computer. Furthermore, said data communication occurs in a series of USB transactions wherein each USB transaction is initiated by a USB host controller and is composed of one, two or three subactions. Each subaction is terminated by a reversal in the direction of data flow.

Of most relevance to the present invention, however, is the feature that all known USB Specifications currently limit the distance that a device can be separated from its host computer to a maximum of 5 meters. By using a series of USB Hubs--devices that are intended to support increased populations rather than increased distances--this distance limitation can be increased, in theory, to 30 meters. However, this multiple hub solution is both expensive and clumsy.

In US Patent No. 6381666, the contents of which are incorporated herein by reference, a method and apparatus for extending the distance between a host computer and a peripheral device, is provided which increased the useable distance to 100 meters or more. While this approach has been beneficial, it would still be desirable to provide alternative and/or improved methods and apparatus for achieving this same effect.

The major factor that limits the extent to which the range of USB can be extended is transmission delay. The USB Specification allows a maximum period of approximately 1.5 microseconds for the round-trip delay of a single communication from a host computer to a device and back to the computer. The round-trip delay budget of 1.5 microseconds is composed of two approximately equal parts, namely, the transmission delay in both directions between the host computer and the device and secondly, the turn-around time required by the device to create the desired response. The approach described in US Patent No. 6381666 removed this restriction on the upper limit of round-trip delay.

While the approach described in US Patent No. 6381666 made it possible to operate USB peripheral devices over an extended distance and in the presence of long transmission

delays, it did not describe a configuration in which a plurality of USB peripheral devices are widely separated from each other. Although a requirement to widely separate USB peripheral devices controlled by a single host computer can be accommodated by utilizing multiple instantiations of the approach described in US Patent No. 6381666, it would be beneficial to devise a more flexible and cost-effective approach.

Of further relevance to the present invention is the feature that all known USB Specifications currently require that a USB hub be employed whenever multiple USB peripheral devices are required to be connected simultaneously to a single port on a USB host controller. It is an attribute of a USB hub that said hub be equipped with a single upstream port for connecting to a USB host controller (or upstream hub) and a plurality of downstream ports for connecting to a plurality of USB peripheral devices (or downstream hubs). The USB driver software resident in the host computer that contains the USB host controller is aware of the connection topology of USB hubs and USB peripheral devices and will fail to operate if said topology is not maintained.

Thus it has been demonstrated that supporting a plurality of USB peripheral devices from a single USB host controller requires that a USB hub be connected between said USB peripheral devices and said USB host controller and that said USB hub must be equipped with an individual downstream port for each USB peripheral device. However, if it is desired to insert a data communications network between said USB hub and said USB peripheral devices, then it would be advantageous to concentrate all USB traffic travelling between said USB hub and said data communications network over a single physical connection.

Of yet further relevance to the present invention is the feature that all known USB Specifications currently require that each downstream port of a USB hub supports control and monitoring of the physical connection between said downstream port and any USB peripheral device that may be connected thereto. In particular, said downstream port must be able to detect the connection and disconnection of a USB peripheral device, and must be able to reset, suspend and resume the operation of said USB peripheral device. It would be advantageous to maintain said connection, disconnection, reset, suspend and resume capabilities normally associated with individual physical connections when said individual physical connections are replaced by a shared connection to a data communications network.

Summary of the Invention

Accordingly, while the range extending USB technology, as described in US 6381666 has proven to be useful in point-to-point configurations, it would still be desirable to provide improvements to the technology by providing an improved method and apparatus for enabling a plurality of peripheral devices, utilizing the USB specification, to be distributed at various locations across a network, wherein said network may exhibit long transmission delays.

Therefore, it is an objective of the present invention to provide methods and apparatus to enable a plurality of USB peripheral devices to be connected through a virtual USB hub to a host computer equipped with a USB host controller.

It is a further object of the present invention that the functions of said virtual USB hub may be distributed across a data communications network.

It is a further object of the present invention that said host computer may be connected to said data communications network through a single physical connection.

It is a further object of the present invention that said data communications network may exhibit transmission delays that exceed the parameters defined by the USB Specification.

It is a further object of the present invention that said plurality of USB peripheral devices and said USB host controller may operate at any of the data rates permitted under the USB 2.0 Specification.

It is a further object of the present invention that a virtual USB peripheral device may be connected to said virtual USB hub.

It is a further object of the present invention that no hardware or software changes need be made to the existing host computers, hubs and devices supported by the system and operating under the USB protocol. The invention, thereby, may be incorporated into networks composed of both conventional delay and extended delay devices.

It is a further object of the present invention that no prior knowledge of the arrangement of said plurality of USB peripheral devices with respect to said data communications network be required.

It is a further object of the present invention that the USB device management functions of connection, disconnection, reset, suspend and resume shall operate consistent with the prior art USB specifications when the prior art physical connections are replaced by a network connection as described by the present invention.

It is a further object of the present invention that the apparatus be very cost effective, consistent with the broadest population of devices targeted by the USB industry.

These and other objects of the invention, which will become apparent herein, are fully or at least partially attained by the present invention which invention provides a method and related apparatuses, wherein a host computer is connected to a local extender device which, in turn, is connected to one or a plurality of remote extender devices through a data communications network. The remote extender devices are, in turn, connected to a plurality of conventional USB peripheral devices, wherein signals between said host computer and said USB peripheral devices are processed in the local extender and/or the remote extenders so as to allow the host computer and the USB peripheral devices to operate in the presence of transmission delays greater than that normally allowed in the USB specification. In particular, the invention is of most utility when the round-trip transmission delay between the host computer and the USB peripheral device exceeds 1 microsecond.

Accordingly, in a first aspect, the present invention provides a computer system for transmitting data between a host computer and one or a plurality of USB peripheral devices, wherein said USB peripheral devices are distributed around a data communications network and wherein the transmission delay across said network is greater than that normally allowed by the USB specification, said computer system comprising a host computer connected to a local extender device which, in turn, is connected to one or a plurality of remote extender devices through a data communications network and which, in turn, are connected to a plurality of USB peripheral devices, wherein signals between said host computer and said USB peripheral devices are saved, collected, absorbed, or otherwise processed in the local extender and/or the remote extenders so as to allow the host computer and the USB peripheral devices to operate in the presence of a round trip delay greater than that normally allowed in the USB specification.

Preferably, the round-trip delay comprises a transmission delay and a turn-around time delay, and wherein said transmission delay between the host computer and the USB peripheral device exceeds 1 microsecond.

As such, the present invention provides a computer system for transmitting data between a host computer and one or a plurality of USB peripheral devices wherein said USB peripheral devices may be distributed around a data communications network and wherein the transmission delay across said network is greater than that normally allowed by the USB specification, said computer system comprising:

a) a host computer for generating and accepting USB subactions;

b) one or a plurality of USB peripheral devices capable of responding to USB subactions initiated by said host computer;

c) a local extender unit connected to said host computer for forwarding USB subactions from said host computer to a data communications network, and for forwarding USB subactions received from said data communications network to said host computer;

d) one or a plurality of remote extender units each of which is connected to one or a plurality of USB peripheral devices, for forwarding USB subactions received from said data communications network to said USB peripheral devices, and for forwarding USB subactions received from said USB peripheral devices to said data communications network;

e) a data communications network for forwarding USB subactions from said local extender unit to said remote extender units, and for forwarding USB subactions from said remote extender units to said local extender unit;

f) means in said local extender unit for forwarding a USB subaction received from said host computer to said remote extender unit over said data communications network, and for generating and sending a generated USB subaction to said host computer;

g) means in said remote extender unit for forwarding said USB subaction received from said host computer to one or a plurality of USB peripheral devices, and for receiving a subaction received from a USB peripheral device;

h) means in said remote extender unit for forwarding said subaction received from a USB peripheral device to said local extender unit over said data communications network;

i) means in said remote extender unit for generating a USB subaction in confirmation of a USB subaction received from a USB peripheral device and sending said generated confirm USB subaction to said USB peripheral device;

j) means in said remote extender unit for generating a USB subaction in response to a USB subaction received from said host computer and sending said generated response USB subaction to said local extender unit;

k) means in said local extender unit for receiving and identifying when a sequence of inbound USB subactions received from said remote extender unit over said data communications network are related to a common outbound USB subaction;

l) means in said local extender unit for storing an inbound USB subaction from said remote extender unit until such inbound USB subaction is again requested by said host computer; and

m) means in said local extender unit for forwarding said stored USB subaction to said host computer.

The computer system also preferably comprises:

a) means, preferably in said local extender unit, for absorbing replicated USB subactions;

b) means in said remote extender unit for assembling a sequence of USB subactions into an atomic USB subaction and preferably sending said atomic USB subaction to said USB peripheral device; and

c) means in said remote extender unit for disassembling an atomic USB subaction into a sequence of discrete USB subactions and preferably sending said sequence of discrete USB subactions to said local extender unit.

In a further aspect, the present invention also provides a local extender apparatus for transmitting USB traffic between a host computer and a data communications network, in a computer system as described hereinabove with respect to the present invention, wherein said

USB traffic may be addressed to a plurality of USB peripheral devices, said apparatus comprising:

a) a USB transceiver for connecting to said host computer;

b) an upstream-facing port for controlling said USB transceiver;

c) a local repeater unit for regenerating USB subactions passing through said apparatus and for switching USB subactions between the components of said apparatus;

d) a memory unit for storing USB subactions during processing by said apparatus;

e) a local router unit for providing a network address for USB subactions moving in a downstream (host to network) direction;

f) a network transceiver for connecting to said data communications network;

g) a hub controller unit for responding to subactions generated by said host computer regarding the status of said plurality of USB peripheral devices;

h) means for instantiating a plurality of virtual ports for managing the status of said plurality of USB peripheral devices;

i) means for instantiating a plurality of virtual USB devices for providing value-added functions;

j) means in said local repeater for identifying USB subactions addressed to said hub controller;

k) means in said local repeater for identifying USB subactions addressed to said plurality of virtual USB devices;

l) means in said plurality of instantiated virtual ports for maintaining the status of said plurality of USB peripheral devices;

m) means in said plurality of instantiated virtual ports for receiving device status change signals from said data communications network and updating the status of said plurality of USB peripheral devices; and

n) means in said hub controller for receiving device management commands from said host computer and sending device management signals to said data communications network.

In a further aspect, the present invention also provides a remote extender apparatus for transmitting USB subactions between a data communications network and a USB peripheral device, in a computer system as described hereinabove with respect to the present invention, said apparatus comprising:

a) a network transceiver for connecting to said data communications network;

b) a remote router unit for providing a network address for USB subactions moving in an upstream (network to host) direction;

c) a remote repeater unit for regenerating USB subactions passing through said apparatus and for switching USB subactions between the components of said apparatus;

d) a transaction translator unit for converting between high-speed split transactions and full-speed/low-speed atomic transactions;

e) a memory unit for storing USB subactions during processing by said apparatus;

f) a USB transceiver for connecting to said USB peripheral device;

g) a downstream-facing port for controlling said USB transceiver;

h) means in said remote router unit for identifying split transactions;

i) means in said downstream port controller for detecting the status of said USB peripheral device;

j) means in said downstream port controller for generating device status signals and sending said signals to said data communications network;

k) means in said downstream port controller for receiving device management signals from said data communications network; and

l) means in said downstream port controller for changing the status of said USB peripheral device.

To operate, the system preferably includes means for, and the ability to detect the attachment of a USB peripheral device to the system, to detect the detachment of a USB peripheral device, and to determine the network address of a USB function wherein said USB function may be a USB hub or a USB peripheral device.

As such, in a further aspect, the present invention provides a method for detecting the attachment of a USB peripheral device, preferably over a data communications network in which the round-trip delay exceeds 1 microsecond, by a host computer, wherein said host computer and said USB peripheral device conform to the requirements of the USB Specification, through a local extender and a remote extender, which method comprises:

a) detecting at said remote extender a device attachment event, having said remote extender send a device connect signal to said local extender, and then having said local extender update its local record of the change in connection status of said USB peripheral device and its local record of the connected status of said USB peripheral device;

b) receiving at said local extender a request from said host computer for device status change information and having said local extender inform said host computer that the status of said USB peripheral device has changed;

c) receiving at said local extender a request from said host computer for the status of said USB peripheral device and having said local extender provide said local record of the change in connection status and said local record of connected status to said host computer;

d) receiving at said local extender a request from said host computer to clear said change in connection status information and having said local extender clear said local record of the change in connection status information;

e) receiving at said local extender a further request from said host computer for the status of said USB peripheral device and having said local extender provide said cleared local record of the change in connection status and said local record of connected status to said host computer;

f) receiving at said local extender a command from said host computer to reset said USB peripheral device, having said local extender send a reset signal to said remote extender,

and then having said remote extender perform a physical reset on said USB peripheral device;

g) detecting at said remote extender the transmission speed of said USB peripheral device, having said remote extender send a speed signal to said local extender, and then having said local extender update its local record of the transmission speed of said USB peripheral device and its local record of the change in reset status of said USB peripheral device;

h) receiving at said local extender a further request from said host computer for device status change information and having said local extender inform said host computer that the status of said USB peripheral device has changed;

i) receiving at said local extender a yet further request from said host computer for the status of said USB peripheral device and having said local extender provide said local record of the transmission speed of said USB peripheral device and its local record of the change in reset status of said USB peripheral device to said host computer;

j) receiving at said local extender a request from said host computer to clear said change in reset status information and having said local extender clear said local record of the change in reset status information; and

k) receiving at said local extender a request from said host computer for the status of said USB peripheral device and having said local extender provide said cleared local record of the change in reset status to said host computer.

In a further aspect, the present invention provides a method for detecting the detachment of a USB peripheral device, preferably over a data communications network in which the round-trip delay exceeds 1 microsecond, by a host computer, wherein said host computer and said USB peripheral device conform to the requirements of the USB Specification, through a local extender and a remote extender, which method comprises:

a) detecting at said remote extender a device detachment event, having said remote extender send a device disconnect signal to said local extender, and then having said local extender update its local record of the change in connection status of said USB peripheral device and its local record of the connected status of said USB peripheral device;

b) receiving at said local extender a request from said host computer for device status change information and having said local extender inform said host computer that the status of said USB peripheral device has changed;

c) receiving at said local extender a request from said host computer for the status of said USB peripheral device and having said local extender provide said local record of the change in connection status and said local record of connected status to said host computer;

d) receiving at said local extender a request from said host computer to clear said change in connection status information and having said local extender clear said local record of the change in connection status information;

e) receiving at said local extender a request from said host computer to clear the enabled status information of said USB peripheral device and having said local extender clear its local record of enabled status information; and

f) receiving at said local extender a further request from said host computer for the status of said USB peripheral device and having said local extender provide said cleared local record of the change in connection status and said cleared local record of enabled status to said host computer.

In a further aspect, the present invention provides a method for determining the network address of a USB function wherein said USB function may be a USB hub or a USB peripheral device, and wherein a plurality of said USB functions may be distributed around a data communications network, and wherein a USB address is allocated to each USB function by a host computer, which method comprises:

a) building a data record for each first USB function connected directly or indirectly to said network and identifying each record by a unique USB address assigned dynamically by said host computer;

b) recording within said data record the USB address of the upstream USB hub to which said first USB function is connected;

c) recording within said data record the port number of the upstream USB hub to which said first USB function is connected;

d) recording within said data record the USB address of each downstream USB function connected directly to said first USB function;

e) recording within said data record the port number of said first USB function to which each downstream USB function is connected; and

f) recording the network address assigned to said first USB function.

In a further aspect, the present invention also provides a method for transmitting data between a host computer and one or a plurality of USB peripheral devices, wherein said USB peripheral devices are distributed around a data communications network and wherein the transmission delay across said network is greater than that normally allowed by the USB specification, said method comprising connecting a host computer to a local extender device, connecting said local extender device to one or a plurality of remote extender devices through a data communication network, and connecting said remote extender devices to one or a plurality of USB peripheral devices, wherein signals between said host computer and said USB peripheral devices are saved, collected, absorbed, or otherwise processed in the local extender and/or the remote extenders so as to allow the host computer and the USB peripheral devices to operate in the presence of a round trip delay greater than that normally allowed by the USB specification.

In more detail, the present invention provides a method for transmitting a USB command from a host computer, through a local extender, to a unique network address on a data communications network, which method comprises:

a) receiving at a local extender a USB command from a host computer;

b) extracting a first USB address from said USB command;

c) using said first USB address to access a first data record within a table of similar records;

d) determining whether said first data record contains a valid network address;

e) extracting from said first data record a second USB address identifying the upstream USB hub through which said first USB address may be accessed;

f) repeating steps (c) through (e) until a valid network address is found;

g) encapsulating said USB command in a network packet;

h) addressing said network packet to said valid network address; and

i) transmitting said addressed network packet to said data communications network.

In a further aspect, the present invention provides a method for conducting asynchronous data transactions, preferably over a data communications network in which the round-trip delay exceeds 1 microsecond, between a host computer and a USB peripheral device, wherein said host computer operates at high-speed and said USB peripheral device operates at classic-speed (full-speed or low-speed), and wherein said data travels in a device to host direction, through a remote extender and a local extender, which method comprises:

a) receiving at a local extender a first request from said host computer for the start of a split data transfer session, having said local extender forward said first request across a network to said remote extender, and then having said local extender generate a negative acknowledgement response to said host computer;

b) receiving at a local extender a subsequent request from said host computer for the start of a split data transfer session and having said local extender continue to generate negative acknowledgement responses to said host computer until said local extender receives a response to said forwarded first request from said remote extender;

c) receiving at a remote extender said forwarded first request for the start of a split data transfer session, having said remote extender convert said forwarded request for the start of a split data transfer session into a classic-speed request for data transfer, and then having said remote extender forward said classic-speed request for data transfer to said USB peripheral device;

d) generating at a remote extender a positive acknowledgement response and forwarding said positive acknowledgement response across a network to said local extender;

e) receiving at a local extender said forwarded positive acknowledgement response and having said local extender store said forwarded positive acknowledgement response in local memory;

f) receiving at a local extender a further request from said host computer for the start of a split data transfer session, having said local extender retrieve from local memory said forwarded positive acknowledgement response, and then having said local extender forward said retrieved positive acknowledgement response to said host computer;

g) receiving at a remote extender a data transfer response from said USB peripheral device and having said remote extender generate a positive acknowledgement response to said USB peripheral device, and then having said remote extender forward said data transfer response across a network to said local extender;

h) receiving at a local extender a first request for completion of a split data transfer session, having said local extender check local memory for the absence of a data transfer response, and then having said local extender generate a not-yet acknowledgement to said host computer;

i) receiving at a local extender said forwarded data transfer response from said remote extender and having said local extender store said forwarded data transfer response in local memory; and

j) receiving at a local extender a further request for completion of a split data transfer session, having said local extender retrieve from local memory said forwarded data transfer response, and then having said local extender forward said retrieved data transfer response to said host computer.

In a further aspect, the present invention provides a method for conducting asynchronous data transactions, preferably over a data communications network in which the round-trip delay exceeds 1 microsecond, between a host computer and a USB peripheral device, wherein said host computer operates at high-speed and said USB peripheral device operates at classic-speed (full-speed or low-speed), and wherein said data travels in a host to device direction, through a local extender and a remote extender, which method comprises:

a) receiving at a local extender a first notification from said host computer for the start of a split data transfer session, having said local extender forward said first notification across a network to said remote extender, and then having said local extender generate a negative acknowledgement response to said host computer;

b) receiving at a local extender a subsequent notification from said host computer for the start of a split data transfer session and having said local extender continue to generate negative acknowledgement responses to said host computer until said local extender receives a response to said forwarded first notification from said remote extender;

c) receiving at a remote extender said forwarded first notification for the start of a split data transfer session, having said remote extender convert said forwarded notification for the start of a split data transfer session into a classic-speed notification for data transfer, and then having said remote extender forward said classic-speed notification for data transfer to said USB peripheral device;

d) generating at a remote extender a positive acknowledgement response and forwarding said positive acknowledgement response across a network to said local extender;

e) receiving at a local extender said forwarded positive acknowledgement response and having said local extender store said forwarded positive acknowledgement response in local memory;

f) receiving at a local extender a further notification from said host computer for the start of a split data transfer session, having said local extender retrieve from local memory said forwarded positive acknowledgement response, and then having said local extender forward said retrieved positive acknowledgement response to said host computer;

g) receiving at a remote extender a positive acknowledgement response from said USB peripheral device and having said remote extender forward said positive acknowledgement response across a network to said local extender;

h) receiving at a local extender a first request for completion of a split data transfer session, having said local extender check local memory for the absence of a positive acknowledgement response, and then having said local extender generate a not-yet acknowledgement to said host computer;

i) receiving at a local extender said forwarded positive acknowledgement response from said remote extender and having said local extender store said forwarded positive acknowledgement response in local memory; and

j) receiving at a local extender a further request for completion of a split data transfer session, having said local extender retrieve from local memory said forwarded positive acknowledgement response, and then having said local extender forward said retrieved positive acknowledgement response to said host computer.

In a further aspect, the present invention provides a method for conducting isochronous data transactions, preferably over a data communications network in which the round-trip delay exceeds 1 microsecond, between a host computer and a USB peripheral device, wherein said host computer operates at high-speed and said USB peripheral device operates at classic-speed (full-speed or low-speed), and wherein said data travels in a device to host direction, through a remote extender and a local extender, which method comprises:

a) receiving at a local extender a first request from said host computer for the start of a split data transfer session and having said local extender forward said first request for the start of a split data transfer session across a network to said remote extender;

b) receiving at a local extender a first request for completion of a split data transfer session, having said local extender check local memory for the absence of a complete sequence of split data transfer responses, and then having said local extender generate a null data response to said host computer;

c) receiving at a remote extender said forwarded first request for the start of a split data transfer session, having said remote extender convert said forwarded request for the start of a split data transfer session into a classic-speed request for data transfer, and then having said remote extender forward said classic-speed request for data transfer to said USB peripheral device;

d) receiving at a remote extender a data transfer response from said USB peripheral device and having said remote extender convert said received data transfer response into a sequence of split data transfer responses, and then having said remote extender forward said sequence of split data transfer responses across a network to said local extender;

e) receiving at a local extender said forwarded sequence of split data transfer responses from said remote extender and having said local extender store said forwarded sequence of split data transfer responses in local memory;

f) receiving at a local extender a subsequent request from said host computer for the start of a split data transfer session and having said local extender forward said subsequent request across a network to said remote extender; and

g) receiving at a local extender a sequence of subsequent requests for completion of a split data transfer session, having said local extender check local memory for the presence of a complete sequence of split data transfer responses, and then having said local extender retrieve said sequence of split data responses from memory and forward said sequence of split data responses to said host computer.

In a further aspect, the present invention provides a method for conducting isochronous data transactions, preferably over a data communications network in which the round-trip delay exceeds 1 microsecond, between a host computer and a USB peripheral device, wherein said host computer operates at high-speed and said USB peripheral device operates at classic-speed (full-speed or low-speed), and wherein said data travels in a host to device direction, through a local extender and a remote extender, which method comprises:

a) receiving at a local extender a notification from said host computer for the start of a split data transfer session, having said local extender forward said notification for the start of a split data transfer session across a network to said remote extender, and then having said remote extender store said notification for the start of a split data transfer session in local memory;

b) receiving at a local extender a first notification from said host computer for the continuation of a split data transfer session, having said local extender forward said first notification for the continuation of a split data transfer session across a network to said remote extender, and then having said remote extender store said first notification for the continuation of a split data transfer session in local memory;

c) receiving at a local extender a further notification from said host computer for the continuation of a split data transfer session, having said local extender forward said further notification for the continuation of a split data transfer session across a network to said remote extender, and then having said remote extender store said further notification for the continuation of a split data transfer session in local memory;

d) receiving at a local extender a notification from said host computer for the completion of a split data transfer session, having said local extender forward said notification for the completion of a split data transfer session across a network to said remote extender, and then having said remote extender store said notification for the completion of a split data transfer session in local memory;

e) assembling at a remote extender said stored notification for the start of a split data transfer, said stored first notification for the continuation of a split data transfer, said stored further notification for the continuation of a split data transfer and said stored notification for the completion of a split data transfer session into a classic-speed notification of data transfer; and

f) having said remote extender forward said classic-speed notification of data transfer to said USB peripheral device.

Description of the Preferred Embodiments

In a preferred embodiment, the host computer and the USB peripheral device can be any standard unit or device that supports the USB Specification. Preferably, no modifications to either the hardware or the software of said host computer are required.

The local extender is preferably a self-contained unit that connects to said host computer through a standard USB cable.

The remote extender is preferably a self-contained unit that connects to said plurality of USB peripheral devices through a plurality of standard USB cables.

The data communications network is not limited to any particular transmission media or protocol, but can, in operation, introduce a round-trip transmission delay between said host computer and said plurality of USB peripheral devices in excess of 1 microsecond. It is a necessary attribute of said data communications network that it provide a communications path between at least one local extender unit and at least one remote extender unit. It is preferable that said data communications network provide a communications path between at least one local extender unit and a plurality of remote extender units (a point-to-multipoint configuration). Networks such as those based on wired Ethernet, wireless Ethernet, IEEE 802.15.3, and the Internet are, for example, compliant with these requirements.

The methods and apparatuses of the present invention are most preferably used in a system wherein said host computer is a personal computer, and said plurality of USB peripheral devices are comprised of USB flash drives, USB hard drives, USB CD/DVD drives, USB cameras, USB mice, USB keyboards, USB hubs or any other device which is compatible with the USB Specification.

In a preferred embodiment of a local extender unit, the local extender includes an upstream transceiver and a downstream transceiver, and the upstream transceiver is a standard USB transceiver and the downstream transceiver is a wireless transceiver.

In a further preferred embodiment of a local extender unit, the upstream transceiver is a standard USB transceiver and the downstream transceiver is an Ethernet transceiver.

In a preferred embodiment of a remote extender unit, the remote extender includes an upstream transceiver and a downstream transceiver, and the upstream transceiver is a wireless transceiver and the downstream transceiver is a standard USB transceiver.

In a further preferred embodiment of a remote extender unit, the upstream transceiver is an Ethernet transceiver and the downstream transceiver is a standard USB transceiver.

Brief Description of the Drawings

The novel features which are believed to be characteristic of the present invention, as to its structure, organization, use and method of operation, together with further objectives and advantages thereof, will be better understood from the following drawings in which a presently preferred embodiment of the invention will now be illustrated by way of example. It is expressly understood, however, that the drawings are for the purpose of illustration and description only and are not intended as a definition of the limits of the invention. Embodiments of this invention will now be described by way of example in association with the accompanying drawings in which:

Figure 1 is a block diagram of a typical system topology according to the USB specification;

Figure 2 is a block diagram of a corresponding system topology according to the invention;

Figure 3 is a block diagram of a hub according to the USB specification;

Figure 4 is a block diagram showing the distribution of USB hub functions across a network according to the invention;

Figure 5 is a timing diagram of typical USB transactions according to the prior art USB Specifications;

Figure 6 is a block diagram of a local extender unit according to the invention;

Figure 7 is a block diagram of a remote extender unit according to the invention;

Figure 8 is a sequence diagram showing the handling of a connect event according to the invention;

Figure 9 is a sequence diagram showing the handling of a disconnect event according to the invention;

Figure 10 is a table recording the topology of a system configured according to the invention;

Figure 11 is a sequence diagram showing the handling of a split asynchronous IN transaction according to the invention;

Figure 12 is a sequence diagram showing the handling of a split asynchronous OUT transaction according to the invention;

Figure 13 is a sequence diagram showing the handling of a split isochronous IN transaction according to the invention; and

Figure 14 is a sequence diagram showing the handling of a split isochronous OUT transaction according to the invention;.

Detailed Description of the Invention

Figure 1 is a block diagram of a prior art system assembled according to the USB Specifications. According to the USB Specifications, a USB-enabled computer (20) may be connected to a plurality of USB devices (40 - 45) through a USB hub (31) and through a chain of USB hubs (31 and 32, and 31 to 34). A device cannot be connected to another device and the

maximum number of hubs that can be connected in a single serial chain is five. The maximum length of each cable used to interconnect a computer, hub or device is 5 metres.

Figure 2 is a block diagram of a system for communicating with USB devices across a network, according to the present invention.

In this arrangement, USB subactions, including input/output operations for host computer (20) are intercepted by a local extender (50) which is connected to said host computer through a standard USB cable. The local extender (50) preferably generates a "modified" form of the USB protocol that is delivered over network (21) to a plurality of remote extenders (51a, 51b, 51c) which can be located at an extended distance from said local extender (50). Hubs 32, and 33, and device 42 are connected to remote extenders 51a, 51b, and 51c, as previously described.

In this embodiment of the present invention, a host computer (20), and a local extender (50) are assembled as individual units. It will be apparent to those skilled in the art though that different combinations of these components might be used and that alternative packaging arrangements are possible.

Each remote extender (51a, 51b, 51c) receives signals from the network (21) and then, if necessary, preferably converts the received signals to electrical signals compatible with the USB protocol and delivers these electrical signals over USB cables to directly connected USB hubs (32, 33) and USB peripheral device (42). Signals are relayed to indirectly connected USB peripheral devices (40, 41, 43, 44, 45) and to indirectly connected USB hub (34) by USB hubs (32, 33). The reverse process occurs when signals are passed from USB peripheral devices (40-45) to host computer (20).

Again, in this embodiment of the present invention, a remote extender (51b) and a USB peripheral device (42) are assembled as individual units. It will be apparent to those skilled in the art though that different combinations of these components might be used and that alternative packaging arrangements are possible.

Also, in this embodiment of the present invention, a remote extender (51a) and a USB hub (32) are assembled as individual units. It will again be apparent to those skilled in the art

that different combinations of these components might be used and that alternative packaging arrangements are possible.

Further, in this embodiment of the present invention, a particular arrangement of three remote extenders, three remote hubs and six USB peripheral devices has been chosen. It will clearly be apparent to those skilled in the art that different populations of these hubs and devices might be used and that alternative connection arrangements are possible.

In this embodiment of the present invention, the data communications network (21) is a wired Ethernet network and the round-trip delay between host computer (20) and USB peripheral device (42) can be up to, for example, 1 millisecond or more. In other embodiments, however, the data communications network can be changed. For example, in another embodiment of the invention, the data communications network (21) can be a wireless network and the round-trip delay between host computer (20) and USB peripheral device (42) can be up to, for example, 100 milliseconds or more. In a further embodiment of the invention, the data communications network (21) can be an internet connection and the round-trip delay between host computer (20) and USB peripheral device (42) can be up to, for example, 1 second or more.

As such, it will be apparent to those skilled in the art that different data communications networks might be used, and that the corresponding round-trip delays may change accordingly.

Figure 3 is a block diagram of a prior art USB hub assembled according to the USB specification. Said USB hub is equipped with an upstream port (60) for communicating with a host computer or upstream hub, and a plurality of downstream ports (65a, 65b, 65c) for communicating with a plurality of USB devices or downstream USB hubs.

A USB subaction arriving at upstream port (60) is forwarded to hub repeater (62) which determines whether said USB subaction can be forwarded directly to one of the downstream ports (65a, 65b, 65c) or must be directed towards transaction translator (61) or hub controller (63). A USB subaction that must be converted from high-speed format to classic-speed format is directed towards transaction translator (61). A USB subaction that relates to the internal operation of the hub is directed towards hub controller (63). A USB subaction that relates to the status of the USB peripheral devices that are directly connected to downstream ports (65a, 65b, 65c) is directed towards hub controller (63).

A USB subaction that arrives at transaction translator (61) from hub repeater (62) is converted from high-speed to classic-speed format by said transaction translator (61) and then forwarded to the appropriate downstream port (65a, 65b or 65c) through routing logic (64).

In the upstream direction, a high-speed USB subaction arriving at any downstream port (65a, 65b or 65c) is forwarded by routing logic (64) to hub repeater (62) which in turn forwards said high-speed USB subaction to upstream port (60). A classic-speed USB subaction arriving at downstream port (65a, 65b or 65c) is forwarded by routing logic (64) to transaction translator (61) where said classic-speed USB subaction is converted to high-speed USB format before being forwarded to hub repeater (62) and thereafter to upstream port (60).

The number of upstream ports is typically one, but the number of downstream ports can vary from 1 to 255, and is not limited to the three ports shown.

Figure 4 is a block diagram showing the distribution of USB hub functions across a network according to the present invention. The following description will describe the operation of the invention with respect to remote extender (51b) for illustration of the method but it will be clear to those skilled in the art that a similar description applies to remote extenders (51a) and (51c) and that additional remote extenders may be deployed beyond the three units shown in Figure 4, up to the maximum number of ports allowed for a USB hub (e.g. currently to a maximum of 255 ports).

In this arrangement of the present invention, the upstream port (60) and hub controller (63) are located within the local extender (50). The hub repeater function (62) from Figure 3 for providing connectivity between the remaining hub functions, is duplicated as a local repeater (71) within local extender (50), and as a remote repeater (75b) in remote extender (51b).

The transaction translator (61) from Figure 3 is located within remote extender (51b) as transaction translator (61b). The downstream port (65b) from Figure 3 is located within remote extender (51b) as downstream port (65b).

The routing logic (64) from Figure 3 is replaced by a local router (72) in local extender (50) and a remote router (74b) in remote extender (51b). Whereas in a conventional USB hub, routing logic (64) is required to direct traffic to a specific port (65a, 65b or 65c), in the present

invention the replacement logic (72 and 74b) is required to direct traffic to a specific network node that identifies remote extenders (51a, 51b or 51c) or local extender (50).

The functionality of hub controller (63) is enhanced by the addition of virtual ports (73a, 73b, 73c), wherein said virtual ports provide to said hub controller (63) a local mechanism for maintaining the status of physical downstream ports (65a, 65b, 65c). In this arrangement, each local virtual port (e.g. 73b) provides local emulation of its corresponding remote physical port (e.g. 65b), enabling hub controller (63) to operate on a local resource (73b) while said virtual port (73b) is responsible for relaying operations to remote physical port (65b). A similar process occurs in the opposite direction when a physical event occurring at remote physical port (65b) is relayed to corresponding local virtual port (73b) and said local virtual port (73b) is then responsible for informing hub controller (63) of said physical event.

Figure 5 is a timing diagram of typical USB transactions according to the prior art USB Specifications.

A USB transaction consists of one, two or three phases, in which a phase is terminated by a reversal in the direction of data flow. Each phase can contain zero, one or more discrete USB packets. The set of packets that comprise a single phase is described herein as a USB subaction.

In the examples shown in Figure 5, transaction #1 occupies three phases and is an example of an IN command addressed to an asynchronous endpoint. Transaction #2 occupies one phase and is an example of an OUT command addressed to an isochronous endpoint. Transactions #3, #6 and #8 occupy two phases and are examples of OUT commands addressed to asynchronous endpoints.

Additional transactions #4 and #5 also occupy two phases and are further examples of IN commands addressed to asynchronous endpoints. Transaction #7 occupies three phases and is an example of an IN command addressed to a low-speed asynchronous endpoint.

Figure 6 is an enhanced block diagram of a local extender unit (50) according to the invention. A particular enhancement included in said local extender unit (50) is the addition of virtual device controller (83). Said virtual device controller (83) can be configured to emulate the operation of a physical USB device or devices and can thereby be used to add value-added

features to said local extender unit (50). In one embodiment of the present invention said virtual device controller (83) emulates a radio management function and can be used to control the physical parameters of network transceiver (84). In another embodiment of the present invention said virtual device controller (83) emulates a network interface card and can be used to transmit TCP/IP packets across data communications network (21). It will be apparent to those skilled in the art that these functions are not unique and that other functions may be performed in a similar manner.

In a first mode of operation, a USB subaction originating from host computer (20) is received by USB transceiver (81) and forwarded through upstream port (60) to local repeater (71). The content of said USB subaction is examined by local repeater (71) and forwarded as required.

If said USB subaction is addressed to virtual USB hub (31), then said USB subaction is forwarded to hub controller (63). If said USB subaction is addressed to a USB peripheral device (40-45) or physical USB hub (32-34), then said USB subaction is forwarded to local router (72). If said USB subaction is addressed to a virtual USB device, then said USB subaction is forwarded to virtual device controller (83).

If a response to said USB subaction is already present in local memory (82), as described herein below, then said response is retrieved from memory by local repeater (71) and forwarded to USB transceiver (81) through upstream port (60). If a synthetic response to said USB subaction is required, then said synthetic response is generated by local repeater (71) and forwarded to USB transceiver (81) through upstream port (60).

When a USB subaction is forwarded by local repeater (71) to local router (72), the USB address contained in said USB command is examined by said local router (72) and translated to a network address. Said local router (72) encapsulates said USB subaction in a network packet, addresses said network packet with said translated network address and forwards said addressed network packet to network transceiver (84) for transmission across said network (21) to remote extender (51b).

In a second mode of operation, an addressed network packet from said remote extender (51b) is received by network transceiver (84) and forwarded to local router (72). Said local router (72) extracts a USB subaction from said addressed network packet, examines the content

of said USB subaction, and forwards said USB subaction to local repeater (71). If said content represents a USB response subaction, then said USB response subaction is stored in local memory (82) for later transmission to the USB transceiver, as discussed hereinabove, in response to a USB command subaction. If said content represents a system subaction indicating a change in status of USB device (42) directly connected to said remote extender (51b), then said system subaction is forwarded to hub controller (63). Hub controller (63) examines the content of said forwarded system subaction and updates the status of virtual port #2 (73b).

Figure 7 is an enhanced block diagram of a remote extender unit (51) according to the invention. In this arrangement, the operation of said remote extender unit (51) is activated by a stimulus occurring at either network transceiver (91) or USB transceiver (92). Where a specific scenario is required, the following description will use remote extender (51b) for illustration of the method but it will be clear to those skilled in the art that a similar description applies to remote extenders (51a) and (51c) and that additional remote extenders may be deployed beyond the three units shown in Figure 4.

In accordance with the USB specifications, transactions that require the use of a transaction translator are described as split transactions. Accordingly, transactions that do not require the use of said transaction translator will be described herein as atomic transactions.

