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(Not for submission under 37 CFR 1.99)

Application Number	14344836
Filing Date	2015-03-03
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	Christopher A. Bartels
Attorney Docket Number	BEEL3004/BEU/TL

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	1	Chinese Office Action dated October 31, 2017, for CN 201280001542.X, and English translation thereof.	X
	2	European Notice of Opposition dated September 27, 2017 for EP 2756668.	☐
	3	StarTech.com: USB to DVI External Dual Monitor Video Adapter/USS to VGA External Dual Monitor Video Adapter, User Manual dated May 19, 2011.	☐
	4	Microsoft Community, conversation on August 30, 2011 about USB2VGA Adapter, retrieved on September 7, 2017.	☐
	5	Webopedia Definition of Peripheral Device, retrieved on September 7, 2017.	☐
	6	Trulink Wireless USB2VGA Adapter, Quick Start Guide, retrieved from www.c2g.com.	☐
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Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2017-11-21
Name/Print	THOMAS LEE	Registration Number	66396

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Application Number:	14344836
Filing Date:	03-Mar-2015
Title of Invention:	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS
First Named Inventor/Applicant Name:	Koen Simon Herman Beel
Filer:	Thomas Lee/Kaitlyn Miller
Attorney Docket Number:	BEEL3004/BEU/TL

Filed as Large Entity

Filing Fees for U.S. National Stage under 35 USC 371

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

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
		Total in USD ($)		**180**

Electronic Acknowledgement Receipt	
EFS ID:	31012730
Application Number:	14344836
International Application Number:	
Confirmation Number:	1046
Title of Invention:	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS
First Named Inventor/Applicant Name:	Koen Simon Herman Beel
Customer Number:	23364
Filer:	Thomas Lee/Kaitlyn Miller
Filer Authorized By:	Thomas Lee
Attorney Docket Number:	BEEL3004/BEU/TL
Receipt Date:	21-NOV-2017
Filing Date:	03-MAR-2015
Time Stamp:	13:13:31
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$180
RAM confirmation Number	112117INTEFSW00012881020200
Deposit Account	020200
Authorized User	Kaitlyn Miller
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Warnings:					
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2	Non Patent Literature	EP_Not_Opposition_27SEP17.pdf	5846122 c3d9405064315914423ba679130b1844de0ae45a	no	104
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(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
22 November 2001 (22.11.2001)

PCT

(10) International Publication Number
WO 01/89156 A2

(51) International Patent Classification[7]: H04L 12/28, 29/06

(21) International Application Number: PCT/JP01/04082

(22) International Filing Date: 16 May 2001 (16.05.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2000-143822 16 May 2000 (16.05.2000) JP

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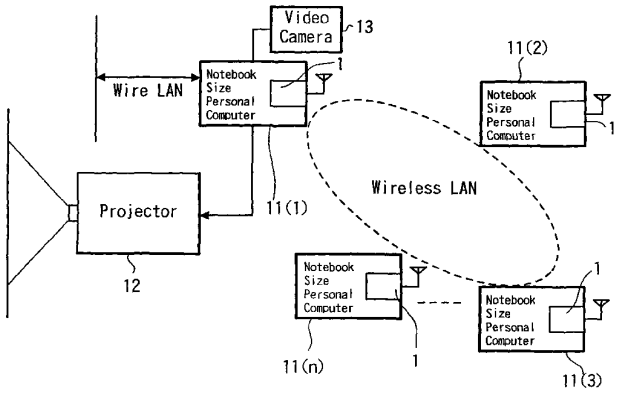
(81) Designated States *(national)*: CA, CN, KR, US.

(84) Designated States *(regional)*: European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR).

Published:
— *without international search report and to be republished upon receipt of that report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: CARD TYPE NETWORK INTERFACE, NETWORK CONFERENCE TERMINAL DEVICE AND NETWORK CONFERENCE SYSTEM



(57) Abstract: A wireless LAN conference system can be constructed without increasing the cost of equipment of a conference hall and without imposing a burden upon participants to execute a network setting. There are provided network conference terminal devices (11 (2) to 11 (n)) in which network interface cards (1) are attached to information terminal devices. The network interface card (1) includes a connecting means for connecting the information terminal device to a wireless LAN, a determining means for determining whether the information terminal device is served as a host or a client of the wireless LAN, a setting means for requesting the host to transmit setting information necessary for executing the network setting to connect the information terminal device to the wireless LAN based on the fact that the information terminal device is determined as the client and executing the network setting by using the setting information transmitted from the host and a processing means for transmitting a requested setting information to the client based on the fact that the information terminal device is determined as the host and transmitting presentation data to the client in which the network setting was completed.

WO 01/89156 A2

DESCRIPTION

CARD TYPE NETWORK INTERFACE, NETWORK CONFERENCE TERMINAL DEVICE AND NETWORK CONFERENCE SYSTEM

TECHNICAL FIELD

The present invention relates to a card type network interface attached to an information terminal device such as a personal computer, a network conference terminal device using such card type network interface and a network conference system using this network conference terminal device.

BACKGROUND ART

Network I/F (interface) cards which are PC cards based on the standards of PCMCIA (personal computer memory card interface adapter) and which are capable of connecting personal computers to a LAN (local area network) are spreading increasingly. When this network interface card is inserted into a PC card slot of a personal computer, it becomes possible to connect this personal computer to the LAN.

In order to connect a personal computer (hereinafter referred to as a "personal computer") to the LAN, it is necessary to execute in advance a setting for connecting personal computers to the LAN (hereinafter referred to as a "network setting"). This network setting contains a setting of an IP address (identification information and location information for controlling a path) of such personal computer in the LAN and a setting of an IP address of a DNS server (server for providing a translation between IP addresses and domain names).

FIG. 1 shows a personal computer to which a conventional network

interface card is connected and to which reference will be made in explaining a function of a portion used to execute this network setting. In the operating system (e.g., Windows 95 or Windows 98 ("Windows" is a registered trademark)) of personal computer, there is supported a network function. This network function contains a function which displays a network setting picture to execute a network setting based on user's input operations.

On the other hand, a device driver which is software to control a conventional network interface card does not contain a network setting function. For this reason, a network setting of a personal computer is executed by using a network function of the operating system of the personal computer.

FIG. 2 shows a working procedure executed by users to connect the personal computer shown in FIG. 1 to the LAN. Users insert the network interface card into the personal computer and activate the operating system of the personal computer to display a control panel on the screen of the personal computer. Then, users select a network setting icon from the control panel and enters data in accordance with instructions of a network setting picture displayed when users select the corresponding icon. Thereafter, users restarts the operating system and the network setting is completed.

As described above, in order to attach the conventional network interface card to the personal computer so that the personal computer may be connected to the LAN, users have to activate the operating system of the personal computer to make operations to execute the network setting. Accordingly, these operations are difficult to understand for users who have little knowledge of the

operating system. When the notebook size personal computer, for example, are carried into various places and is connected to the LAN, the above operations should be made at every place so that such operations become troublesome for users who are rich in knowledge of the operating system.

Under circumstances in which a DHCP which is a protocol capable of managing information to execute the network setting in a centralized fashion is supported by the operating system, since the operating system side automatically executes the network setting processing, users need not do operations to execute the network setting. However, in actual practice, most of the users have personal computers in which the DHCP is not supported by the operating system.