In a first mode of operation, an addressed network packet is received by network transceiver (91) and forwarded to remote router (74). Said remote router (74) extracts a USB subaction from said addressed network packet, examines the content of said USB subaction, and forwards said USB subaction to remote repeater (75). If said content represents a USB subaction indicating a split transaction, then said USB subaction is forwarded to transaction translator (61). If said content represents a USB subaction indicating an atomic (non-split) USB transaction, then said USB subaction is forwarded to USB transceiver (92) through downstream port controller (65). If said content represents a system subaction, then said system subaction is forwarded to remote controller (93).

In a second mode of operation, a USB subaction is received from USB peripheral device (42) by USB transceiver (92) and forwarded through downstream port controller (65) to remote repeater (75). Said remote repeater (75) examines the content of said USB subaction and optionally generates a USB confirm subaction for transmission to said USB peripheral

device (42) through downstream port controller (65) and USB transceiver (92). Also, if said content of said USB subaction indicates an atomic USB transaction, then said USB subaction is forwarded to remote router (74). Further, if said content of said USB subaction indicates a classic-speed USB transaction, then said USB subaction is forwarded to transaction translator (61) for conversion to high-speed split transaction format. Said converted USB subaction is then forwarded through remote repeater (75) to remote router (74).

When remote router (74) receives a USB subaction from remote repeater (75), said remote router (74) encapsulates said USB subaction in a network packet, addresses said network packet with the network address of local extender (50) and forwards said addressed network packet to network transceiver (91) for transmission over data communications network (21).

In a third mode of operation, a change in the status of USB peripheral device (42) is detected by downstream port controller (65) through USB transceiver (92) and reported to remote controller (93). In response to said reported change in status, said remote controller generates a system subaction and forwards said system subaction to remote repeater (75) for transmission to local extender (50).

Figure 8 is a sequence diagram showing the handling of a connect event according to the invention. The presentation format used in the diagram is attributable to Jacobson et al. (Ivar Jacobson, Magnus Christerson, Patrick Jonsson and Gunnar Overgaard, Object-Oriented Software Engineering: A Use Case Driven Approach, Addison-Wesley, 1992.). For illustration purposes, it will be assumed that said sequence diagram describes the attachment of USB peripheral device (42) to remote extender (51b), and that remote extender (51b) is assigned to virtual port #2 (73b) on hub controller (63). It will be apparent to those skilled in the art that the same process can be applied to the attachment of any USB peripheral device or any USB hub to any remote extender and that further virtual ports can be assigned as required..

The connection sequence begins in section "A". On power-up, in accordance with standard USB protocols, control logic (104) in USB peripheral device (42) drives a static J/K value on its USB data lines. Said static J/K value is detected by control logic (103) in remote extender (51b) and transmitted as a connect subaction across network (21) to local extender

(50). Control logic (101) in local extender (50) updates the status of the corresponding virtual port (73b) and reports said change of status event to host computer (20).

Control logic (100) in host computer (20) then requests the status of port #2, and control logic (101) in local extender (50) replies with a device connected indication.

Subsequently, in section "B", control logic (100) in host computer (20) issues a command to clear the change in connection status indicator belonging to port #2, and then requests confirmation that said command has been completed by issuing a further request for the status of port #2. Control logic (101) in local extender (50) clears said change in connection status indicator belonging to port #2, and reports that no further changes in status are outstanding. This operation completes the physical attachment sequence.

Thereafter, in section "C", control logic (100) in host computer (20) initiates a device reset sequence by generating a USB command to reset the device attached to port #2. Control logic (101) in local extender (50) translates said USB command into a reset subaction and transmits said reset subaction across network (21) to remote extender (51b). Control logic (103) in remote extender (51b) receives said transmitted reset subaction and drives a reset condition (SE0) on the data lines of downstream port (65b). After transmitting the reset condition for a period of time determined by the USB specification, said remote extender (51b) establishes the speed of operation of said USB peripheral device (42), and transmits said speed of operation as a speed subaction across network (21) to said local extender (50). Control logic (101) in local extender (50) updates the status of the corresponding virtual port and reports said change of status event to host computer (20).

Control logic (100) in host computer (20) then requests the status of port #2, and control logic (101) in local extender (50) replies with a reset complete plus speed indication.

Subsequently, in section "D", control logic (100) in host computer (20) issues a command to clear the change in reset status indicator belonging to port #2, and then requests confirmation that said command has been completed by issuing a further request for the status of port #2. Control logic (101) in local extender (50) clears said change in reset status indicator belonging to virtual port #2 (73b), and reports that no further changes in status are outstanding. This operation completes the device reset sequence.

Figure 9 is a sequence diagram showing the handling of a disconnect event according to the invention. For illustration purposes, it will be assumed that said sequence diagram describes the detachment of USB peripheral device (42) from remote extender (51b), and that remote extender (51b) is assigned to virtual port #2 (73b) on hub controller (63). It will be apparent to those skilled in the art that the same process can be applied to the detachment of any USB peripheral device or any USB hub from any remote extender and that further virtual ports can be assigned as required.

The disconnection sequence begins in section "A". On device detachment, control logic (104) in USB peripheral device (42) ceases to drive a static J/K value on its USB data lines. Said cessation of driving a static J/K value is detected by control logic (103) in remote extender (51b) and transmitted as a disconnect subaction across network (21) to local extender (50). Control logic (101) in local extender (50) updates the status of the corresponding virtual port and reports said change of status event to host computer (20).

Control logic (100) in host computer (20) then requests the status of port #2, and control logic (101) in local extender (50) replies with a device disconnected indication.

Subsequently, in section "B", control logic (100) in host computer (20) issues a command to clear the change in connection status indicator belonging to port #2, and then issues a further command to clear the enabled status of port #2. Control logic (100) in host computer (20) then requests confirmation that said commands have been completed by issuing a further request for the status of port #2. Control logic (101) in local extender (50) clears said change in connection status indicator and said enabled status belonging to virtual port #2 (73b), and reports that no further changes in status are outstanding. This operation completes the physical detachment sequence.

Figure 10 is a table recording the topology of a system configured according to the invention.

The data presented in said table provides a method by which the example topology presented in Figure 2 can be mapped. In turn, the topology of the current invention illustrated in Figure 2 is required to emulate the topology of the prior art system illustrated in Figure 1. The device column records the USB address of each device and hub contained in Figure 2. For clarity, the USB address is set identical to the numbering of the blocks in Figure 2. It will be

apparent to those skilled in the art that this association is not essential and that any USB address in the range 1 - 127 may be allocated by host computer (20).

A special case is presented by USB hub (31). In Figure 1, said USB hub (31) is a physical unit and is allocated USB address 31. In Figure 2, said USB hub is a virtual unit created by the combined operations of local extender (50), remote extenders (51a, 51b and 51c) and network (21). In order to emulate the operation of said physical USB hub (31), said virtual hub is also allocated USB address 31.

The parent/address column records the USB address of the upstream hub to which a device or hub is connected. The parent/port column records the port number of the upstream hub to which a device or hub is connected. The child/port # columns record the USB address of the downstream device or hub connected to said port number. The number of child/port # columns shown in the table is four which enables a maximum of four remote extender units to be incorporated in the system. It will be apparent to those skilled in the art that this value is not unique and that currently any value in the range from 1 to 255 can be chosen, thereby enabling the maximum number of remote extender units to also fall within the range 1 to 255.

The network address column records the network address of the network node to which a device or hub is directly connected.

The operation of said table will be further described by selecting particular examples. A special case is presented by USB hub (31) which is connected to host computer (20) and acts as the root of the USB topology. In Figure 2, said USB hub (31) is implemented as a virtual hub by the functions distributed in extenders (50, 51a, 51b and 51c) and in particular by hub controller (63) in local extender (50). Said USB hub (31) appears as device (31) in said table. Since USB hub (31) forms the root of the system it has no parent within the system and the value of its parent address and port number is set to null. The child entries for said USB hub (31) show that USB hub (32) is connected to its port #1, USB peripheral device (42) is connected to its port #2 and USB hub (33) is connected to its port #4. The network entry for said USB hub (31) shows that it is connected to network node (N0). It will be apparent to those skilled in the art that value (N0) is representational and that any other value may be used that is appropriate to the network chosen to provide data communications between said local and remote extenders. For example, if said data communications network is an Ethernet network

then said network entry would be an Ethernet address. If said data communications network is an Internet network then said network entry would be an IP address.

The entry for USB hub (34) in said table shows that its parent is port #3 on USB hub (33), that USB peripheral device (44) is connected to its port #1, that USB peripheral device (45) is connected to its port #4, and that said USB hub (34) is not directly connected to network (21). The network address to be used for USB hub (34) is then found by tracing its connectivity back through its parent or parent's parent. In the case of USB hub (34), its parent is USB hub (33) and the network address of said USB hub (33) is (N3). In this manner, the chaining of USB hubs according to the USB Specification is accommodated by the present invention.

The entry for USB peripheral device (42) shows that its parent is port #2 on USB hub (31) and that it is directly connected to network (21) at node (N2).

Figure 11 is a sequence diagram showing the handling of a split asynchronous IN transaction according to the invention.

Control logic (100) in host computer (20) initiates said transaction by issuing a first start-split IN command to local extender (50). Control logic (101) responds to said first start-split IN command by transmitting a negative response subaction to said host computer (20), and then forwards said first start-split IN command to remote extender (51b) across network (21). Control logic (101) continues to generate negative response subactions whenever a subsequent start-split IN command is received from host computer (20) and no response has been received from remote extender (51b).

Control logic (103) in remote extender (51b) receives said first start-split IN command from network (21), converts said start-split IN command into a classic-speed IN command, and then forwards said classic-speed IN command to USB peripheral device (42). Also, control logic (103) in remote extender (51b) transmits a positive response subaction across network (21) to local extender (50) where said positive response subaction is stored in local memory. When control logic (100) in host computer (20) issues a further start-split IN command, control logic (101) in local extender (50) retrieves said positive response subaction from local memory and forwards said retrieved positive response subaction to host computer (20). Control logic (100) in host computer (20) then issues a complete-split IN command and control logic (101) in local extender (50) replies with a not-yet response.

Meanwhile, control logic (104) in USB peripheral device (42) generates a classic-speed DATA0/1 response and forwards said response to remote extender (51b). Control logic (103) in remote extender (51b) generates a classic-speed confirm subaction and forwards said subaction to USB peripheral device (42). Also, control logic (103) in remote extender (51b) forwards said DATA0/1 response across network (21) to local extender (50) where said DATA0/1 response subaction is stored in local memory. When control logic (100) in host computer (20) issues a further complete-split IN command, control logic (101) in local extender (50) retrieves said DATA0/1 response subaction from local memory and forwards said retrieved DATA0/1 response subaction to host computer (20).

Figure 12 is a sequence diagram showing the handling of a split asynchronous OUT transaction according to the invention.

Control logic (100) in host computer (20) initiates said transaction by issuing a first start-split OUT/DATA0/1 command to local extender (50). Control logic (101) responds to said first start-split OUT/DATA0/1 command by transmitting a negative response subaction to said host computer (20), and then forwards said first start-split OUT/DATA0/1 command to remote extender (51b) across network (21). Control logic (101) continues to generate negative response subactions whenever a subsequent start-split OUT/DATA0/1command is received from host computer (20) and no response has been received from remote extender (51b).

Control logic (103) in remote extender (51b) receives said first start-split OUT/DATA0/1 command from network (21), converts said start-split OUT/DATA0/1 command into a classic-speed OUT/DATA0/1 command, and then forwards said classic-speed OUT/DATA0/1 command to USB peripheral device (42). Also, control logic (103) in remote extender (51b) transmits a positive response subaction across network (21) to local extender (50) where said positive response subaction is stored in local memory. When control logic (100) in host computer (20) issues a further start-split OUT/DATA0/1 command, control logic (101) in local extender (50) retrieves said positive response subaction from local memory and forwards said retrieved positive response subaction to host computer (20). Control logic (100) in host computer (20) then issues a complete-split OUT command and control logic (101) in local extender (50) replies with a not-yet response.

Meanwhile, control logic (104) in USB peripheral device (42) generates a classic-speed positive response subaction and forwards said subaction to remote extender (51b). Control logic (103) in remote extender (51b) forwards said positive response subaction across network (21) to local extender (50) where said positive response subaction is stored in local memory. When control logic (100) in host computer (20) issues a further complete-split OUT command, control logic (101) in local extender (50) retrieves said positive response subaction from local memory and forwards said retrieved positive response subaction to host computer (20).

Figure 13 is a sequence diagram showing the handling of a split isochronous IN transaction according to the invention.

Control logic (100) in host computer (20) initiates said transaction by issuing a first start-split IN command to local extender (50). Control logic (101) in local extender (50) forwards said first start-split IN command to remote extender (51b) across network (21). Control logic (103) in remote extender (51b) receives said first start-split IN command from network (21), converts said start-split IN command into a classic-speed IN command, and then forwards said classic-speed IN command to USB peripheral device (42). After a delay, control logic (100) in host computer (20) transmits a complete-split IN command to local extender (50) and control logic (101) in local extender (50) replies with a null-data response. Control logic (101) continues to generate null-data responses whenever a subsequent complete-split IN command is received from host computer (20) and a DATA0 response has not been received from remote extender (51b).

Meanwhile, control logic (104) in USB peripheral device (42) generates a classic-speed DATA0 response and forwards said response to remote extender (51b). Control logic (103) in remote extender (51b) converts said classic-speed DATA0 response into a sequence of high-speed MDATA/DATA0 responses and forwards said responses across network (21) to local extender (50) where said MDATA/DATA0 responses are stored in local memory. When control logic (100) in host computer (20) issues a further sequence of complete-split IN commands, control logic (101) in local extender (50) retrieves said MDATA/DATA0 responses from local memory and forwards said retrieved MDATA/DATA0 responses to host computer (20).

Figure 14 is a sequence diagram showing the handling of a split isochronous OUT transaction according to the invention.

Control logic (100) in host computer (20) initiates said transaction by issuing a start-split-begin OUT/DATA0 command to local extender (50). Control logic (101) in local extender (50) forwards said start-split-begin OUT/DATA0 command to remote extender (51b) across network (21).

Control logic (100) in host computer (20) continues said transaction by issuing one or more start-split-mid OUT/DATA0 commands to local extender (50). Control logic (101) in local extender (50) forwards each start-split-mid OUT/DATA0 command to remote extender (51b) across network (21).

Control logic (100) in host computer (20) completes said transaction by issuing a start-split-end OUT/DATA0 command to local extender (50). Control logic (101) in local extender (50) forwards said start-split-end OUT/DATA0 command to remote extender (51b) across network (21).

When control logic (103) in remote extender (51b) receives said start-split-end OUT/DATA0 command, said control logic (103) assembles said start-split-begin OUT/DATA0 command, said one or more start-split-mid OUT/DATA0 commands and said start-split-end OUT/DATA0 command into a classic-speed OUT/DATA0 command and forwards said command to USB peripheral device (42).

Thus, it is apparent that there has been provided, in accordance with the present invention, methods, systems and/or USB-related devices which fully, or at least partially, satisfy the means, objects, and advantages over the prior art as set forth hereinbefore. Therefore, having described specific embodiments of the present invention, it will be understood that alternatives, modifications and variations thereof may be suggested to those skilled in the art, and that it is intended that the present specification embrace all such alternatives, modifications and variations as fall within the scope of the appended claims.

Additionally, for clarity and unless otherwise stated, the word "comprise" and variations of the word such as "comprising" and "comprises", when used in the description and

claims of the present specification, is not intended to exclude other additives, components, integers or steps.

Claims

1. A computer system for transmitting data between a host computer and one or a plurality of USB peripheral devices, wherein said USB peripheral devices are distributed around a data communications network and wherein the transmission delay across said network is greater than that normally allowed by the USB specification, said computer system comprising a host computer connected to a local extender device which, in turn, is connected to one or a plurality of remote extender devices through a data communications network and which, in turn, are connected to a plurality of USB peripheral devices, wherein signals between said host computer and said USB peripheral devices are saved, collected, absorbed, or otherwise processed in the local extender and/or the remote extenders so as to allow the host computer and the USB peripheral devices to operate in the presence of a round trip delay greater than that normally allowed in the USB specification.

2. A computer system as claimed in Claim 1 wherein said round-trip delay comprises a transmission delay and a turn-around time delay, and wherein said transmission delay between the host computer and the USB peripheral device exceeds 1 microsecond.

3. A computer system as claimed in Claim 1 wherein said host computer is a computer that supports the USB Specification.

4. A computer system as claimed in Claim 1 wherein said plurality of USB peripheral devices are comprised of USB flash drives, USB hard drives, USB CD/DVD drives, USB cameras, USB mice, USB keyboards, USB hubs or any other device which is compatible with the USB Specifications.

5. A computer system for transmitting data between a host computer and one or a plurality of USB peripheral devices as claimed in Claim 1 wherein said USB peripheral devices

may be distributed around a data communications network and wherein the transmission delay across said network is greater than that normally allowed by the USB specification, said computer system comprising:

a) a host computer for generating and accepting USB subactions;

b) one or a plurality of USB peripheral devices capable of responding to USB subactions initiated by said host computer;

c) a local extender unit connected to said host computer for forwarding USB subactions from said host computer to a data communications network, and for forwarding USB subactions received from said data communications network to said host computer;

d) one or a plurality of remote extender units each of which is connected to one or a plurality of USB peripheral devices, for forwarding USB subactions received from said data communications network to said USB peripheral devices, and for forwarding USB subactions received from said USB peripheral devices to said data communications network;

e) a data communications network for forwarding USB subactions from said local extender unit to said remote extender units, and for forwarding USB subactions from said remote extender units to said local extender unit;

f) means in said local extender unit for forwarding a USB subaction received from said host computer to said remote extender unit over said data communications network, and for generating and sending a generated USB subaction to said host computer;

g) means in said remote extender unit for forwarding said USB subaction received from said host computer to one or a plurality of USB peripheral devices, and for receiving a subaction received from a USB peripheral device;

h) means in said remote extender unit for forwarding said subaction received from a USB peripheral device to said local extender unit over said data communications network;

i) means in said remote extender unit for generating a USB subaction in confirmation of a USB subaction received from a USB peripheral device and sending said generated confirm USB subaction to said USB peripheral device;

j) means in said remote extender unit for generating a USB subaction in response to a USB subaction received from said host computer and sending said generated response USB subaction to said local extender unit;

k) means in said local extender unit for receiving and identifying when a sequence of inbound USB subactions received from said remote extender unit over said data communications network are related to a common outbound USB subaction;

l) means in said local extender unit for storing an inbound USB subaction from said remote extender unit until such inbound USB subaction is again requested by said host computer; and

m) means in said local extender unit for forwarding said stored USB subaction to said host computer.

6. A computer system as claimed in Claim 5 additionally comprising

a) means, preferably in said local extender unit, for absorbing replicated USB subactions;

b) means in said remote extender unit for assembling a sequence of USB subactions into an atomic USB subaction and preferably sending said atomic USB subaction to said USB peripheral device; and

c) means in said remote extender unit for disassembling an atomic USB subaction into a sequence of discrete USB subactions and preferably sending said sequence of discrete USB subactions to said local extender unit.

7. A local extender apparatus for use in transmitting USB traffic between a host computer and a data communications network wherein said USB traffic may be addressed to a plurality of USB peripheral devices, said apparatus comprising:

a) a USB transceiver for connecting to said host computer;

b) an upstream-facing port for controlling said USB transceiver;

c) a local repeater unit for regenerating USB subactions passing through said apparatus and for switching USB subactions between the components of said apparatus;

d) a memory unit for storing USB subactions during processing by said apparatus;

e) a local router unit for providing a network address for USB subactions moving in a downstream (host to network) direction;

f) a network transceiver for connecting to said data communications network;

g) a hub controller unit for responding to subactions generated by said host computer regarding the status of said plurality of USB peripheral devices;

h) means for instantiating a plurality of virtual ports for managing the status of said plurality of USB peripheral devices;

i) means for instantiating a plurality of virtual USB devices for providing value-added functions;

j) means in said local repeater for identifying USB subactions addressed to said hub controller;

k) means in said local repeater for identifying USB subactions addressed to said plurality of virtual USB devices;

l) means in said plurality of instantiated virtual ports for maintaining the status of said plurality of USB peripheral devices;

m) means in said plurality of instantiated virtual ports for receiving device status change signals from said data communications network and updating the status of said plurality of USB peripheral devices; and

n) means in said hub controller for receiving device management commands from said host computer and sending device management signals to said data communications network.

8. A local extender as claimed in Claim 7 wherein said USB transceiver is a standard USB transceiver and said network transceiver is a wireless transceiver.

9. A local extender as claimed in Claim 7 wherein said USB transceiver is a standard USB transceiver and said network transceiver is an ethernet transceiver.

10. A local extender as claimed in Claim 7 wherein said local extender is a self-contained unit that connects to said host computer through a standard USB cable.

11. A remote extender apparatus for use in transmitting USB traffic between a data communications network and at least one USB peripheral device, said apparatus comprising:

a) a network transceiver for connecting to said data communications network;

b) a remote router unit for providing a network address for USB subactions moving in an upstream (network to host) direction;

c) a remote repeater unit for regenerating USB subactions passing through said apparatus and for switching USB subactions between the components of said apparatus;

d) a transaction translator unit for converting between high-speed split transactions and full-speed/low-speed atomic transactions;

e) a memory unit for storing USB subactions during processing by said apparatus;

f) a USB transceiver for connecting to said USB peripheral device;

g) a downstream-facing port for controlling said USB transceiver;

h) means in said remote router unit for identifying split transactions;

i) means in said downstream port controller for detecting the status of said USB peripheral device;

j) means in said downstream port controller for generating device status signals and sending said signals to said data communications network;

k) means in said downstream port controller for receiving device management signals from said data communications network; and

l) means in said downstream port controller for changing the status of said USB peripheral device.

12. A remote extender as claimed in Claim 11 wherein said network transceiver is a wireless transceiver and said USB transceiver is a standard USB transceiver.

13. A remote extender as claimed in Claim 11 wherein said network transceiver is an ethernet transceiver and said USB transceiver is a standard USB transceiver.

14. A remote extender as claimed in Claim 11 wherein said remote extender is a self-contained unit that connects to said plurality of USB peripheral devices through a plurality of standard USB cables.

15. A method for transmitting data between a host computer and one or a plurality of USB peripheral devices, wherein said USB peripheral devices are distributed around a data communications network and wherein the transmission delay across said network is greater than that normally allowed by the USB specification, said method comprising connecting a host computer to a local extender device, connecting said local extender device to one or a plurality of remote extender devices through a data communication network, and connecting said remote extender devices to one or a plurality of USB peripheral devices, wherein signals between said host computer and said USB peripheral devices are saved, collected, absorbed, or otherwise processed in the local extender and/or the remote extenders so as to allow the host computer and the USB peripheral devices to operate in the presence of a round trip delay greater than that normally allowed in the USB specification.

16. A method as claimed in Claim 15 wherein said method includes the ability to detect the attachment of a USB peripheral device to the system, to detect the detachment of a

USB peripheral device, and/or the ability to determine the network address of a USB function wherein said USB function may be a USB hub or a USB peripheral device.

17. A method as claimed in Claim 16 for detecting the attachment of a USB peripheral device by a host computer, wherein said host computer and said USB peripheral device conform to the requirements of the USB Specification, through a local extender and a remote extender, which method comprises:

a) detecting at said remote extender a device attachment event, having said remote extender send a device connect signal to said local extender, and then having said local extender update its local record of the change in connection status of said USB peripheral device and its local record of the connected status of said USB peripheral device;

b) receiving at said local extender a request from said host computer for device status change information and having said local extender inform said host computer that the status of said USB peripheral device has changed;

c) receiving at said local extender a request from said host computer for the status of said USB peripheral device and having said local extender provide said local record of the change in connection status and said local record of connected status to said host computer;

d) receiving at said local extender a request from said host computer to clear said change in connection status information and having said local extender clear said local record of the change in connection status information;

e) receiving at said local extender a further request from said host computer for the status of said USB peripheral device and having said local extender provide said cleared local record of the change in connection status and said local record of connected status to said host computer;

f) receiving at said local extender a command from said host computer to reset said USB peripheral device, having said local extender send a reset signal to said remote extender, and then having said remote extender perform a physical reset on said USB peripheral device;

g) detecting at said remote extender the transmission speed of said USB peripheral device, having said remote extender send a speed signal to said local extender, and then having said local extender update its local record of the transmission speed of said USB peripheral device and its local record of the change in reset status of said USB peripheral device;

h) receiving at said local extender a further request from said host computer for device status change information and having said local extender inform said host computer that the status of said USB peripheral device has changed;

i) receiving at said local extender a yet further request from said host computer for the status of said USB peripheral device and having said local extender provide said local record of the transmission speed of said USB peripheral device and its local record of the change in reset status of said USB peripheral device to said host computer;

j) receiving at said local extender a request from said host computer to clear said change in reset status information and having said local extender clear said local record of the change in reset status information; and

k) receiving at said local extender a request from said host computer for the status of said USB peripheral device and having said local extender provide said cleared local record of the change in reset status to said host computer.

18. A method as claimed in Claim 17 wherein said method operates over a data communications network in which the round-trip delay exceeds 1 microsecond.

19. A method as claimed in Claim 16 for detecting the detachment of a USB peripheral device by a host computer, wherein said host computer and said USB peripheral device conform to the requirements of the USB Specification, through a local extender and a remote extender, which method comprises:

a) detecting at said remote extender a device detachment event, having said remote extender send a device disconnect signal to said local extender, and then having said local

extender update its local record of the change in connection status of said USB peripheral device and its local record of the connected status of said USB peripheral device;

b) receiving at said local extender a request from said host computer for device status change information and having said local extender inform said host computer that the status of said USB peripheral device has changed;

c) receiving at said local extender a request from said host computer for the status of said USB peripheral device and having said local extender provide said local record of the change in connection status and said local record of connected status to said host computer;

d) receiving at said local extender a request from said host computer to clear said change in connection status information and having said local extender clear said local record of the change in connection status information;

e) receiving at said local extender a request from said host computer to clear enabled status information of said USB peripheral device and having said local extender clear its local record of enabled status information; and

f) receiving at said local extender a further request from said host computer for the status of said USB peripheral device and having said local extender provide said cleared local record of the change in connection status and said cleared local record of enabled status to said host computer.

20. A method as claimed in Claim 19 wherein said method operates over a data communications network in which the round-trip delay exceeds 1 microsecond.

21. A method as claimed in Claim 16 for determining the network address of a USB function wherein said USB function may be a USB hub or a USB peripheral device, and wherein a plurality of said USB functions may be distributed around a data communications network, and wherein a USB address is allocated to each USB function by a host computer, which method comprises:

a) building a data record for each first USB function connected directly or indirectly to said network and identifying each record by a unique USB address assigned dynamically by said host computer;

b) recording within said data record the USB address of the upstream USB hub to which said first USB function is connected;

c) recording within said data record the port number of the upstream USB hub to which said first USB function is connected;

d) recording within said data record the USB address of each downstream USB function connected directly to said first USB function;

e) recording within said data record the port number of said first USB function to which each downstream USB function is connected; and

f) recording the network address assigned to said first USB function.

22. A method as claimed in Claim 16 for transmitting a USB command from a host computer, through a local extender, to a unique network address on a data communications network, which method comprises:

a) receiving at a local extender a USB command from a host computer;

b) extracting a first USB address from said USB command;

c) using said first USB address to access a first data record within a table of similar records;

d) determining whether said first data record contains a valid network address;

e) extracting from said first data record a second USB address identifying the upstream USB hub through which said first USB address may be accessed;

f) repeating steps (c) through (e) until a valid network address is found;

g) encapsulating said USB command in a network packet;

h) addressing said network packet to said valid network address; and

i) transmitting said addressed network packet to said data communications network.

23. A method as claimed in Claim 15 for conducting asynchronous data transactions, between a host computer and a USB peripheral device, wherein said host computer operates at high-speed and said USB peripheral device operates at classic-speed (full-speed or low-speed), and wherein said data travels in a device to host direction, through a remote extender and a local extender, which method comprises:

a) receiving at a local extender a first request from said host computer for the start of a split data transfer session, having said local extender forward said first request across a network to said remote extender, and then having said local extender generate a negative acknowledgement response to said host computer;

b) receiving at a local extender a subsequent request from said host computer for the start of a split data transfer session and having said local extender continue to generate negative acknowledgement responses to said host computer until said local extender receives a response to said forwarded first request from said remote extender;

c) receiving at a remote extender said forwarded first request for the start of a split data transfer session, having said remote extender convert said forwarded request for the start of a split data transfer session into a classic-speed request for data transfer, and then having said remote extender forward said classic-speed request for data transfer to said USB peripheral device;

d) generating at a remote extender a positive acknowledgement response and forwarding said positive acknowledgement response across a network to said local extender;

e) receiving at a local extender said forwarded positive acknowledgement response and having said local extender store said forwarded positive acknowledgement response in local memory;

f) receiving at a local extender a further request from said host computer for the start of a split data transfer session, having said local extender retrieve from local memory said forwarded positive acknowledgement response, and then having said local extender forward said retrieved positive acknowledgement response to said host computer;

g) receiving at a remote extender a data transfer response from said USB peripheral device and having said remote extender generate a positive acknowledgement response to said USB peripheral device, and then having said remote extender forward said data transfer response across a network to said local extender;

h) receiving at a local extender a first request for completion of a split data transfer session, having said local extender check local memory for the absence of a data transfer response, and then having said local extender generate a not-yet acknowledgement to said host computer;

i) receiving at a local extender said forwarded data transfer response from said remote extender and having said local extender store said forwarded data transfer response in local memory; and

j) receiving at a local extender a further request for completion of a split data transfer session, having said local extender retrieve from local memory said forwarded data transfer response, and then having said local extender forward said retrieved data transfer response to said host computer.

24. A method as claimed in Claim 23 wherein said method operates over a data communications network in which the round-trip delay exceeds 1 microsecond.

25. A method as claimed in Claim 15 for conducting asynchronous data transactions between a host computer and a USB peripheral device, wherein said host computer operates at high-speed and said USB peripheral device operates at classic-speed (full-speed or low-speed), and wherein said data travels in a host to device direction, through a local extender and a remote extender, which method comprises:

a) receiving at a local extender a first notification from said host computer for the start of a split data transfer session, having said local extender forward said first notification across a network to said remote extender, and then having said local extender generate a negative acknowledgement response to said host computer;

b) receiving at a local extender a subsequent notification from said host computer for the start of a split data transfer session and having said local extender continue to generate negative acknowledgement responses to said host computer until said local extender receives a response to said forwarded first notification from said remote extender;

c) receiving at a remote extender said forwarded first notification for the start of a split data transfer session, having said remote extender convert said forwarded notification for the start of a split data transfer session into a classic-speed notification for data transfer, and then having said remote extender forward said classic-speed notification for data transfer to said USB peripheral device;

d) generating at a remote extender a positive acknowledgement response and forwarding said positive acknowledgement response across a network to said local extender;

e) receiving at a local extender said forwarded positive acknowledgement response and having said local extender store said forwarded positive acknowledgement response in local memory;

f) receiving at a local extender a further notification from said host computer for the start of a split data transfer session, having said local extender retrieve from local memory said forwarded positive acknowledgement response, and then having said local extender forward said retrieved positive acknowledgement response to said host computer;

g) receiving at a remote extender a positive acknowledgement response from said USB peripheral device and having said remote extender forward said positive acknowledgement response across a network to said local extender;

h) receiving at a local extender a first request for completion of a split data transfer session, having said local extender check local memory for the absence of a positive acknowledgement response, and then having said local extender generate a not-yet acknowledgement to said host computer;

i) receiving at a local extender said forwarded positive acknowledgement response from said remote extender and having said local extender store said forwarded positive acknowledgement response in local memory; and

j) receiving at a local extender a further request for completion of a split data transfer session, having said local extender retrieve from local memory said forwarded positive acknowledgement response, and then having said local extender forward said retrieved positive acknowledgement response to said host computer.

26. A method as claimed in Claim 25 wherein said method operates over a data communications network in which the round-trip delay exceeds 1 microsecond.

27. A method as claimed in Claim 15 for conducting isochronous data transactions between a host computer and a USB peripheral device, wherein said host computer operates at high-speed and said USB peripheral device operates at classic-speed (full-speed or low-speed), and wherein said data travels in a device to host direction, through a remote extender and a local extender, which method comprises:

a) receiving at a local extender a first request from said host computer for the start of a split data transfer session and having said local extender forward said first request for the start of a split data transfer session across a network to said remote extender;

b) receiving at a local extender a first request for completion of a split data transfer session, having said local extender check local memory for the absence of a complete sequence of split data transfer responses, and then having said local extender generate a null data response to said host computer;

c) receiving at a remote extender said forwarded first request for the start of a split data transfer session, having said remote extender convert said forwarded request for the start of a split data transfer session into a classic-speed request for data transfer, and then having said remote extender forward said classic-speed request for data transfer to said USB peripheral device;

d) receiving at a remote extender a data transfer response from said USB peripheral device and having said remote extender convert said received data transfer response into a sequence of split data transfer responses, and then having said remote extender forward said sequence of split data transfer responses across a network to said local extender;

e) receiving at a local extender said forwarded sequence of split data transfer responses from said remote extender and having said local extender store said forwarded sequence of split data transfer responses in local memory;

f) receiving at a local extender a subsequent request from said host computer for the start of a split data transfer session and having said local extender forward said subsequent request across a network to said remote extender; and

g) receiving at a local extender a sequence of subsequent requests for completion of a split data transfer session, having said local extender check local memory for the presence of a complete sequence of split data transfer responses, and then having said local extender retrieve said sequence of split data responses from memory and forward said sequence of split data responses to said host computer.

28. A method as claimed in Claim 27 wherein said method operates over a data communications network in which the round-trip delay exceeds 1 microsecond.

29. A method as claimed in Claim 15 for conducting isochronous data transactions between a host computer and a USB peripheral device, wherein said host computer operates at high-speed and said USB peripheral device operates at classic-speed (full-speed or low-speed), and wherein said data travels in a host to device direction, through a local extender and a remote extender, which method comprises:

a) receiving at a local extender a notification from said host computer for the start of a split data transfer session, having said local extender forward said notification for the start of a split data transfer session across a network to said remote extender, and then having said remote extender store said notification for the start of a split data transfer session in local memory;

b) receiving at a local extender a first notification from said host computer for the continuation of a split data transfer session, having said local extender forward said first notification for the continuation of a split data transfer session across a network to said

remote extender, and then having said remote extender store said first notification for the continuation of a split data transfer session in local memory;

c) receiving at a local extender a further notification from said host computer for the continuation of a split data transfer session, having said local extender forward said further notification for the continuation of a split data transfer session across a network to said remote extender, and then having said remote extender store said further notification for the continuation of a split data transfer session in local memory;

d) receiving at a local extender a notification from said host computer for the completion of a split data transfer session, having said local extender forward said notification for the completion of a split data transfer session across a network to said remote extender, and then having said remote extender store said notification for the completion of a split data transfer session in local memory;

e) assembling at a remote extender said stored notification for the start of a split data transfer, said stored first notification for the continuation of a split data transfer, said stored further notification for the continuation of a split data transfer and said stored notification for the completion of a split data transfer session into a classic-speed notification of data transfer; and

f) having said remote extender forward said classic-speed notification of data transfer to said USB peripheral device.

30. A method as claimed in Claim 29 wherein said method operates over a data communications network in which the round-trip delay exceeds 1 microsecond.