In view of the aforesaid aspect, the first problem to be solved by the present invention is that, when the network interface card is attached to the personal computer to thereby connect the personal computer to the LAN, even though the DHCP is not supported by the operating system of the personal computer, the network setting can be executed without troubling users.

On the other hand, in the places such as various kinds of meetings, presentations and lecture meetings (these meetings, presentations and lecture meetings will be generally referred to as a "conference" in this specification), heretofore, the presentation is made by displaying presentation data such as images and illustrations on a projector. However, depending on the scale of the conference hall and the size of the screen of the projector, those who have been seated distant from the projector cannot always watch

presentation data displayed on the projector well.

In recent years, there is increasingly spread such a form in which presentation data can be displayed on a personal computer connected to the LAN at each seat in the conference hall. As described above, if the conference is held by effectively utilizing the LAN, then participants on all seats become able to watch presentation data satisfactorily.

However, if the personal computer is provided at each seat as equipment, then it is unavoidable that the cost of equipment in the conference hall will be increased. If notebook size personal computers brought by the participants of the conference are connected to the LAN within the conference hall, then the cost of equipment can be prevented from being increased. In that case, the operations for executing the network setting become troublesome for the participants.

In view of the aforesaid aspect, the second problem to be solved by the present invention is that a conference system using the LAN can be constructed without increasing the cost of equipment of the conference hall and also without imposing a burden on the participants in order to execute the network setting.

DISCLOSURE OF INVENTION

In order to solve the above first problem, there is proposed a card type network interface which can be attached to an information terminal device such as a personal computer. This card type network interface includes a connecting means for connecting this information terminal device to a LAN and a setting means for requesting a host of the LAN to transmit setting information

necessary for setting a network to connect the information terminal device to the LAN and setting the network by using setting information transmitted from the host based on the fact that this card type network interface is attached to the information terminal device.

This card type network interface includes not only the connecting means for connecting the information terminal device to the LAN (i.e., function to connect the information terminal device to the LAN) but also the setting means for setting the network. Then, when this card is attached to the information terminal device, this setting means requests the host of the LAN to transmit the setting information necessary for setting the network and sets the network by using the setting information transmitted from the host.

As described above, when the card type network interface is attached to the information terminal device, since the network is automatically set by this setting means, the network can be set without troubling users.

Therefore, in the conference using the LAN, for example, if the card type network interfaces are prepared in the conference hall and these card type network interfaces are attached to the information terminal devices such as notebook size personal computers brought by those who attended the conference, the network by which members are assumed to attend the conference can be set without troubling those who attend the conference. Simultaneously, the cost of equipment in the conference hall can be prevented from being increased unlike the case in which the information terminal device such as the personal computer should be provided in each seat as equipment.

This card type network interface further includes a determining means for determining based on the fact that this card type network interface is attached to the information terminal device whether the information terminal device is served as a host or a client of the LAN and a processing means for transmitting requested setting information to the client if it is determined by this determining means that the information terminal device is served as the host. The setting means requests the setting information if it is determined by this determining means that the information terminal device is served as the client.

Consequently, the host of the LAN also is comprised of the information terminal device to which this card type network interface is attached. Accordingly, the system of the LAN can be constructed without providing an exclusive-device as a host independently of this card type network interface and the information terminal device. Therefore, in the conference using the LAN, for example, the cost of equipment in the conference hall can be suppressed more.

Based on the fact that the card type network interface is attached to the information terminal device and on the condition that the command for inhibiting the information terminal device from being determined as the host is not received through the LAN, this determining means determines this information terminal device as the host and transmits the command for inhibiting other information terminal device from being determined as the host through the LAN. As a result, the first information terminal device to which the card type network interface is attached within the area of the LAN is

determined as the host.

This card type network interface further includes a processing means for requesting the host to get a presentation right based on the fact that the information terminal device is determined as the client by the determining means, the setting of the network is completed by the setting means and that a predetermined operation is carried out by the information terminal device and transmitting presentation data to the host and other clients based on the fact that the host got the presentation right and a processing means for allowing the client to get the presentation right based on the fact that the information terminal device is determined as the host by the determining means and that the processing means requests the host to get the presentation right.

Consequently, in the conference using the LAN, for example, those who attended the conference can get the presentation right by operating the information terminal devices in hand and can transmit presentation data. Therefore, those who attend the conference can make a presentation without leaving the seats.

When the connecting means connects the information terminal device to the wireless LAN, this card type network interface further includes a processing means for receiving in a polling system a request from the client in which the setting of the network was completed based on the fact that the information terminal device is determined as the host by the determining means and wherein the setting means requests the setting information at the end of the polling cycle.

Consequently, the host can accurately receive requests

transmitted through the wireless LAN from a plurality of clients in which the setting of the network was completed. Simultaneously, the host can accurately receive the setting information request through the wireless LAN.

Presentation application software (program in which a processing for displaying and controlling presentation data is written) is stored in this card type network interface.

As a result, in the conference using the LAN, for example, when those who attend the conference bring information terminal devices in which the presentation application software is not installed, if this card type network interface is attached to such information terminal device, then the information terminal device becomes able to execute this presentation application software and to display the presentation data.

When the information terminal device is such one which automatically activates the application software stored in the hard disk (e.g., a personal computer in which the operating system for automatically activating the application software stored in the hard disk is installed), the card type network interface allows the information terminal device to recognize the card type network interface as the hard disk so that the presentation application software may be automatically activated in the information terminal device.

Consequently, those who attend the conference need not carry out operations to activate this presentation application software and a burden imposed upon those who attend the conference can be alleviated more.

In order to solve the above second problem, there is proposed a network conference terminal device in which a card type network interface is attached to an information terminal device such as a personal computer, for example, and which includes a presentation processing means for displaying and controlling presentation data. This card type network interface includes a connecting means for connecting this information terminal device to the wireless LAN and a setting means for requesting a host of this wireless LAN to transmit setting information necessary for setting the network to connect this information terminal device to this wireless LAN based on the fact that the card type network interface is attached to this information terminal device and setting the network by using the setting information transmitted from the host.

This network conference terminal device is constructed by using the card type network interface for the wireless LAN of the above card type network interface. Accordingly, if the card type network interface is prepared in the conference hall and the information terminal devices are brought by those who attend the conference, then the network by which participants are assumed to attend the conference using the wireless LAN can be set without troubling those who attend the conference. At the same time, the cost of equipment of the conference hall can be prevented from being increased unlike the case in which the information terminal device should be provided in each seat as equipment.

This network conference terminal device includes a presentation processing means for displaying and controlling presentation data. This network conference terminal device can display presentation

data by this presentation processing means.

Also in this network conference terminal device, this card type network interface further includes a determining means for determining based on the fact that this card type network interface is attached to the information terminal device whether the information terminal device is served as a host or a client of the LAN and a processing means for transmitting requested setting information to the client if it is determined by this determining means that the information terminal device is served as the host. The setting means requests the setting information if it is determined by this determining means that the information terminal device is served as the client.

Consequently, the host of the LAN also is comprised of the network conference terminal device. Accordingly, the wireless LAN conference system can be constructed without providing an exclusive-device as a host independently of this network conference terminal device. Therefore, the cost of equipment in the conference hall can be suppressed more.

As mentioned before, this determining means determines the first information terminal device to which the card type network interface is attached within the area of the wireless LAN as the host.

This network conference terminal device further includes a processing means for requesting the host to get a presentation right based on the fact that the information terminal device is determined as the client by the determining means, the setting of the network is completed by the setting means and that a predetermined operation is carried out by the information terminal device and transmitting

presentation data to the host and other clients based on the fact that the host got the presentation right and a processing means for allowing the client to get the presentation right based on the fact that the information terminal device is determined as the host by the determining means and that the processing means requests the host to get the presentation right.

Consequently, in the conference using the LAN, for example, those who attended the conference can get the presentation right by operating the information terminal devices in hand and can transmit presentation data. Therefore, those who attend the conference can make a presentation without leaving the seats.

Also in this network conference terminal device, this card type network interface further includes a processing means for receiving in a polling system a request from the client in which the setting of the network was completed based on the fact that the information terminal device is determined as the host by the determining means and wherein the setting means requests the setting information at the end of the polling cycle.

Consequently, the host can accurately receive requests transmitted through the wireless LAN from a plurality of clients in which the setting of the network was completed. Simultaneously, the host can accurately receive the setting information request through the wireless LAN.

In this network conference terminal, the presentation processing means can be realized when the information terminal device executes the presentation application software stored in the network interface card.

Consequently, the information terminal device in which the presentation application software is not installed becomes able to display the presentation data.

When the information terminal device is such one which automatically activates the application software stored in the hard disk, the card type network interface allows the information terminal device to recognize the card type network interface as the hard disk so that the presentation application software may automatically be activated in the information terminal device.

Consequently, those who attend the conference need not carry out the operations to activate this presentation application software and a burden imposed upon those who attend the conference can be alleviated more.

In order to solve the above second problem, there is proposed a network conference system (wireless LAN conference system) in which there are provided a host of a wireless LAN and a client of the wireless LAN, the client is constructed such that a card type network interface is attached to an information terminal device and includes a presentation processing means for displaying and controlling presentation data. This card type network interface includes a connecting means for connecting this information terminal device to the wireless LAN and a setting means for requesting a host of this wireless LAN to transmit setting information necessary for setting the network to connect this information terminal device to this wireless LAN based on the fact that the card type network interface is attached to this information terminal device and setting the network by using the setting information transmitted

from the host. The host transmits the setting information to the client based on this setting information request and also transmits the presentation data to the client in which the setting of the network was completed.

This network conference system is constructed by using the above network conference terminal device as the client (i.e., the above wireless LAN card type network interface).

Therefore, the network of the clients can be set without troubling those who attend the conference, and the system can be constructed without increasing the cost of equipment of the conference hall.

Also in this network conference system, the card type network interface further includes a determining means for determining based on the fact that this card type network interface is attached to the information terminal device whether the information terminal device is served as a host or a client of the LAN and a processing means for transmitting requested setting information to the client if it is determined by this determining means that the information terminal device is served as the host. The setting means requests the setting information if it is determined by this determining means that the information terminal device is served as the client.

Consequently, since the host of the LAN also is comprised of the same network conference terminal device, an exclusive-device need not be provided within the system as the host, and hence the cost of equipment in the conference hall can be suppressed more.

As mentioned before, this determining means determines the first information terminal device to which the card type network interface

is attached within the area of the wireless LAN as the host.

Also in this network conference system, this card type network interface further includes a processing means for requesting the host to get a presentation right based on the fact that the information terminal device is determined as the client by the determining means, the setting of the network is completed by the setting means and that a predetermined operation is carried out by the information terminal device and transmitting presentation data to the host and other clients based on the fact that the host got the presentation right and a processing means for allowing the client to get the presentation right based on the fact that the information terminal device is determined as the host by the determining means and that the processing means requests the host to get the presentation right.

Consequently, those who attend the conference can get the presentation right by operating the network conference terminal devices in hand and can transmit presentation data. Therefore, those who attended the conference can make a presentation without leaving the seats.

Also in this network conference system, this card type network interface further includes a processing means for receiving in a polling system a request from the client in which the setting of the network was completed based on the fact that the information terminal device is determined as the host by the determining means and wherein the setting means requests the setting information at the end of the polling cycle.

Consequently, the host can accurately receive the requests

transmitted through the wireless LAN from a plurality of clients in which the setting of the network was completed. Simultaneously, the host can accurately receive the setting information request through the wireless LAN.

Also in this network conference system, the presentation processing means can be realized when the information terminal device executes the presentation application software stored in the network interface card.

Consequently, the client and the host using the information terminal device in which the presentation application software is not installed become able to display the presentation data.

When the information terminal device is such one which automatically activates the application software stored in the hard disk, the card type network interface allows the information terminal device to recognize the card type network interface as the hard disk so that the presentation application software may be automatically activated in the information terminal device.

Consequently, those who attend the conference need not carry out the operations to activate this presentation application software and a burden imposed upon those who attend the conference can be alleviated more.

In order to solve the above second problem, there is proposed a network conference system in which there are provided an image display device and a client of the wireless LAN. This image display device includes an information terminal device to which a card type network interface can be attached. This card type network interface is attached to this information terminal device and this information

terminal device includes a presentation processing means for displaying and controlling presentation data. The client is constructed such that a card type network interface is attached to an information terminal device and includes this presentation processing means. This card type network interface includes a connecting means for connecting this information terminal device to the wireless LAN, a determining means for determining based on the fact that the card type network interface is attached to this information terminal device whether this information terminal device is served as a host or a client of the wireless LAN, a setting means for requesting the host of this wireless LAN to transmit setting information necessary for setting the network to connect this information terminal device to this wireless LAN based on the fact that the information terminal device is determined as the client by the determining means and setting the network by using the setting information transmitted from the host, a processing means for transmitting the requested setting information to the client based on the fact that the information terminal device is determined as the host by the determining means and transmitting presentation data to the client in which the setting of the network was completed, a processing means for requesting the host to get a presentation right based on the fact that the information terminal device is determined as the client by the determining means, the setting of the network was completed by the setting means and a predetermined operation was executed by the information terminal device and transmitting presentation data to the host and the client based on the fact that the host got the presentation right and a processing means for

allowing the client to get the presentation right based on the fact that the information terminal device is determined as the host by the determining means and that the host is requested to get the presentation right. The image display device is such one in which the information terminal device belonging to the image display device is determined as the host by the determining means.

This network conference system has the arrangement in which the above network conference terminal device is used as the client (i.e., the above wireless LAN card type network interface is used), the image display device having the information terminal device to which the card type network interface can be attached is provided as the image display device such as the projector and this image display device serves both as an image display device and a host.

Accordingly, the network of the clients can be set without troubling those who attend the conference, and the system can be constructed without increasing the cost of equipment of the conference hall. Moreover, those who attend the conference can make a presentation without leaving the seats.

Then, the same presentation data as the presentation data displayed on the image display device can be directly transmitted from the image display device through the wireless LAN to the client and thereby displayed on the client. At the same time, the presentation data can be directly transmitted from the client through the wireless LAN to the image display device and thereby the presentation data can be displayed on the image display device.