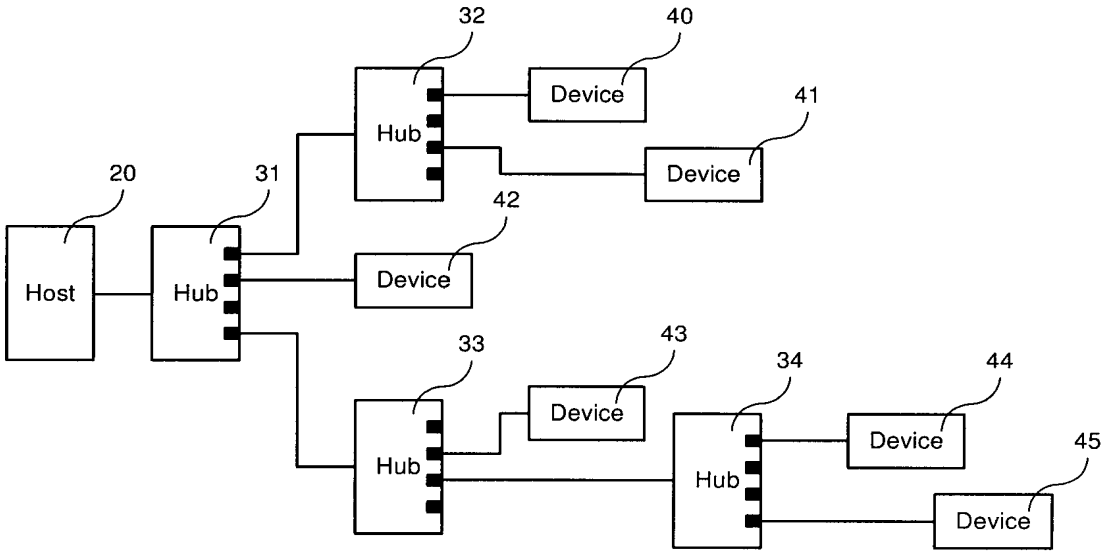


Figure 1 (Prior Art)

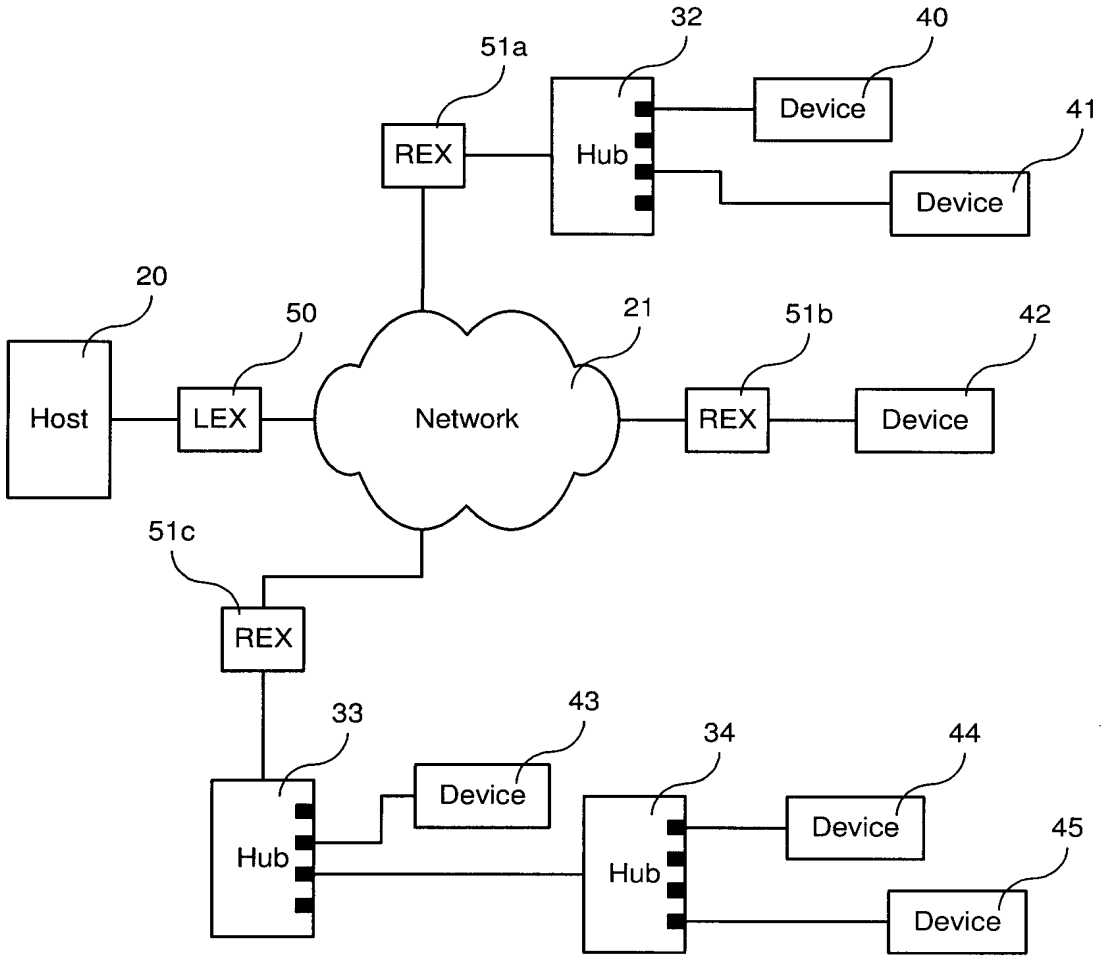

32
40
51a
Device
41
REX
Hub
Device
20
50
21
51b
42
Host
LEX
Network
REX
Device
51c
REX
33
43
34
44
Device
Hub
Device
Hub
45
Device

Figure 2

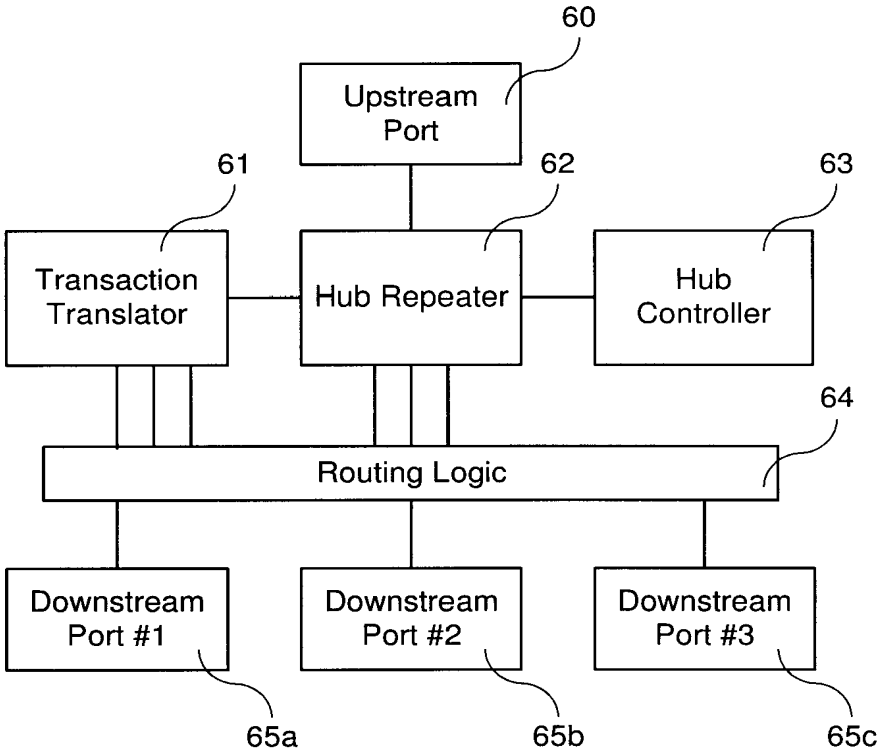


Figure 3 (Prior Art)

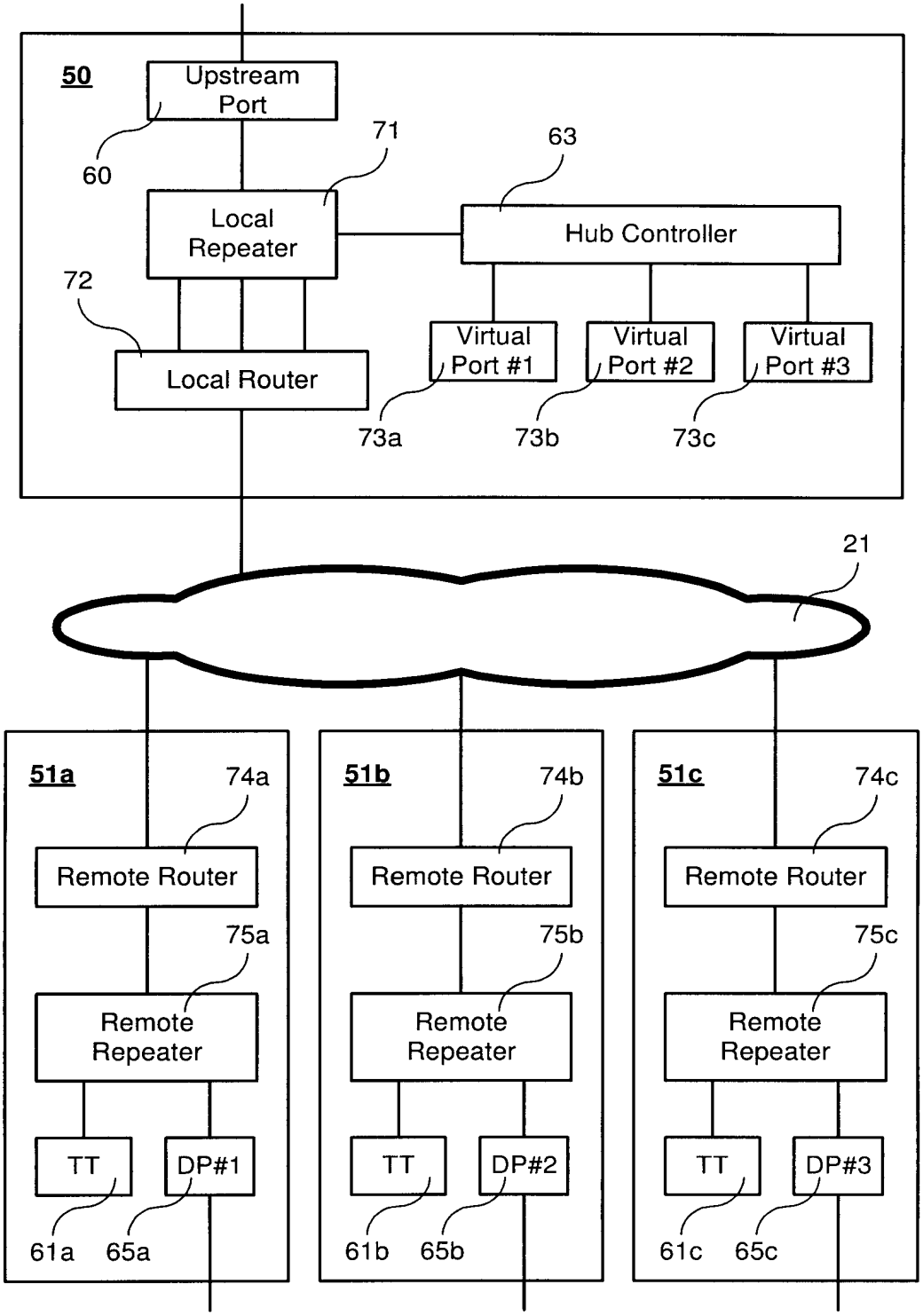

50
Upstream Port
60
71
63
Local Repeater
Hub Controller
72
Local Router
Virtual Port #1
Virtual Port #2
Virtual Port #3
73a
73b
73c
21
51a
74a
Remote Router
75a
Remote Repeater
TT
DP#1
61a
65a
51b
74b
Remote Router
75b
Remote Repeater
TT
DP#2
61b
65b
51c
74c
Remote Router
75c
Remote Repeater
TT
DP#3
61c
65c

Figure 4

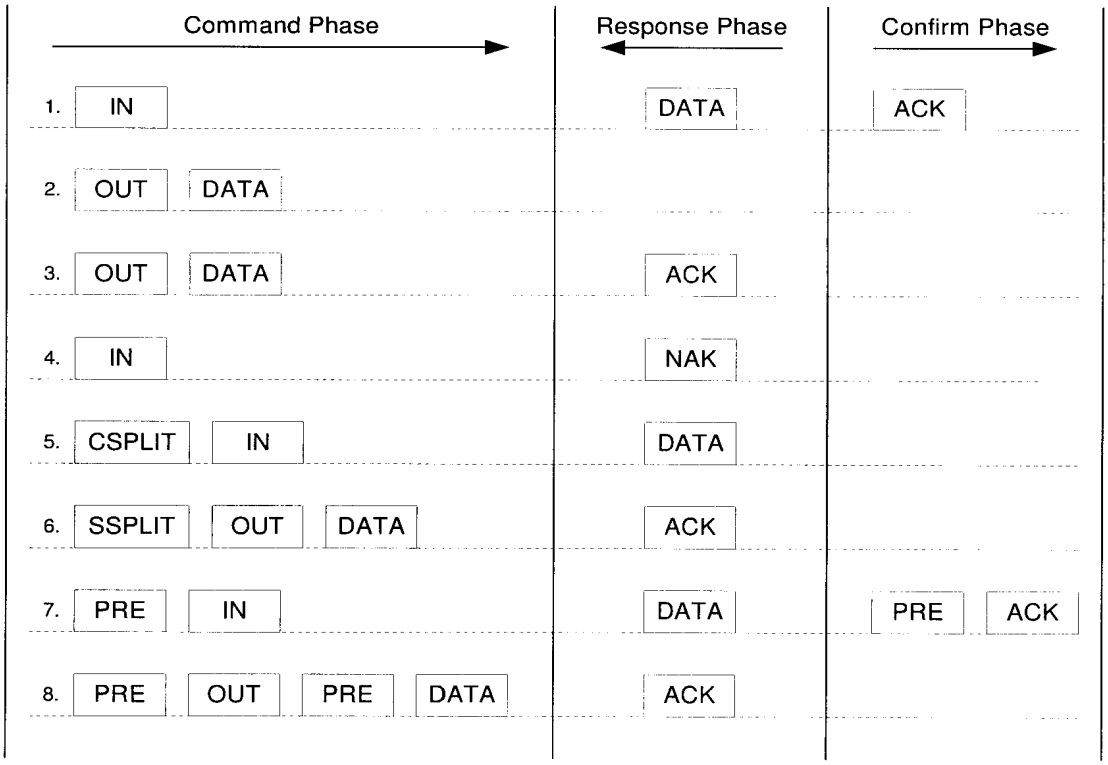


Figure 5 (Prior Art)

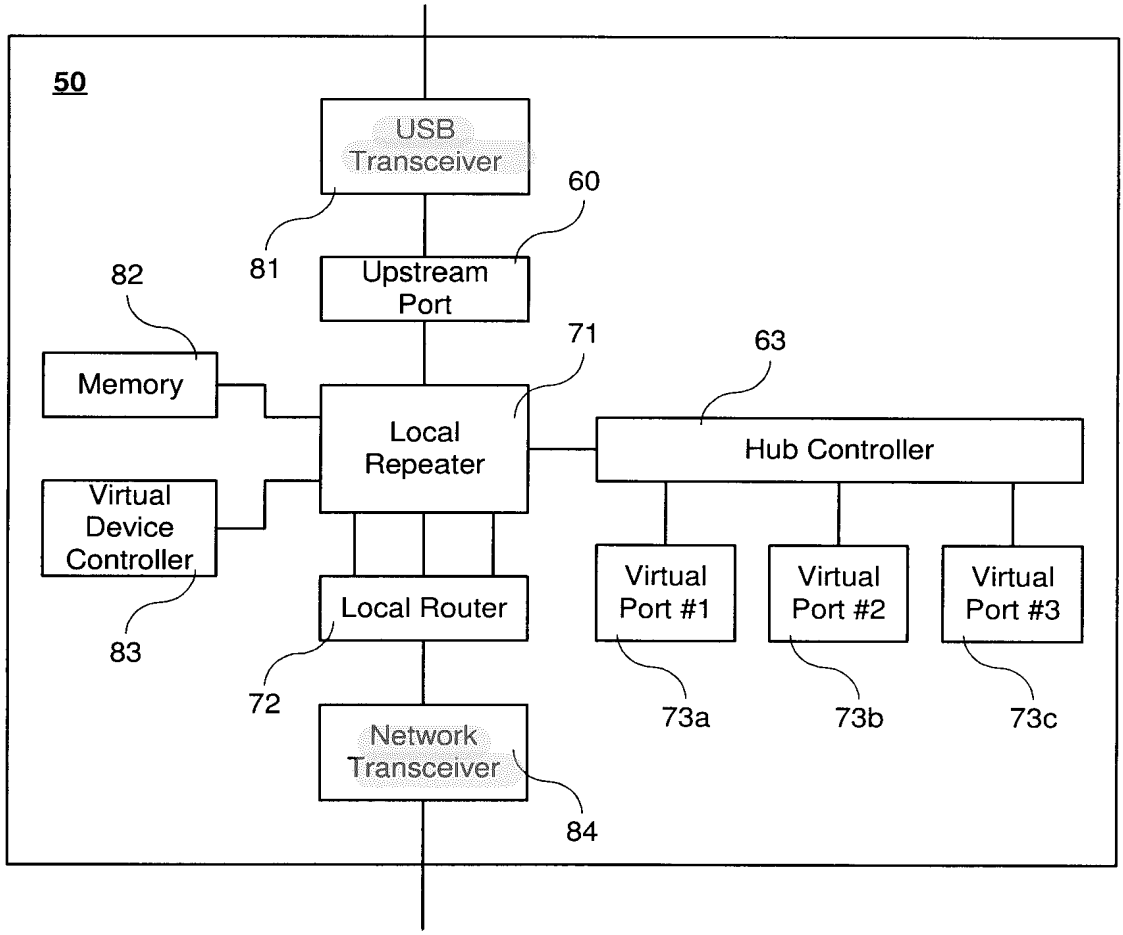

50
USB Transceiver
60
81
Upstream Port
82
71
63
Memory
Local Repeater
Hub Controller
Virtual Device Controller
Local Router
Virtual Port #1
Virtual Port #2
Virtual Port #3
83
72
73a
73b
73c
Network Transceiver
84

Figure 6

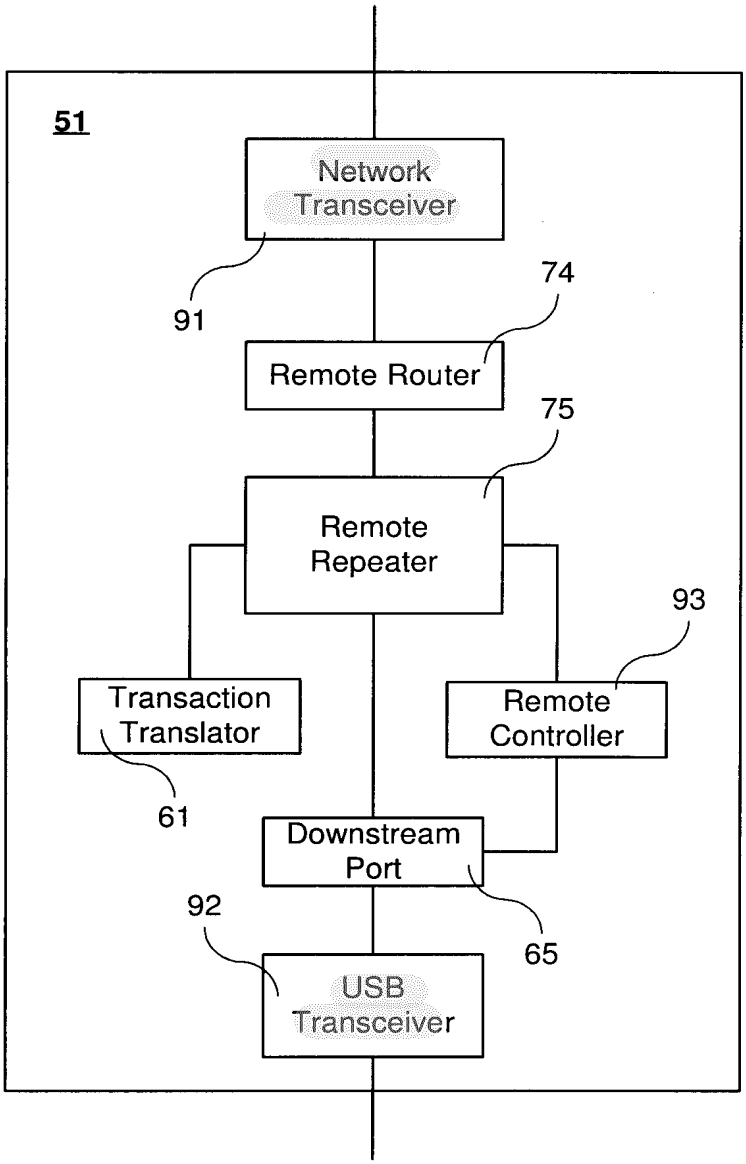

51
Network Transceiver
91
74
Remote Router
75
Remote Repeater
93
Transaction Translator
Remote Controller
61
Downstream Port
92
65
USB Transceiver

Figure 7

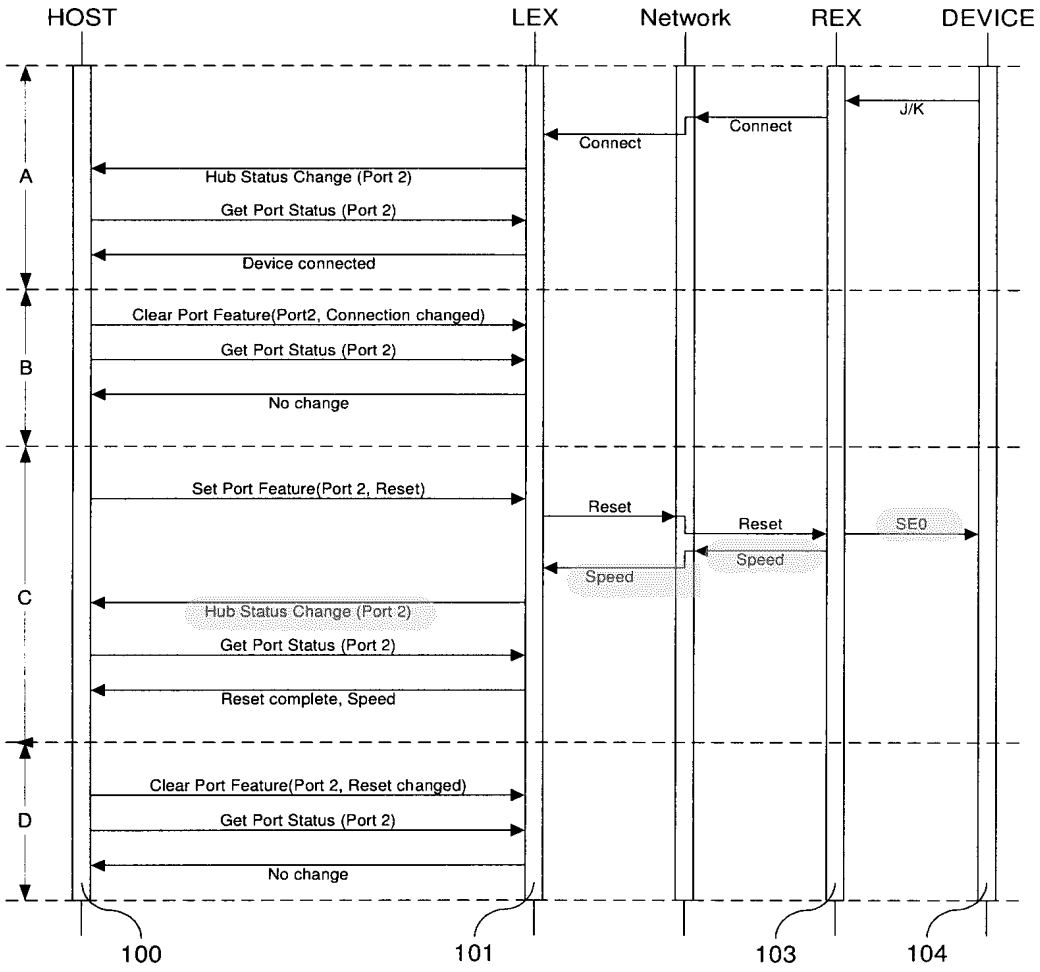

HOST
LEX
Network
REX
DEVICE
J/K
Connect
Connect
A
Hub Status Change (Port 2)
Get Port Status (Port 2)
Device connected
Clear Port Feature(Port2, Connection changed)
Get Port Status (Port 2)
B
No change
Set Port Feature(Port 2, Reset)
Reset
Reset
SE0
Speed
Speed
C
Hub Status Change (Port 2)
Get Port Status (Port 2)
Reset complete, Speed
Clear Port Feature(Port 2, Reset changed)
D
Get Port Status (Port 2)
No change
100
101
103
104

Figure 8

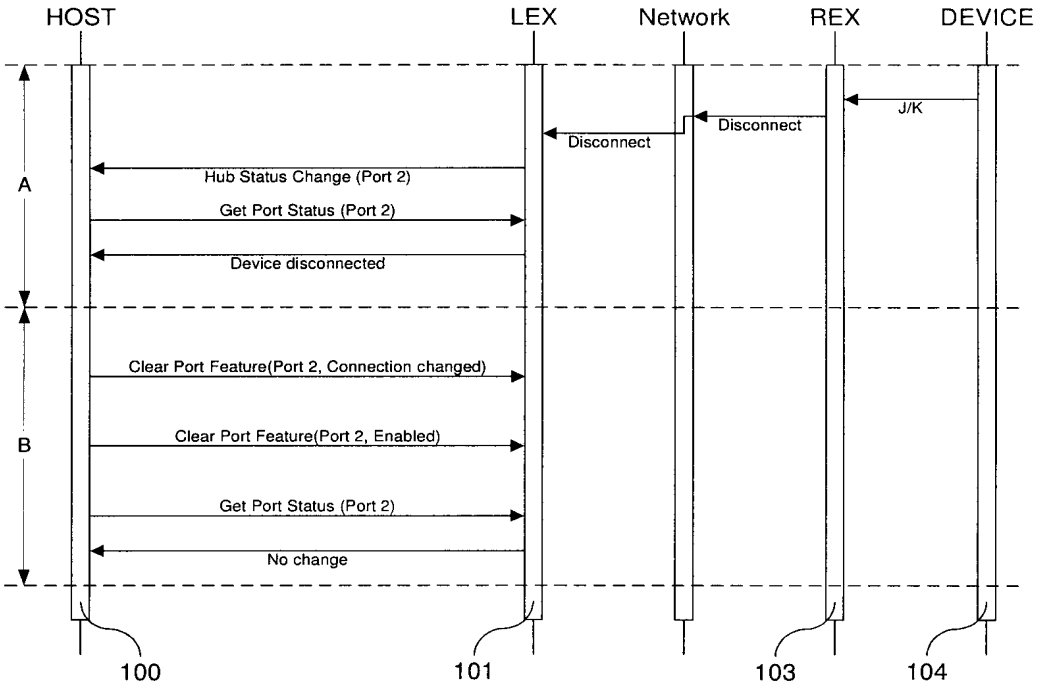

HOST
LEX
Network
REX
DEVICE
J/K
Disconnect
Disconnect
A
Hub Status Change (Port 2)
Get Port Status (Port 2)
Device disconnected
B
Clear Port Feature(Port 2, Connection changed)
Clear Port Feature(Port 2, Enabled)
Get Port Status (Port 2)
No change
100
101
103
104

Figure 9

Device	Parent		Child				Network
	Address	Port	Port #1	Port #2	Port #3	Port #4	
"							
"							
31	Null	Null	32	42	-	33	N0
32	31	1	40	-	41	-	N1
33	31	4	-	43	34	-	N3
34	33	3	44	-	-	45	
"							
"							
40	32	1					
41	32	3					
42	31	2					N2
43	33	2					
44	34	1					
45	34	4					

Figure 10

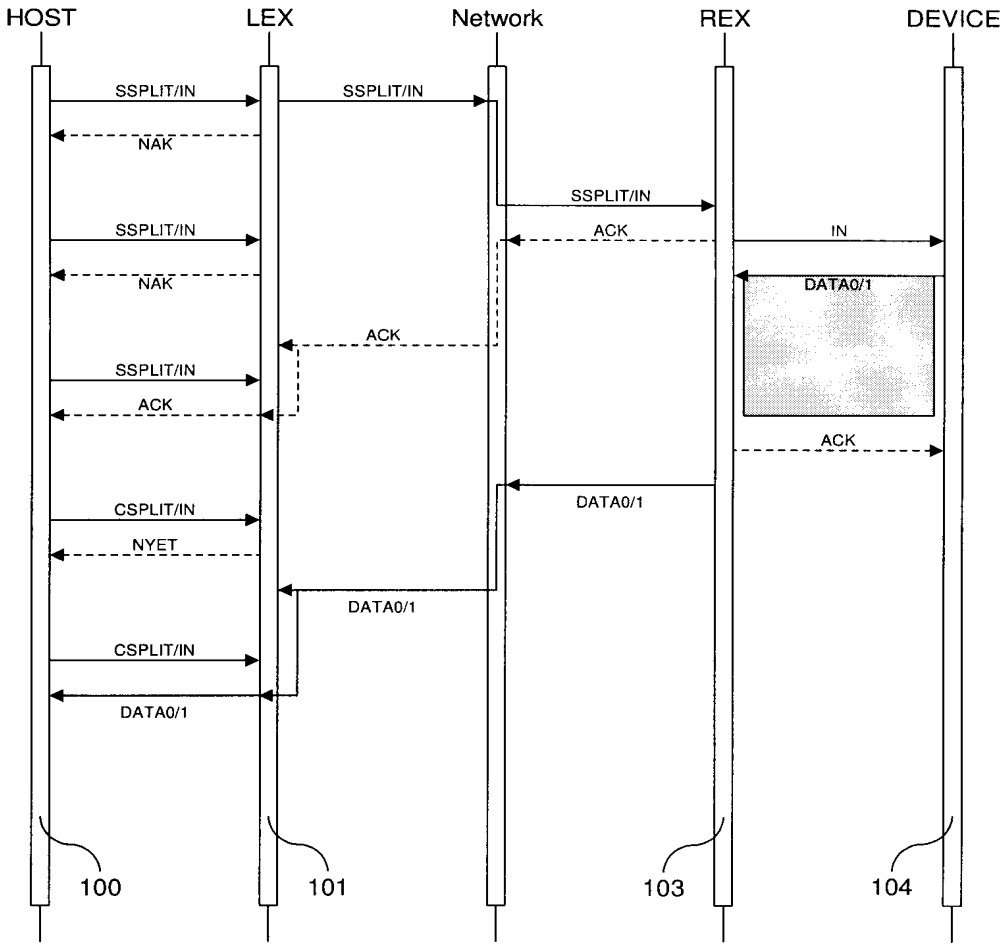

HOST
LEX
Network
REX
DEVICE
SSPLIT/IN
SSPLIT/IN
NAK
SSPLIT/IN
ACK
IN
SSPLIT/IN
NAK
DATA0/1
ACK
SSPLIT/IN
ACK
ACK
DATA0/1
CSPLIT/IN
NYET
DATA0/1
CSPLIT/IN
DATA0/1
100
101
103
104

Figure 11

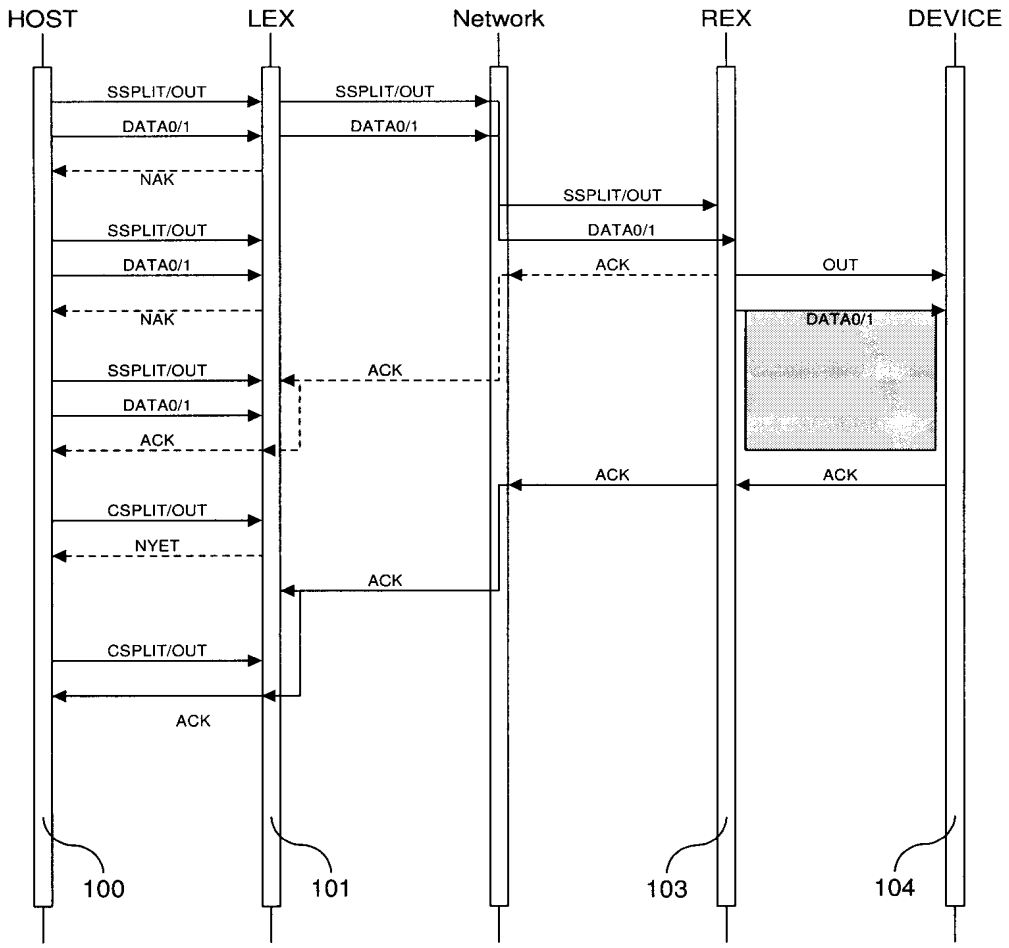

HOST
LEX
Network
REX
DEVICE
SSPLIT/OUT
DATA0/1
NAK
SSPLIT/OUT
DATA0/1
NAK
SSPLIT/OUT
DATA0/1
ACK
CSPLIT/OUT
NYET
CSPLIT/OUT
ACK
SSPLIT/OUT
DATA0/1
ACK
ACK
SSPLIT/OUT
DATA0/1
ACK
OUT
DATA0/1
ACK
ACK
100
101
103
104

Figure 12

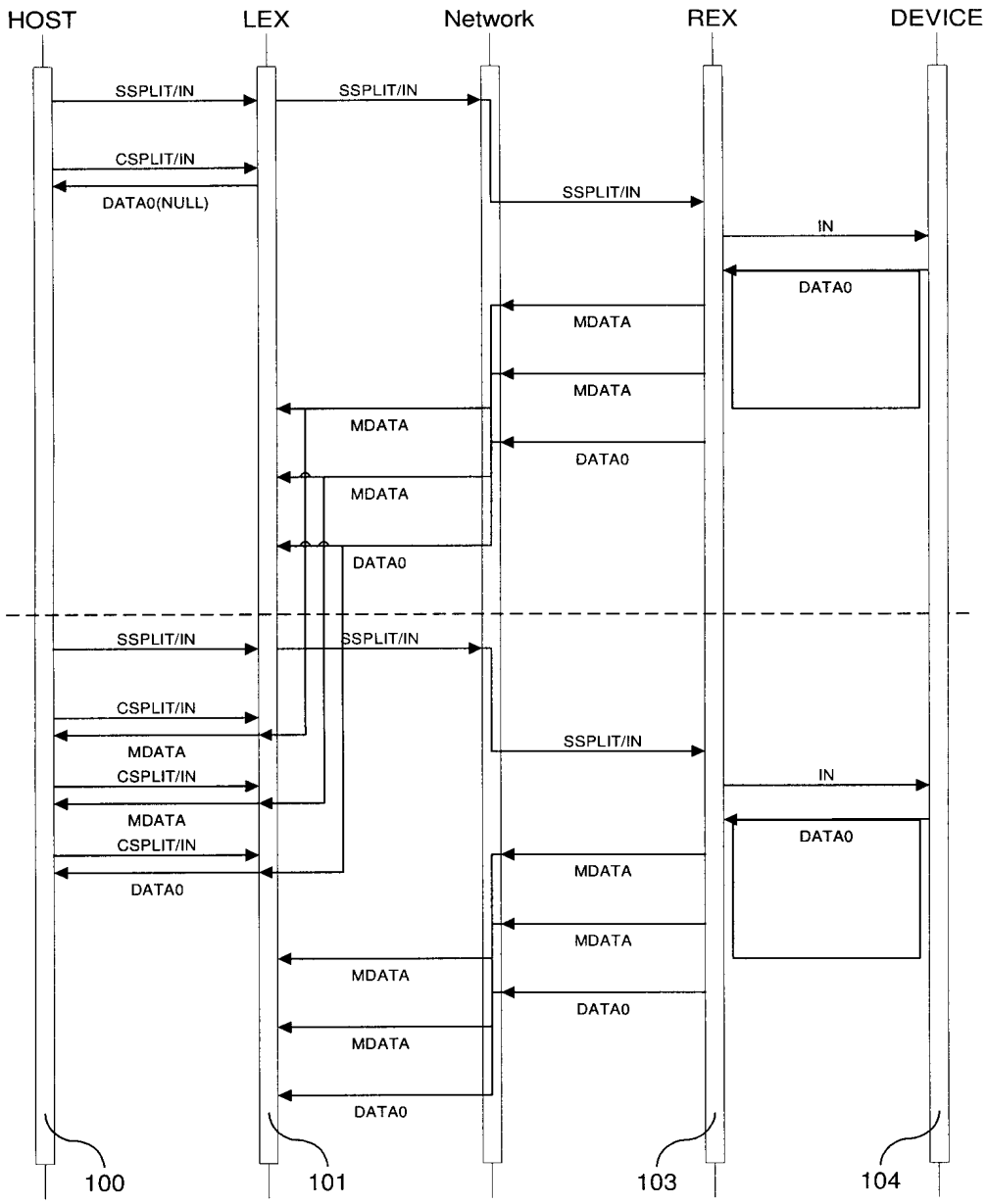

HOST
LEX
Network
REX
DEVICE
SSPLIT/IN
SSPLIT/IN
CSPLIT/IN
DATA0(NULL)
SSPLIT/IN
IN
DATA0
MDATA
MDATA
MDATA
DATA0
MDATA
DATA0
SSPLIT/IN
SSPLIT/IN
CSPLIT/IN
MDATA
SSPLIT/IN
CSPLIT/IN
IN
MDATA
DATA0
CSPLIT/IN
MDATA
DATA0
MDATA
MDATA
MDATA
DATA0
MDATA
DATA0
100
101
103
104

Figure 13

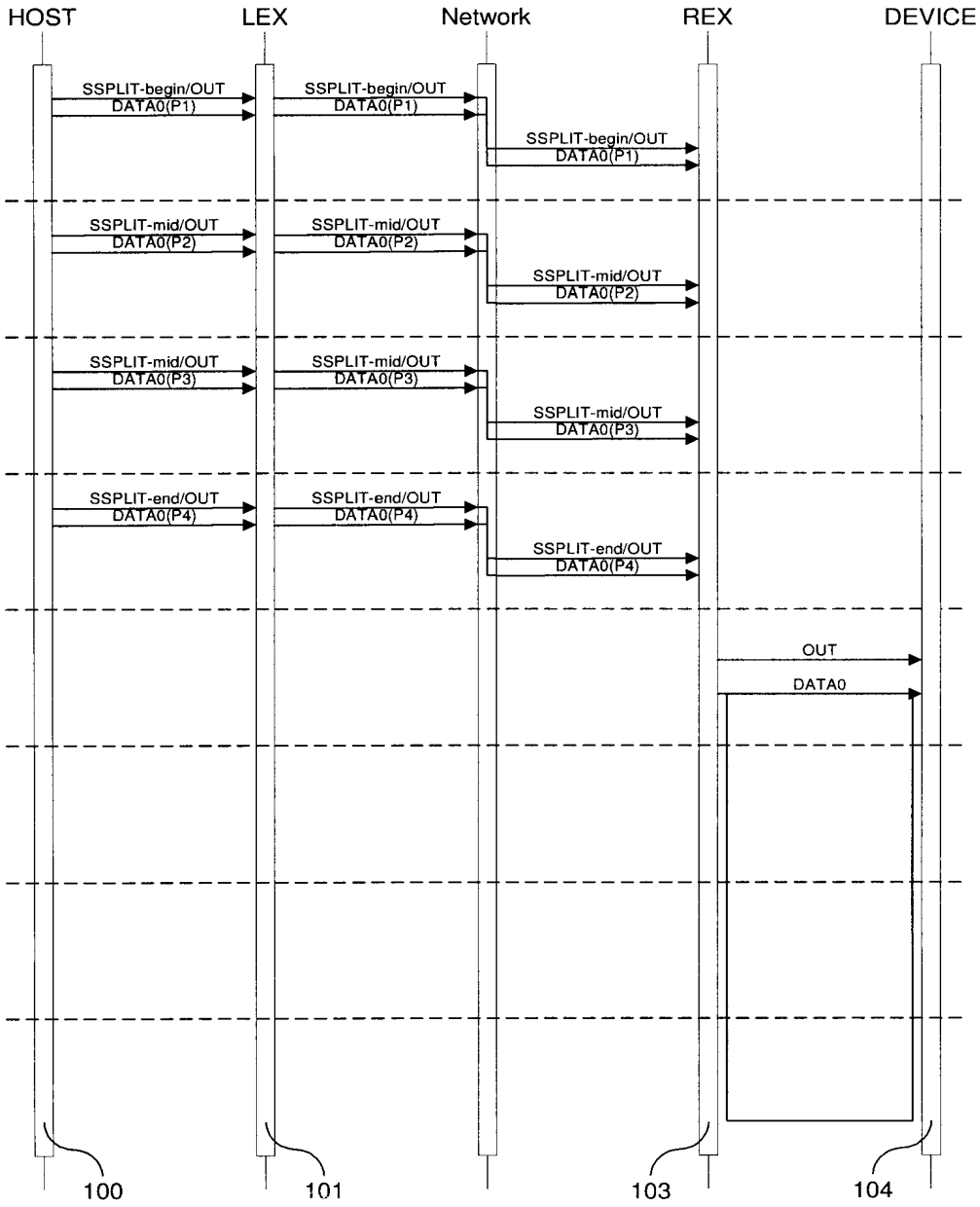

HOST
LEX
Network
REX
DEVICE
SSPLIT-begin/OUT
DATA0(P1)
SSPLIT-begin/OUT
DATA0(P1)
SSPLIT-begin/OUT
DATA0(P1)
SSPLIT-mid/OUT
DATA0(P2)
SSPLIT-mid/OUT
DATA0(P2)
SSPLIT-mid/OUT
DATA0(P2)
SSPLIT-mid/OUT
DATA0(P3)
SSPLIT-mid/OUT
DATA0(P3)
SSPLIT-mid/OUT
DATA0(P3)
SSPLIT-end/OUT
DATA0(P4)
SSPLIT-end/OUT
DATA0(P4)
SSPLIT-end/OUT
DATA0(P4)
OUT
DATA0
100
101
103
104

Figure 14

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA2007/001341

A. CLASSIFICATION OF SUBJECT MATTER
IPC: ***G06F 13/00*** (2006.01) , ***G06F 13/38*** (2006.01) , ***H04L 12/40*** (2006.01)
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC: ***G06F 13/00*** (2006.01) , ***G06F 13/38*** (2006.01) , ***H04L 12/40*** (2006.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used)
Canadian Patents Database, IEEEXplore, West, QWEB Keywords: local extender, remote extender , delay, virtual, port, hub, USB

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US20040205279 (Ohnishi) 14 October 2004 (14-10-2004) * paragraphs 0008, 0012, 0014, 0026, 0027, 0049, 0117 *	1-4, 7-20
Y	Figure 1	5
Y	US20060020736 (Jackson) 26 January 2006 (26-01-2006) * paragraphs 0629-0633 *	5
P, X	US20060206636 (McLeod) 14 September 2006 (14-09-2006) * paragraphs 0013, 0015, 0017-0032 *	1, 15
A	US6721332 (McAlear) 13 April 2004 (13-04-2004) * whole document *	1-30
A	US20020144042 (Garney) 03 October 2002 (03-10-2002) * whole document *	1-30

[ ] Further documents are listed in the continuation of Box C. [X] See patent family annex.