Also in this network conference system, the card type network interface further includes a processing means for receiving in a

polling system a request from the client in which the setting of the network was completed based on the fact that the information terminal device is determined as the host by the determining means and awaiting the request of the setting information at the end of the polling cycle and wherein the setting means requests the setting information at the end of the polling cycle.

Consequently, the host can accurately receive requests transmitted through the wireless LAN from a plurality of clients in which the setting of the network was completed. Simultaneously, the host can accurately receive the request of the setting information through the wireless LAN.

Also in this network conference system, the presentation processing means can be realized when the information terminal device executes the presentation application software stored in the network interface card.

Consequently, the client and the host using the information terminal device in which the presentation application software is not installed become able to display the presentation data.

When the information terminal device is such one which automatically activates the application software stored in the hard disk, the card type network interface allows the information terminal device to recognize the card type network interface as the hard disk so that the presentation application software may automatically be activated in the information terminal device.

Consequently, those who attend the conference need not carry out the operations to activate this presentation application software and a burden imposed upon those who attend the conference can be

alleviated more.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a functional block diagram showing a portion of a personal computer having a conventional network interface card and which portion is used to execute a network setting.

FIG. 2 is a diagram showing a working procedure necessary to execute a network setting of the personal computer shown in FIG. 1.

FIG. 3 is a perspective view showing an example of an outward appearance of a network interface card to which the present invention is applied.

FIG. 4 is a block diagram showing an example of a circuit arrangement of the network interface card shown in FIG. 3.

FIG. 5 is a diagram showing an example of an overall arrangement of a network conference system according to the present invention.

FIG. 6 is a flowchart to which reference will be made in explaining processing contents of a "host/client decision program".

FIG. 7 is a flowchart to which reference will be made in explaining processing contents of a "host program" corresponding to a network setting processing of a "client program".

FIG. 8 is a flowchart to which reference will be made in explaining a network setting processing which is a part of the processing contents of the "client program".

FIG. 9 is a timing chart showing the manner in which a request signal is transmitted or received in accordance with a polling system.

FIG. 10A is a diagram showing formats of the polling command and the request signal shown in FIG. 9.

FIG. 10B is a diagram showing examples of contents of data or command.

FIG. 11 is a functional block diagram showing a portion, of the client shown in FIG. 5, used to execute the network setting.

FIG. 12 is a diagram showing a working procedure which is used to execute the network setting of the client shown in FIG. 5.

FIG. 13 is a flowchart to which reference will be made in explaining a part of the processing contents of the "host program".

FIG. 14 is a flowchart to which reference will be made in explaining a part of the processing contents of the "client program".

FIG. 15 is a flowchart to which reference will be made in explaining a part of the processing contents of the "host program".

FIG. 16 is a flowchart to which reference will be made in explaining a part of the processing contents of the "client program".

FIG. 17 is a diagram showing other example of an overall arrangement of a network conference system according to the present invention.

FIG. 18 is a diagram showing a further example of an overall arrangement of a network conference system according to the present invention.

FIG. 19 is a diagram showing yet a further example of an overall arrangement of a network conference system according to the present invention.

BEST MODE FOR CARRYING OUT THE INVENTION

Embodiments according to the present invention will be described

below with reference to the drawings.

FIG. 3 shows an example of an outward appearance and an arrangement of a network interface card, to which the present invention is applied, together with a notebook size personal computer to which this network interface card can be attached. This network interface card 1 has a shape and a dimension based on a type 2 or a type 3 of the standards of the PCMCIA. A notebook size personal computer 2 includes a personal computer card slot 2a into which there can be inserted the network interface card 1.

FIG. 4 shows an example of a circuit arrangement of this network interface card 1. The network interface card 1 includes a PCMCIA interface 3, a network interface 4, an RF modulator 5, an RF demodulator 6, an antenna 7, a CPU 8, a flash ROM 9 and a RAM 10.

The PCMCIA interface 3 is an interface section which interacts with a personal computer having a PC card slot like the notebook size persona computer 2 shown in FIG. 3. Through this PCMCIA interface 3, data and commands are transmitted and received between the personal computer having the network interface card 1 and the network interface card 1.

The network interface 4 transforms data and commands, transmitted thereto from the personal computer through the PCMCIA interface 3, into data and commands conforming to the format of predetermined wireless LAN standards (e.g., the standards of 11 works groups in 802 of the IEEE 802), transmits the data and commands thus transformed into the RF modulator 5, and inverse-transforms data and commands, transmitted from the RF demodulator 6, and transmits the data and commands thus inverse-transformed to the

PCMCIA interface 3.

The RF modulator 5 modulates data and commands, transmitted from the network interface 4, into a radio frequency signal based on the standards and transmits the radio frequency signal from the antenna 7. The RF demodulator 6 demodulates the radio frequency signal received at the antenna 7 to provide data and commands, and transmits the data and the commands to the network interface 4. While FIG. 3 shows the arrangement of the outward appearance in which the antenna 7 is an internal antenna, the present invention is not limited thereto and an antenna having a shape exposed to the outside may be used in response to a frequency band and the like.

The CPU 8 controls the PCMCIA interface 3 by executing a microprogram (firmware) stored in the flash ROM 9 so that data and command may be transmitted and received between the network interface card and the personal computer having the network interface card 1, and also controls the network interface 4 so that data and commands may be transmitted and received through the wireless LAN in accordance with a predetermined communications protocol (e.g., TCP/IP protocol).

As the features of the present invention, the flash ROM 9 stores therein the following microprograms (1) to (4). Contents processed by the programs (1) to (3) will be described in the examples of operations of a host and a client of a network conference system as will be described later on.

(1): A program which ha described processing for enabling the personal computer having the network interface card 1 to function as a host for managing the wireless LAN (hereinafter referred to as a

"host program").

(2): A program which has described processing for enabling the personal computer having the network interface card 1 to function as a client using the wireless LAN under management of the host (hereinafter referred to as a "client program").

(3): A program which has described processing for deciding whether the host program or the client program should be executed (hereinafter referred to as a "host/client decision program).

(4): Presentation application software (program which has described processing for displaying and controlling presentation data such as images and graphical. This application software contains graphic viewer which is software for displaying images, software for creating, displaying and controlling graphical (e.g., "Microsoft PowerPoint" manufactured by Microsoft, "Microsoft" and "PowerPoint" are registered trademarks of Microsoft) and WWW browser which is software used to access WWW server on the Internet to display images of Web pages and the like.

The RAM 10 stores therein various data in a process during which the CPU 8 executes microprograms within the flash ROM 9.

Next, FIG. 5 shows an example of an arrangement of a network conference terminal device (wireless LAN conference terminal device) according to the present invention and an example of an overall arrangement of a network conference system (wireless LAN conference system) according to the present invention.

This wireless LAN conference system is comprised of a plurality of (e.g., about 30 to 50) wireless LAN conference terminal devices 11 (11 (1) to 11 (n)), a projector 12 and a video camera 13.

Each wireless LAN conference terminal device 11 is constructed in such a manner that the network interface card 1 shown in FIGS. 3 and 4 is attached to a notebook size personal computer (Windows 95 or Windows 98, for example, is installed as the operating system) like the notebook size personal computer 2 shown in FIG. 3. Participants bring the notebook size personal computer with them and the network interface cards 1 are prepared in the conference hall.

One (11 (1)) of the wireless LAN conference terminal devices 11 is served as a host of the wireless LAN, and remaining (n-1) terminal devices (11 (2) to 11 (n)) are served as clients of the wireless LAN.

The wireless LAN conference terminal device 11 is determined when the network interface card 1 starts the "host/client decision program" stored in the aforementioned flash ROM 9 based on the fact that the operating system of the notebook size personal computer is activated after the network interface card 1 has been attached to the notebook size personal computer (or based on the fact that the network interface card 1 has been attached to the notebook size personal computer whose operating system was activated).

FIG. 6 shows the processed contents of this "host/client decision program". First, the network interface card 1 is initialized (data stored when this network interface card was attached to and used by the notebook size personal computer is erased (step S1). Subsequently, it is determined whether or not a command for inhibiting the activation of the "host program" is received through the wireless LAN (step S2).

If this command is not received, then the "host program" is

activated (step S3). Then, until the network interface card 1 is ejected from the notebook size personal computer or the operating system of the notebook size personal computer is ended, the command for inhibiting the activation of the "host program" is continuously transmitted through the wireless LAN (steps S4, S5). Then, when the network interface card 1 is ejected from the notebook size personal computer or the operating system is ended, control is ended.

If on the other hand the above command is received at the step S2, then the "client program" is activated (step S6), and control is ended.

As a consequence, the wireless LAN conference terminal device 11 which was the first terminal device to which the network interface card 1 was attached and in which the operating system of the notebook size personal computer was activated within the conference hall (within the wireless LAN area) is served as the host after the "host program" was activated by executing the steps S2 to S4.

Since the wireless LAN conference terminal device 11 which was the second terminal device to which the network interface card 1 was attached and in which the operating system of the notebook size personal computer was activated receives the command transmitted from the first wireless LAN conference terminal device 11 to which the network interface card 1 was attached and in which the operating system of the notebook size personal computer was activated, this terminal device is served as the client after the "client program" was activated by executing the steps S1, S2 and S5.

In actual practice, a participant who plays a part of a coordinator in the conference first attaches the network interface

card 1 to the notebook size personal computer or the participant first activates the operating system of the notebook size personal computer to make its own wireless LAN conference terminal device 11 become the host.

As shown in FIG. 5, the host 11 (1) is connected through an external display output terminal of the notebook size personal computer to the projector 12 located within the conference hall and is also connected through a DV terminal of the notebook size personal computer to the video camera 13.

The host 11 (1) is connected through a network port of the notebook size personal computer to a wire LAN (e.g., Ethernet) which was constructed in advance within a building in the conference hall. This wire LAN is connected to the Internet through a gateway, not shown.

The "client program" contains processings used to execute the network setting to connect the clients 11 (2) to 11 (n) to the wireless LAN. The network interface cards 1 of the clients 11 (2) to 11 (n) whose "client programs" were activated immediately start this network setting processing.

The "host program" contains processings to transmit setting information necessary for the network setting to the clients 11 (2) to 11 (n) in response to the network setting processing of this "client program". The host 11 (1) immediately starts the processing of the "host program".

FIG. 7 shows processed contents of the "host program" corresponding to the network setting processing. FIG. 8 shows the contents of the network setting processing. As shown in FIG. 7, the

network interface card 1 of the host 11 (1) displays pictures which instruct the notebook size personal computer to enter the following information (a) to (d):

(a): Enter net mask (information for dividing the IP address into a previously-determined network portion and a host portion which can be set freely);

(b): Enter IP address of host;

(c): Enter IP address of DNS server (server for providing a translation between IP addresses and domain names); and

(d): Enter IP address of gateway (a means placed at the connected portion between the wire LAN and the Internet in FIG. 3)

Then, when the coordinator of the conference enters these information by operating the notebook size personal computer in accordance with the instructions displayed on the screen, these information are registered on the RAM 10 as the database (step S12). Subsequently, the host is placed in the standby mode for awaiting the network setting request from the client (step S13).

The "host program" contains a processing for receiving various kinds of requests from the network interface card 1 of the client in which the network setting was already completed (client whose IP address was already registered as the database) in the polling system for sequentially calling these clients. Moreover, the "client program" contains a processing for transmitting a request, generated after the network setting has been completed, in response to this calling.

FIG. 9 shows the manner in which the requests are transmitted and received in accordance with this polling system. The network

interface card 1 of the host 11 (1) transmits a polling command for permitting the transmission of the request to one client 11 (2) of the clients 11 (2) to 11 (i) in which the network setting was already completed. Then, this network interface card awaits the request during a constant time t.

The network interface card 1 of the client 11 (2) learns that it is permitted to transmit the request, and transmits the request within a time t1 if it has any request. On the other hand, the network interface cards 1 of the clients 11 (3) to 11 (i) are not permitted to transmit the requests, and hence they do not transmit the requests. Accordingly, within this time t1, only the request from the client 11 (2) is received by the host 11 (1).

Subsequently, the network interface card 1 of the host 11 (1) transmits the polling command for permitting the transmission of the request to the next one client 11 (3) and awaits the request during the time t1. Within this time t1, only the request from the client 11 (3) is received by the host.

In a like manner, the host sequentially transmits the polling commands to the clients 11 (4) to 11 (i) one by one and awaits their requests during the time t1. As a consequence, since the requests are transmitted one by one from the clients 11 (2) to 11 (i) and received by the host 11 (1), the host can accurately receive the requests from those clients without being affected by an interference caused when the requests from a plurality of clients are received through the wireless LAN at the same time.

Data "Polling end" indicating that one cycle of calling the clients in which the network setting was completed was finished

(indicating the end of the polling cycle) is added to the polling command which is to be transmitted to the last client 11 (i). Then, after the host has awaited the request from the client 11 (i) during the time t1, the host is further placed in the standby mode during a constant time t2. If the request is not received by the host during this time t2, then the host immediately calls the next client (i.e., the host sequentially transmits the polling commands again to the clients 11 (2) to 11 (i) one by one and awaits the request during the time t1).

FIG. 10A shows formats of the polling command and the request signal. The polling command and the request signal contain an IP address of a transmission destination, an IP address of a transmission source, a value indicating bytes of the following signal, data or a command indicating the contents of the polling command and the request signal and a checksum, in that order.

FIG. 10B shows examples of the contents of the data or the command shown in FIG. 10A. The "Polling end" is data which is added to the polling command transmitted to the last client in order to indicate the end of the polling cycle.

A network interface card 1 of a client 11 (i + 1) attached to the notebook size personal computer (of which the network setting was not yet executed) in somewhere of this polling cycle continues monitoring this polling command until the polling command with the data "Polling end" attached thereto is received (i.e., up to the end of the polling cycle) as shown in FIG. 8 (steps S21, S22). Then, at the end of the polling cycle, after only the time t1 during which the client 11 (i) in FIG. 9 is allowed to transmit the request

signal has elapsed, the network setting request signal is transmitted to the host 11 (1) during the time t2 (when the request signal transmitted from the client 11 (i) is received within this time t1, the request signal may be transmitted to the host before the time t1 elapses) (step S23).