* Special categories of cited documents :
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
05 October 2007 (05-10-2007)	21 November 2007 (21-11-2007)

Name and mailing address of the ISA/CA	Authorized officer
Canadian Intellectual Property Office Place du Portage I, C114 - 1st Floor, Box PCT 50 Victoria Street Gatineau, Quebec K1A 0C9 Facsimile No.: 001-819-953-2476	Mark J. Stephens 819- 934-3472

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of the first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons :

1. [ ] Claim Nos. :
because they relate to subject matter not required to be searched by this Authority, namely :

2. [ ] Claim Nos. :
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically :

3. [ ] Claim Nos. :
because they are dependant claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows :

1-6, 15-30 a local extender device which accommodates delays associated which a USB device is not normally capable of handling

7-14 determination of status of a remote USB device

1. [ ] As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. [X] As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.

3. [ ] As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claim Nos. :

4. [ ] No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim Nos. :

Remark on Protest

[ ] The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

[ ] The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

[ ] No protest accompanied the payment of additional search fees.

Patent Document Cited in Search Report	Publication Date	Patent Family Member(s)	Publication Date
US2004205279	14-10-2004	JP2004295333 A	21-10-2004
		US7111106 B2	19-09-2006
US2006020736	26-01-2006	AU4501200 A	17-11-2000
		US7028133 B1	11-04-2006
		US7177973 B2	13-02-2007
		WO0067103 A1	09-11-2000
US2006206636	14-09-2006	WO2006094412 A1	14-09-2006
US6721332	13-04-2004	AU1024900 A	29-05-2000
		AU1025100 A	29-05-2000
		CA2390606 A1	25-05-2001
		US6389029 B1	14-05-2002
		US6697372 B1	24-02-2004
		US6965614 B1	15-11-2005
		WO0028696 A2	18-05-2000
		WO0028697 A2	18-05-2000
		WO0137485 A1	25-05-2001
US2002144042	03-10-2002	CN1299215C C	07-02-2007
		EP1374074 A1	02-01-2004
		HK1066887 A1	21-09-2007
		TW233554B B	01-06-2005
		US6886062 B2	26-04-2005
		WO02080008 A1	10-10-2002

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PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/742,166	**03/08/2023 06:08:23 PM ET**	**21063.0018USC1**

Title of Invention

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	9959	FILED BY	Yanling Cottle
PATENT CENTER #	61711304	FILING DATE	05/11/2022
CUSTOMER #	52835	FIRST NAMED INVENTOR	Gauthier RENARD
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Thomas Lee

Documents

TOTAL DOCUMENTS: 6

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
FR1_WO2008011727.pdf	70	Foreign Reference	3171 KB
NPL1-WiRanger.pdf	28	Non Patent Literature	1169 KB
NPL2_3rd_Party_Observation.pdf	4	Non Patent Literature	136 KB
NPL3_OA3_EP.pdf	5	Other reference-Patent/Application/Search Documents	152 KB
NPL4_OA2_CN.pdf	20	Other reference-Patent/Application/Search Documents	9511 KB

SB08_0018USC1.pdf	4	Information Disclosure Statement (IDS) Form (SB08)	1234 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
FR1_WO2008011727.pdf	354BC4CC498AC4251501CBB6A58541A58E3235995BE2624898D2588B8F9A1BE6BDAFAD4E2E20E8F159769FD8710C47E3DB245E9DED5C8E025EA63284EDE9089E
NPL1-WiRanger.pdf	AC9F5439311C95AF27D95BBFCA3830934B0A2180D512B81A830621DE23E963A64F735A983C5039EB776775F8FE1472D3D13EECA1FB1172446078BD2F9AA9A8DC
NPL2_3rd_Party_Observation.pdf	F72AB0368532F079C71264A656ECFEE1E5A8129AE5E3EC770223EE83E5FF64BD721F68AFF57B18A74C607FED73318F10EAB5EABAC96D58A5156CA9B1E06040D2
NPL3_OA3_EP.pdf	6659AF636CA066FF509EBADB791333F39AE93FC293DDD2116F55052C65C2BF5D2A079769CA21FE98957F52B16B83C6BB89E01F6114BC0764BF582547CE5EA591
NPL4_OA2_CN.pdf	E5B098DB84099EFE59D90B6C23FD85C483D31BAE312168F2FCE123D222F64934A1D4C5171C3AB97B3F9F0DA473D8F4F0FB65F7016CA15A26D42A055597B2ECDA
SB08_0018USC1.pdf	25EEF7363A8054B17D080806C4C9F964C0EE3255415FB206E67CD51F3B1B39A722125A23F4156F68379F6842C9D48F5AB1C47B0EFA4E37491B2298E0213B809D

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/742,166	05/11/2022	Gauthier RENARD	21063.0018USC1	9959

52835 7590 05/09/2023

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 South Seventh Street
Suite 2700
Minneapolis, MN 55402-1683

EXAMINER	
MISIURA, BRIAN THOMAS	

ART UNIT	PAPER NUMBER
2186	

NOTIFICATION DATE	DELIVERY MODE
05/09/2023	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTOMail@hsml.com

Office Action Summary	Application No. 17/742,166	Applicant(s) RENARD et al.	
	Examiner BRIAN T MISIURA	Art Unit 2186	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 5/11/2022.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-28 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1-11,13 and 15-25 is/are rejected.

8) ☑ Claim(s) 12,14 and 26-28 is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☑ The drawing(s) filed on 5/11/2022 is/are: a)☑ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date See Continuation Sheet.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

Continuation of Attachment(s) 2) Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date: 7/11/2022, 8/10/2022, 11/1/2022, 1/25/2023, 3/8/2023

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Detailed Action

Claim Rejections - 35 USC § 112

The following is a quotation of 35 U.S.C. 112(b):
(b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 11 recites the limitation "the third video data" in line 1. There is insufficient antecedent basis for this limitation in the claim as the third video data was introduced in claim 10, and not claim 9, from which claim 11 is dependent.

Claim 16 recites the limitation "the first peripheral device" in line 4. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having

> ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103 are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-3, 6-9, 15-18, and 21-24 are rejected under 35 U.S.C. 103 as being unpatentable over **Brands** et al. U.S. PGPUB No. 2015/0121466 in view of **Christison** et al. U.S. Patent No. 7,761,627 (both previously cited in IDS documents).

Per Claim 1, Brands discloses a method for connecting a processing device (**Paragraph 118, processing device 31**) to a functional device (**Paragraphs 120-121; display 44, whiteboard 45, camera 35, microphones 38**), the functional device being connected to or in a base unit of a communications network (**Paragraphs 119-121; base node 36**), the processing device having a memory, a display and an operating system (**Paragraph 118; Devices such as laptop computers and tablet computing devices each have those elements.**), wherein the processing device hosts a host application (**Paragraph 128, "portable application 60"**), further comprising: a first peripheral device (**connection unit 47**) being configured to be coupled to the processing device via a generic communications protocol (**Paragraphs 118, 126, 140**), the base unit having a transmitter and the first peripheral device having a receiver (**Paragraphs 129-130**), the method further comprising: the base unit being configured to transmit and the first peripheral device being configured to receive first processed video data over the communications network, the functional device being configured for first video data to flow into the base unit or first video data is captured in the base unit, the first video data being processed in the base unit to generate the first processed video data, wherein the first processed video data is sent to the first peripheral device (**Paragraphs 118 and 119 disclose that base node 36 may be a processing device**

or host computer, and is in communication with client device 31 via network 50 and first connection unit 47. Paragraph 120 and Figure 1a disclose cameras 39-41. Paragraph 122 discloses that any or all the outputs of the cameras can be recorded and stored digitally in base node 36. Therefore, base node 36 receives first video data from cameras 39-41, processes the video data to be able to transmit it via network 50 to first connection unit 47, and ultimately to client device 31.), the first peripheral device being configured to process the first processed video data received by the first peripheral device to generate second video data, the first peripheral device being configured to make the second video data available through the at least one fixed or configurable endpoint of the first peripheral device (**Paragraph 140, Figures 1 and 4; Connection unit 47 communicates with base node 36 via network connection and with client device 31 via a USB interface. Therefore, connection unit 47 must process the first received video from base node 36 in order to facilitate receiving the video via network connection and sending the video via a USB connection. Some level of processing is necessary.**), the operating system of the processing device being configured to capture the second video data and to make it available through a custom or standard driver to either the host application or a 3rd party application running on the processing device or to other processing devices (**Paragraphs 138 and 153**).

Brands discloses that base node 36 interconnects processing devices 31 with display 44, whiteboard 45, and/or other peripheral devices such as cameras, loudspeakers, and microphones. The interconnected processing and peripheral devices allow for an electronic meeting to take place by way of sharing media content from the plurality of different devices using the display(s) in a meeting room 30 **(Paragraphs 119-124 and 127)**. Brands further teaches the portable application's role in coordinating the interactions between the processing devices 31 and the peripheral devices present within meeting room 30 (**Paragraphs 128 and 138-140**). Brands does not specifically disclose at least one fixed or configurable endpoint of the functional device is exposed on the first peripheral device.

However, Christison similarly discloses connecting a host computing device (**400**) via USB to a first peripheral device (**HWA 410**), wherein said first peripheral device is connected via network to a base unit (**DWA 420**) which is further connected directly to a functional device (**USB devices 421, 422, 431, 432**). Christison further discloses exposing endpoints to a host device so that they appear as though they are native USB devices (**Col. 6 line 13 – Col. 7 line 35; Wired devices appear to the host as if they are native WUSB devices. Attached USB devices are presented as a separate function on an already existing device by using wired device endpoints mapped into WUSB hub endpoints.**).

- It would have been obvious to one having ordinary skill in the art before the effective filing date of the claimed invention to implement the endpoint representation of USB devices as taught by Christison within the USB dongle of Brands electronic meeting system in order to provide a seamless integration for a meeting participant to access all of the functional devices present within the disclosure of Brands, such as various USB devices like a camera, microphone, and/or speaker.

Per Claims 2 and 3, Brands discloses the method of claim 1, wherein the first video data is interpreted and/or encoded in the base unit to form the first processed video data and wherein the first video data is enhanced, mixed, multiplexed, and/or encrypted in the base unit (**Paragraph 122 discloses that any or all the outputs of the cameras can be recorded and stored digitally in base node 36. Therefore, base node 36 receives first video data from cameras 39-41, processes the video data to be able to transmit it via network 50 to first connection unit 47, and ultimately to client device 31. This processing and transmitting over a network includes at least an interpretation/encoding step and an encryption step based on common network packetization techniques.**).

Per Claim 6, please refer to the above rejection of claim 1 as the limitations are substantially similar and the rejection is equally applicable.

Per Claim 7, Brands discloses the method according to claim 4, wherein the first processed video data is sent to the first peripheral device through a wireless link (**network 50**).

Per Claim 8, Brands discloses the method according to claim 1, wherein the first video data is for display on a display (**Client device 31 comprises a display device.**).

Per Claim 9, Brands discloses the method according to claim 1, wherein the 3rd party application is a hosted Unified Communication (**Paragraph 152, "multiple participants…engage in a media conference"; Paragraph 153, "a dedicated software client"**).

Per Claim 15, Brands teaches the method of claim 1, wherein the functional device is a second peripheral device (**Paragraph 120, cameras 39-41**).

Per Claims 16-18 and 21-24, please refer to the above rejection of claims 1-3 and 6-9, as the claims are substantially similar and the rejections are equally applicable.

* * * * * * *

Claims 4, 5, 10, 11, 19, and 20 are rejected under 35 U.S.C. 103 as being unpatentable over **Brands** et al. U.S. PGPUB No. 2015/0121466 in view of **Christison** et al. U.S. Patent No. 7,761,627, in further view of **Beel** et al. U.S. PGPUB No. 2015/0169477 (all references previously cited in IDS documents).

Per Claims 4 and 5, Brands discloses video being captured by cameras 39-41, passed to base node 36, transmitted to dongle 47, and finally provided to client device 31 (**Paragraph 140, Figures 1 and 4; Connection unit 47 communicates with base node 36 via network connection and with client device 31 via a USB interface. Therefore, connection unit 47 must process the first received video from base**

node 36 to facilitate receiving the video via network connection and sending the video via a USB connection. Some level of processing is necessary.).

Brands does not specifically teach the dongle 47 performing the steps of claims 4 and 5.

However, Beels, of common assignee and field of endeavor, teaches that dongle 47 comprising a plurality of components required to perform the claimed limitations in a communication between the client pc 31 and base node 36 (**Paragraphs 319-329, Figure 11; The example discussed comprises a communication from the client pc to the base node, however, a similar process is performed in a communication originating at the base node 36 and concluding at the client pc 31.**).

- It would have been obvious to one having ordinary skill in the art before the effective filing date of the claimed invention to for the dongle 47 of Brands to comprise the software/hardware of the similar dongle of Beels and to perform the processing on the video being passed between the base unit and the client pc in order to ben able to communicate between a network connected device (base unit) and a direct USB connected device (client PC)

Per Claim 10, Beel further teaches wherein third video data, received from the host application and/or from the 3rd party application running on the processing device, is sent to an endpoint of the first peripheral device via a standard generic driver, the first peripheral device receiving the third video data and processing the third video data to form second processed video data (**Paragraphs 318-324, Figure 11**).

Per Claims 11 and 12, Brands/Beel disclose the method according to claim 9, wherein the third video data is enhanced, and/or encoded to form the second processed data and the second processed data is sent through a wireless link to the base unit, and wherein the base unit decrypts the second processed data (**Beel, Paragraphs 318-324, Figure 11; Both dongles comprise a WiFi transmitter that would perform the encoding necessary to transmit the video data over a wireless network and a**

receiving base unit would necessarily need to decrypt the received network data.).

Per Claims 19, 20, and 25, please refer to the above rejection of claims 4, 5, and 10, as the limitations are substantially similar and the rejections are equally applicable.

Allowable Subject Matter

Claims 12, 14, and 26-28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Claims 12 and 26 distinguish over Brands in that Brands, while disclosing the base node 36 being connected to a display device 44 or over a network to other devices within a meeting room (**Fig. 1a**), does not specifically disclose receiving second processed data, decoding/enhancing said data, and forwarding it to a function device through a serial connection. Claim 27 inherits the allowable subject matter of claim 26.

Claims 14 and 28 distinguish over the prior art in that neither Brands nor Beel teach the base unit performing the disclose limitations.

- Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRIAN T MISIURA whose telephone number is (571)272-0889 - (Direct Fax: 571-273-0889). The examiner can normally be reached on M-F: 8-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kim Huynh can be reached on (571) 272-4174. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Brian T Misiura/
Primary Examiner, Art Unit 2186

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/742,166	RENARD et al.
	Examiner	Art Unit
	BRIAN T MISIURA	2186

CPC - Searched*		
Symbol	Date	Examiner
G06F13/122, 387, 4282	05/04/2023	BTM
H04L12/12, 0428, 1813	05/04/2023	BTM

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
IDS Consideration, Review/update search from parent application	05/04/2023	BTM

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	17742166
Filing Date	2022-05-11
First Named Inventor	RENARD
Art Unit	
Examiner Name	
Attorney Docket Number	21063.0018USC1

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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	1							

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

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Examiner Name	
Attorney Docket Number	21063.0018USC1

	1	Notice of Grounds of Rejection issued in corresponding Japanese Application No. 2020-536065, dated August 16, 2022, with English machine translation	X
	2	"Skype for Business" Skype for Business product brochure, Microsoft Japan, October 29, 2015, with partial translation	☒
	3	Office Action in related U.S. app. 16/771068 dated July 29, 2022.	☐

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EXAMINER SIGNATURE

Examiner Signature	/BRIAN T MISIURA/	Date Considered	05/03/2023

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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Art Unit	
Examiner Name	
Attorney Docket Number	21063.0018USC1

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2022-11-01
Name/Print	Thomas Lee	Registration Number	66,396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

Bibliographic Data

Application No: 17/742,166

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☑ No ☐ Met After Allowance

Verified and Acknowledged: /BRIAN T MISIURA/ Examiner's Signature | Initials

Title: METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
05/11/2022	710	2186	21063.0018USC1
RULE			

APPLICANTS

Barco N.V., Kortrijk, BELGIUM

INVENTORS

Gauthier RENARD, Kuurne, BELGIUM

Johan Peter Frans DEGRAEF, Gent, BELGIUM

CONTINUING DATA

This application is a CON of 16771068 06/09/2020

16771068 is a 371 of PCT/EP2018/086537 12/21/2018

PCT/EP2018/086537 is a CON of 15858668 12/29/2017 PAT 10684972

FOREIGN APPLICATIONS

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05/19/2022

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Suite 2700
Minneapolis, MN 55402-1683
UNITED STATES

FILING FEE RECEIVED

$2,620

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (03-15)
Approved for use through 07/31/2016. OMB 0651-0031
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

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First Named Inventor	Gauthier RENARD
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Examiner Name	
Attorney Docket Number	21063.0018USC1

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	9722986	B2	2017-08-01	Brands	Corresponds to CN104412542
	2	7761627		2010-07-20	Christison	
	3	7617342		2009-11-10	Rofougaran	
	4	9183164		2015-11-10	Brabenac	
	5	9201826		2015-12-01	Huang	
	6	9804977		2017-10-31	Ghosh	
	7	9934168		2018-04-03	Griffin	
	8	9722986		2017-08-01	Brands	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

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	Art Unit	
	Examiner Name	
	Attorney Docket Number	21063.0018USC1

	9	9538138		2017-01-03	Leete	
	10	9083769		2015-07-14	Beel	
	11	8896656		2014-11-25	Epstein	
	12	8756348		2014-06-17	Beel	
	13	8316138		2012-11-20	Chang	
	14	10031873	B2	2018-07-24	Hundal et al.	

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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20140181325	A1	2014-06-26	Hundal et al.	
	2	20160125838	A1	2016-05-05	Hundal et al.	
	3	20020196378	A1	2002-12-26	Slobodin et al.	

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	Attorney Docket Number	21063.0018USC1

	4	20060075100		2006-04-06	Stirbu	
	5	20140148152	A1	2014-05-29	Periyalwar et al.	
	6	20160092153		2016-03-31	Demik	
	7	20140362161		2014-12-11	Leete	
	8	20100302130		2010-12-02	kikuchi	
	9	20100115145		2010-05-06	Banerjee	
	10	20090198839		2009-08-06	Banerjee	
	11	20150169477	A1	2015-06-18	Beel et al.	
	12	20150121466	A1	2015-04-30	Brands et al.	
	13	20150263905	A1	2015-09-17	Beel et al.	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	17742166
Filing Date	2022-05-11
First Named Inventor	Gauthier RENARD
Art Unit	
Examiner Name	
Attorney Docket Number	21063.0018USC1

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	104412542	CN	A	2015-03-11		Corresponds to US9722986	
	2	2015011679	JP	A	2015-01-19		With English translation	X
	3	2016178422	JP	A	2016-10-06		With English translation	☒
	4	106412683	CN	A	2017-02-15		With English machine translation	☒
	5	1879143	EP	A1	2008-01-16			☐
	6	3099009	EP	A1	2016-11-30			☐
	7	2013037980	WO	A2	2013-03-21			☐
	8	2008080107	WO	A2	2008-07-03			☐

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

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	Filing Date	2022-05-11
	First Named Inventor	Gauthier RENARD
	Art Unit	
	Examiner Name	
	Attorney Docket Number	21063.0018USC1

	1	Office Action issued in Chinese Application No. 201880084464.1, dated January 26, 2022, with machine tranlation	☒
	2	Notice of Reason for Refusal issued in corresponding Japanese Application No. 2020-536065, dated November 4, 2021, with English translation	☒
	3	Office Action issued in European Patent Application No. 18833045.0, dated June 28, 2021	☐
	4	International Search Report in corresponding PCT/EP2018/086537 dated April 10, 2019.	☐
	5	Written Opinion in corresponding PCT/EP2018/086537 dated April 10, 2019.	☐
	6	International Preliminary Report on Patentability in corresponding PCT/EP2018/086537 dated November 21, 2019.	☐
	7	Barco - Clickshare Brochure, November 2018 (20 pages).	☐
	8	Communication issued in European Application No. 18 833 045.0, dated March 14, 2022	☐
	9	Wireless USB, from Wikipedia page, last edited on 22 December 2017, 11 pages provided	☐
	10	Written Opinion issued in corresponding Singapore Application No. 11202005201Y, dated May 23, 2022	☐

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	Filing Date	2022-05-11
	First Named Inventor	Gauthier RENARD
	Art Unit	
	Examiner Name	
	Attorney Docket Number	21063.0018USC1

EXAMINER SIGNATURE			
Examiner Signature	/BRIAN T MISIURA/	Date Considered	05/03/2023

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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Attorney Docket Number	21063.0018USC1

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See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2022-07-11
Name/Print	Thomas Lee	Registration Number	66396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	17742166
Filing Date	2022-05-11
First Named Inventor	Gauthier RENARD
Art Unit	
Examiner Name	
Attorney Docket Number	21063.0018USC1

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20040010464	A1	2004-01-15	John Boaz	cited in Office Action issued in US 17/675641

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17742166
	Filing Date	2022-05-11
	First Named Inventor	Gauthier RENARD
	Art Unit	
	Examiner Name	
	Attorney Docket Number	21063.0018USC1

	1	Office Action issued in US patent application 17/675,641, dated October 27, 2022	

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Examiner Signature	/BRIAN T MISIURA/	Date Considered	05/03/2023

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(Not for submission under 37 CFR 1.99)

Application Number	17742166
Filing Date	2022-05-11
First Named Inventor	Gauthier RENARD
Art Unit	
Examiner Name	
Attorney Docket Number	21063.0018USC1

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The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

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Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2023-01-25
Name/Print	Thomas Lee	Registration Number	66,396

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Doc code: IDS
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	17742166
Filing Date	2022-05-11
First Named Inventor	RENARD
Art Unit	2186
Examiner Name	
Attorney Docket Number	21063.0018USC1

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17742166
	Filing Date	2022-05-11
	First Named Inventor	RENARD
	Art Unit	2186
	Examiner Name	
	Attorney Docket Number	21063.0018USC1

	1	Office Action issued in Indian Application No. 202017017906, dated July 4, 2022, with English translation	X

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Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2022-08-10
Name/Print	Thomas Lee	Registration Number	66,396

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	1152	barco.as.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/03/21 06:21 AM
L2	1	((("RENARD") near3 ("Gauthier")) OR (("DEGRAEF") near3 ("Johan"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	ADJ	ON	ON	2019/03/21 06:22 AM
L3	3	"20020196378"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/03/21 06:24 AM
L4	23	"8756348"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/03/21 06:27 AM
L5	12	"2013037980"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/03/21 07:14 AM
L6	5	"20150169477"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/03/21 07:16 AM
L7	2	"20170351621"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/03/21 05:40 PM
L8	1152	barco.as.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/03/22 06:00 AM
L9	348	barco.as. and (microphone or speaker or projector or camera)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/03/22 06:02 AM
L10	4	"2001089156"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/03/22 06:15 AM
L11	13	"6917964"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/03/22 06:16 AM
L12	13	"2010105335"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/03/22 06:16 AM
L13	4	"20100302454"	(US-PGPUB; USPAT;	ADJ	ON	ON	2019/03/22

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)				06:18 AM
L14	42	("20020174254" | "20020196378" | "20040125777" | "20040128354" | "20040263636" | "20050015719" | "20050036509" | "20050122392" | "20060031779" | "20060095376" | "20070005809" | "20070033289" | "20070065078" | "20070109410" | "20070244970" | "20090046139" | "20090064302" | "20090092198" | "20090198839" | "20090235170" | "20090247006" | "20090300520" | "20100066806" | "20100087139" | "20100302130" | "20100302454" | "20100332663" | "20110023096" | "20110078716" | "20110115689" | "20110150433" | "20110179182" | "20110180380" | "20120331509" | "20130050254" | "20130054348" | "20130060662" | "20130067121" | "20140082227" | "6966035" | "8316138" | "8346753").PN. OR ("10050800").URPN.	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2019/03/22 06:21 AM
L15	6	(("20090064302") or ("20110078716")).PN.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	OFF	OFF	2019/03/22 06:34 AM
L16	0	L8 and functional device	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/03/22 06:37 AM
L17	29	L8 and ((screen$1 with (share$1 or sharing)) or lecture or seminar or collaborative or skype)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/03/22 06:41 AM

L18	105	L8 and (encod$3 or encrypt$3)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/03/22 06:52 AM
L19	14	(US-20150169477-$ or US-20150089395-$ or US-20100302130-$ or US-20090198839-$ or US-20150121466-$ or US-20150263905-$).did. or (US-7180475-$ or US-8756348-$ or US-8896656-$ or US-8316138-$ or US-9722986-$ or US-9083769-$).did. or (WO-2013037980-$).did.	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2019/03/22 09:33 AM
L20	8	L19 and driver$1	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/03/22 09:33 AM
L21	3	("20130067121").PN.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	OFF	OFF	2019/03/22 09:40 AM
L22	5744	barco not L8	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/03/22 09:51 AM
L23	471	L22 and ((screen$1 with (share$1 or sharing)) or lecture or seminar or collaborative or skype or conference or meeting)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/03/22 09:51 AM
L24	52	ClickShare	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/03/22 09:53 AM
L25	47	("20030098819" | "20050078172" | "20050135611" | "20050176416" | "20060160489" | "20060258300" | "20070287498" | "20090156120" | "20090328189" | "20100046455" | "20100115145" | "20100302454" | "20100321402" | "20110090942" | "20110134852" | "20120082069" |	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2019/03/22 10:07 AM

		"20120083215" | "20120133727" | "20120202426" | "20120278192" | "20120300759" | "20130016079" | "20130029685" | "20130034184" | "20130044695" | "20130050398" | "20130070739" | "20130084796" | "20130094439" | "20150035938" | "7142812" | "7593704" | "7912449" | "7912506" | "7965837" | "8218427" | "8229352" | "8259647" | "8265657" | "8279784" | "8285223" | "8306483" | "8320877" | "8326221" | "8332495" | "8345577" | "8396042").PN. OR ("9538138").URPN.					
L26	4	LiteShow	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2019/03/22 10:17 AM
L27	18	(US-20150169477-$ or US-20150089395-$ or US-20100302130-$ or US-20090198839-$ or US-20150121466-$ or US-20150263905-$ or US-20130067121-$ or US-20100115145-$ or US-20140362161-$).did. or (US-7180475-$ or US-8756348-$ or US-8896656-$ or US-8316138-$ or US-9722986-$ or US-9083769-$ or US-9538138-$).did. or (WO-2013037980-$).did.	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2019/03/22 10:26 AM
L28	26660	((H04M3/567 OR H04L65/4038 OR H04L12/1813 OR H04L65/403).CPC.)	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2019/03/22 10:28 AM
L29	13006	L28 and (collaborat$3 or group)	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2019/03/22 10:29 AM
L30	8618	L29 and (shared or share or sharing)	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2019/03/22 10:29 AM
L31	11	L27 and (encod$3 or encrypt$3)	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2019/03/22 02:49 PM
L32	18	(US-20150169477-$ or US-20150089395-$ or	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2019/03/25 10:37 AM

		US-20100302130-$ or US-20090198839-$ or US-20150121466-$ or US-20150263905-$ or US-20130067121-$ or US-20100115145-$ or US-20140362161-$).did. or (US-7180475-$ or US-8756348-$ or US-8896656-$ or US-8316138-$ or US-9722986-$ or US-9083769-$ or US-9538138-$).did. or (WO-2013037980-$).did.					
L33	10	L32 and driver$1	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2019/03/25 10:37 AM
L34	12	L32 and ((software or firmware) with user)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/03/25 10:59 AM
L35	11	L32 and (encod$3 or encrypt$3)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/03/25 03:44 PM
L36	8	L32 and (host same (conference or meeting))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/03/25 03:52 PM
L37	2	"20190205275"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/10/07 02:15 PM
L38	19	(US-20150169477-$ or US-20150089395-$ or US-20100302130-$ or US-20090198839-$ or US-20150121466-$ or US-20150263905-$ or US-20130067121-$ or US-20100115145-$ or US-20140362161-$ or US-20190205275-$).did. or (US-7180475-$ or US-8756348-$ or US-8896656-$ or US-8316138-$ or US-9722986-$ or US-9083769-$ or US-9538138-$).did. or (WO-2013037980-$).did.	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2019/10/07 02:15 PM
L39	4	L38 and endpoint$1	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	ADJ	ON	ON	2019/10/07 02:15 PM

			IBM_TDB)				
L40	1252	USB (HID or human interface (device or device class))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/10/07 02:48 PM
L41	1289	(universal serial bus or USB) (HID or human interface (device or device class))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/10/07 02:48 PM
L42	307	(HID or human interface (device or device class)) (universal serial bus or USB)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/10/07 02:48 PM
L43	12	(HID or human interface (device or device class)) endpoint$1	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/10/07 02:49 PM
L44	1436	L40 or L41 or L42	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/10/07 02:53 PM
L45	6	L44 and barco	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/10/07 02:53 PM
L46	6	("20060075100"|"20140148152").PN.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/10/07 03:14 PM
L48	29	"3099009"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/10/07 03:15 PM
L49	70	(USB or universal serial bus) near3 middleware	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/10/08 10:06 AM
L50	91	(wireless or bluetooth) (USB or universal serial bus) hub	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/10/08 10:19 AM
L51	10	L50 and (meeting$1 or conferenc$3)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/10/08 10:24 AM
L52	27	("20050278472" | "20060048196" | "20060061963" | "20060073788" | "20060143330" | "20060166621" | "20060179144" | "20060215574" | "20060218315" |	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2019/10/08 10:28 AM

		"20070066314" | "20070204076" | "20070230500" | "20070286416" | "20080005395" | "20080025329" | "20090006676" | "20090172216" | "6725302" | "6944687" | "7334059" | "7502011" | "7526590" | "7574323").PN. OR ("7761627").URPN.					
L53	344	control (HID or human interface (device or device class))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/10/08 11:58 AM
L54	46	L53 and (emulat$3 or mirror$3)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/10/08 12:00 PM
L55	23	(US-20150169477-$ or US-20150089395-$ or US-20100302130-$ or US-20090198839-$ or US-20150121466-$ or US-20150263905-$ or US-20130067121-$ or US-20100115145-$ or US-20140362161-$ or US-20190205275-$).did. or (US-7180475-$ or US-8756348-$ or US-8896656-$ or US-8316138-$ or US-9722986-$ or US-9083769-$ or US-9538138-$ or US-9183164-$ or US-7761627-$ or US-9201826-$ or US-7617342-$).did. or (WO-2013037980-$).did.	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2019/10/08 01:02 PM
L56	21	L55 and (stor$3)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/10/08 01:02 PM
L57	10	L50 and endpoint$1	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/10/08 01:23 PM
L58	6	L55 and endpoint$1	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/10/08 01:29 PM

L59	426	(IN or OUT) endpoint same USB	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/10/08 01:32 PM
L60	150	L59 and (conferenc$3 or meeting or collaborat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/10/08 01:35 PM
L61	1	L59 and barco	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/10/08 01:36 PM
L62	17	L55 and local$2	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/10/08 01:50 PM
L64	53	clickshare	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/10/08 02:37 PM
L65	25	(US-20150169477-$ or US-20150089395-$ or US-20100302130-$ or US-20090198839-$ or US-20150121466-$ or US-20150263905-$ or US-20130067121-$ or US-20100115145-$ or US-20140362161-$ or US-20190205275-$ or US-20160092153-$).did. or (US-7180475-$ or US-8756348-$ or US-8896656-$ or US-8316138-$ or US-9722986-$ or US-9083769-$ or US-9538138-$ or US-9183164-$ or US-7761627-$ or US-9201826-$ or US-7617342-$ or US-9804977-$).did. or (WO-2013037980-$).did.	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2019/10/08 02:43 PM
L66	11	L65 and (prox$3 or emulat$3 or endpoint$1)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/10/08 02:43 PM
L67	419	Connected (classroom or (meeting or conference or board) room)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/10/08 02:47 PM
L68	53	L67 and (prox$3 or emulat$3 or	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	ADJ	ON	ON	2019/10/08 02:47 PM

		endpoint$1)	JPO; DERWENT; IBM_TDB)				
L69	47	("20030098819" | "20050078172" | "20050135611" | "20050176416" | "20060160489" | "20060258300" | "20070287498" | "20090156120" | "20090328189" | "20100046455" | "20100115145" | "20100302454" | "20100321402" | "20110090942" | "20110134852" | "20120082069" | "20120083215" | "20120133727" | "20120202426" | "20120278192" | "20120300759" | "20130016079" | "20130029685" | "20130034184" | "20130044695" | "20130050398" | "20130070739" | "20130084796" | "20130094439" | "20150035938" | "7142812" | "7593704" | "7912449" | "7912506" | "7965837" | "8218427" | "8229352" | "8259647" | "8265657" | "8279784" | "8285223" | "8306483" | "8320877" | "8326221" | "8332495" | "8345577" | "8396042").PN. OR ("9538138").URPN.	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2019/10/08 03:56 PM
L70	1184	barco.as.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/10/08 04:11 PM
L71	5985	barco not L70	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/10/08 04:11 PM
L72	25	L70 and endpoint	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/10/08 04:11 PM
L73	48	L71 and endpoint	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	ADJ	ON	ON	2019/10/08 04:13 PM