This network setting request signal is transmitted in accordance with the signal format shown in FIG. 10A. However, since the IP address is not given to the client 11 (i + 1) from the host 11 (1), the IP address of the transmission source is set to a dummy address which is determined by the network interface card 1 of the client 11 (i + 1), for example. In this network setting request signal, as shown in FIG. 10B, the contents of the data or the command are set to "Request IP address".

The network interface card 1 of the host 13 (1) awaits this network setting request at every time t2 after the end of the polling cycle in FIG. 9 at the step S13 shown in FIG. 7. Consequently, the client can accurately receive the network setting request without being affected by the interference caused when the request from the client in which the network setting was already completed and this network setting request are received simultaneously.

Then, if the host receives the network setting request within this time t2, then the polling system request receiving processing shown in FIG. 9 is paused (step S14). Then, the IP address is given to the client 11 (i + 1), and as shown in FIG. 9, that IP address and the IP addresses of the host registered at the step S12 and the DNS server are transmitted to the client 11 (i + 1) as setting

information for the network (step S15).

These IP addresses are transmitted in accordance with the signal format shown in FIG. 10A. The IP address of the transmission destination is set to a dummy address which is determined by the network interface card 1 of the aforementioned client 11 (i + 1).

As shown in FIG. 8, the client 11 (i + 1) which has transmitted the network setting request signal awaits the reception of these IP addresses (step S24). Then, if these IP addresses are received, then the setting used to connect the client 11 (i + 1) to the wireless LAN is executed by storing these IP addresses in the RAM 10 (step S25). Then, data indicating that the network setting was completed is transmitted through the wireless LAN (step S26). Then, control is ended.

The data indicating that the network setting was completed also is transmitted in accordance with the signal format shown in FIG. 10A. Then, the IP address of the transmission source is set to the IP address given from the host 11 (1). In this data, as shown in FIG. 10B, the contents of the data or the command are set to a "Complete set IP Address".

As shown in FIG. 7, the network interface card 1 of the host 11 (1) awaits the reception of the data indicating that this network setting was completed (step S16). Then, when this data is received, the IP address given to the client 11 (i + 1) is registered as a database (step S17).

Subsequently, the polling system request reception processing which was temporarily interrupted is resumed (step S18). In the resumed polling system request reception processing, the clients 11

(2) to 11 (i + 1) including the client 11 (i + 1) in which the network setting was completed are called sequentially.

Then, referring back to the step S13, the host awaits the fact that another client executes the network setting. The processing shown in FIG. 7 is executed until the network interface card 1 is ejected from the notebook size personal computer or the operating system of the notebook size personal computer is ended.

In the resumed polling system request reception processing, the clients 11 (2) to 11 (i + 1) including the new client in which the network setting was completed are called sequentially.

In the stage in which the network setting of even one client is not yet completed, the network interface card 1 of the host 11 (1) does not receive the request signal in accordance with the polling system. Therefore, at that stage, while the network interface card 1 of the host 11 (1), for example, is constantly awaiting the network setting request from the client at the step S13 shown in FIG. 7, the network interface card 1 of the client transmits the network setting request at any time on condition that the host 11 (1) does not yet transmit the polling command.

By the processing shown in FIGS. 7 and 8, the network setting for connecting the respective clients 11 (2) to 11 (n) of FIG. 5 to the wireless LAN is completed as an assumption that the participants are to attend the wireless LAN.

FIG. 11 shows a function of any portion of the clients 11 (2) to 11 (n) used to execute this network setting. The device driver (microprogram stored within the flash ROM 9 shown in FIG. 4) for controlling the network interface card 1 contains the network

setting function (the "host program" and the "client program"). The network setting of the clients 11 (2) to 11 (n) is executed by using the device driver function of this network interface card 1.

Accordingly, as is clear from the contrast with FIG. 1 which shows the conventional network interface card, the network setting can be carried out without using the operating system of the notebook size personal computer to which the network interface card 1 is attached.

FIG. 12 shows a procedure of operations that should be executed by the participants of the conference in order to execute the network setting of the clients 11 (2) to 11 (n). When the network interface card 1 is attached to the notebook size personal computer and the operating system of the notebook size personal computer is activated (the network interface card 1 may be attached to the notebook size personal computer after the operating system of the notebook size personal computer has been activated), the network setting is automatically executed by the processings shown in FIGS. 7 and 8.

Accordingly, as is clear from the contrast with FIG. 2 which shows the conventional network interface card, the network setting of the clients 11 (2) to 11 (n) as the assumption that the participants are to attend the wireless LAN can be carried out without imposing a burden on the participants of the conference.

The "host program" and the "client program" respectively contain processings in which a presentation is executed by using presentation application software stored within the flash ROM 9. The network interface card 1 of the host 11 (1) which has activated the

"host program" immediately starts this processing after the network setting of any one client has been completed. The network interface card 1 of the clients 11 (2) to 11 (n) which have activated the "client program" also starts this processing after the respective network settings have been completed.

FIGS. 13 and 14 show the contents of the processings at the "host program" and the "client program", respectively. As shown in FIG. 13, the network interface card 1 of the host 11 (1) enables the operating system of the notebook size personal computer of the host 11 (1) to recognize this network interface card 1 as a hard disk. At the same time, this network interface card sets an automatic activation file (step S31).

The Windows 95 and the Windows 98 have a function in which application software stored within the hard disk can automatically be activated when the automatic activating file is set to the hard disk. Accordingly, the notebook size personal computer of the host 11 (1) recognizes the network interface card 1 as the hard disk based on the processing at this step S31 so that the presentation application software stored within the flash ROM 9 is activated automatically.

The processing at this step S31 may be the existing processing which is adopted by "MEMORY STICK", for example.

The coordinator of the conference can display the presentation data on the notebook size personal computer of the host 11 (1) by operating the notebook size personal computer of the host 11 (1) in accordance with the presentation application software which was activated automatically and can display the same presentation data

on the projector 12 (FIG. 5) through the external display output terminal of the notebook size personal computer of the host 11 (1).

Specifically, by using "Microsoft PowerPoint", for example, illustrations and the like reproduced from the hard disk and the floppy disk of the notebook size personal computer of the host 11 (1) and illustrations and the like transmitted from the server of the wire LAN can be displayed on the notebook size personal computer of the host 11 (1) and the projector 12.

Images reproduced from the hard disk and the floppy disk of the notebook size personal computer of the host 11 (1) by using the graphic viewer, images transmitted from the server of the wire LAN and images picked up by the video camera 13 (FIG. 5) can be displayed on the notebook size personal computer of the host 11 (1) and the projector 12 shown in FIG. 5 by using the graphic viewer.

Moreover, images and the like of the web page can be displayed on the notebook size personal computer of the host 11 (1) and the projector 12 shown in FIG. 5 by accessing the WWW of the Internet through the wire LAN with the WWW browser.

As shown in FIG. 14, the network interface cards 1 of the clients 11 (2) to 11 (n) enable the notebook size personal computers of the clients 11 (2) to 11 (n) to recognize this network interface card 1 as a hard disk, respectively. At the same time, the above network interface cards set the automatic activating file (step S41).

Accordingly, the notebook size personal computers of the clients 11 (2) to 11 (n) recognize the network interface card 1 as the hard disk so that the presentation application software stored in the

flash ROM 9 may be activated automatically.

Other participants of the conference than the coordinator can display presentation data on the notebook size personal computers of the clients 11 (2) to 11 (n) by operating the notebook size personal computers of the clients 11 (2) to 11 (n) with this presentation application software, respectively.

As shown in FIG. 13, the network interface card 1 of the host 11 (1) awaits the operation in which the presentation data is displayed on the notebook size personal computer of the host 11 (1) by using the presentation application software (step S32).

Then, when that operation is carried out (i.e., the presentation data is displayed on the notebook size personal computer of the host 11 (1) and the projector 12), the same presentation data is transmitted to the clients 11 (2) to 11 (n), and a command for displaying the presentation data by using the presentation application software (e.g., graphic viewer in case of images) corresponding to that presentation data and a command for displaying that presentation data in synchronism with the host 11 (1) (page switching timing and the like are made coincident) are transmitted to the clients 11 (2) to 11 (n).

As shown in FIG. 14, the network interface cards 1 of the clients 11 (2) to 11 (n) await the reception of this presentation data and the commands (step S42). Then, if the network interface cards receive the presentation data and the commands, then this presentation data is displayed on the notebook size personal computers of the clients 11 (2) to 11 (n) by using the presentation application software in accordance with this command, respectively

(step S43).

Consequently, the same presentation data as that displayed on the projector 12 is also displayed on the notebook size personal computers of the clients 11 (2) to 11 (n).

As shown in FIG. 13, while executing the steps S32 and S33, the network interface card 1 of the host 11 (1) repeatedly determines whether or not a presentation right get request from any of the clients 11 (2) to 11 (n) is received (step S34). The request signals are transmitted and received in the polling system shown in FIG. 9 in the processings shown in FIGS. 13 and 14.

As shown in FIG. 14, while executing the steps S42 and S43, the network interface cards 1 of the clients 11 (2) to 11 (n) repeatedly determine whether or not the notebook size personal computers of the clients 11 (2) to 11 (n) execute the predetermined operation in order to get the presentation right (step S44). If this operation is executed, then the presentation right get request is transmitted to the host 11 (1) (step S45).

As shown in FIG. 13, if the presentation right get request from any of the clients 11 (2) to 11 (n) is received, then the network interface card 1 of the host 11 (1) transmits the presentation right get command to the corresponding client (step S35).

As shown in FIG. 14, after the network interface card 1 of the client which has transmitted the presentation right get request transmitted the presentation right get request, this network interface card 1 awaits that the presentation right get command is received (step S46).

When this command is received, the network interface card awaits

that the notebook size personal computer of the client concerned displays presentation data by using the presentation application software (step S47).

If such operation is carried out (i.e., if the presentation data is displayed on the notebook size personal computer of the client concerned), then the same presentation data is transmitted to the host 11 (1) and other clients, and the command for displaying the presentation data by using the presentation application software corresponding to that presentation data and the command for displaying that presentation data in synchronism with the client concerned are transmitted to the host 11 (1) and other clients (step S48).

As shown in FIG. 13, it is determined by the network interface card 1 of the host 11 (1) whether the presentation data and the command are received (step S36). If they are received, then this presentation data is displayed on the notebook size personal computer of the host 11 (1) and the projector 12 by using the presentation application software (step S37). The network interface cards 1 of other clients display this presentation data at the steps S42, S43 shown in FIG. 14.

As a result, the same presentation data as that displayed on the notebook size personal computer of the client who got the presentation right is displayed on the notebook size personal computers of the host 11 (1) and other clients and the projector 12.

As shown in FIG. 13, while executing the steps S36 and S37, the network interface card 1 of the host 11 (1) repeatedly determines whether or not the notebook size personal computer of the host 11

(1) executes a predetermined operation for returning the presentation right (step S38) and also repeatedly determines whether or not a new presentation right get request from other client is received (step S39).

Then, if the presentation return operation is executed, then a command for returning the presentation right is transmitted to the client which got the presentation right (step S40). Then, control goes back to the step S32.

If the presentation right get request from any one of other clients is received, then at a step S35, a new presentation right get command is transmitted to that client.

As shown in FIG. 14, while executing the steps S47 and S48 and transmitting the presentation data and the command, it is repeatedly determined by the network interface card 1 of the client which got the presentation right whether or not the presentation right return command or the command for enabling other client to get the presentation right is received (step S49). Then, if any command is received, then control goes back to the step S42.

Consequently, the presentation right is again transferred to the host 11 (1) or other client and the presentation data transmitted from the host 11 (1) or the client is displayed on the notebook size personal computers of the host 11 (1) and the clients 11 (2) to 11 (n) and the projector 12.

The processings shown in FIGS. 13 and 14 are continuously executed until the network interface card 1 is ejected from the notebook size personal computer or the operating system of the notebook size personal computer is ended.

By the processings shown in FIGS. 13 and 14, the same presentation data as that displayed on the projector 12 is displayed on the notebook size personal computers of the clients 11 (2) to 11 (n). Moreover, the presentation data transmitted from the client (client which has got the presentation right) is displayed on the notebook size personal computers of other clients and the projector 12.

Therefore, the participant on the seat distant from the projector can visually confirm the presentation data well by watching the screen of the notebook size personal computer of the client on hand. The participant on the seat which is not distant from the projector 12 is able to watch the presentation data from either the projector 12 or the notebook size personal computer of the client (e.g., the participant can watch the image through the projector 12 having the large-size screen and can also watch small illustrations through the notebook size personal computer of the client on hand).

Moreover, while being seated, the participant of the conference can obtain the presentation right by the client on hand and can transmit the presentation data. Therefore, the participant can make a presentation without leaving the seat.

The "host program" and the "client program" contain processings which are used to individually display data from the server of the wire LAN (FIG. 5) and data from the WWW server of the Internet on the notebook size personal computers of the individual clients 11 (2) to 11 (n). The network interface cards 1 of the host 11 (1) and the clients 11 (2) to 11 (n) start these processings immediately

after the presentation application software has automatically been activated in the presentation processings shown in FIGS. 13, 14.

FIGS. 15 and 16 show the contents of these processings on the "host program" and the "client program", respectively. As shown in FIG. 15, it is determined by the network interface card 1 of the host 11 (1) whether or not the access request to the server of the wire LAN or the WWW server of the Internet are received from the individual clients 11 (2) to 11 (n) (step S51). The requests are transmitted and received in accordance with the polling system shown in FIG. 7 in the processings shown in FIGS. 15 and 16.

As shown in FIG. 16, it is determined by the network interface cards 1 of the clients 11 (2) to 11 (n) whether or not the notebook size personal computers of the clients 11 (2) to 11 (n) concerned access the server of the wire LAN or the WWW server of the Internet (step S61). If this operation is executed, then the access request to this server is transmitted to the host 11 (1) (step S62).

As shown in FIG. 15, if the access request from the client is received, then the network interface card 1 of the host 11 (1) accesses the server (the server of the wire LAN or the WWW server of the Internet) in accordance with this access request, and transmits the data transmitted from this server to that client (step S52).

As a consequence, data of the server of the wire LAN or data of the WWW server of the Internet is individually displayed on the notebook size personal computer of that client.