			JPO; DERWENT; IBM_TDB)				
L74	116	(USB or universal serial bus) (sharing or device sharing)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/10/08 04:24 PM
L75	25	(US-20150169477-$ or US-20150089395-$ or US-20100302130-$ or US-20090198839-$ or US-20150121466-$ or US-20150263905-$ or US-20130067121-$ or US-20100115145-$ or US-20140362161-$ or US-20190205275-$ or US-20160092153-$).did. or (US-7180475-$ or US-8756348-$ or US-8896656-$ or US-8316138-$ or US-9722986-$ or US-9083769-$ or US-9538138-$ or US-9183164-$ or US-7761627-$ or US-9201826-$ or US-7617342-$ or US-9804977-$).did. or (WO-2013037980-$).did.	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2019/10/08 04:32 PM
L77	4835	H04L65/4061.CPC.	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2019/10/08 04:34 PM
L78	74532	H04L12/18-1895.cpc. OR H04M3/56-568.cpc OR H04L65/403-4061.CPC.	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2019/10/08 04:35 PM
L79	21993	L78 AND (teleconference or conferenc$3 or meeting)	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2019/10/08 04:36 PM
L80	153	L79 and (emulat$3 with device)	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2019/10/08 04:36 PM
L81	159	L79 and (emulat$3 with (USB or peripheral$1 or device$1))	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2019/10/08 04:36 PM
L82	3297	L79 and endpoint$1	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2019/10/08 04:37 PM
L85	165	L78 AND ((expos$3 or appear$5) with nativ$3)	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2019/10/08 04:45 PM
L86	1726	((expos$3 or appear$5) with nativ$3 with (device$1 or peripheral$1))	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2019/10/08 04:50 PM

L89	815	((expos$3 or appear$5) near5 nativ$3 with (device$1 or peripheral$1))	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2019/10/08 04:52 PM
L90	195	L89 and (meeting or conferenc$3 or teleconferenc$3 or collaborat$3)	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2019/10/08 04:57 PM
L91	929	appear$4 near2 (direct$2) near2 (connect$3 or insert$2)	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2019/10/08 05:01 PM
L93	267	appear$5 near2 (direct$2) near2 (connect$3 or insert$2) with (USB or device or peripheral)	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2019/10/08 05:01 PM
L94	2554	BYOD	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2019/10/09 06:46 AM
L95	1241	L94 and (meeting or conferenc$3 or teleconferenc$3 or collaborat$3)	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2019/10/09 06:52 AM
L96	801	L95 and ((share$1 or sharing) with (USB or peripheral$1 or device))	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2019/10/09 06:53 AM
L97	165	L94 and (meeting or conferenc$3 or teleconferenc$3 or collaborat$3) room	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2019/10/09 06:55 AM
L98	3	"20070233922"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/10/23 09:52 AM
L99	4	(("20070233922") or ("7761627")).PN.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	OFF	OFF	2019/10/23 09:52 AM
L100	27	(US-20150169477-$ or US-20150089395-$ or US-20100302130-$ or US-20090198839-$ or US-20150121466-$ or US-20150263905-$ or US-20130067121-$ or US-20100115145-$ or US-20140362161-$ or US-20190205275-$ or US-20160092153-$ or US-20070233922-$).did. or (US-7180475-$ or US-8756348-$ or US-8896656-$ or US-8316138-$ or US-9722986-$ or US-9083769-$ or US-	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2019/10/23 09:54 AM

		9538138-$ or US-9183164-$ or US-7761627-$ or US-9201826-$ or US-7617342-$ or US-9804977-$ or US-9934168-$).did. or (WO-2013037980-$).did.					
L101	17	L100 and (encod$3 or encrypt$4)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2019/10/23 09:54 AM
L102	27	(US-20150169477-$ or US-20150089395-$ or US-20100302130-$ or US-20090198839-$ or US-20150121466-$ or US-20150263905-$ or US-20130067121-$ or US-20100115145-$ or US-20140362161-$ or US-20190205275-$ or US-20160092153-$ or US-20070233922-$).did. or (US-7180475-$ or US-8756348-$ or US-8896656-$ or US-8316138-$ or US-9722986-$ or US-9083769-$ or US-9538138-$ or US-9183164-$ or US-7761627-$ or US-9201826-$ or US-7617342-$ or US-9804977-$ or US-9934168-$).did. or (WO-2013037980-$).did.	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2020/01/21 03:13 PM
L103	20	L102 and (meeting or conferenc$3 or teleconferenc$3 or collaborat$3 or unified)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2020/01/21 03:14 PM
L104	92	(wireless or bluetooth) (USB or universal serial bus) hub	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2020/01/21 03:24 PM
L105	11	L104 and (meeting or conferenc$3 or teleconferenc$3 or collaborat$3 or unified)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2020/01/21 03:25 PM
L106	1	L104 and (skype or facetime)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2020/01/21 03:27 PM

L107	32819	((H04M3/567 OR G06F13/102 OR H04L12/1822 OR H04L65/403).CPC.)	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2020/01/21 03:29 PM
L108	0	L104 and unified (meeting or conferenc$3 or teleconferenc$3 or collaborat$3)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2020/01/21 03:40 PM
L109	163	unified (meeting or conferenc$3 or teleconferenc$3 or collaborat$3 communication)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2020/01/21 03:40 PM
L110	5531	unified (meeting or conferenc$3 or teleconferenc$3 or collaborat$3 or communication)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2020/01/21 03:41 PM
L115	12	"10684972"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2021/09/24 02:51 PM
L117	8	((("RENARD") near3 ("Gauthier")) OR (("DEGRAEF") near3 ("Johan"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	ADJ	ON	ON	2021/10/05 02:39 PM
L118	31	(US-20150169477-$ or US-20150089395-$ or US-20100302130-$ or US-20090198839-$ or US-20150121466-$ or US-20150263905-$ or US-20130067121-$ or US-20100115145-$ or US-20140362161-$ or US-20190205275-$ or US-20160092153-$ or US-20070233922-$ or US-20210191893-$ or US-20210176285-$).did. or (US-7180475-$ or US-8756348-$ or US-8896656-$ or US-8316138-$ or US-9722986-$ or US-9083769-$ or US-9538138-$ or US-9183164-$ or US-7761627-$ or US-9201826-$ or US-7617342-$ or US-9804977-$ or US-9934168-$ or US-10684972-$).did. or (WO-2013037980-	(US-PGPUB; USPAT; FPRS; DERWENT)	ADJ	ON	ON	2021/10/05 03:16 PM

		$).did. or (US-20190205275-$).did.					
L119	12	L118 and endpoint	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2021/10/05 03:16 PM
L120	5684	barco	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2021/10/05 03:40 PM
L121	412	L120 and meeting	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2021/10/05 03:40 PM
L122	27	"3099009"	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2021/10/06 10:11 AM
L123	44	("20020174254" | "20020196378" | "20040128354" | "20040263636" | "20050015719" | "20050036509" | "20050122392" | "20060031779" | "20060095376" | "20070005809" | "20070033289" | "20070109410" | "20070244970" | "20090046139" | "20090064302" | "20090198839" | "20090300520" | "20100066806" | "20100087139" | "20100302130" | "20110023096" | "20110092198" | "20110115689" | "20110150433" | "20110179182" | "20120331509" | "20130050254" | "20130060662" | "20130067121" | "20140082227" | "6966035" | "8316138" | "8346753").PN. OR ("9722986").URPN.	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2021/10/06 10:57 AM
L124	32	(US-20150169477-$ or US-20150089395-$ or US-20100302130-$ or US-20090198839-$ or US-20150121466-$ or US-20150263905-$ or US-20130067121-$ or US-20100115145-$ or US-20140362161-$ or US-20190205275-$ or US-20160092153-$ or	(US-PGPUB; USPAT; FPRS; DERWENT)	ADJ	ON	ON	2021/10/06 11:22 AM

		US-20070233922-$ or US-20210191893-$ or US-20210176285-$).did. or (US-7180475-$ or US-8756348-$ or US-8896656-$ or US-8316138-$ or US-9722986-$ or US-9083769-$ or US-9538138-$ or US-9183164-$ or US-7761627-$ or US-9201826-$ or US-7617342-$ or US-9804977-$ or US-9934168-$ or US-10684972-$).did. or (WO-2013037980-$ or EP-3099009-$).did. or (US-20190205275-$).did.					
L125	12	L124 and endpoint$1	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2021/10/06 11:22 AM
L126	7	(USB or universal serial bus) same middleware same endpoint$1	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2021/10/06 11:33 AM
L127	4	"20160125838"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2021/10/06 11:34 AM
L128	6	L124 and descriptor	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2021/10/06 11:44 AM
L129	32	(US-20150169477-$ or US-20150089395-$ or US-20100302130-$ or US-20090198839-$ or US-20150121466-$ or US-20150263905-$ or US-20130067121-$ or US-20100115145-$ or US-20140362161-$ or US-20190205275-$ or US-20160092153-$ or US-20070233922-$ or US-20210191893-$ or US-20210176285-$).did. or (US-7180475-$ or US-8756348-$ or US-8896656-$ or US-8316138-$ or US-9722986-$ or US-	(US-PGPUB; USPAT; FPRS; DERWENT)	ADJ	ON	ON	2021/10/06 03:00 PM

		9083769-$ or US-9538138-$ or US-9183164-$ or US-7761627-$ or US-9201826-$ or US-7617342-$ or US-9804977-$ or US-9934168-$ or US-10684972-$).did. or (WO-2013037980-$ or EP-3099009-$).did. or (US-20190205275-$).did.					
L130	27	L129 and (speaker$1 or webcam or camera or microphone)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2021/10/06 03:00 PM
L131	31	(US-20150169477-$ or US-20150089395-$ or US-20100302130-$ or US-20090198839-$ or US-20150121466-$ or US-20150263905-$ or US-20130067121-$ or US-20100115145-$ or US-20140362161-$ or US-20190205275-$ or US-20160092153-$ or US-20070233922-$ or US-20210191893-$ or US-20210176285-$).did. or (US-7180475-$ or US-8756348-$ or US-8896656-$ or US-8316138-$ or US-9722986-$ or US-9083769-$ or US-9538138-$ or US-9183164-$ or US-7761627-$ or US-9201826-$ or US-7617342-$ or US-9804977-$ or US-9934168-$ or US-10684972-$).did. or (WO-2013037980-$ or EP-3099009-$).did.	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2021/10/06 03:08 PM
L132	11	L131 and endpoint$1	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2021/10/06 03:08 PM
L133	11	L129 and ((speaker$1 or webcam or camera or microphone) same (USB Or universal serial bus))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2021/10/06 03:16 PM

L134	7	L133 and endpoint$1	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2021/10/06 03:23 PM
L135	31	(US-20150169477-$ or US-20150089395-$ or US-20100302130-$ or US-20090198839-$ or US-20150121466-$ or US-20150263905-$ or US-20130067121-$ or US-20100115145-$ or US-20140362161-$ or US-20190205275-$ or US-20160092153-$ or US-20070233922-$ or US-20210191893-$ or US-20210176285-$).did. or (US-7180475-$ or US-8756348-$ or US-8896656-$ or US-8316138-$ or US-9722986-$ or US-9083769-$ or US-9538138-$ or US-9183164-$ or US-7761627-$ or US-9201826-$ or US-7617342-$ or US-9804977-$ or US-9934168-$ or US-10684972-$).did. or (WO-2013037980-$ or EP-3099009-$).did.	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2021/10/06 03:41 PM
L136	4	L135 and ((audio or video or content or data) same (raw or unedited or unfiltered or unaltered))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2021/10/06 03:41 PM
L137	6	L135 and ((raw or unedited or unfiltered or unaltered))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2021/10/06 03:43 PM
L138	6	L135 and descriptor	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2021/10/06 03:56 PM
L139	43628	G06F13/122,387,4282. CPC. OR H04L12/12,0428.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2021/10/06 09:07 PM
L140	1825	L139 AND (meeting or conferenc$3)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2021/10/06 09:07 PM
L141	31	(US-20150169477-$ or	(US-PGPUB; USPAT;	ADJ	ON	ON	2021/10/06

		US-20150089395-$ or US-20100302130-$ or US-20090198839-$ or US-20150121466-$ or US-20150263905-$ or US-20130067121-$ or US-20100115145-$ or US-20140362161-$ or US-20190205275-$ or US-20160092153-$ or US-20070233922-$ or US-20210191893-$ or US-20210176285-$).did. or (US-7180475-$ or US-8756348-$ or US-8896656-$ or US-8316138-$ or US-9722986-$ or US-9083769-$ or US-9538138-$ or US-9183164-$ or US-7761627-$ or US-9201826-$ or US-7617342-$ or US-9804977-$ or US-9934168-$ or US-10684972-$).did. or (WO-2013037980-$ or EP-3099009-$).did.	FPRS)				09:07 PM
L142	23	L141 and (meeting or conferenc$3)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2021/10/06 09:08 PM
L143	61	L140 and (dongle)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2021/10/06 09:08 PM
L145	5	"20140181325"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2022/03/14 01:52 PM
L146	34	(US-20150169477-$ or US-20150089395-$ or US-20100302130-$ or US-20090198839-$ or US-20150121466-$ or US-20150263905-$ or US-20130067121-$ or US-20100115145-$ or US-20140362161-$ or US-20190205275-$ or US-20160092153-$ or US-20070233922-$ or US-20210191893-$ or US-20210176285-$ or US-20140181325-$).did. or (US-7180475-	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2022/03/15 07:45 AM

		$ or US-8756348-$ or US-8896656-$ or US-8316138-$ or US-9722986-$ or US-9083769-$ or US-9538138-$ or US-9183164-$ or US-7761627-$ or US-9201826-$ or US-7617342-$ or US-9804977-$ or US-9934168-$ or US-10684972-$ or US-10031873-$ or US-9817772-$).did. or (WO-2013037980-$ or EP-3099009-$).did.					
L147	17	L146 and virtual	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2022/03/15 07:45 AM
L148	34	(US-20150169477-$ or US-20150089395-$ or US-20100302130-$ or US-20090198839-$ or US-20150121466-$ or US-20150263905-$ or US-20130067121-$ or US-20100115145-$ or US-20140362161-$ or US-20190205275-$ or US-20160092153-$ or US-20070233922-$ or US-20210191893-$ or US-20210176285-$ or US-20140181325-$).did. or (US-7180475-$ or US-8756348-$ or US-8896656-$ or US-8316138-$ or US-9722986-$ or US-9083769-$ or US-9538138-$ or US-9183164-$ or US-7761627-$ or US-9201826-$ or US-7617342-$ or US-9804977-$ or US-9934168-$ or US-10684972-$ or US-10031873-$ or US-9817772-$).did. or (WO-2013037980-$ or EP-3099009-$).did.	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2022/03/15 12:11 PM
L149	21	L148 and ((software or program or application) same (meeting or call or	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	ADJ	ON	ON	2022/03/15 12:11 PM

		conferenc$3))	IBM_TDB)				
L150	34	(US-20150169477-$ or US-20150089395-$ or US-20100302130-$ or US-20090198839-$ or US-20150121466-$ or US-20150263905-$ or US-20130067121-$ or US-20100115145-$ or US-20140362161-$ or US-20190205275-$ or US-20160092153-$ or US-20070233922-$ or US-20210191893-$ or US-20210176285-$ or US-20140181325-$).did. or (US-7180475-$ or US-8756348-$ or US-8896656-$ or US-8316138-$ or US-9722986-$ or US-9083769-$ or US-9538138-$ or US-9183164-$ or US-7761627-$ or US-9201826-$ or US-7617342-$ or US-9804977-$ or US-9934168-$ or US-10684972-$ or US-10031873-$ or US-9817772-$).did. or (WO-2013037980-$ or EP-3099009-$).did.	(US-PGPUB; USPAT; FPRS)	ADJ	ON	ON	2022/03/15 03:28 PM
L151	14	L150 and (virtual with (device or USB or peripheral))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2022/03/15 03:28 PM
L152	17	L150 and (virtual)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2022/03/15 03:30 PM
L153	9	L150 and (virtual with (device or USB or peripheral) same (program or software or application))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2022/03/15 05:28 PM
L154	5	L150 and (speakerphone or speaker phone or speaker-phone)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2022/03/15 05:47 PM
L155	12	L150 and (scrap$3)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2022/03/15 05:56 PM
L156	18	L150 and (process$3	(US-PGPUB; USPAT;	ADJ	ON	ON	2022/03/15

		with video)	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)				06:00 PM
L157	17	L150 and (decod$3 or composit$3 or decrypt$4)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2022/03/15 06:01 PM
L158	14	L150 and (decod$3)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2022/03/15 06:12 PM
L159	33	((US-20070233922-A1 OR US-20190205275-A1 OR US-20160092153-A1 OR US-20140362161-A1 OR US-20210191893-A1 OR US-20210176285-A1 OR US-20140181325-A1 OR US-20100115145-A1 OR US-20130067121-A1 OR US-20150263905-A1 OR US-20150121466-A1 OR US-20090198839-A1 OR US-20100302130-A1 OR US-20150089395-A1 OR US-20150169477-A1).did. AND PGPB.dbnm.) OR ((US-9183164-B2 OR US-7761627-B2 OR US-9201826-B2 OR US-7617342-B2 OR US-9804977-B2 OR US-9934168-B2 OR US-10684972-B2 OR US-10031873-B2 OR US-9817772-B2 OR US-7180475-B2 OR US-9538138-B2 OR US-9083769-B2 OR US-9722986-B2 OR US-8316138-B2 OR US-8896656-B2 OR US-8756348-B2).did. AND USPT.dbnm.) OR ((EP-3099009-A1 OR WO-2013037980-A2).did. AND FPRS.dbnm.)	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2022/06/21 02:42 PM
L160	12	L159 AND (simulat$4 OR translat$4)	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2022/06/21 02:43 PM
L161	26	L159 AND (touch OR	(US-PGPUB; USPAT;	ADJ	ON	ON	2022/06/21

		touchscreen OR touch-screen OR tablet OR smartphone)	USOCR)				02:50 PM
L162	33	((US-20070233922-A1 OR US-20190205275-A1 OR US-20160092153-A1 OR US-20140362161-A1 OR US-20210191893-A1 OR US-20210176285-A1 OR US-20140181325-A1 OR US-20100115145-A1 OR US-20130067121-A1 OR US-20150263905-A1 OR US-20150121466-A1 OR US-20090198839-A1 OR US-20100302130-A1 OR US-20150089395-A1 OR US-20150169477-A1).did. AND PGPB.dbnm.) OR ((US-9183164-B2 OR US-7761627-B2 OR US-9201826-B2 OR US-7617342-B2 OR US-9804977-B2 OR US-9934168-B2 OR US-10684972-B2 OR US-10031873-B2 OR US-9817772-B2 OR US-7180475-B2 OR US-9538138-B2 OR US-9083769-B2 OR US-9722986-B2 OR US-8316138-B2 OR US-8896656-B2 OR US-8756348-B2).did. AND USPT.dbnm.) OR ((EP-3099009-A1 OR WO-2013037980-A2).did. AND FPRS.dbnm.)	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2022/07/25 12:09 PM
L163	108	("10031873"|"20020196378"|"20060075100"|"20090198839"|"20100115145"|"20100302130"|"20140148152"|"20140181325"|"20140362161"|"20150121466"|"20150169477"|"20150263905"|"20160092153"|"20160125838"|"7617342"|"7761627"|"8316138"|"8756348"|"8896656"|"908	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH,	ADJ	ON	ON	2022/07/25 12:09 PM

		3769"|"9183164"|"9201826"|"9538138"|"9722986"|"9804977"|"9934168").PN.	TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L165	26	("10031873"|"20020196378"|"20060075100"|"20090198839"|"20100115145"|"20100302130"|"20140148152"|"20140181325"|"20140362161"|"20150121466"|"20150169477"|"20150263905"|"20160092153"|"20160125838"|"7617342"|"7761627"|"8316138"|"8756348"|"8896656"|"9083769"|"9183164"|"9201826"|"9538138"|"9722986"|"9804977"|"9934168").PN.	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2022/07/25 12:12 PM
L166	2	"10684972"	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2022/07/25 01:50 PM
L167	0	(16/771068).APP.	(USPAT; USOCR)	ADJ	ON	ON	2022/07/25 01:52 PM
L168	2	("20150121466"|"20160125838").PN.	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2022/07/25 02:26 PM
L169	34	((US-20070233922-A1 OR US-20190205275-A1 OR US-20160092153-A1 OR US-20210191893-A1 OR US-20210176285-A1 OR US-20140181325-A1 OR US-20100115145-A1 OR US-20150169477-A1 OR US-20150089395-A1 OR US-20100302130-A1 OR US-20090198839-A1 OR US-20150121466-A1 OR US-20150263905-A1 OR US-20130067121-A1 OR US-20140362161-A1 OR US-20160125838-A1).did. AND PGPB.dbnm.) OR ((US-9183164-B2 OR US-7761627-B2 OR US-9201826-B2 OR US-7617342-B2 OR US-9804977-B2 OR US-9934168-B2 OR US-8756348-B2 OR US-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2022/10/28 11:03 AM

		10684972-B2 OR US-10031873-B2 OR US-9817772-B2 OR US-7180475-B2 OR US-8896656-B2 OR US-8316138-B2 OR US-9722986-B2 OR US-9083769-B2 OR US-9538138-B2).did. AND USPT.dbnm.) OR ((EP-3099009-A1 OR WO-2013037980-A2).did. AND FPRS.dbnm.)					
L170	1	"20220173981"	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/04/06 04:22 PM
L171	1	"20040010464"	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/04/06 04:26 PM
L172	18	L169 AND virtual	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/04/06 04:52 PM
L173	401	(collaborativ$3 OR meeting OR workspace) SAME (virtual (display OR functional OR speaker OR audio))	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/04/06 05:05 PM
L174	58	(collaborativ$3 OR meeting OR workspace) SAME (virtual (display OR functional OR speaker OR audio) WITH (present$3 OR expos$3))	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/04/06 05:57 PM
L175	20	L174 AND @AD<"20171229"	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/04/06 05:57 PM
L176	0	L173 AND virtual hub	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/04/07 08:02 AM
L177	17	(collaborativ$3 OR meeting OR workspace) SAME virtual hub	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/04/07 08:02 AM
L178	1	L169 AND ("47" SAME base unit)	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/04/07 09:21 AM
L179	11	L169 AND (connection unit SAME base unit)	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/04/07 09:22 AM
L180	19	L169 AND hub	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/04/07 09:57 AM
L181	73	(wireless OR wifi OR wi-fi) (USB OR universal serial bus) (hub OR device hub)	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/04/07 09:59 AM
L182	76	(wireless OR wifi OR wi-fi) (USB OR universal serial bus) (hub OR device hub OR peripheral device)	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/04/07 09:59 AM

L183	59	L182 AND @AD<"20171229"	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/04/07 10:00 AM
L184	140	"6725302" OR "6603744"	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/04/07 10:01 AM
L185	50	(L183 OR L184) AND virtual$2	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/04/07 10:02 AM
L186	49	L185 AND @AD<"20171229"	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/04/07 10:02 AM
L187	5	(L183 OR L184) AND virtual$2 (device OR audio)	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/04/07 10:08 AM
L188	37	wireless hub AND virtual device$1	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/04/07 10:10 AM
L189	27	L188 AND @AD<"20171229"	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/04/07 10:14 AM
L190	3037	wireless hub AND (device$1 WITH (appear$4 OR present$3))	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/04/07 10:16 AM
L191	274	wireless hub SAME (device$1 WITH (appear$4 OR present$3))	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/04/07 10:16 AM
L192	217	L191 AND @AD<"20171229"	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/04/07 10:16 AM
L193	15	wireless hub SAME (device$1 WITH (appear$4 OR present$3) SAME virtual$2)	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/04/07 10:17 AM
L194	4131	(wireless hub OR wireless (USB OR universal serial (bus OR device)) hub)	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/04/07 10:20 AM
L195	15	L182 AND enumerat$3	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/04/07 10:31 AM
L196	5	L169 AND hub AND appear$4	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/04/07 11:08 AM
L197	34	((US-20070233922-A1 OR US-20190205275-A1 OR US-20160092153-A1 OR US-20210191893-A1 OR US-20210176285-A1 OR US-20140181325-A1 OR US-20100115145-A1 OR US-20150169477-A1 OR US-20150089395-A1 OR US-20100302130-A1 OR US-20090198839-A1 OR US-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT;	ADJ	ON	ON	2023/05/03 11:37 AM

		20150121466-A1 OR US-20150263905-A1 OR US-20130067121-A1 OR US-20140362161-A1 OR US-20160125838-A1).did. AND PGPB.dbnm.) OR ((US-9183164-B2 OR US-7761627-B2 OR US-9201826-B2 OR US-7617342-B2 OR US-9804977-B2 OR US-9934168-B2 OR US-8756348-B2 OR US-10684972-B2 OR US-10031873-B2 OR US-9817772-B2 OR US-7180475-B2 OR US-8896656-B2 OR US-8316138-B2 OR US-9722986-B2 OR US-9083769-B2 OR US-9538138-B2).did. AND USPT.dbnm.) OR ((EP-3099009-A1 OR WO-2013037980-A2).did. AND FPRS.dbnm.)	IBM_TDB)				
L198	11	L197 AND generic.clm.	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/05/03 11:38 AM
L199	3	L198 AND (expos$3).clm.	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/05/03 11:39 AM
L201	19	L197 AND (process$3 WITH video)	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/05/03 02:04 PM
L202	27	L197 AND (interpret$3 OR encod$3 OR enhanc$3 OR mix$3 OR multiplex43 OR encrypt$3)	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/05/03 02:22 PM
L203	16	L197 AND ((interpret$3 OR encod$3 OR enhanc$3 OR mix$3 OR multiplex43 OR encrypt$3) WITH video)	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/05/03 02:23 PM
L204	500	barco.as.	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/05/03 03:48 PM
L205	411	L204 AND @AD<"20171229"	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/05/03 03:49 PM
L206	68	L205 AND ((interpret$3 OR encod$3 OR enhanc$3 OR mix$3 OR multiplex43 OR encrypt$3 OR pack$3 OR unpack$3) WITH video)	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/05/03 03:51 PM

L207	16	L197 AND (native$2)	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/05/04 12:08 PM

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-22)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	17742166
Filing Date	2022-05-11
First Named Inventor	Gauthier RENARD
Art Unit	
Examiner Name	
Attorney Docket Number	21063.0018USC1

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	2008011727	WO	A1	2008-01-31			

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

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First Named Inventor	Gauthier RENARD
Art Unit	
Examiner Name	
Attorney Docket Number	21063.0018USC1

	1	ICRON WiRanger Cable USB 2.0 Hub User Guide, by Icron Technologies Corporation, www.icron.com	
	2	Observations by a third party in European Application No. 18833045.0, dated February 17, 2023	
	3	Office Action issued in European Application No. 18833045.0, dated February 1, 2023	
	4	Office Action in Chinese Application No. 201880084464.1, dated January 19, 2023, with machine translation	X

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Examiner Signature	/BRIAN T MISIURA/	Date Considered	05/03/2023

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[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☒ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2023-03-08
Name/Print	Thomas Lee	Registration Number	66,396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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PTO/SB/08a (01-22)
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	Filing Date	2022-05-11
	First Named Inventor	Gauthier RENARD
	Art Unit	
	Examiner Name	
	Attorney Docket Number	21063.0018USC1

	1	Office Action issued in U.S. Application No. 16/771068, issued April 12, 2023	

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That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2023-05-09
Name/Print	Thomas Lee	Registration Number	66,396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/742,166	**05/09/2023 05:55:01 PM ET**	**21063.0018USC1**

Title of Invention

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	9959	FILED BY	Yanling Cottle
PATENT CENTER #	62063903	FILING DATE	05/11/2022
CUSTOMER #	52835	FIRST NAMED INVENTOR	Gauthier RENARD
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Thomas Lee

Documents

TOTAL DOCUMENTS: 2

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
SB08_0018USC1.pdf	4	Information Disclosure Statement (IDS) Form (SB08)	1234 KB
Final_OA.pdf	27	Other reference-Patent/Application/Search Documents	3428 KB

Warning: The attached file contains comments or annotations. Comments are not recommended and may cause processing problems with the document.

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
SB08_0018USC1.pdf	86DF536C6313073E1DDB75D41EDE4B49DE78FB5BF6C0CD64 101EB27D633E572C870602F08721F9EE3D76EC2755E7F397A7 7BB000D4A7B2A987F1FDA495CE2F84
Final_OA.pdf	CA7434B46DD70E471B1A096AEAD7E5D053E0D800CA6A135A 30DACA30476851E4439DC4C3A9E465EA7E6ABE300AE45A2C 5CB7B11126F85B7B09997BAF34009D3D

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/08a (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	17742166
Filing Date	2022-05-11
First Named Inventor	RENARD
Art Unit	2186
Examiner Name	MISIURA
Attorney Docket Number	21063.0018USC1

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Patent citation information please click the Add button. Add

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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17742166
	Filing Date	2022-05-11
	First Named Inventor	RENARD
	Art Unit	2186
	Examiner Name	MISIURA
	Attorney Docket Number	21063.0018USC1

	1	Written Opinion issued in parallel Singapore patent application No. 11202005201Y, dated 10 May 2023, 8 pages provided

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17742166
	Filing Date	2022-05-11
	First Named Inventor	RENARD
	Art Unit	2186
	Examiner Name	MISIURA
	Attorney Docket Number	21063.0018USC1

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☒ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☒ See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2023-06-02
Name/Print	Thomas Lee	Registration Number	66,396

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1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Doc Code: PTA.IDS
Document Description: Patent Term Adjustment Stmt Under 37 CFR 1.704(d)

PTO/SB/133 (10-21)

PATENT TERM ADJUSTMENT STATEMENT UNDER 37 CFR 1.704(d)		
	Application Number	17/742166
	Filing Date	2022-05-11
	First Named Inventor	RENARD
	Art Unit	2186
	Examiner Name	MISIURA
	Practitioner Docket No.	21063.0018USC1

APPLICANT HEREBY STATES THE FOLLOWING (please review 37 CFR 1.704(d) before filing this form):

☑ Each item of information contained in the information disclosure statement was first cited in any communication from a patent office in a counterpart foreign or international application or from the Office, and this communication was not received by any individual designated in 37 CFR 1.56(c) more than thirty days prior to the filing of the information disclosure statement.

AND/OR

☐ Each item of information contained in the information disclosure statement is a communication that was issued by a patent office in a counterpart foreign or international application or by the Office, and this communication was not received by any individual designated in 37 CFR 1.56(c) more than thirty days prior to the filing of the information disclosure statement.

INSTRUCTIONS:

- **This form will not satisfy the requirement of 37 CFR 1.97(e).** The present statement is filed under 37 CFR 1.704(d) and will not substitute for compliance with any of the requirements of 37 CFR 1.97 and 1.98. For an information disclosure statement to comply with 37 CFR 1.97(c) or (d), the information disclosure statement must be accompanied by a statement under 37 CFR 1.97(e) notwithstanding any statement filed under 37 CFR 1.704(d).
- The present form (PTO/SB/133) should be filed concurrently with the information disclosure statement to derive benefit under 37 CFR 1.704(d).

Signature	/Thomas Lee/	Date	June 2, 2023
Typed or Printed Name	Thomas Lee	Practitioner Registration Number	66,396

Note: *Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required in accordance with 37 CFR 1.33 and 11.18. Please see 37 CFR 1.4(d) for the form of the signature. If necessary, submit multiple forms for more than one signature, see below*.*

☐ *Total of _____ forms are submitted.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

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UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/742,166	**06/02/2023 04:31:26 PM ET**	**21063.0018USC1**

Title of Invention

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	9959	FILED BY	Yanling Cottle
PATENT CENTER #	62202117	FILING DATE	05/11/2022
CUSTOMER #	52835	FIRST NAMED INVENTOR	Gauthier RENARD
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Thomas Lee

Documents

TOTAL DOCUMENTS: 3

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
OA.pdf	8	Other reference-Patent/Application/Search Documents	172 KB
Warning: The attached file contains comments or annotations. Comments are not recommended and may cause processing problems with the document.			
SB133_0018USC1.pdf	2	Patent Term Adjustment Statement under 37 CFR 1.704(d) filed with an IDS	250 KB
SB08_0018USC1.pdf	4	Information Disclosure Statement (IDS) Form (SB08)	1234 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
OA.pdf	7376DAF476A115079253F4D9489CF4594F04483ED551FE7A39 4FA69133A341C8A2C1DFEE1A4B5B5EE6676F7CF9F886F073C CA1186415A3C8DE8F3227324901FE
SB133_0018USC1.pdf	8A9BFD853D6FC9ADE909E6079AC42BCD3810F82D4DF9A3DE A3CE0A21AD78773135B7687C6B43DADD27533F99FEFA81534 3B992AC2BAB8E0EB0D8DFD427222DAE
SB08_0018USC1.pdf	FE4D09AA8571CB27D0120A1A85F4B48463EAEC66FBA922BB7 99361E5DFD95CE7327DA50EBD543E2387077B110582EC9D4E 12B74222AB8EE7F2B64087B1A3A983

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

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National Stage of an International Application under 35 U.S.C. 371

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New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 17/742,166	Filing Date 05/11/2022	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $480 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	09/07/2023	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 31	Minus	** 28	= 3		x $100 =	300
	Independent (37 CFR 1.16(h))	* 4	Minus	*** 3	= 1		x $480 =	480
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	780

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/CHRISTOPHER D PORTER/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventorship:	RENARD	Examiner:	MISIURA, BRIAN THOMAS
Serial No.:	17/742166	Group Art Unit:	2186
Filed:	May 11, 2022	Docket No.:	21063.0018USC1
Title:	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS		

CERTIFICATE OF TRANSMISSION.
I hereby certify that this paper is being transmitted by EFS Web to the United States Patent & Trademark Office on September 7, 2023.

By: /Jessica A. Sun/
Name: Jessica A. Sun

AMENDMENT AND RESPONSE

Mail Stop: AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Dear Commissioner:

In response to the Non-Final Office Action issued May 9, 2023, please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of claims that begins on page 2 of this paper.

Remarks begin on page 7 of this paper.

Please charge the fee for three additional claims and one independent claim to Deposit Account No. 50-3478, if necessary.

AMENDMENT TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1. (Currently Amended) A method for connecting a processing device to a functional device, the functional device being connected to or in a base unit of a communications network, the processing device having a memory, a display and an operating system, wherein the processing device hosts a host application, further comprising: a first peripheral device being configured to be coupled to the processing device via a generic communications protocol, the base unit having a transmitter and the first peripheral device having a receiver and at least one fixed or configurable endpoint of the functional device is exposed on the first peripheral device, the method further comprising:

the base unit being configured to transmit and the first peripheral device being configured to receive first processed video data over the communications network,

the functional device being configured for first video data to flow into the base unit or first video data is captured in the base unit, the first video data being processed in the base unit to generate the first processed video data, wherein the first processed video data is sent to the first peripheral device, the first peripheral device being configured to process the first processed video data received by the first peripheral device to generate second video data, the first peripheral device being configured to make the second video data available through the at least one fixed or configurable endpoint of the first peripheral device, the operating system of the processing device being configured to capture the second video data and to make it available through a custom or standard driver to either the host application or a 3rd party application running on the processing device or to other processing devices,

wherein third video data, received from the host application and/or from the 3rd party application running on the processing device, is sent to an endpoint of the first peripheral device via a standard generic driver, the first peripheral device receiving the third video data and processing the third video data to form second processed video data, and

wherein the base unit receives the second processed data, and decodes and/or enhances the second processed data and forwards it to a functional device which is connected or attached to the base unit through a serial connection.

2. (Original) The method of claim 1, wherein the first video data is interpreted and/or encoded in the base unit to form the first processed video data.

3. (Original) The method of claim 2, wherein the first video data is enhanced, mixed, multiplexed, and/or encrypted in the base unit.

4. (Original) The method of claim 2, wherein the first processed video data is received by the first peripheral device, and the first peripheral device is configured to decode and/or interpret the first processed video data and to generate the second video data.

5. (Original) The method of claim 4 wherein the first peripheral device demultiplexes, and/or decrypts, the first processed video data received by the first peripheral device to generate the second video data.

6. (Cancelled)

7. (Original) The method according to claim 4, wherein the first processed video data is sent to the first peripheral device through a wireless link.

8. (Original) The method according to claim 1, wherein the first video data is for display on a display.

9. (Original) The method according to claim 1, wherein the 3rd party application is a hosted Unified Communication.

10. (Cancelled)

11. (Currently Amended) The method according to claim [[9]] 1, wherein the third video data is enhanced, and/or encoded to form the second processed data and the second processed data is sent through a wireless link to the base unit.

12. (Cancelled)

13. (Original) The method of claim 11, wherein the base unit decrypts the second processed data.

14. (Original) The method of claim 13, the base unit being configured to expose and make available the functional device that is connected to the base unit, simultaneously with a plurality of first peripheral devices by interpreting, processing and translating the electronic signals coming from the functional device.

15. (Cancelled)

16. (Currently Amended) A system for making a functional device available to a processing device, the functional device being connected to or in a base unit of a communications network, the processing device having a memory, a display and an operating system, wherein the processing device hosts a host application, further comprising: [[the]] a first peripheral device being configured to be coupled to the processing device via a generic communications protocol, the base unit having a transmitter and the first peripheral device having a receiver and at least one fixed or configurable endpoint of the functional device is exposed on the first peripheral device, the system further comprising:

the base unit being configured to transmit and the first peripheral device being configured to receive first processed video data over the communications network,

the functional device being configured for first video data to flow into the base unit or first video data to be captured in the base unit, the first video data being processed in the base unit to generate the first processed video data, wherein the first processed video data is sent to the first peripheral device, the first peripheral device being configured to process the first processed video data received by the first peripheral device to generate second video data, the

first peripheral device being configured to make the second video data available through the at least one fixed or configurable endpoint of the first peripheral device, the operating system of the processing device being configured to capture the second video data and to make it available through a custom or standard driver to either the host application or a 3rd party application running on the processing device or to other processing devices,

wherein third video data, received from the host application and/or from the 3rd party application running on the processing device, are sent to an endpoint of the first peripheral device via a generic driver, the first peripheral device being configured to receive the third video data and to process the third video data to form second processed video data, and

wherein the base unit is configured to receive the second processed video data, to decode and/or to enhance the second processed video data and to subsequently forward it to a functional device or a second peripheral device which is connected or attached to the base unit through a serial connection.

17. (Original) The system of claim 16, wherein the base unit is configured to interpret and/or encode the first video data to form the first processed video data.

18. (Original) The system of claim 17, wherein the base unit is configured to enhance, mix, multiplex, and/or encrypt the first video data.

19. (Original) The system of claim 17, wherein the first peripheral device is configured to decode, and/or interpret the first processed video data received by the first peripheral device to generate the second video data.

20. (Original) The system of claim 19, wherein the first peripheral device is configured to demultiplex and/or decrypt, the first processed video data received by the first peripheral device.

21. (Original) The system according to claim 16, wherein the functional device is configured to be exposed natively on the first peripheral device.

22. (Original) The system according to claim 16, wherein base unit is configured to transmit the first processed video data to the first peripheral device through a wireless link.

23. (Original) The system according to claim 16, wherein the first video data is for display on a display.

24. (Original) The system according to claim 16, wherein the 3rd party application is a hosted Unified Communication.

25-26. (Cancelled)

27. (Currently Amended) The system of claim [[26]] 16, wherein the base unit is configured to receive the second processed video data, and to decrypt the second processed video data and to subsequently forward it to a functional device or a second peripheral device which is connected or attached to the base unit through a serial connection.

28. (Original) The system of claim 16, wherein the base unit is configured to expose and to make available the functional device that is connected to the base unit, simultaneously with a plurality of first peripheral devices by interpreting, processing and translating the electronic signals coming from the functional device.

29. (New) A method for connecting a processing device to a functional device, the functional device being connected to or in a base unit of a communications network, the processing device having a memory, a display and an operating system, wherein the processing device hosts a host application, further comprising: a first peripheral device being configured to be coupled to the processing device via a generic communications protocol, the base unit having a transmitter and the first peripheral device having a receiver and at least one fixed or configurable endpoint of the functional device is exposed on the first peripheral device, the method further comprising:

the base unit being configured to transmit and the first peripheral device being configured to receive first processed video data over the communications network,

the functional device being configured for first video data to flow into the base unit or first video data is captured in the base unit, the first video data being processed in the base unit to generate the first processed video data, wherein the first processed video data is sent to the first peripheral device, the first peripheral device being configured to process the first processed video data received by the first peripheral device to generate second video data, the first peripheral device being configured to make the second video data available through the at least one fixed or configurable endpoint of the first peripheral device, the operating system of the processing device being configured to capture the second video data and to make it available through a custom or standard driver to either the host application or a 3rd party application running on the processing device or to other processing devices,

wherein third video data, received from the host application and/or from the 3rd party application running on the processing device, is sent to an endpoint of the first peripheral device via a standard generic driver, the first peripheral device receiving the third video data and processing the third video data to form second processed video data,

wherein the third video data is enhanced, and/or encoded to form the second processed data and the second processed data is sent through a wireless link to the base unit,

wherein the base unit decrypts the second processed data, and

wherein the base unit is configured to expose and make available the functional device that is connected to the base unit, simultaneously with a plurality of first peripheral devices by interpreting, processing and translating the electronic signals coming from the functional device.

30. (New) The method according to claim 29, wherein the functional device is exposed natively on the first peripheral device.

31. (New) The method of claim 29, wherein the functional device is a second peripheral device.

32. (New) The method of claim 29, wherein the base unit receives the second processed data, and decodes and/or enhances the second processed data and forwards it to a functional device which is connected or attached to the base unit through a serial connection.

33. (New) A system for making a functional device available to a processing device, the functional device being connected to or in a base unit of a communications network, the processing device having a memory, a display and an operating system, wherein the processing device hosts a host application, further comprising: the first peripheral device being configured to be coupled to the processing device via a generic communications protocol, the base unit having a transmitter and the first peripheral device having a receiver and at least one fixed or configurable endpoint of the functional device is exposed on the first peripheral device, the system further comprising:

the base unit being configured to transmit and the first peripheral device being configured to receive first processed video data over the communications network,

the functional device being configured for first video data to flow into the base unit or first video data to be captured in the base unit, the first video data being processed in the base unit to generate the first processed video data, wherein the first processed video data is sent to the first peripheral device, the first peripheral device being configured to process the first processed video data received by the first peripheral device to generate second video data, the first peripheral device being configured to make the second video data available through the at least one fixed or configurable endpoint of the first peripheral device, the operating system of the processing device being configured to capture the second video data and to make it available through a custom or standard driver to either the host application or a 3rd party application running on the processing device or to other processing devices, and

wherein the base unit is configured to expose and to make available the functional device that is connected to the base unit, simultaneously with a plurality of first peripheral devices by interpreting, processing and translating the electronic signals coming from the functional device.

34. (New) The system according to claim 33, wherein third video data, received from the host application and/or from the 3rd party application running on the processing device, are sent to an endpoint of the first peripheral device via a generic driver, the first peripheral device being configured to receive the third video data and to process the third video data to form second processed video data.

35. (New) The system according to claim 34, wherein the base unit is configured to receive

the second processed video data, to decode and/or to enhance the second processed video data and to subsequently forward it to a functional device or a second peripheral device which is connected or attached to the base unit through a serial connection.

36. (New) The system of claim 35, wherein the base unit is configured to receive the second processed video data, and to decrypt the second processed video data and to subsequently forward it to a functional device or a second peripheral device which is connected or attached to the base unit through a serial connection.

37. (New) The system according to claim 33, wherein the functional device is configured to be exposed natively on the first peripheral device.

REMARKS

Applicant respectfully requests favorable reconsideration of this application in view of the above amendments and the following remarks.

Claim 1 is amended to include the allowable subject matter of claim 12 and intervening claim 10. Applicant notes that the subject matter of intervening claim 9 was not added, in view of the indication of allowable subject matter.

Claim 16 is amended to include the allowable subject matter of claim 26 and intervening claim 25.

Claim 29 is added to include the allowable subject matter of claim 14 with base claim 1 and intervening claims 10, 11, and 13.

Claims 30-32 are added as supported by previously presented claims 6, 12, and 15.

Claim 33 is added to include the allowable subject matter of claim 28 with base claim 16.

Claims 34-37 are added as supported by previously presented claims 21 and 25-27.

Claims 6, 10, 12, 25, 26, and 28 are cancelled without prejudice or disclaimer.

No new matter has been added.

Claims 1-5, 7-9, 11, 13-24, 27, and 29-37 are pending.

Allowable Subject Matter

Applicant is gratefully appreciative of the indication that claims 12, 14, and 26-28 recite allowable subject matter and would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. In view of the amendments and remarks provided herein, Applicant submits that all of the claims are now in condition for allowance.

Claim Rejections - 35 U.S.C. § 112

Claims 11 and 16 are rejected under 35 U.S.C. § 112(b) or 35 U.S.C. § 112 (pre-AIA), second paragraph, as being indefinite. Claims 11 and 16 have been amended to address the rejection. Favorable consideration and withdrawal of the rejection is requested.

Claim Rejections - 35 U.S.C. § 103

Claims 1-3, 6-9, 15-18, and 21-24 are rejected under 35 U.S.C. 103 as being unpatentable over Brands et al. (U.S. Patent Application Publication No. 2015/0121466) ("Brands") in view of Christison et al. (U.S. Patent No. 7,761,627) ("Christison").

In addition, claims 4, 5, 10, 11, 19, and 20 are rejected under 35 U.S.C. 103 as being unpatentable over Brands in view of Christison and further in view of Beel et al. (U.S. Patent Application Publication No. 2015/0169477) ("Beel").

Applicant respectfully traverses the rejection.

However, without acquiescing to the merits of the rejection, but in order to advance prosecution, independent claims 1 and 16 are amended to include the allowable subject matter of claims 12 and 26, respectively.

Specifically, as suggested on page 8 of the Office Action, Brands "does not specifically disclose receiving second processed data, decoding/enhancing said data, and forwarding it to a function device through a serial connection," as now recited in claims 1 and 16.

For at least the foregoing remarks, claims 1 and 16 are patentable over Brands and Christison. The remaining claims depend on claims 1 and 16 and are patentable over Brands and Christison for at least the same reasons as claims 1 and 16. Beel fails to cure the deficiencies of Brands and Christison with respect to claims 1 and 16. Applicant is not conceding the correctness of the rejection of the features not discussed herein. Applicant respectfully requests reconsideration and withdrawal of this rejection.

In view of the above, Applicant respectfully requests favorable reconsideration in the form of a Notice of Allowance. If any questions arise regarding this communication, the Examiner is invited to contact Applicant's representative listed below. Please charge any additional fees or credit any overpayment to Deposit Account No. 50-3478.

Respectfully submitted,

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 S. 7th St., Suite 2700
Minneapolis, MN 55402
(612) 455-3800

Dated: September 7, 2023

By: ___/Thomas Lee/_____
Thomas Lee
Reg. No.: 66,396
TL/ajs

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
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ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/742,166	**09/07/2023 04:56:08 PM ET**	**21063.0018USC1**

Title of Invention

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	9959	FILED BY	Jessica Sun
PATENT CENTER #	62756492	AUTHORIZED BY	Thomas Lee
CUSTOMER #	52835	FILING DATE	05/11/2022
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Gauthier RENARD

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 1021	**E202397G56456563**	**Jessica Sun**

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
1251	EXTENSION FOR RESPONSE WITHIN FIRST MONTH	220.00	1	220.00
1202	EACH CLAIM IN EXCESS OF 20	100.00	3	300.00
1201	EACH INDEPENDENT CLAIM IN EXCESS OF THREE	480.00	1	480.00
			TOTAL AMOUNT:	**$1,000.00**

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described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/AIA/22 (12-22)
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PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)

Docket Number (Optional): 21063.0018USC1

Application Number: 17/742166

Filed: May 11, 2022

For: METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Art Unit: 2186

Examiner: MISIURA, BRIAN THOMAS

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above-identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

		Fee	Small Entity Fee	Micro Entity Fee	
☑	One month (37 CFR 1.17(a)(1))	$220	$88	$44	$ 220
☐	Two months (37 CFR 1.17(a)(2))	$640	$256	$128	$
☐	Three months (37 CFR 1.17(a)(3))	$1,480	$592	$296	$
☐	Four months (37 CFR 1.17(a)(4))	$2,320	$928	$464	$
☐	Five months (37 CFR 1.17(a)(5))	$3,160	$1,264	$632	$

☐ Applicant asserts small entity status. See 37 CFR 1.27.

☐ Applicant certifies micro entity status. See 37 CFR 1.29.
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

☐ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☑ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 503478.

☑ Payment made via USPTO's patent electronic filing system (Patent Center or EFS-Web).

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the

☐ applicant.

☑ attorney or agent of record. Registration number 66396.

☐ attorney or agent acting under 37 CFR 1.34. Registration number _____.

/Thomas Lee/ — Signature

September 7, 2023 — Date

Thomas Lee — Typed or printed name

612-455-3800 — Telephone Number

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.

☐ * Total of _____ forms are submitted.

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Alexandria, VA 22313 - 1450
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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
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PATENT CENTER #	62756492	FILING DATE	05/11/2022
CUSTOMER #	52835	FIRST NAMED INVENTOR	Gauthier RENARD
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Thomas Lee

Documents

TOTAL DOCUMENTS: 4

DOCUMENT		PAGES	DESCRIPTION	SIZE (KB)
Response_0018.pdf		12	-	109 KB
Response_0018-A....pdf	(1-1)	1	Amendment/Request for Reconsideration-After Non-Final Rejection	75 KB
Response_0018-CLM.pdf	(2-9)	8	Claims	99 KB
Response_0018-REM.pdf	(10-12)	3	Applicant Arguments/Remarks Made in an Amendment	78 KB
Extensionoftime.pdf		2	Extension of Time	355 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
Response_0018.pdf	B3E9997CB3A6CBC59D0EE4FCFBA7415598EE90A8BFB64FB8B770C12CE00FF6B4379613FF9DA2CA0FFE78054CEF84FE23CA8E1A5653EB72BD3DAC0783F4C61212
Response_0018-A....pdf	01F2FC08B02B7CBEAB2F3E35C06D6133888114D596EEAB145C004197803FB7ABFDE682C875C588ADF551EED80A74146284081BAAEEFD7BF2B5B02274B2BF5DCC
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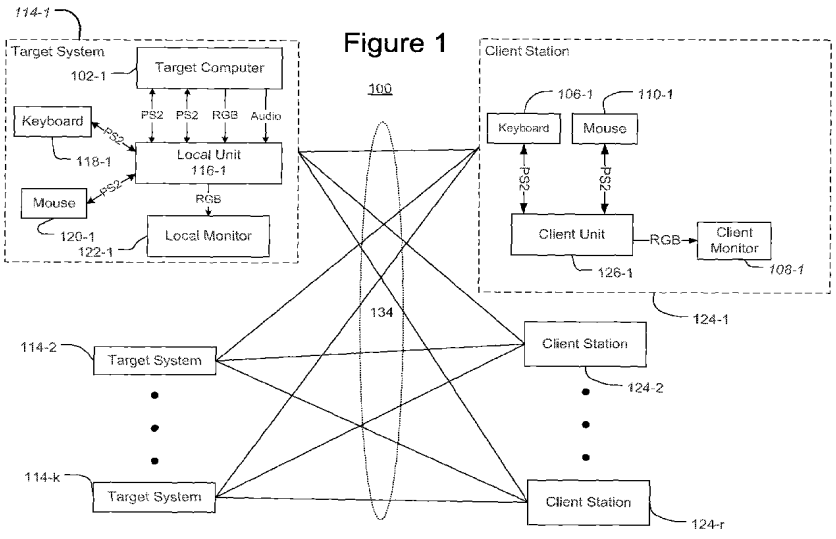
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(54) **Title**: METHOD AND SYSTEM FOR USB DEVICE VIRTUALIZATION

Figure 1



(57) **Abstract**: Methods and systems are provided to allow personal computer users to virtualize a local USB device so that they can remotely connect to a server and interact with the server as if the local USB device was physically connected to the server. They connect a remote USB target hardware device to the target system through a physical USB connection, and the device interacts with the local user's computer over a network. The target system is unaware that the USB device is not connected directly to the system through a physical connection, and the target system does not need special software to implement the remote USB device. The USB target hardware device connected to the target computer may be physically connected and disconnected.

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METHOD AND SYSTEM FOR USB DEVICE VIRTUALIZATION

[0001] This application is related to U.S. Patent Application No. 12/458,086, entitled "Method and System for Smart Card Virtualization," and U.S. Patent Application No. 13/070,175, entitled "Method and System for Audio Device Virtualization," which are hereby incorporated by reference.

FIELD OF INVENTION

[0002] This generally relates to USB devices and more particularly to virtualization of a USB device over a network.

BACKGROUND

[0003] USB (Universal Serial Bus) connections are commonly used to establish communication between devices and a host controller (usually personal computers). USB has replaced many varieties of serial and parallel ports, and can connect various computer peripherals such as mice, keyboards, digital cameras, printers, personal media players, flash drives, and external hard drives to a computer. For many of those devices, USB has become the standard connection method. USB was designed for personal computers, but it has become commonplace on other devices such as smartphones, PDAs and video game consoles, and as a power cord between a device and an AC adapter plugged into a wall plug for charging.

[0004] In another aspect of computing, systems exist to facilitate remote control of and access to a computer by an operator at a remote station. Such systems typically use a device or mechanism that enables an operator at a remote station to control aspects of a so-called target (or local) computer. More particularly, such systems typically allow a remote station to provide mouse and keyboard input to the target computer and further allow the remote

station to view the video display output of the target computer. These types of systems are typically called keyboard-video-mouse (KVM) systems.

[0005] Remote KVM systems allow a user to interact with a computer anywhere in the world via the keyboard, mouse, and video, as if they were seated right next to the computer. In addition to virtualization of the keyboard, mouse and video, storage media such as CD/DVD-ROMs, flash drives, and floppy disks have also been virtualized. As such, a user can provide access to data on a disk to a server anywhere in the world.

[0006] Some conventional systems virtualize USB devices over a network. In such systems, a user may use a USB device connected to a remote computer as if it was connected to the local computer. Conventional USB-over-IP systems allow a user to use a USB device in one location while it is virtualized from a PC in another location and provide special software installed and running on the target computer to interact with a USB device. However, this software running on the target must be specifically tailored, requires greater overhead and infrastructure, and provides less flexibility. These products also require special software be installed on both the local PC and the remote PC. Installing software on the client PC may be acceptable, but installing it on the target PC is typically not as it may violate the security of the computer to be accessed.

[0007] The remote target computer does not typically have a USB connection to a local USB device without the installation of software on the target computer. Accordingly, there is a desire for a system that provides virtualization of USB device use while not requiring special software to do so.

SUMMARY

[0008] In accordance with methods and systems consistent with the present invention, a data processing system for virtualization of a USB device is provided, comprising a target computer configured to send and receive USB device data to a locally connected device, and a client computer locally

connected to a USB device. The data processing also comprises a USB virtualization device locally physically connected to the target computer, configured to receive USB device data from the client USB device over the network, process the received USB device data, and send the processed USB device data to the locally connected target computer through a physical USB connection.

[0009] In one implementation, a USB virtualization device is provided, comprising a network interface configured to interact with a client computer to send USB device data and receive USB device data over a network. The USB virtualization device further provides a USB input/output interface configured to physically connect to a target computer in a USB port, and to receive USB data from the target computer and send USB device data to the target computer. The USB virtualization device also provides a processor configured to translate the received USB device data from the physical USB input/output interface for output to the network interface, and to translate the received USB device data from the network interface for output to the physical USB input/output interface.

[0010] In another implementation, a method in a data processing system for virtualization of a USB device is provided, comprising receiving USB device data from the USB device physically connected to a client computer, sending the received USB device data over a network, and receiving USB device data by a USB virtualization device from the client computer over the network. The method further comprises processing the received USB device data, and sending the processed USB device data to a target computer locally connected to the USB virtualization device through a physical USB connection.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] Figure 1 illustrates an exemplary KVM computer system in accordance methods and systems consistent with the present invention.

[0012] Figure 2 illustrates an exemplary target computer system consistent with systems and methods consistent with the present invention.

[0013] Figure 3 depicts a USB virtualization device in a computer network in accordance with methods and systems consistent with the present invention.

[0014] Figure 4 illustrates a flowchart of exemplary steps of a method for USB device virtualization in a computer network in accordance with methods and systems consistent with the present invention

DETAILED DESCRIPTION

[0015] Methods and systems in accordance with the present invention allow personal computer users to virtualize a local USB device so that they can remotely connect to a server and interact with the server as if the local USB device was physically connected to the server. They allow USB devices to be virtualized so that a remote user may attach their USB device to their local PC and then virtualize the USB device so that it can be used with a computer anywhere in the world. In one implementation, they connect a remote USB device virtualization hardware device to the target computer through a physical connection, such as a USB connection, and the device interacts with the local user's computer and USB device over a network. As such, the target system is unaware that the actual USB device is not connected directly to the system through a physical connection, and the target system does not need special software to implement the remote USB device. The USB target device connected to the target computer may be physically connected and disconnected, and the target computer interacts with the device as if it was the USB device, thereby avoiding the installation of special software on the target computer. In these systems, USB devices may be connected to a remote target computer without the target computer knowing that the USB device is not locally connected.

[0016] Methods and systems in accordance with the present invention do not require special software on a remote PC. Through the use of hardware device at the remote location, the connection to the remote PC may be through a normal USB device connection. The device driver and middle layer software for the USB device is typically already installed with the base operating system running on the remote PC. No more software is needed on the remote PC than would be required if a user connected a USB device directly to the remote PC. For the target system, the implementation over the network appears the same as a local USB device. For example, Windows or Linux is already configured to accept a plug in USB device, and do not require any additional software on the host or target. The operating system operates as if a physical USB is plugged into the target computer.

[0017] The lack of a need to have special software on the target computer provides the ability to be flexible, generic and used by a variety of clients and infrastructures with minimal infrastructure requirements. The target computer does not have to be a particular target or have particular software, and as a result, less overhead needs to be developed for implementation.

[0018] In the discussion that follows, the computer or system to which the USB device is being virtualized is generally referred to as the target computer or the target system. In some instances, the target computer is also referred to as the local computer, however, components local to the client computer may also be referred to as local. The system that is connected to the USB device to be virtualized is generally referred to herein as the client system.

[0019] Figure 1 depicts an exemplary KVM computer system in accordance methods and systems consistent with the present invention. A KVM system 100 is shown in Figure 1, where one or more target systems 114-1 . . . 114-k are controlled or accessed by one or more client stations 124-1, 124-2, . . ., 124-r (generally 124). Each target system 114 includes a target computer 102 with associated and attached local unit 116. Each client station 124 generally includes a client unit 126, a keyboard 106, a video monitor 108,

and a mouse (or similar point-and-click device) 110, although some client stations may only include a video display 108 and a client unit. Operation of a particular target computer 102-i may be remotely viewed on the video monitor 108 of any of the client stations 124, and the keyboard 106 and mouse 110 of the client station 124 may be used to provide keyboard and mouse input to the target computer 102-i. As shown in Figure 1, in a KVM system 100, a client station 124 is able to control or access more than one target computer. Note that the lines drawn between target systems and client stations in Figure 1 represent potential (and not necessarily actual) wired or wireless (*e.g.*, RF) links between those sides. Thus, each target computer 102 may be controlled or accessed by more than one client station 124, and each client station 124 may control more than one target computer 102. The client station 124, in one implementation, may be located within several hundred feet of the target system 114.

[0020] Furthermore, in certain contexts, the target system 114 is considered to be a video transmitter or sending unit, and the client system 112 is the video receiving unit or receiver, although both units transmit and receive. Generally, video travels from target system 114 to client station 124, while keyboard and mouse data move from client station to target system.

[0021] As shown in Figure 1 the local or target system 114 includes a target computer 102 and an associated local unit 116. The local system 114 may also include a keyboard 118, a mouse (or other point-and-click-type device) 120 and a local monitor 122, each connected to the local unit 116 directly. The client station 124 includes a client unit 126. The local or target computer 102 may be a computer, a server, a processor or other collection of processors or logic elements. Generally, a target computer may include any processor or collection of processors. By way of example, a target computer may be a processor or collection of processors or logic elements located (or embedded) in a server, a desktop computer (such as a PC, Apple Macintosh or the like), a kiosk, an ATM, a switch, a set-top box, an appliance (such as a

television, DVR, DVD player and the like), a vehicle, an elevator, on a manufacturing or processing production line. A collection of target computers 102 may be a collection of servers in a rack or some other collection, they may be independent of each other or connected to each other in a network or by some other structure. The local and client monitors 122, 108, may be digital or analog.

[0022] The local unit 116 is a device or mechanism, *e.g.*, a printed circuit board ("PCB"), that is installed locally to the target/local computer 102. This device may be close to, but external to the computer, or may be installed inside the computer's housing. Regardless of the positioning of the local unit 116, in one implementation, there is a direct electrical connection between the target computer 102 and the local unit 116.

[0023] Various components on the local / target system 114 communicate wirelessly or via a wired connection with components on the client station 124 via a wireless connection link 134. In one implementation, the wireless connection or link 134 follows the IEEE 802.11 standard protocol, although one skilled in the art will realize that other protocols and methods of communication are possible.

[0024] The local unit 116 receives local mouse and keyboard signals, *e.g.*, USB or PS2 signals. These signals are provided by the local unit 116 to the target computer 102. The target computer 102 generates video output signals, *e.g.*, RGB (Red, Green, Blue) signals, which are provided to the local unit 116 which, in turn, provides the signals to drive the local monitor 122. The target computer 102 may also generate audio output signals which are provided to the local unit 116. As noted, the target computer 102 need not have a keyboard, mouse or monitor, and may be controlled entirely by a client station 124.

[0025] Local unit 116 transmits image data for transmission to a client station 124 (*e.g.*, via client unit 126). Some or all of the data may be compressed before being transmitted. Additionally, local unit 116 may receive

mouse and keyboard data (from a client station 124), which is then provided to the local / target computer 102. The target computer 102 may execute the data received and may display output on its local monitor 122.

[0026] The client station 124 receives video data from the local unit 116 of the target computer 102, via a wired or wireless connection (*e.g.*, 802.11a wireless connection 134). The client unit 126 receives (possibly compressed) video data (not all of the data need be compressed) from the local unit 116. The client unit 126 decompresses (as necessary) the video data from the local unit 116 and provides it to the appropriate rendering device, *e.g.*, to the client monitor 108, which displays the video data. Additionally, client mouse 110 and keyboard 106 may be used to generate appropriate signals (*e.g.*, PS2 signals or USB) that may be transmitted via client unit 126 to local unit 116 for execution on target computer 102.

[0027] Figure 2 illustrates an exemplary client computer system consistent with systems and methods consistent with the present invention. Client computer 124 includes a bus 202 or other communication mechanism for communicating information, and a processor 204 coupled with bus 202 for processing the information. Client station 124 may also include similar components as client computer 124, including some or all of the components mentioned. Client computer 124 also includes a main memory 206, such as a random access memory (RAM) or other dynamic storage device, coupled to bus 202 for storing information and instructions to be executed by processor 204. In addition, main memory 206 may be used for storing temporary variables or other intermediate information during execution of instructions to be executed by processor 204. Main memory 206 includes a program 212 for implementing processing consistent with methods and systems in accordance with the present invention. Client computer 124 further includes a Read-Only Memory (ROM) 208 or other static storage device coupled to bus 202 for storing static information and instructions for processor 204. A storage device

210, such as a magnetic disk or optical disk, is provided and coupled to bus 202 for storing information and instructions.

[0028] According to one embodiment, processor 204 executes one or more sequences of one or more instructions contained in main memory 206. Such instructions may be read into main memory 206 from another computer-readable medium, such as storage device 210. Execution of the sequences of instructions in main memory 206 causes processor 204 to perform processes described herein. One or more processors in a multi-processing arrangement may also be employed to execute the sequences of instructions contained in main memory 206. In alternative embodiments, hard-wired circuitry may be used in place of or in combination with software instructions. Thus, embodiments are not limited to any specific combination of hardware circuitry and software.

[0029] Although described relative to main memory 206 and storage device 210, instructions and other aspects of methods and systems consistent with the present invention may reside on another computer-readable medium, such as a floppy disk, a flexible disk, hard disk, magnetic tape, a CD-ROM, magnetic, optical or physical medium, a RAM, a PROM, and EPROM, a FLASH-EPROM, any other memory chip or cartridge, or any other medium from which a computer can read, either now known or later discovered.

[0030] Figure 3 depicts a virtual USB device controller 300 in a computer network in accordance with methods and systems consistent with the present invention. As shown on the Figure, the client station 124 includes a client operating system 302 which may connect to external devices, *e.g.*, USB devices 304 or any other suitable component. A client user plugs their USB device 304 into the USB input on the client station 124 so that it can interact remotely with the target computer 102.

[0031] The target operating system 310 on the target computer 102 may be a normal operating system. Further, the target computer 102 may include

one or more USB connections and may connect to USB devices or any other suitable components.

[0032] The client operating system 302 also includes a USB device virtualization client component 306, which may be software on the client computer 124 which interacts with the remote target virtual USB device controller 300, which in one implementation, is a hardware device. The client computer 124 may download the USB device virtualization client component 306. The USB device virtualization client component 306 communicates with the USB device virtualization server 308 remotely over a network using TCP/IP, and interacts with the local USB device 304.

[0033] In one implementation, the virtual USB device controller 300 is a hardware component that includes the USB device virtualization server 308 which may be firmware, software, or hardware for interacting remotely with the USB device virtualization client component 306 and locally with the target computer 102 and target computer operating system 304. This virtual USB device controller 300 may be plugged into the target computer 102 with a physical connection, such as a USB connection. In one implementation, the USB device virtualization server 308 communicates with the USB device virtualization client component 306 in the Avocent Virtual USB Protocol (AVUP) developed by Avocent, Inc. However, other suitable protocols and methods are possible.

[0034] When the USB device 304 is plugged into the client system 124, it connects to a USB host 314 on the client system 124. The USB host may, for example, be a combination of hardware and software. At this point, the system may ask the user whether to use the USB device 304 locally or whether to redirect it to a remote target computer 102. When the USB device 304 is plugged in and the user has indicated virtualization of the device, the USB device virtualization client 306 sends a notification to the USB device virtualization server 308 that a new USB device 304 has been attached and that it is virtualizing the new USB device. In this notification, the USB device

virtualization client 306 transmits the type of device it is, the number of endpoints (*e.g.*, how many different types of functions it can perform) and begins a bi-directional flow of information including status and data and requests for status and data, pursuant to the USB protocol.

[0035] Upon receiving the notification of the new USB device 304, the USB device virtualization server 308 on the virtual USB device controller 300 plugged into the target computer 102 configures its USB device 316 that interfaces with the USB host 312 on the target computer. The USB device 316 may be a physical component that plugs into the USB jack on the target computer 102 and also comprises configurable software. The software on the USB device 316 is configured to emulate the USB device 304 that is being virtualized on the client computer 124. When signals are received from the USB device 304 on the client computer 124, this USB device 316 on the virtual USB device controller 300 emulates the signals received and sends those signals to the target computer 102 via the USB host 312. It also receives USB signals from the target computer 102 and sends them to the USB device 304 on the client computer 124 via the USB device virtualization client 306.

[0036] When the USB host 312 on the target computer 102 requests status, for example, the USB device virtualization client 306 responds back with the status. USB device virtualization client 306 may also inform the target computer 102 that it has data to send, and the target computer may respond to proceed with the transmission.

[0037] The virtual USB device controller 300 receives information for USB device interaction, such as USB device commands or packets, from the target operating system 310 and they are processed by the USB device virtualization server 308 on the virtual USB device controller 300. The USB device virtualization server 308 processes, translates and transmits the USB device commands in the AVUP protocol over TCP/IP to the USB device virtualization client component 306. The virtual USB device controller 300 includes a processor that runs USB device virtualization server software 308,

and that processor may also have a USB device 316 built in. It uses a network connection to connect to the client computer 124, and a USB device connection to connect to the target computer 102. The virtual USB device controller 300 translates USB device commands and responses from the network format to the USB format and vice versa.

[0038] For example, the USB device virtualization server 308 receives the USB device command from the target computer 102, translates the command and sends it over TCP/IP to the USB device virtualization client component 306. The response to the USB device command traverses back from the USB device virtualization client component 306 to the USB device virtualization protocol server 308 on the virtual USB device controller 300, and through the physical USB connection to the target computer 102. In one implementation, the USB device commands may conform to the USB specification for USB devices 304.

[0039] On the client system 124, the USB device virtualization client component 306 uses services provided by the client operating system 302, such as the USB host 314, to send the USB device command out to the physical USB device 304 connected to the client computer.

[0040] Figure 4 illustrates a flowchart of exemplary steps of a method for USB device virtualization in a computer network in accordance with methods and systems consistent with the present invention. First, a virtual USB device controller 300 is plugged into a target computer 102 via a physical connection (such as its USB device 316) and connects with the USB host 312 (step 402). The target operating system 310 recognizes the USB-connected virtual USB device controller 300 as a local USB device and operates accordingly (step 404). Additionally, a USB device 304 to be virtualized is plugged into the client computer 124 via the USB host 314 on the client computer (step 406). Upon prompting by the system, the user indicates that they would like the USB device 304 to be virtualized to the target computer 102 (step 408).

[0041] The USB device 304 attached to the client computer 124 interfaces with the USB host 314 which passes the USB device information to the USB device virtualization client component 306 (step 410). Initially, these commands may indicate the presence and identification of the device and may later include relevant status and data. Further, the USB device virtualization client component 306 processes the received USB device command and sends it via TCP/IP over the network to the USB device virtualization server 308 on the virtual USB device controller 300 (step 412). Then, the USB device virtualization server 308 translates the received USB device command to the USB format to be outputted to the target operating system 310 on the target computer 102 (step 414). The USB device virtualization server 308 also configures the USB device 316 on the virtual USB device controller 300 to emulate the USB device 304 locally connected to the client computer system 124 (step 416). The USB device 316 then sends the USB command information to the target operating system 310 via the USB host 312 to which it is connected (step 418).

[0042] The target operating system 310 may respond or initiate USB interaction by transmitting a USB device command, *e.g,* status or data request, over the USB connection to the virtual USB device controller 300 as it would to a physically connected local USB device 304 (step 420). Next, the USB device 316 on the virtual USB device controller 300 receives the USB device command and passes it to USB device virtualization server 308 (step 422). Furthermore, the USB device virtualization server 308 on the virtual USB device controller 300 receives the USB device command and translates it to a protocol used by the USB device virtualization server 308 and the USB device virtualization client component 306, such as the AVUP protocol (step 424).

[0043] The USB device virtualization server 308 transmits the translated USB device command over TCP/IP to the remote client computer 124 (step 426). The remote client computer's operating system 302 receives the translated USB device command and passes it to the USB device virtualization

client component 306 (step 428) to translate it into USB to be outputted to the connected USB device 304.

[0044] The foregoing description of various embodiments provides illustration and description, but is not intended to be exhaustive or to limit the invention to the precise form disclosed. Modifications and variations are possible in light of the above teachings or may be acquired from practice in accordance with the present invention. It is to be understood that the invention is intended to cover various modifications and equivalent arrangements included within the spirit and scope of the appended claims.

CLAIMS

What is claimed is:

1. A data processing system for virtualization of a USB device, comprising:
a target computer configured to send and receive USB device data to a locally connected device;
a client computer locally connected to a USB device;
a USB virtualization device locally physically connected to the target computer, configured to:
receive USB device data from the client USB device over the network;
process the received USB device data; and
send the processed USB device data to the locally connected target computer through a physical USB connection.

2. The data processing system of claim 1, wherein the USB virtualization device is further configured to:
receive USB device commands from the locally connected target computer;
process the commands to be transmitted over the network; and
send the processed USB device commands to the client computer over the network.

3. The data processing system of claim 1, wherein the target computer interacts with the USB virtualization device in the same way the target computer interacts with a locally connected USB device.

4. The data processing system of claim 1, wherein all software for remote USB device interaction is on the USB virtualization device and the client computer.

5. The data processing system of claim 1, wherein the client computer is a KVM client that controls the target computer.

6. The data processing system of claim 1, wherein the client computer comprises a program configured to interact with the locally connected USB device and the USB vitualization device.

7. The data processing system of claim 1, wherein communications over the network are TC/PIP communications.

8. A USB virtualization device, comprising:

a network interface configured to interact with a client computer to send USB device data and receive USB device data over a network;

a USB input/output interface configured to physically connect to a target computer in a USB port, and to receive USB data from the target computer and send USB device data to the target computer; and

a processor configured to:

translate the received USB device data from the physical USB input/output interface for output to the network interface; and

translate the received USB device data from the network interface for output to the physical USB input/output interface.

9. The USB virtualization device of claim 8, wherein the target computer interacts with the USB virtualization device in the same way the target computer interacts with a locally connected USB device.

10. The USB virtualization device of claim 8, wherein the client computer is a KVM client that controls the target computer.

11. The USB virtualization device of claim 8, wherein the client computer comprises a program configured to interact with the locally connected USB device and the USB virtualization device.

12. The USB virtualization device of claim 8, wherein the network interface communicates using TCP/IP.

13. The USB virtualization device of claim 8, wherein the USB virtualization device is a hardware device.

14. A method in a data processing system for virtualization of a USB device, comprising:

receiving USB device data from the USB device physically connected to a client computer;

sending the received USB device data over a network;

receiving USB device data by a USB virtualization device from the client computer over the network;

processing the received USB device data; and

sending the processed USB device data to a target computer locally connected to the USB virtualization device through a physical USB connection.

15. The method of claim 14, wherein the USB virtualization device interacts with the target computer in the same way as a locally connected USB device.

16. The method of claim 14, wherein all software for remote USB device interaction is on the USB virtualization device and the client computer.

17. The method of claim 14, wherein the client computer is a KVM client that controls the target computer.

18. The method of claim 14, wherein the client computer comprises a program configured to interact with the locally connected USB device and the USB virtualization device.

Figure 1

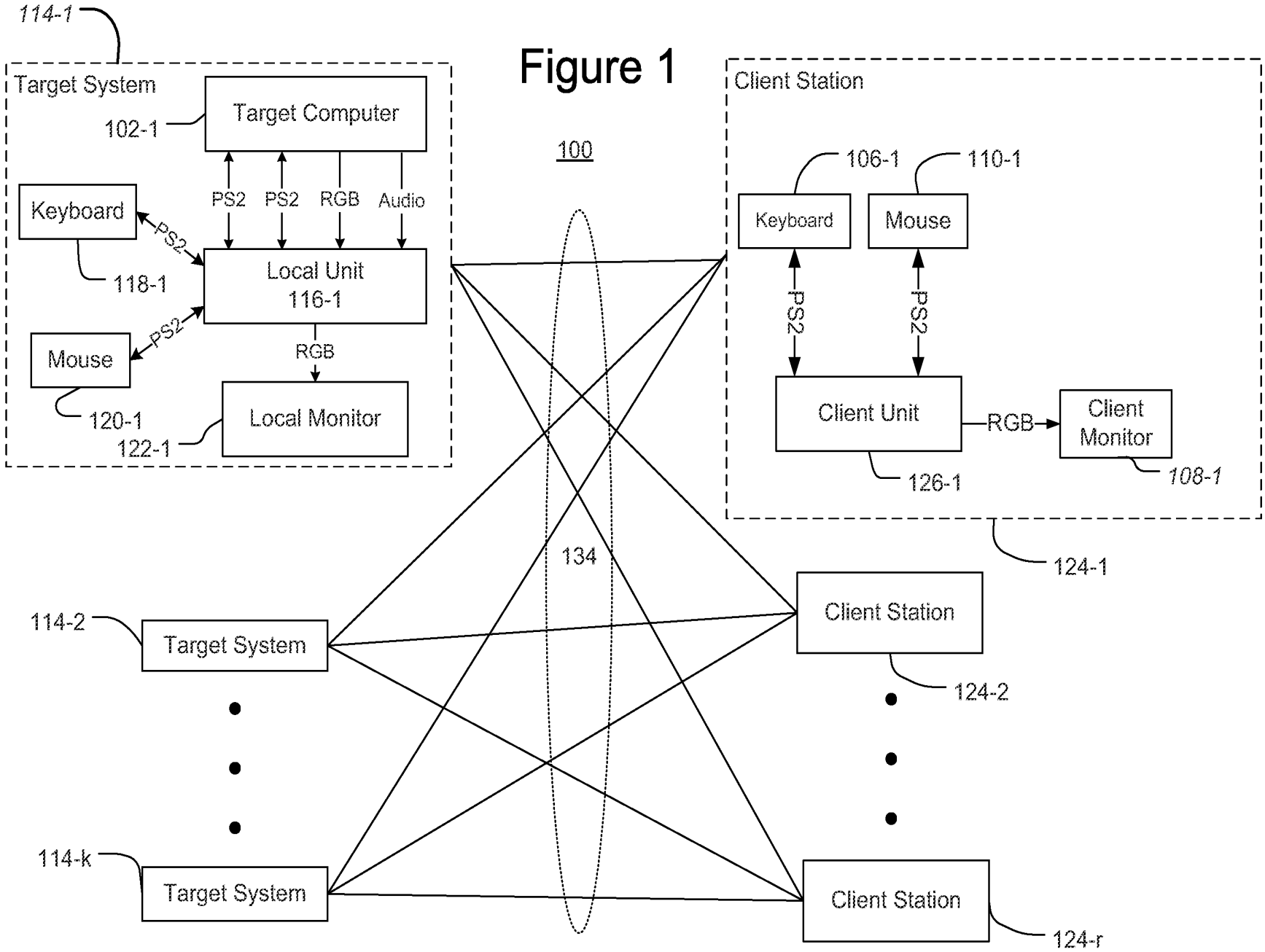

114-1
Target System
102-1
Target Computer
PS2
PS2
RGB
Audio
Keyboard
PS2
118-1
Local Unit
116-1
PS2
Mouse
RGB
120-1
Local Monitor
122-1
100
Client Station
106-1
110-1
Keyboard
Mouse
PS2
PS2
Client Unit
RGB
Client Monitor
126-1
108-1
124-1
134
114-2
Target System
Client Station
124-2
114-k
Target System
Client Station
124-r

Figure 2

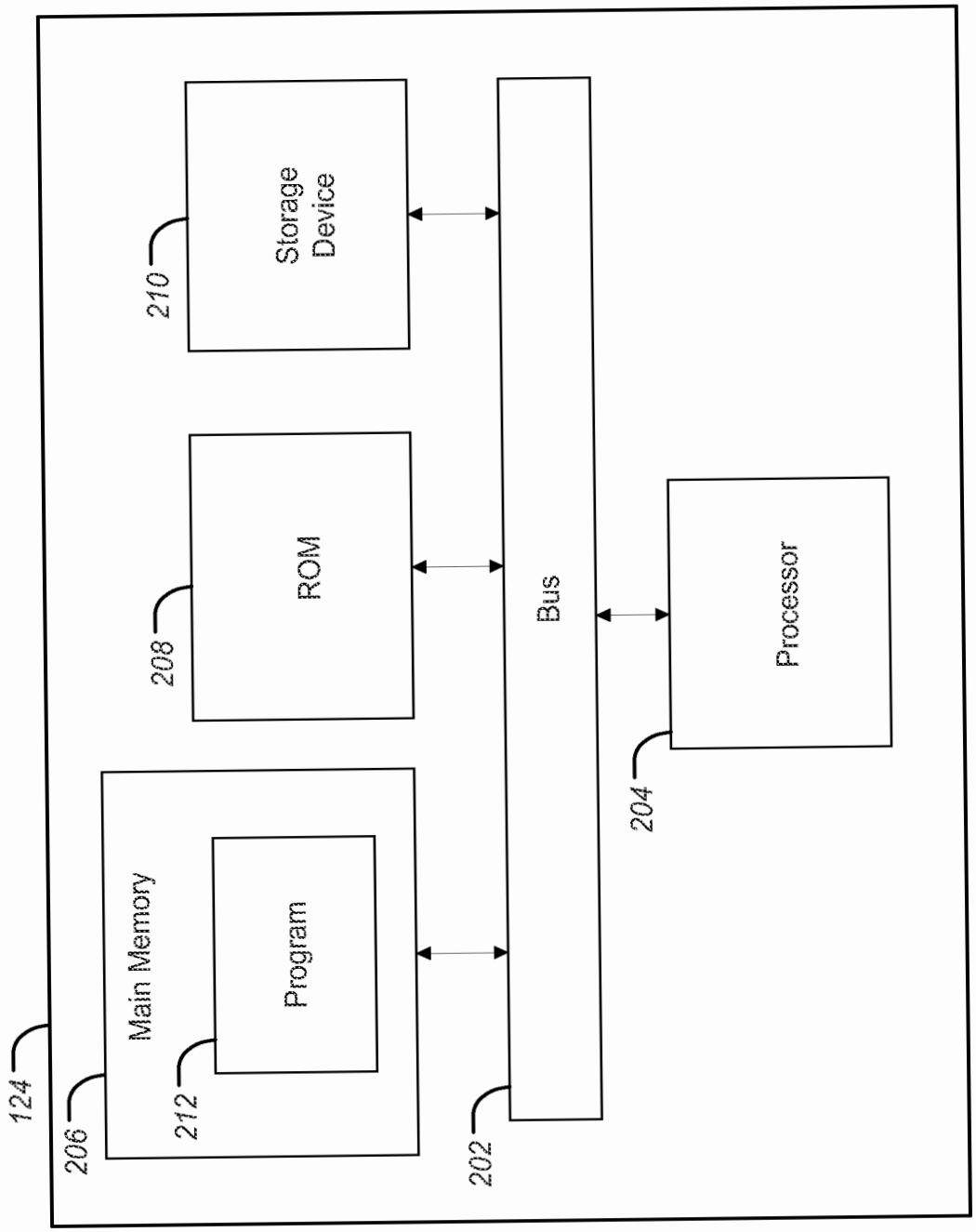

124
206
Main Memory
212
Program
202
Bus
208
ROM
210
Storage Device
204
Processor

Figure 3

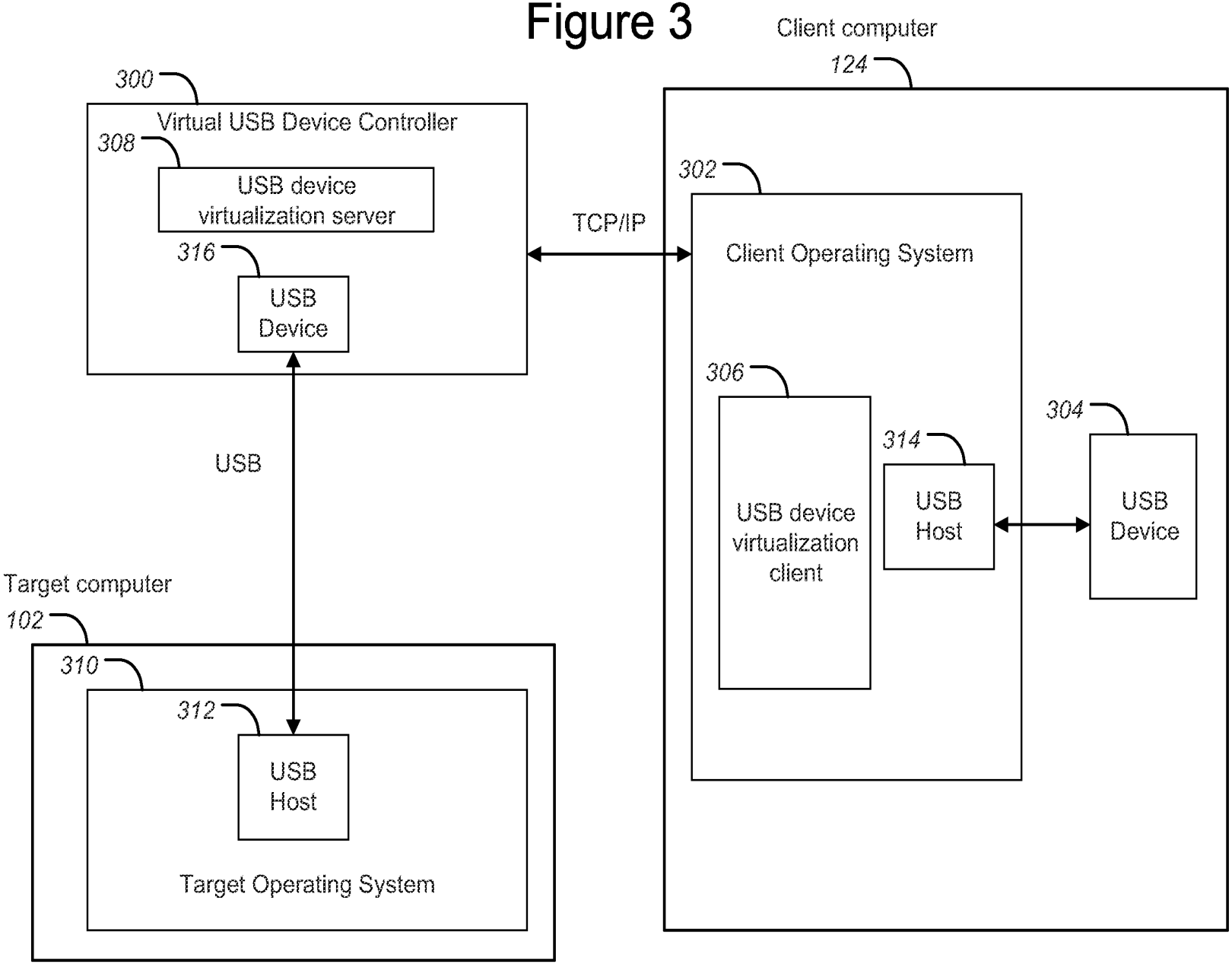
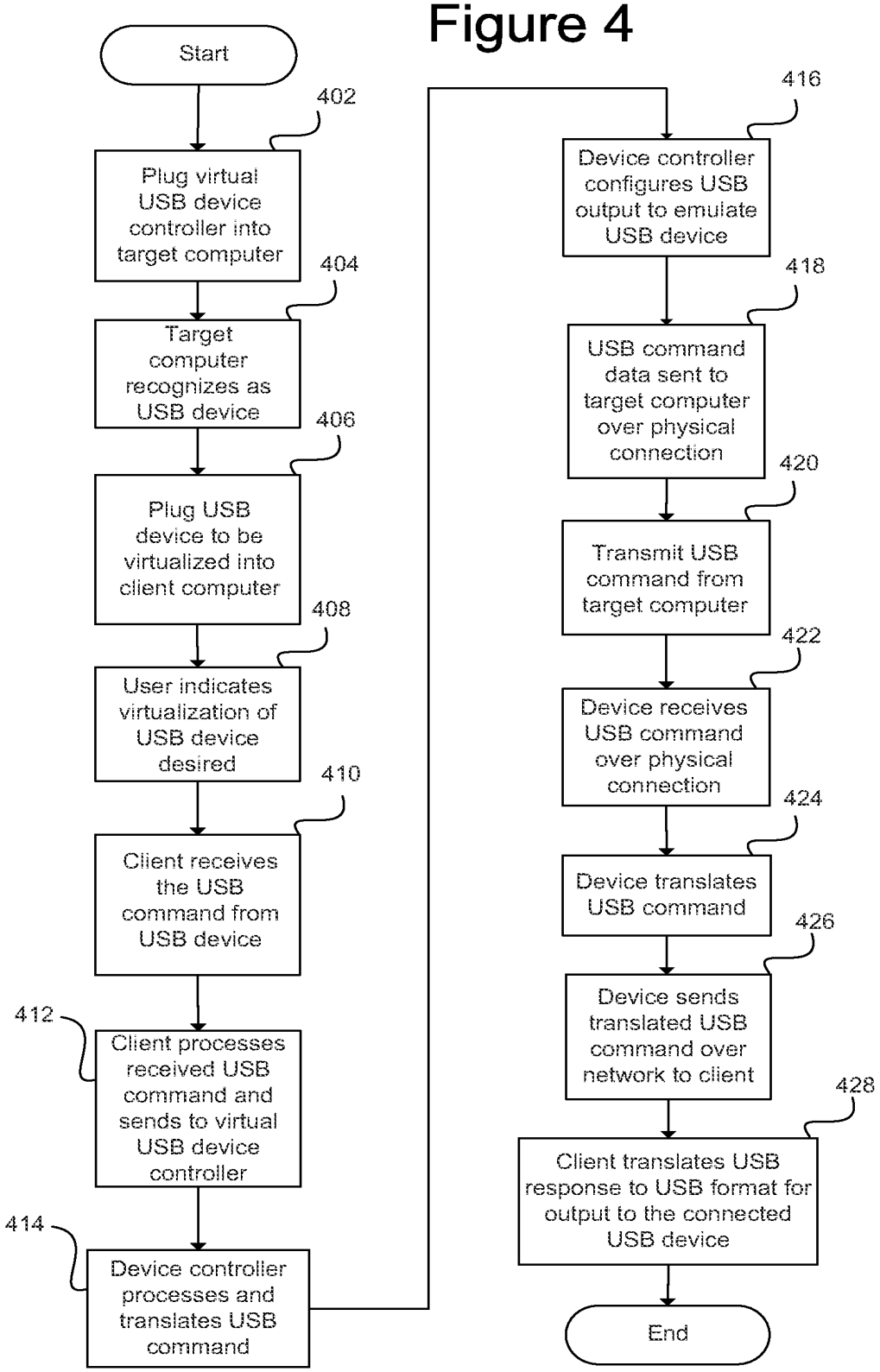

Client computer
124
300
Virtual USB Device Controller
308
USB device virtualization server
316
USB Device
TCP/IP
302
Client Operating System
306
USB device virtualization client
314
USB Host
304
USB Device
USB
Target computer
102
310
312
USB Host
Target Operating System

Figure 4


Start
402
Plug virtual USB device controller into target computer
404
Target computer recognizes as USB device
406
Plug USB device to be virtualized into client computer
408
User indicates virtualization of USB device desired
410
Client receives the USB command from USB device
412
Client processes received USB command and sends to virtual USB device controller
414
Device controller processes and translates USB command
416
Device controller configures USB output to emulate USB device
418
USB command data sent to target computer over physical connection
420
Transmit USB command from target computer
422
Device receives USB command over physical connection
424
Device translates USB command
426
Device sends translated USB command over network to client
428
Client translates USB response to USB format for output to the connected USB device
End

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US12/28443

A. CLASSIFICATION OF SUBJECT MATTER
IPC: **G06F 15/16**(2006.01),**13/00**(2006.01)

USPC: 710/33;709/217,229
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 710/33; 709/217, 229

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Please See Continuation Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 2008/0071950 A1 (JUSTICE) 20 March 2008 (20.03.2008), see entire document.	1-4, 6, 8-9, 11, 13-16, 18 --- 5, 7, 10,1 12, 17
Y	US 2008/0168118 A1 (HICKEY et al.) 10 July 2008 (10.07.2008), see entire document.	5, 7, 10, 12, 17

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
11 May 2012 (11.05.2012)	23 MAY 2012
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201	Authorized officer William Krynski Telephone No. 571-272-1700

Form PCT/ISA/210 (second sheet) (April 2007)

INTERNATIONAL SEARCH REPORT	International application No. PCT/US12/28443

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of any additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

Continuation of B. FIELDS SEARCHED Item 3:
US-PGPUB; USPAT; USOCR; EPO; DERWENT; IBM_TDB: scragg, anthony, siegman, craig, straub, michael, roca, agustin, audio, virtual, USB, networ, emulat, server, remote, client, target, host

PTO/SB/08a (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	17742166
Filing Date	2022-05-11
First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	MISIURA, BRIAN THOMAS
Attorney Docket Number	21063.0018USC1

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	2012128972	WO	A1	2012-09-27			☐

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	17742166
	Filing Date	2022-05-11
	First Named Inventor	Gauthier RENARD
	Art Unit	2186
	Examiner Name	MISIURA, BRIAN THOMAS
	Attorney Docket Number	21063.0018USC1

	1	Observations by a third party in European Application No. 18833045.0, dated August 2, 2023	☐
	2	Communication issued in European Application No. 18833045.0, dated September 1, 2023	☐

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	17742166
	Filing Date	2022-05-11
	First Named Inventor	Gauthier RENARD
	Art Unit	2186
	Examiner Name	MISIURA, BRIAN THOMAS
	Attorney Docket Number	21063.0018USC1

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☒ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2023-09-21
Name/Print	Thomas Lee	Registration Number	66396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/742,166	**09/21/2023 05:53:49 PM ET**	**21063.0018USC1**

Title of Invention

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	9959	FILED BY	Yanling Cottle
PATENT CENTER #	62844864	FILING DATE	05/11/2022
CUSTOMER #	52835	FIRST NAMED INVENTOR	Gauthier RENARD
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Thomas Lee

Documents

TOTAL DOCUMENTS: 4

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
NPL1_Observations.pdf	1	Other reference-Patent/Application/Search Documents	27 KB
NPL2_Communication.pdf	3	Other reference-Patent/Application/Search Documents	72 KB
FR_WO2012128972A1.pdf	26	Foreign Reference	964 KB
SB08_0018USC1.pdf	4	Information Disclosure Statement (IDS) Form (SB08)	1234 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
NPL1_Observations.pdf	BF3D7AC48C55FC080EE43E4F17B7482D449CC3022936DCA8 E41FA3680385CFE31CBF5300317DC1E0CC1060B4091264E3D E3062DC25EEDACA2B49238BCB30CE97
NPL2_Communication.pdf	ED106EEA1F94958A765D7147907EB66BB362345023C7CE87C 378A1F88E2131378C8EF067A01FF58C4FDB7F8702CCB9A7AE 827602F0C9EC7AFC1789D9E5136779
FR_WO2012128972A1.pdf	A925A59E6FA6C2F42B0F8C60FF5279AAEDAB07BEA10256EA5 1C8190A9651B76D7B22ED6DA8F66AC8184A061F7C632631431 B0305E82A320C232D856A328F8835
SB08_0018USC1.pdf	D159E72AEF5E3764149461DD3CC05BEA9CD7E77E73F92584C 700EE8E6C365BED6803453D272DC2FD29B17E09B876DBA4E8 0D5D5F2F8057F7352EEEFAB4AB5C5B

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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NOTICE OF ALLOWANCE AND FEE(S) DUE

52835 7590 09/27/2023

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 South Seventh Street
Suite 2700
Minneapolis, MN 55402-1683

EXAMINER	
MISIURA, BRIAN THOMAS	
ART UNIT	PAPER NUMBER
2186	

DATE MAILED: 09/27/2023

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/742,166	05/11/2022	Gauthier RENARD	21063.0018USC1	9959

TITLE OF INVENTION: METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	12/27/2023

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 40% the amount of undiscounted fees, and micro entity fees are 20% the amount of undiscounted fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications. **Because electronic patent issuance may occur shortly after issue fee payment, any desired continuing application should preferably be filed prior to payment of this issue fee in order not to jeopardize copendency.**

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

52835 7590 09/27/2023

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 South Seventh Street
Suite 2700
Minneapolis, MN 55402-1683

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/742,166	05/11/2022	Gauthier RENARD	21063.0018USC1	9959

TITLE OF INVENTION: METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	12/27/2023

EXAMINER	ART UNIT	CLASS-SUBCLASS
MISIURA, BRIAN THOMAS	2186	710-011000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ❑ Issue Fee ❑ Publication Fee (if required)

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via Patent Center or EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

❑ Applicant asserting small entity status. See 37 CFR 1.27

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

❑ Applicant changing to regular undiscounted fee status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

Page 465 of 684
354 of 684

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/742,166	05/11/2022	Gauthier RENARD	21063.0018USC1	9959

52835 7590 09/27/2023

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 South Seventh Street
Suite 2700
Minneapolis, MN 55402-1683

EXAMINER	
MISIURA, BRIAN THOMAS	

ART UNIT	PAPER NUMBER
2186	

DATE MAILED: 09/27/2023

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 17/742,166	Applicant(s) RENARD et al.	
	Examiner BRIAN T MISIURA	Art Unit 2186	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to 9/7/2023.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 1-5,7-9,11,13-14,16-24 and 27-37 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some* c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 5/9/2023, 6/2/2023, 9/21/2023.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/BRIAN T MISIURA/
Primary Examiner, Art Unit 2186

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/742,166	RENARD et al.
	Examiner	Art Unit
	BRIAN T MISIURA	2186

CPC - Searched*		
Symbol	Date	Examiner
G06F13/122, 387, 4282	05/04/2023	BTM
H04L12/12, 0428, 1813	05/04/2023	BTM

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
IDS Consideration, Review/update search from parent application	05/04/2023	BTM
IDS Consideration and Interference Search	09/21/2023	BTM

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
H04L12	18-1895	09/21/2023	BTM
H04M3	56-568	09/21/2023	BTM
H04L65	403-4061	09/21/2023	BTM

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/742,166	RENARD et al.
	Examiner	**Art Unit**
	BRIAN T MISIURA	2186

CPC						
Symbol					**Type**	**Version**
G06F	/	13	/	387	F	2013-01-01
H04L	/	12	/	12	I	2013-01-01
G06F	/	13	/	122	I	2013-01-01
G06F	/	13	/	4282	I	2013-01-01
H04L	/	63	/	0428	I	2013-01-01

CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	31	
/BRIAN T MISIURA/ Primary Examiner, Art Unit 2186	21 September 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	4

U.S. Patent and Trademark Office — Part of Paper No.: 20230921

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/742,166	RENARD et al.
	Examiner	**Art Unit**
	BRIAN T MISIURA	2186

INTERNATIONAL CLASSIFICATION				
CLAIMED				
G06F13/38	/	13	/	38
H04L12/12	/	12	/	12
G06F13/12	/	13	/	12
G06F13/42	/	13	/	42
H04L9/40	/	9	/	40

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	31	
/BRIAN T MISIURA/ Primary Examiner, Art Unit 2186	21 September 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	4

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/742,166	RENARD et al.
	Examiner	**Art Unit**
	BRIAN T MISIURA	2186

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1		10	15	19	22	28	31	37						
2	2	9	11	16	20	23	29								
3	3		12	17	21	24	30								
4	4	10	13	18	22	25	31								
5	5	11	14	19	23	26	32								
	6		15	20	24	27	33								
6	7	12	16		25	28	34								
7	8	13	17		26	29	35								
8	9	14	18	21	27	30	36								

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	31	
/BRIAN T MISIURA/ Primary Examiner, Art Unit 2186	21 September 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	4

U.S. Patent and Trademark Office Part of Paper No.: 20230921

Case 1:23-cv-00684

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	17742166
Filing Date	2022-05-11
First Named Inventor	RENARD
Art Unit	2186
Examiner Name	MISIURA
Attorney Docket Number	21063.0018USC1

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							

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NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17742166
	Filing Date	2022-05-11
	First Named Inventor	RENARD
	Art Unit	2186
	Examiner Name	MISIURA
	Attorney Docket Number	21063.0018USC1

	1	Written Opinion issued in parallel Singapore patent application No. 11202005201Y, dated 10 May 2023, 8 pages provided

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/BRIAN T MISIURA/	Date Considered	09/21/2023

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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Art Unit	2186
Examiner Name	MISIURA
Attorney Docket Number	21063.0018USC1

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☒ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☒ See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2023-06-02
Name/Print	Thomas Lee	Registration Number	66,396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Number	17742166
Filing Date	2022-05-11
First Named Inventor	Gauthier RENARD
Art Unit	
Examiner Name	
Attorney Docket Number	21063.0018USC1

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NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	Filing Date	2022-05-11
	First Named Inventor	Gauthier RENARD
	Art Unit	
	Examiner Name	
	Attorney Docket Number	21063.0018USC1

	1	Office Action issued in U.S. Application No. 16/771068, issued April 12, 2023	

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EXAMINER SIGNATURE

Examiner Signature	/BRIAN T MISIURA/	Date Considered	09/21/2023

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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First Named Inventor	Gauthier RENARD
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That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2023-05-09
Name/Print	Thomas Lee	Registration Number	66,396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

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3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

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Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-22)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	17742166
Filing Date	2022-05-11
First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	MISIURA, BRIAN THOMAS
Attorney Docket Number	21063.0018USC1

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	2012128972	WO	A1	2012-09-27			☐

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

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	Art Unit	2186
	Examiner Name	MISIURA, BRIAN THOMAS
	Attorney Docket Number	21063.0018USC1

	1	Observations by a third party in European Application No. 18833045.0, dated August 2, 2023	☐
	2	Communication issued in European Application No. 18833045.0, dated September 1, 2023	☐

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/BRIAN T MISIURA/	Date Considered	09/25/2023

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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Name/Print	Thomas Lee	Registration Number	66396

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PE2E SEARCH - Search History (Prior Art)

There are no Prior Art searches to show.

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N121	46532	H04M3/56-568.cpc OR H04L65/403-4061.CPC. OR H04L12/18-1895.cpc.	(US-PGPUB; USPAT)	ADJ	ON	ON	2023/09/21 01:50 PM
N122	22209	N121 AND (meeting OR conference)	(US-PGPUB; USPAT)	ADJ	ON	ON	2023/09/21 01:51 PM
N123	997	N122 AND ((decod$3 OR encod$3 OR enhanc$3) WITH data).clm.	(US-PGPUB; USPAT)	ADJ	ON	ON	2023/09/21 01:52 PM

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
17/742,166	05/11/2022	2186	3400	21063.0018USC1	28	2

CONFIRMATION NO. 9959

REPLACEMENT FILING RECEIPT

52835
HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 South Seventh Street
Suite 2700
Minneapolis, MN 55402-1683



Date Mailed: 10/02/2023

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

Gauthier RENARD, Kuurne, BELGIUM;
Johan Peter Frans DEGRAEF, Gent, BELGIUM;

Applicant(s)

Barco N.V., Kortrijk, BELGIUM;

Assignment For Published Patent Application

BARCO N.V., Kortrijk, BELGIUM

Power of Attorney: The patent practitioners associated with Customer Number 52835

Domestic Priority data as claimed by applicant

This application is a CON of 16/771,068 06/09/2020
which is a 371 of PCT/EP2018/086537 12/21/2018
which is a CIP of 15/858,668 12/29/2017 PAT 10,684,972

Foreign Applications for which priority is claimed (You may be eligible to benefit from the Patent Prosecution Highway program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 05/19/2022

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 17/742,166**

Projected Publication Date: 08/25/2022

Non-Publication Request: No

Early Publication Request: No

Title

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Preliminary Class

710

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific

countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

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This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

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(Not for submission under 37 CFR 1.99)

Application Number	17742166
Filing Date	2022-05-11
First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	BRIAN THOMAS MISIURA
Attorney Docket Number	21063.0018USC1

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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	Attorney Docket Number	21063.0018USC1

	1	Office Action issued in U.S. Application No. 17/664,147, dated September 13, 2023	☐

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EXAMINER SIGNATURE

Examiner Signature		Date Considered	

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Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2023-10-08
Name/Print	Thomas Lee	Registration Number	66,396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

UNITED STATES
PATENT AND TRADEMARK OFFICE

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/742,166	**10/08/2023 07:27:52 PM ET**	**21063.0018USC1**

Title of Invention

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	9959	FILED BY	Yanling Cottle
PATENT CENTER #	62950771	FILING DATE	05/11/2022
CUSTOMER #	52835	FIRST NAMED INVENTOR	Gauthier RENARD
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Thomas Lee

Documents

TOTAL DOCUMENTS: 2

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
OA.pdf	9	Other reference-Patent/Application/Search Documents	514 KB
SB08_0018USC1.pdf	4	Information Disclosure Statement (IDS) Form (SB08)	1234 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
OA.pdf	BDDF83200E3B2CCF63EA5EF9DFEBF921348D3C5B6374065C

	6412CF5AC55508E9980691BB590D73F0A84C8DC51EE72D6BD E8D19C16D4043A614814A0FDE8CD6CC
SB08_0018USC1.pdf	E254597CD2FD3D21AFC6AA80896684C8FA985376472320AC4 50F5831DDA78C93623B893D52A672ED4229C86CACE0C960F3 4420ED814C8B786CCDF753BF9BE0F8

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

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ELECTRONIC PAYMENT RECEIPT

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17/742,166	**10/08/2023 07:27:52 PM ET**	**21063.0018USC1**

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CUSTOMER #	52835	FILING DATE	05/11/2022
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Gauthier RENARD

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 1021	**E202308J 28307200**	**Yanling Cottle**

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
1806	SUBMISSION OF AN INFORMATION DISCLOSURE STATEMENT	260.00	1	260.00
			TOTAL AMOUNT:	**$260.00**

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/742,166	05/11/2022	Gauthier RENARD	21063.0018USC1	9959

52835 7590 10/17/2023

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 South Seventh Street
Suite 2700
Minneapolis, MN 55402-1683

EXAMINER	
MISIURA, BRIAN THOMAS	

ART UNIT	PAPER NUMBER
2186	

NOTIFICATION DATE	DELIVERY MODE
10/17/2023	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTOMail@hsml.com

Corrected ***Notice of Allowability***	**Application No.** 17/742,166	**Applicant(s)** RENARD et al.	
	Examiner BRIAN T MISIURA	**Art Unit** 2186	**AIA (FITF) Status** Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to 10/8/2023.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are See Continuation Sheet . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some* c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 10/8/2023.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/BRIAN T MISIURA/
Primary Examiner, Art Unit 2186

Continuation of 3. The allowed claim(s) is/are: 1-5,7-9,11,13-14,16-24 and 27-37

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	17742166
Filing Date	2022-05-11
First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	BRIAN THOMAS MISIURA
Attorney Docket Number	21063.0018USC1

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17742166
	Filing Date	2022-05-11
	First Named Inventor	Gauthier RENARD
	Art Unit	2186
	Examiner Name	BRIAN THOMAS MISIURA
	Attorney Docket Number	21063.0018USC1

	1	Office Action issued in U.S. Application No. 17/664,147, dated September 13, 2023	☐

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/BRIAN T MISIURA/	Date Considered	10/11/2023

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(**Not for submission under 37 CFR 1.99)**

Application Number	17742166
Filing Date	2022-05-11
First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	BRIAN THOMAS MISIURA
Attorney Docket Number	21063.0018USC1

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2023-10-08
Name/Print	Thomas Lee	Registration Number	66,396

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UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
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ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/742,166	**11/01/2023 01:05:43 PM ET**	**21063.0018USC1**

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PATENT CENTER #	63133408	AUTHORIZED BY	Thomas Lee
CUSTOMER #	52835	FILING DATE	05/11/2022
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Gauthier RENARD

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 1021	**E2023A1D06196609**	**Yanling Cottle**

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
1801	REQUEST FOR CONTINUED EXAMINATION (RCE) - 1ST REQUEST (SEE 37 CFR 1.114)	1360.00	1	1360.00
			TOTAL AMOUNT:	**$1,360.00**

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PTO/SB/08a (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Application Number	17742166
Filing Date	2022-05-11
First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	BRIAN THOMAS MISIURA
Attorney Docket Number	21063.0018USC1

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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	1	20070005809	A1	2007-01-04	Kobayashi et al.	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
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	Examiner Name	BRIAN THOMAS MISIURA
	Attorney Docket Number	21063.0018USC1

	1	Chae et al., "Wireless Webcam Implementation and Application Utilizing Wireless USB Technology", Journal of the Korea Institute of Information and Communication Engineering, Vol. 18, No. 3 : 569~575 Mar. 2014, with English translation	☒

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	17742166
	Filing Date	2022-05-11
	First Named Inventor	Gauthier RENARD
	Art Unit	2186
	Examiner Name	BRIAN THOMAS MISIURA
	Attorney Docket Number	21063.0018USC1

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2023-11-01
Name/Print	Thomas Lee	Registration Number	66396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/742,166	**11/01/2023 01:05:43 PM ET**	**21063.0018USC1**

Title of Invention

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	9959	FILED BY	Yanling Cottle
PATENT CENTER #	63133408	FILING DATE	05/11/2022
CUSTOMER #	52835	FIRST NAMED INVENTOR	Gauthier RENARD
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Thomas Lee

Documents

TOTAL DOCUMENTS: 3

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
SB08_0018USC1.pdf	4	Information Disclosure Statement (IDS) Form (SB08)	1234 KB
RCE_0018USC1.pdf	3	Request for Continued Examination (RCE)	1628 KB
NPL_CHAE.pdf	14	Non Patent Literature	10199 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)

SB08_0018USC1.pdf	A44CA34F88A11B0EE9D5B5C695413FF127F15FCA61AA7ACE0 8CE6CDFA9C320B47899B0EFA52DE8C6E8C1F884A9E3D0598 0D60DF1375BAF1AAD3BC44B5A1CA18B
RCE_0018USC1.pdf	DED7CC9116A161ED6FF01121D4AC5100DFDBD1FC54307821 79A97F4FCEBEE2A67B1D2615159351270D62FFBF2C2A61057 A3AE4E890737DD5C75B8D313EAB7671
NPL_CHAE.pdf	81F633A797F7034299FEDECF963799FDCD8053104056CE9D81 AA05F0676C52FE4E831FE2957BC76C3C381FA4FA113A43785 29801688344A3D5C9175475F3ACD4

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/30EFS (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	17742166	Filing Date	2022-05-11	Docket Number (if applicable)	21063.0018USC1	Art Unit	2186
First Named Inventor	Gauthier RENARD			Examiner Name	BRIAN THOMAS MISIURA		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

- ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- ☐ Other _____

☒ Enclosed

- ☐ Amendment/Reply
- ☒ Information Disclosure Statement (IDS)
- ☐ Affidavit(s)/ Declaration(s)
- ☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____
(Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☒ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 503478

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

PTO/SB/30EFS (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Signature of Registered U.S. Patent Practitioner			
Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2023-11-01
Name	Thomas Lee	Registration Number	66396

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

52835 7590 11/17/2023

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 South Seventh Street
Suite 2700
Minneapolis, MN 55402-1683

EXAMINER	
MISIURA, BRIAN THOMAS	
ART UNIT	PAPER NUMBER
2186	

DATE MAILED: 11/17/2023

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/742,166	05/11/2022	Gauthier RENARD	21063.0018USC1	9959

TITLE OF INVENTION: METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	02/20/2024

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 40% the amount of undiscounted fees, and micro entity fees are 20% the amount of undiscounted fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via the USPTO patent electronic filing system.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications. **Because electronic patent issuance may occur shortly after issue fee payment, any desired continuing application should preferably be filed prior to payment of this issue fee in order not to jeopardize copendency.**

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

52835 7590 11/17/2023

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 South Seventh Street
Suite 2700
Minneapolis, MN 55402-1683

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via the USPTO patent electronic filing system or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/742,166	05/11/2022	Gauthier RENARD	21063.0018USC1	9959

TITLE OF INVENTION: METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	02/20/2024

EXAMINER	ART UNIT	CLASS-SUBCLASS
MISIURA, BRIAN THOMAS	2186	710-011000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ❑ Issue Fee ❑ Publication Fee (if required)

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via the USPTO patent electronic filing system ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

❑ Applicant asserting small entity status. See 37 CFR 1.27

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

❑ Applicant changing to regular undiscounted fee status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

Case 1:24-cv-00665-LO-IDD Document 1-6 Filed 06/06/24 Page 2 of 3 PageID# 684

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/742,166	05/11/2022	Gauthier RENARD	21063.0018USC1	9959

52835 7590 11/17/2023

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 South Seventh Street
Suite 2700
Minneapolis, MN 55402-1683

EXAMINER	
MISIURA, BRIAN THOMAS	

ART UNIT	PAPER NUMBER
2186	

DATE MAILED: 11/17/2023

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 17/742,166	Applicant(s) RENARD et al.	
	Examiner BRIAN T MISIURA	Art Unit 2186	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to 11/1/2023.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are See Continuation Sheet . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some* c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 11/1/2023.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☑ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/BRIAN T MISIURA/
Primary Examiner, Art Unit 2186

Continuation of 3. The allowed claim(s) is/are: 1-5,7-9,11,13-14,16-24 and 27-37

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Examiner's Statement of Reasons for Allowance

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/1/2023 has been entered.

Allowable Subject Matter

Claims 1-5, 7-9, 11, 13-14, 16-24 and 27-37 are allowed for reasons discussed in previous Notice of Allowances.

The IDS filed 11/1/2023 has been considered and the prior art presented does not change the allowability of the claims, as originally indicated in the Notice of Allowance dated 9/27/2023, with the allowable subject matter detailed in the Non-Final Rejection dated 5/9/2023.

- Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRIAN T MISIURA whose telephone number is (571)272-0889 - (Direct Fax: 571-273-0889). The examiner can normally be reached on M-F: 8-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kim Huynh can be reached on (571) 272-4147. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Brian T Misiura/
Primary Examiner, Art Unit 2186

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/742,166	RENARD et al.
	Examiner	**Art Unit**
	BRIAN T MISIURA	2186

CPC						
Symbol					**Type**	**Version**
G06F	/	13	/	387	F	2013-01-01
H04L	/	12	/	12	I	2013-01-01
G06F	/	13	/	122	I	2013-01-01
G06F	/	13	/	4282	I	2013-01-01
H04L	/	63	/	0428	I	2013-01-01

CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	31	
/BRIAN T MISIURA/ Primary Examiner, Art Unit 2186	07 November 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	4

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/742,166	RENARD et al.
	Examiner	**Art Unit**
	BRIAN T MISIURA	2186

INTERNATIONAL CLASSIFICATION				
CLAIMED				
G06F13/38	/	13	/	38
H04L12/12	/	12	/	12
G06F13/12	/	13	/	12
G06F13/42	/	13	/	42
H04L9/40	/	9	/	40

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE (Assistant Examiner) (Date)		**Total Claims Allowed:** 31	
/BRIAN T MISIURA/ Primary Examiner, Art Unit 2186 (Primary Examiner)	07 November 2023 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 4

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/742,166	RENARD et al.
	Examiner	**Art Unit**
	BRIAN T MISIURA	2186

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1		10	15	19	22	28	31	37						
2	2	9	11	16	20	23	29								
3	3		12	17	21	24	30								
4	4	10	13	18	22	25	31								
5	5	11	14	19	23	26	32								
	6		15	20	24	27	33								
6	7	12	16		25	28	34								
7	8	13	17		26	29	35								
8	9	14	18	21	27	30	36								

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	31	
/BRIAN T MISIURA/ Primary Examiner, Art Unit 2186	07 November 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	4

U.S. Patent and Trademark Office Part of Paper No.: 20231107

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/742,166	RENARD et al.
	Examiner	Art Unit
	BRIAN T MISIURA	2186

CPC - Searched*		
Symbol	Date	Examiner
G06F13/122, 387, 4282	05/04/2023	BTM
H04L12/12, 0428, 1813	05/04/2023	BTM

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
IDS Consideration, Review/update search from parent application	05/04/2023	BTM
IDS Consideration and Interference Search	09/21/2023	BTM
IDS Consideration and update Interference Search	11/07/2023	BTM

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
H04L12	18-1895	09/21/2023	BTM
H04M3	56-568	09/21/2023	BTM
H04L65	403-4061	09/21/2023	BTM

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L226	2	"20070005809"	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/11/06 04:39 PM

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N124	3133	(H04M3/56-568.cpc OR H04L65/403-4061.CPC. OR H04L12/18-1895.cpc.) AND ((translat$3 OR convert$3 OR conversion OR encod$3 OR decod$3) WITH data).clm.	(US-PGPUB; USPAT)	ADJ	ON	ON	2023/11/06 04:49 PM
N125	514	(H04M3/56-568.cpc OR H04L65/403-4061.CPC. OR H04L12/18-1895.cpc.) AND ((translat$3 OR convert$3 OR conversion OR encod$3 OR decod$3) WITH data WITH (software OR program OR application)).clm.	(US-PGPUB; USPAT)	ADJ	ON	ON	2023/11/06 04:50 PM
N126	88	(H04M3/56-568.cpc OR H04L65/403-4061.CPC. OR H04L12/18-1895.cpc.) AND ((translat$3 OR convert$3 OR conversion OR encod$3 OR decod$3) WITH data WITH (software)).clm.	(US-PGPUB; USPAT)	ADJ	ON	ON	2023/11/06 04:50 PM
N127	242	N125 AND (meeting OR conference)	(US-PGPUB; USPAT)	ADJ	ON	ON	2023/11/06 04:50 PM

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	17742166
Filing Date	2022-05-11
First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	BRIAN THOMAS MISIURA
Attorney Docket Number	21063.0018USC1

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

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U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20070005809	A1	2007-01-04	Kobayashi et al.	

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FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

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NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17742166
	Filing Date	2022-05-11
	First Named Inventor	Gauthier RENARD
	Art Unit	2186
	Examiner Name	BRIAN THOMAS MISIURA
	Attorney Docket Number	21063.0018USC1

	1	Chae et al., "Wireless Webcam Implementation and Application Utilizing Wireless USB Technology", Journal of the Korea Institute of Information and Communication Engineering, Vol. 18, No. 3 : 569~575 Mar. 2014, with English translation	☒

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/BRIAN T MISIURA/	Date Considered	11/07/2023

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**	Application Number	17742166
	Filing Date	2022-05-11
	First Named Inventor	Gauthier RENARD
	Art Unit	2186
	Examiner Name	BRIAN THOMAS MISIURA
	Attorney Docket Number	21063.0018USC1

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2023-11-01
Name/Print	Thomas Lee	Registration Number	66396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/742,166	**12/18/2023 01:48:57 PM Z ET**	**21063.0018USC1**

Title of Invention

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	9959	FILED BY	Yanling Cottle
PATENT CENTER #	63651259	FILING DATE	05/11/2022
CUSTOMER #	52835	FIRST NAMED INVENTOR	Gauthier RENARD
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Thomas Lee

Documents

TOTAL DOCUMENTS: 3

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
EESR.pdf	8	Other reference-Patent/Application/Search Documents	260 KB
SB133_0018USC1.pdf	2	Patent Term Adjustment Statement under 37 CFR 1.704(d) filed with an IDS	231 KB
SB08_0018USC1.pdf	4	Information Disclosure Statement (IDS) Form (SB08)	1234 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
EESR.pdf	7B7E137679FA54B62AE06B9237A7D60718AE0EDADDF816327 1010F9483FD12794299A695DB9C2CC46B30FB585B21CF23A40 368D7ABC9B1A559BCEEE0D6654BDB
SB133_0018USC1.pdf	2C3404B70C231874BAACE728D04176E2982FEECA5385ED3DA 1F9CC4C24312DA50D98C4C24E953D077D2BCE3F292C5A6DB 2364A7A1857DC9BBB0B477D82164678
SB08_0018USC1.pdf	E790035F648E9E5270EF0CF5402C6BCC5A8266F5F55FA7C96 FA80AC8841E15EB4818BA83419059D9AD1915D69D92D810CE 3D7CBA1D99BF222017C7D49B385F9E

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/08a (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	17742166
Filing Date	2022-05-11
First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	BRIAN THOMAS MISIURA
Attorney Docket Number	21063.0018USC1

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	9129602	B1	2015-09-08	Shepard et al.	cited in EESR

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20040236547	A1	2004-11-25	Rappaport et al.	cited in EESR
	2	20150364274	A1	2015-12-17	Khattak	cited in EESR

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	17742166
Filing Date	2022-05-11
First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	BRIAN THOMAS MISIURA
Attorney Docket Number	21063.0018USC1

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	The extended European search report issued in European Application No. 23192763.3, dated November 30, 2023	☐

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17742166
	Filing Date	2022-05-11
	First Named Inventor	Gauthier RENARD
	Art Unit	2186
	Examiner Name	BRIAN THOMAS MISIURA
	Attorney Docket Number	21063.0018USC1

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☒ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☒ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2023-12-18
Name/Print	Thomas Lee	Registration Number	66396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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Alexandria, VA 22313 - 1450
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ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/742,166	12/18/2023 01:48:57 PM Z ET	21063.0018USC1

Title of Invention

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	9959	FILED BY	Yanling Cottle
PATENT CENTER #	63651259	AUTHORIZED BY	Thomas Lee
CUSTOMER #	52835	FILING DATE	05/11/2022
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Gauthier RENARD

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 1021	E2023BHD49325208	Yanling Cottle

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
1806	SUBMISSION OF AN INFORMATION DISCLOSURE STATEMENT	260.00	1	260.00
			TOTAL AMOUNT:	$260.00

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

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New International Application Filed with the USPTO as a Receiving Office

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Doc Code: PTA.IDS
Document Description: Patent Term Adjustment Stmt Under 37 CFR 1.704(d)

PTO/SB/133 (10-21)

PATENT TERM ADJUSTMENT STATEMENT UNDER 37 CFR 1.704(d)		
	Application Number	17742166
	Filing Date	2022-05-11
	First Named Inventor	Gauthier RENARD
	Art Unit	2186
	Examiner Name	BRIAN THOMAS MISIURA
	Practitioner Docket No.	21063.0018USC1

APPLICANT HEREBY STATES THE FOLLOWING (please review 37 CFR 1.704(d) before filing this form):

☑ Each item of information contained in the information disclosure statement was first cited in any communication from a patent office in a counterpart foreign or international application or from the Office, and this communication was not received by any individual designated in 37 CFR 1.56(c) more than thirty days prior to the filing of the information disclosure statement.

AND/OR

☐ Each item of information contained in the information disclosure statement is a communication that was issued by a patent office in a counterpart foreign or international application or by the Office, and this communication was not received by any individual designated in 37 CFR 1.56(c) more than thirty days prior to the filing of the information disclosure statement.

INSTRUCTIONS:

- **This form will not satisfy the requirement of 37 CFR 1.97(e).** The present statement is filed under 37 CFR 1.704(d) and will not substitute for compliance with any of the requirements of 37 CFR 1.97 and 1.98. For an information disclosure statement to comply with 37 CFR 1.97(c) or (d), the information disclosure statement must be accompanied by a statement under 37 CFR 1.97(e) notwithstanding any statement filed under 37 CFR 1.704(d).
- The present form (PTO/SB/133) should be filed concurrently with the information disclosure statement to derive benefit under 37 CFR 1.704(d).

Signature	/Thomas Lee/	Date	December 18, 2023
Typed or Printed Name	Thomas Lee	Practitioner Registration Number	66396

Note: *Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required in accordance with 37 CFR 1.33 and 11.18. Please see 37 CFR 1.4(d) for the form of the signature. If necessary, submit multiple forms for more than one signature, see below*.*

☐ *Total of _____ forms are submitted.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

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1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/742,166	05/11/2022	Gauthier RENARD	21063.0018USC1	9959

52835 7590 01/02/2024

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 South Seventh Street
Suite 2700
Minneapolis, MN 55402-1683

EXAMINER	
MISIURA, BRIAN THOMAS	

ART UNIT	PAPER NUMBER
2186	

NOTIFICATION DATE	DELIVERY MODE
01/02/2024	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTOMail@hsml.com

Corrected ***Notice of Allowability***	**Application No.** 17/742,166	**Applicant(s)** RENARD et al.	
	Examiner BRIAN T MISIURA	**Art Unit** 2186	**AIA (FITF) Status** Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to 12/18/2023.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are See Continuation Sheet . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some* c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 12/18/2023.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/BRIAN T MISIURA/
Primary Examiner, Art Unit 2186

Continuation of 3. The allowed claim(s) is/are: 1-5,7-9,11,13-14,16-24 and 27-37

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/742,166	RENARD et al.
	Examiner	Art Unit
	BRIAN T MISIURA	2186

CPC - Searched*		
Symbol	Date	Examiner
G06F13/122, 387, 4282	05/04/2023	BTM
H04L12/12, 0428, 1813	05/04/2023	BTM

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
IDS Consideration, Review/update search from parent application	05/04/2023	BTM
IDS Consideration and Interference Search	09/21/2023	BTM
IDS Consideration and update Interference Search	11/07/2023	BTM
IDS Consideration	12/22/2023	BTM

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/742,166	RENARD et al.
	Examiner	Art Unit
	BRIAN T MISIURA	2186

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
H04L12	18-1895	09/21/2023	BTM
H04M3	56-568	09/21/2023	BTM
H04L65	403-4061	09/21/2023	BTM

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/742,166	RENARD et al.
	Examiner	**Art Unit**
	BRIAN T MISIURA	2186

CPC						
Symbol					**Type**	**Version**
G06F	/	13	/	387	F	2013-01-01
H04L	/	12	/	12	I	2013-01-01
G06F	/	13	/	122	I	2013-01-01
G06F	/	13	/	4282	I	2013-01-01
H04L	/	63	/	0428	I	2013-01-01

CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	31	
/BRIAN T MISIURA/ Primary Examiner, Art Unit 2186	22 December 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	4

U.S. Patent and Trademark Office — Part of Paper No.: 20231222

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/742,166	RENARD et al.
	Examiner	**Art Unit**
	BRIAN T MISIURA	2186

INTERNATIONAL CLASSIFICATION				
CLAIMED				
G06F13/38	/	13	/	38
H04L12/12	/	12	/	12
G06F13/12	/	13	/	12
G06F13/42	/	13	/	42
H04L9/40	/	9	/	40

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 31	
/BRIAN T MISIURA/ Primary Examiner, Art Unit 2186 (Primary Examiner)	22 December 2023 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 4

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/742,166	RENARD et al.
	Examiner	**Art Unit**
	BRIAN T MISIURA	2186

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1		10	15	19	22	28	31	37						
2	2	9	11	16	20	23	29								
3	3		12	17	21	24	30								
4	4	10	13	18	22	25	31								
5	5	11	14	19	23	26	32								
	6		15	20	24	27	33								
6	7	12	16		25	28	34								
7	8	13	17		26	29	35								
8	9	14	18	21	27	30	36								

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	31	
/BRIAN T MISIURA/ Primary Examiner, Art Unit 2186	22 December 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	4

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-22)
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First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	BRIAN THOMAS MISIURA
Attorney Docket Number	21063.0018USC1

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	9129602	B1	2015-09-08	Shepard et al.	cited in EESR

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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20040236547	A1	2004-11-25	Rappaport et al.	cited in EESR
	2	20150364274	A1	2015-12-17	Khattak	cited in EESR

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	17742166
Filing Date	2022-05-11
First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	BRIAN THOMAS MISIURA
Attorney Docket Number	21063.0018USC1

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	The extended European search report issued in European Application No. 23192763.3, dated November 30, 2023	☐

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/BRIAN T MISIURA/	Date Considered	12/22/2023

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

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First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	BRIAN THOMAS MISIURA
Attorney Docket Number	21063.0018USC1

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☒ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☒ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2023-12-18
Name/Print	Thomas Lee	Registration Number	66396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via the USPTO patent electronic filing system.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications. **Because electronic patent issuance may occur shortly after issue fee payment, any desired continuing application should preferably be filed prior to payment of this issue fee in order not to jeopardize copendency.**

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

52835 7590 11/17/2023

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 South Seventh Street
Suite 2700
Minneapolis, MN 55402-1683

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via the USPTO patent electronic filing system or by facsimile to (571) 273-2885, on the date below.

Yanling Cottle	(Typed or printed name)
/yanling cottle/	(Signature)
February 20, 2024	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/742,166	05/11/2022	Gauthier RENARD	21063.0018USC1	9959

TITLE OF INVENTION: METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	02/20/2024

EXAMINER	ART UNIT	CLASS-SUBCLASS
MISIURA, BRIAN THOMAS	2186	710-011000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 HSML P.C.
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: BARCO N.V.

(B) RESIDENCE: (CITY and STATE OR COUNTRY): KORTRIJK, BELGIUM

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☒ Issue Fee ☐ Publication Fee (if required)

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

☒ Electronic Payment via the USPTO patent electronic filing system ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. 503478

5. **Change in Entity Status** (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

☐ Applicant asserting small entity status. See 37 CFR 1.27

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

☐ Applicant changing to regular undiscounted fee status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Thomas Lee/ Date February 20, 2024

Typed or printed name Thomas Lee Registration No. 66396

Electronic Patent Application Fee Transmittal 644 of 684

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/742,166	**02/20/2024 02:00:16 PM Z ET**	**21063.0018USC1**

Title of Invention

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	9959	FILED BY	Yanling Cottle
PATENT CENTER #	64377899	FILING DATE	05/11/2022
CUSTOMER #	52835	FIRST NAMED INVENTOR	Gauthier RENARD
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Thomas Lee

Documents

TOTAL DOCUMENTS: 1

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
IF_0018USC1_.pdf	1	Issue Fee Payment (PTO-85B)	924 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
IF_0018USC1_.pdf	97AD64ADF83F24850334109AEBBDFF70444CC44F99E4CD3A2375815642D1232B9181C86CA81A2B4569DD1254FAC3C3918040457CEFE38A907A9A68F39A63E0B3

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/742,166	**02/20/2024 02:00:16 PM Z ET**	**21063.0018USC1**

Title of Invention

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Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	9959	FILED BY	Yanling Cottle
PATENT CENTER #	64377899	AUTHORIZED BY	Thomas Lee
CUSTOMER #	52835	FILING DATE	05/11/2022
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Gauthier RENARD

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 1021	**E20242JE00597730**	**Yanling Cottle**

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
1501	UTILITY ISSUE FEE	1200.00	1	1200.00
			TOTAL AMOUNT:	**$1,200.00**

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New Applications Under 35 U.S.C. 111

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submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/742,166	03/26/2024	11940937	21063.0018USC1	9959

52835 7590 03/06/2024

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 South Seventh Street
Suite 2700
Minneapolis, MN 55402-1683

ISSUE NOTIFICATION

The projected patent number and issue date are specified above. The patent will issue electronically. The electronically issued patent is the official patent grant pursuant to 35 U.S.C. § 153. The patent may be accessed on or after the issue date through Patent Center at https://patentcenter.uspto.gov/. The patent will be available in both the public and the private sides of Patent Center. Further assistance in electronically accessing the patent, or about Patent Center, is available by calling the Patent Electronic Business Center at 1-888-217-9197.

The USPTO is implementing electronic patent issuance with a transition period, during which period the USPTO will mail a ceremonial paper copy of the electronic patent grant to the correspondence address of record. Additional copies of the patent (i.e., certified and presentation copies) may be ordered for a fee from the USPTO's Certified Copy Center at https://certifiedcopycenter.uspto.gov/index.html. The Certified Copy Center may be reached at (800)972-6382.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Center (https://patentcenter.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Patents Stakeholder Experience (OPSE), Stakeholder Support Division (SSD) at (571)-272-4200.

INVENTOR(s) (Please see PATENT CENTER site https://patentcenter.uspto.gov for additional inventors):

Gauthier RENARD, Kuurne, BELGIUM;
Johan Peter Frans DEGRAEF, Gent, BELGIUM;

APPLICANT(s) (Please see PATENT CENTER site https://patentcenter.uspto.gov for additional applicants):

Barco N.V., Kortrijk, BELGIUM;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

Doc Code: PTA.IDS
Document Description: Patent Term Adjustment Stmt Under 37 CFR 1.704(d)

PTO/SB/133 (10-21)

PATENT TERM ADJUSTMENT STATEMENT UNDER 37 CFR 1.704(d)		
	Application Number	17742166
	Filing Date	2022-05-11
	First Named Inventor	Gauthier RENARD
	Art Unit	2186
	Examiner Name	BRIAN THOMAS MISIURA
	Practitioner Docket No.	21063.0018USC1

APPLICANT HEREBY STATES THE FOLLOWING (please review 37 CFR 1.704(d) before filing this form):

☑ Each item of information contained in the information disclosure statement was first cited in any communication from a patent office in a counterpart foreign or international application or from the Office, and this communication was not received by any individual designated in 37 CFR 1.56(c) more than thirty days prior to the filing of the information disclosure statement.

AND/OR

☐ Each item of information contained in the information disclosure statement is a communication that was issued by a patent office in a counterpart foreign or international application or by the Office, and this communication was not received by any individual designated in 37 CFR 1.56(c) more than thirty days prior to the filing of the information disclosure statement.

INSTRUCTIONS:

- **This form will not satisfy the requirement of 37 CFR 1.97(e).** The present statement is filed under 37 CFR 1.704(d) and will not substitute for compliance with any of the requirements of 37 CFR 1.97 and 1.98. For an information disclosure statement to comply with 37 CFR 1.97(c) or (d), the information disclosure statement must be accompanied by a statement under 37 CFR 1.97(e) notwithstanding any statement filed under 37 CFR 1.704(d).
- The present form (PTO/SB/133) should be filed concurrently with the information disclosure statement to derive benefit under 37 CFR 1.704(d).

Signature	/Thomas Lee/	Date	March 14, 2024
Typed or Printed Name	Thomas Lee	Practitioner Registration Number	66396

Note: *Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required in accordance with 37 CFR 1.33 and 11.18. Please see 37 CFR 1.4(d) for the form of the signature. If necessary, submit multiple forms for more than one signature, see below*.*

☐ *Total of _____ forms are submitted.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

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4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
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7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
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ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/742,166	**03/14/2024 04:32:32 PM Z ET**	**21063.0018USC1**

Title of Invention

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	11940937
CONFIRMATION #	9959	FILED BY	Thomas Lee
PATENT CENTER #	64689963	AUTHORIZED BY	-
CUSTOMER #	52835	FILING DATE	05/11/2022
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Gauthier RENARD

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 1021	**E20243DG32436901**	**Thomas Lee**

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
1464	PETITIONS REQUIRING THE PETITION FEE SET FORTH IN 37 CFR 1.17(H) (GROUP III)	140.00	1	140.00
1820	REQUEST FOR CONTINUED EXAMINATION (RCE)- 2ND AND SUBSEQUENT REQUEST (SEE 37 CFR 1.114)	2000.00	1	2000.00
			TOTAL AMOUNT:	**$2,140.00**

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Doc Code: QPIDS.REQ
Document Description: Quick Path Information Disclosure Statement

PTO/SB/09 (11-23)

CERTIFICATION AND REQUEST FOR CONSIDERATION OF AN INFORMATION DISCLOSURE STATEMENT FILED AFTER PAYMENT OF THE ISSUE FEE UNDER THE QPIDS PROGRAM

Non-Provisional Application Number: 17742166	Filing Date: 2022-05-11
First Named Inventor: Gauthier RENARD	Title of Invention: METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS O

THE UNDERSIGNED HEREBY CERTIFIES AND REQUESTS THE FOLLOWING FOR THE ABOVE-IDENTIFIED APPLICATION.

1. Consideration is requested of the information disclosure statement (IDS) submitted herewith, which is being filed after payment of the issue fee.
2. Check the box next to the appropriate selection:

   ☑ Each item of information contained in the IDS was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the IDS. See 37 CFR 1.97(e)(1).

   OR

   ☐ No item of information contained in the IDS was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the IDS was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the IDS. See 37 CFR 1.97(e)(2).

   OR

   ☐ See attached certification statement in compliance with 37 CFR 1.97(e).
3. Please charge the IDS fee set forth in 37 CFR 1.17(p) to Deposit Account No. 503478.
4. A Petition to Withdraw from Issue After Payment of the Issue Fee (37 CFR 1.313(c)(2)), including the petition fee set forth in 37 CFR 1.17(h), is submitted herewith as a **Web-based ePetition**.
   WARNING: Do not submit the petition as a follow-on paper via the USPTO patent electronic filing system. Submit the petition as a Web-based ePetition by signing on to the USPTO patent electronic filing system as a registered user, selecting "Petitions" in the top menu or by using the display cards, and then selecting the appropriate Petition to Withdraw from Issue after Payment of the Issue Fee (for automatic processing and immediate grant, if all petitions requirements are met). Failure to use a Web-based ePetition will result in automatic entry of the RCE.
5. A request for continued examination (RCE) under 37 CFR 1.114 and the RCE fee under 37 CFR 1.17(e) are submitted herewith.
6. The RCE will be treated as a "conditional" RCE. In the event the examiner determines that any item of information contained in the IDS necessitates the reopening of prosecution in the application, the undersigned understands that (i) the RCE will be processed and treated as an RCE under 37 CFR 1.114 and therefore (ii) the IDS fee under 37 CFR 1.17(p) will be returned in accordance with 37 CFR 1.97(b)(4). In the event that no item of information in the IDS necessitates reopening prosecution, the undersigned understands that the RCE will not be processed and the RCE fee under 37 CFR 1.17(e) will be returned.
7. This certification and request is being filed as a **Web-based ePetition** and is not accompanied by an amendment to the application. Inclusion of an amendment will result in automatic entry of the RCE.

Signature /Thomas Lee/	Date March 14, 2024
Name (Print/Typed) THOMAS LEE	Practitioner Registration Number (If applicable) 66396

Note: *Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required in accordance with 37 CFR 1.33 and 11.18. Please see 37 CFR 1.4(d) for the form of the signature. If necessary, submit multiple forms for more than one signature, see below.**

☐ *Total of _____ forms are submitted.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

Routine uses of the information in this record may include disclosure to:

1) law enforcement, in the event that the system of records indicates a violation or potential violation of law;

2) a federal, state, local, or international agency, in response to its request;

3) a contractor of the USPTO having need for the information in order to perform a contract;

4) the Department of Justice for determination of whether the Freedom of Information Act (FOIA) requires disclosure of the record;

5) a Member of Congress submitting a request involving an individual to whom the record pertains, when the individual has requested the Member's assistance with respect to the subject matter of the record;

6) a court, magistrate, or administrative tribunal, in the course of presenting evidence, including disclosures to opposing counsel in the course of settlement negotiations;

7) the Administrator, General Services Administration (GSA), or their designee, during an inspection of records conducted by GSA under authority of 44 U.S.C. 2904 and 2906, in accordance with the GSA regulations and any other relevant (i.e., GSA or Commerce) directive, where such disclosure shall not be used to make determinations about individuals;

8) another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c));

9) the Office of Personnel Management (OPM) for personnel research purposes; and

10) the Office of Management and Budget (OMB) for legislative coordination and clearance.

If you do not furnish the information requested on this form, the USPTO may not be able to process and/or examine your submission, which may result in termination of proceedings, abandonment of the application, and/or expiration of the patent.

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/742,166	**03/14/2024 04:32:32 PM Z ET**	**21063.0018USC1**

Title of Invention

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	11940937
CONFIRMATION #	9959	FILED BY	Thomas Lee
PATENT CENTER #	64689963	FILING DATE	05/11/2022
CUSTOMER #	52835	FIRST NAMED INVENTOR	Gauthier RENARD
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 6

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
petition-request.pdf	2	ePetition Request Form	29 KB
NPL_EPOA5.pdf	3	Non Patent Literature	72 KB
QPIDS.REQ_0018USC1.pdf	2	Quick Path Information Disclosure Statement	193 KB
SB133_0018USC1.pdf	2	Patent Term Adjustment Statement under 37 CFR 1.704(d) filed with an IDS	231 KB
SB08_0018USC1.pdf	4	Information Disclosure Statement (IDS) Form (SB08)	1234 KB
RCE_0018USC1.pdf	3	Request for Continued Examination (RCE)	1628 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
petition-request.pdf	988EC47F72FE88B9B9FD7BC470B97C9F124B71E7F1201AEFE 99869DECA52D10DDFF0D50FB4FDF601A948A22C7736D87A1 33196C4E5464C5A25F5112CBF129C37
NPL_EPOA5.pdf	E06094FC09D6663F83C9AA026090E963F26830AB3E6C2EA9B 7EFCF1A9ED7647EF15911976E9EC6E1E077615033CEF17443 4F3EE6DC6781FD7C05ED1AE53AC668
QPIDS.REQ_0018USC1.pdf	23D822E81B751DFF783D97B7B1C0AAA9B4F8EBDCD1D9EDC 685E7386C42F758E62E33A1F49FD45E647601619694AE6E56D 9B537F123B7B478B492DB16A246416E
SB133_0018USC1.pdf	8ACE09774906ABF25C5F6CBFB622B86D0EF567232966AB26A 79E14F1C8D728482AD9A0A4C4A81C3945FEF10D508CB66944 E28ABDC3A8070881AA74BB0AF98D20
SB08_0018USC1.pdf	ACCC834CB708A53B17E89891C95B48E020186DA330904F64F A37F33449F8813048BADB512138010EBE762E7F030A4CE0863 DD946BD5D9C546897C7540BA04090
RCE_0018USC1.pdf	43895320756167958A62B130713FB545F9E88C5C78B67557C1 720831058A7744299E7A1B4AF53B3C56A33D85954081A0BCA9 4ED536409E1F6E2C5755660B6C53

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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PETITION TO WITHDRAW AN APPLICATION FROM ISSUE AFTER PAYMENT OF THE ISSUE FEE UNDER 37 CFR 1.313(c)(2) with Assigned Patent Number)

APPLICATION #	ATTORNEY DOCKET #	FILING DATE
17742166	21063.0018USC1	05/11/2022

Title of Invention

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Application Information

CONFIRMATION #	**9959**	FILING DATE	**05/11/2022**
ART UNIT	**2186**	FIRST NAMED INVENTOR	**Gauthier RENARD**
EXAMINER	**BRIAN MISIURA**		

An application may be withdrawn from issue for further action upon petition by the applicant. To request that the Office withdraw an application from issue, applicant must file a petition under this section including the fee set forth in § 1.17(h) and a showing of good and sufficient reasons why withdrawal of the application from issue is necessary.

APPLICANT HEREBY PETITIONS TO WITHDRAW THIS APPLICATION FROM ISSUE UNDER 37 CFR 1.313(c).

A grantable petition requires the following items:

(1) Petition fee; and
(2) One of the following reasons: A grantable petition requires the following items: (a) Unpatentability of one or more claims, which must be accompanied by an unequivocal statement that one or more claims are unpatentable, an amendment to such claim or claims, and an explanation as to how the amendment causes such claim or claims to be patentable;
(b) Consideration of a request for continued examination in compliance with § 1.114 (for a utility or plant application only); or
(c) Express abandonment of the application. Such express abandonment may be in favor of a continuing application, but not a CPA under 37 CFR 1.53(d).

Reason for withdrawal

Consideration of a request for continued examination (Quick Path Information Disclosure Statement) - RCE request, submission, and fee are attached

Applicant claims the following entity status

Regular Undiscounted

Signature

I certify, in accordance with 37 CFR 1.4(d)(4) that I am:
An attorney or agent registered to practice before the Patent and Trademark Office who has been given power of attorney in this application

Signature	Name	Registration #
/Thomas Lee/	Thomas Lee	66396

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

GRANT LETTER

APPLICATION #	DECISION DATE	DECISION ON PETITION #	ATTORNEY DOCKET NUMBER
17/742,166	03/14/2024		21063.0018USC1

Title of Invention

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

In re Application of Gauthier RENARD

This is an electronic decision on the petition under , filed March 14, 2024 to withdraw the above-identified application from issue after payment of the issue fee.

The request is **GRANTED.**

Petitioner is advised that the issue fee paid in this application cannot be refunded. If, however, this application is again allowed, petitioner may request that it be applied towards the issue fee required by the new Notice of Allowance.

The application is being referred to Technology Center AU for

Telephone inquired concerning this decision should be directed to the Patent Electronic Business Center (EBC) at 866-217-9197.

Office of Petitions

PTO/SB/08a (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	17742166
Filing Date	2022-05-11
First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	BRIAN THOMAS MISIURA
Attorney Docket Number	21063.0018USC1

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17742166
	Filing Date	2022-05-11
	First Named Inventor	Gauthier RENARD
	Art Unit	2186
	Examiner Name	BRIAN THOMAS MISIURA
	Attorney Docket Number	21063.0018USC1

	1	The communication pursuant to Art. 94(3) in European Application No. 23192763.3, dated March 5, 2024.	☐

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17742166
	Filing Date	2022-05-11
	First Named Inventor	Gauthier RENARD
	Art Unit	2186
	Examiner Name	BRIAN THOMAS MISIURA
	Attorney Docket Number	21063.0018USC1

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☒ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☒ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2024-03-14
Name/Print	Thomas Lee	Registration Number	66396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

United States Patent and Trademark Office

Office of the Chief Financial Officer

Document Code:WFEE

User :Terrance Lawrence

Sale Accounting Date:03/15/2024

Sale Item Reference Number	Effective Date
17742166	03/14/2024

Document Number	Fee Code	Fee Code Description	Amount Paid	Payment Method
I20243ED20219228	1806	SUBMISSION- INFORMATION DISCLOSURE STMT	$260.00	Deposit Account

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/742,166	05/11/2022	Gauthier RENARD	21063.0018USC1	9959

52835 7590 03/21/2024

HSML P.C.
45 South Seventh Street
Suite 2700
MINNEAPOLIS, MN 55402-1683

EXAMINER	
MISIURA, BRIAN THOMAS	

ART UNIT	PAPER NUMBER
2186	

NOTIFICATION DATE	DELIVERY MODE
03/21/2024	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTOMail@hsml.com

Corrected ***Notice of Allowability***	**Application No.** 17/742,166	**Applicant(s)** RENARD et al.	
	Examiner BRIAN T MISIURA	**Art Unit** 2186	**AIA (FITF) Status** Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to 3/14/2024.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are See Continuation Sheet . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some* c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 3/14/2024.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/BRIAN T MISIURA/
Primary Examiner, Art Unit 2186

Continuation of 3. The allowed claim(s) is/are: 1-5,7-9,11,13-14,16-24 and 27-37

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/742,166	RENARD et al.
	Examiner	**Art Unit**
	BRIAN T MISIURA	2186

CPC						
Symbol					**Type**	**Version**
G06F	/	13	/	387	F	2013-01-01
H04L	/	12	/	12	I	2013-01-01
G06F	/	13	/	122	I	2013-01-01
G06F	/	13	/	4282	I	2013-01-01
H04L	/	63	/	0428	I	2013-01-01

CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	31	
/BRIAN T MISIURA/ Primary Examiner, Art Unit 2186	19 March 2024	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	4

U.S. Patent and Trademark Office — Part of Paper No.: 20240318

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/742,166	RENARD et al.
	Examiner	**Art Unit**
	BRIAN T MISIURA	2186

INTERNATIONAL CLASSIFICATION				
CLAIMED				
G06F13/38	/	13	/	38
H04L12/12	/	12	/	12
G06F13/12	/	13	/	12
G06F13/42	/	13	/	42
H04L9/40	/	9	/	40

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE (Assistant Examiner) (Date)	**Total Claims Allowed:** 31	
/BRIAN T MISIURA/ Primary Examiner, Art Unit 2186 (Primary Examiner) 19 March 2024 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 4

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/742,166	RENARD et al.
	Examiner	**Art Unit**
	BRIAN T MISIURA	2186

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1		10	15	19	22	28	31	37						
2	2	9	11	16	20	23	29								
3	3		12	17	21	24	30								
4	4	10	13	18	22	25	31								
5	5	11	14	19	23	26	32								
	6		15	20	24	27	33								
6	7	12	16		25	28	34								
7	8	13	17		26	29	35								
8	9	14	18	21	27	30	36								

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 31	
/BRIAN T MISIURA/ Primary Examiner, Art Unit 2186 (Primary Examiner)	19 March 2024 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 4

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/742,166	RENARD et al.
	Examiner	Art Unit
	BRIAN T MISIURA	2186

CPC - Searched*		
Symbol	Date	Examiner
G06F13/122, 387, 4282	05/04/2023	BTM
H04L12/12, 0428, 1813	05/04/2023	BTM

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
IDS Consideration, Review/update search from parent application	05/04/2023	BTM
IDS Consideration and Interference Search	09/21/2023	BTM
IDS Consideration and update Interference Search	11/07/2023	BTM
IDS Consideration	12/22/2023	BTM
IDS Consideration	03/19/2024	BTM

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/742,166	RENARD et al.
	Examiner	Art Unit
	BRIAN T MISIURA	2186

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**
H04L12	18-1895	09/21/2023	BTM
H04M3	56-568	09/21/2023	BTM
H04L65	403-4061	09/21/2023	BTM

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	17742166
Filing Date	2022-05-11
First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	BRIAN THOMAS MISIURA
Attorney Docket Number	21063.0018USC1

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17742166
	Filing Date	2022-05-11
	First Named Inventor	Gauthier RENARD
	Art Unit	2186
	Examiner Name	BRIAN THOMAS MISIURA
	Attorney Docket Number	21063.0018USC1

	1	The communication pursuant to Art. 94(3) in European Application No. 23192763.3, dated March 5, 2024.	☐

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EXAMINER SIGNATURE

Examiner Signature	/BRIAN T MISIURA/	Date Considered	03/19/2024

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	17742166
Filing Date	2022-05-11
First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	BRIAN THOMAS MISIURA
Attorney Docket Number	21063.0018USC1

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☒ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☒ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2024-03-14
Name/Print	Thomas Lee	Registration Number	66396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

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Document Code:WFEE

User :Sengpheth Sandara

Sale Adjustment Accounting Date:04/01/2024

Effective Date	Sale Accounting Date	Sale Item Reference Number
04/01/2024	04/01/2024	17742166

Document Number	Fee Code	Fee Code Description	Amount Paid	Payment Method
I202441F35097876	1820	RCE- 2ND AND SUBSEQUENT REQUEST	$2,000.00	American Express



United States Patent and Trademark Office

Office of the Chief Financial Officer

Document Code:WFEE

User :Sengpheth Sandara

Refund Accounting Date:04/01/2024

Effective Date	Sale Item Reference Number	Refund Total
04/01/2024	17742166	$2,000.00

Document Number	Fee Code	Fee Code Description	Amount Paid	Payment Method	Account Number
I202441F35097876	1820	RCE- 2ND AND SUBSEQUENT REQUEST	$2,000.00	American Express	**********1021

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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/742,166	04/23/2024	11966347	21063.0018USC1	9959

52835 7590 04/03/2024

HSML P.C.
45 South Seventh Street
Suite 2700
MINNEAPOLIS, MN 55402-1683

ISSUE NOTIFICATION

The projected patent number and issue date are specified above. The patent will issue electronically. The electronically issued patent is the official patent grant pursuant to 35 U.S.C. § 153. The patent may be accessed on or after the issue date through Patent Center at https://patentcenter.uspto.gov/. The patent will be available in both the public and the private sides of Patent Center. Further assistance in electronically accessing the patent, or about Patent Center, is available by calling the Patent Electronic Business Center at 1-888-217-9197.

The USPTO is implementing electronic patent issuance with a transition period, during which period the USPTO will mail a ceremonial paper copy of the electronic patent grant to the correspondence address of record. Additional copies of the patent (i.e., certified and presentation copies) may be ordered for a fee from the USPTO's Certified Copy Center at https://certifiedcopycenter.uspto.gov/index.html. The Certified Copy Center may be reached at (800)972-6382.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Center (https://patentcenter.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Patents Stakeholder Experience (OPSE), Stakeholder Support Division (SSD) at (571)-272-4200.

INVENTOR(s) (Please see PATENT CENTER site https://patentcenter.uspto.gov for additional inventors):

Gauthier RENARD, Kuurne, BELGIUM;
Johan Peter Frans DEGRAEF, Gent, BELGIUM;

APPLICANT(s) (Please see PATENT CENTER site https://patentcenter.uspto.gov for additional applicants):

Barco N.V., Kortrijk, BELGIUM;

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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/742,166	05/11/2022	Gauthier RENARD	21063.0018USC1	9959

52835 7590 04/23/2024

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45 South Seventh Street
Suite 2700
MINNEAPOLIS, MN 55402-1683

EXAMINER	
MISIURA, BRIAN THOMAS	

ART UNIT	PAPER NUMBER
2186	

NOTIFICATION DATE	DELIVERY MODE
04/23/2024	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTOMail@hsml.com

APPLICATION NO.	ISSUE DATE	PATENT NO.
17/742,166	23-Apr-2024	11966347

HSML P.C.
45 South Seventh Street
MINNEAPOLIS, MN 55402-1683

EGRANT NOTIFICATION

Your electronic patent grant (eGrant) is now available, which can be accessed via Patent Center at https://patentcenter.uspto.gov

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