If the presentation is now being executed by the processings shown in FIGS. 13 and 14, data of this server is transmitted to that client at the step S52 instead of the presentation data that has

been transmitted so far. Consequently, instead of the presentation data that has been displayed so far, data of this server (i.e., data different from the presentation data displayed on the notebook size personal computers of the host 11 (1) and other clients and the projector 12) is displayed on the notebook size personal computer of that client.

While executing the step S52, it is repeatedly determined by the network interface card 1 of the host 11 (1) whether or not an access end request from that client is received (step S53), whether or not the new access request is received (step S54) and whether or not the presentation is now being executed and whether or not the display of new presentation data is changed (switching of page and the like) (step S55).

As shown in FIG. 16, after having transmitted the access request, it is repeatedly determined by the network interface cards 1 of the clients 11 (2) to 11 (n) whether or not the notebook size computers of the clients 11 (2) to 11 (n) concerned end the access (step S63) and whether or not they access a new server (step S64).

Then, if it is determined that the access end operation is executed, then the access end request is transmitted to the host 11 (1) (step S65), and control goes back to the step S61. If it is determined that the operation for accessing another server is executed, then control goes back to the step S62.

As shown in FIG. 15, if the access end request is received, then the network interface card 1 of the host 11 (1) ends the access of the server (step S56), and control goes back to the step S51. As a result, when the presentation is being executed, the presentation

data is again displayed on the notebook size personal computer of that client.

If a new access request is received, then this time the server is accessed at the step S52 in accordance with the access request, and data is transmitted to the client.

If the presentation is now being executed and the display of the new presentation data is changed, then the transmission of data from the server is interrupted during a constant time (step S57).

While the transmission of the data from the server is being interrupted at the step S57, the presentation data is transmitted to that client by the processings shown in FIGS. 13 and 14. Thus, each time the display of the presentation data is changed, the changed presentation data is displayed on the notebook size personal computer of the client, which displays data of the server of the wire LAN and data of the WWW server of the Internet, during a constant time.

The processings shown in FIGS. 15 and 16 are continuously executed until the network interface card 1 is ejected from the notebook size personal computer or the operating system of the notebook size personal computer is ended.

Owing to the processings shown in FIGS. 15 and 16, when the participants of the conference want to examine data of the server of the wire LAN and data of the WWW server of the Internet before they make a presentation, they can examine the data of that server by the client on hand.

While the participant is examining data during other participant is making a presentation, since the changed presentation data is

displayed during a constant time each time the display of the presentation data is altered, the presentation data can be prevented from being overlooked for a mistake.

As described above, in this wireless LAN conference system, since the card type network interface 1 is prepared at the conference hall and the clients are each comprised of the notebook size personal computers brought by the participants of the conference and this card type network interface 1, the network of the clients can be set without imposing the burden upon the participants of the conference, and the system can be constructed without increasing the costs of equipment of the conference hall unlike the case in which personal computers are installed at respective seats as equipment.

Moreover, since the host also is comprised of the same network conference terminal device as that of the client, an exclusive device need not be provided as the host, and hence the costs of equipment of the conference hall can be suppressed more.

In addition, since the presentation application software is stored in the network interface card 1, even when the participant of the conference brings a notebook size personal computer in which the presentation application software is not installed, such notebook size personal computer also can display the presentation data.

Further, this presentation application software can be activated automatically. Accordingly, the participant of the conference need not execute operations to activate this presentation application software, and hence a burden imposed upon the participants can be alleviated more.

Since the host and the clients are connected by the wireless LAN, a wire transmission medium such as a coaxial cable and an optical fiber cable need not be laid over the conference hall, and hence the cost of equipment can be reduced from this viewpoint. Further, the position of the wireless LAN conference terminal device 11 within the conference hall is not fixed unlike the case in which the wire transmission medium is laid over (accordingly, the layout of seats is not fixed), and hence the layout of seats can be determined freely.

Moreover, the LAN conference system can be constructed without changing at all the wire LAN which is constructed in advance within a building in which a conference hall is prepared.

In the above example, the processing content of the "host/client decision program" is that the first wireless LAN conference terminal device 11 to which the network interface card 1 is attached and in which the operating system of the notebook size personal computer is activated in the conference hall as the host.

However, the processing content of the "host/client decision program" is not limited thereto and may be a processing content in which any one of the wireless LAN conference terminal devices 11 is determined as the host by a proper method (e.g., a picture for urging the participant to select the host or the client is displayed on the notebook size personal computer and the host or the client is determined in accordance with the operations of the notebook size personal computer).

While the projector is provided in the above example, as another example, the wireless LAN conference system may be constructed

without providing the projector and presentation data may be displayed only on the notebook size personal computers of the host and the clients.

Since the projector is connected only to the host through the external display output terminal of the notebook size personal computer in the above example, when other participant than the coordinator of the conference makes a presentation, the host transmits presentation data, transmitted from the client to the host, to the projector.

However, as another example, as shown in FIG. 17, by using a projector that can be connected to the wireless LAN (e.g., projector with a personal computer, which can be connected to the wireless LAN, attached thereto) 14, the presentation data may directly be transmitted to the projector 14 through the wireless LAN from the clients 11 (2) to 11 (n) (the host 11 (1) also may transmit the presentation data to the projector 14 through the wireless LAN) (in FIG. 17, parts common to those of FIG. 5 are marked with the identical reference numerals and this relationship applies for the following FIGS. 18, 19 as well).

In the above example, the host and the projector are provided as separate sections. However, as other example, as shown in FIG. 18, there may be provided a projector 16 with a personal computer 15 having a PC card slot attached thereto. The network interface card 1 may be attached to this personal computer 15 and this personal computer may be served as the host, whereby the projector may be served also as the host.

In the wireless LAN conference system shown in FIG. 18, the same

presentation data as that displayed on the projector 16 is directly transmitted to the clients 11 (2) to 11 (n) from the projector 16 through the wireless LAN and thereby is displayed on the clients 11 (2) to 11 (n). Similarly to the wireless LAN conference system shown in FIG. 17, presentation data may directly be transmitted to the projector 16 from the clients 11 (2) to 11 (n) through the wireless LAN and thereby such presentation data can be displayed on the projector 16.

Further, in the example shown in FIG. 18, when the presentation data displayed on the projector 16 can be well watched from all seats and only one participant makes a presentation, as shown in FIG. 19, for example, there is provided only one wireless LAN conference terminal device (client) 11 (2). Then, this wireless LAN conference terminal device 11, the wire LAN and the video camera 13 may be connected together, whereby the participant which will make a presentation gets the presentation right by this client 11 (2) from beginning to end and may transmit the presentation data to the projector 16.

In the above example, not only the "client program" but also the "host/client decision program" and the "host program" are stored in the network interface card, whereby the notebook size personal computer with the network interface card attached thereto may be served as the host.

However, as other example, the "host/client decision program" and the "host program" may not be stored in the network interface card and the "client program" may constantly be activated based on the fact that the network interface card is attached to the notebook

size personal computer. In that case, as the host, there may be used such one in which an ordinary (not relating to the present invention) network interface card is attached to the personal computer in which the "host program" and the presentation application software are installed (in the examples shown in FIGS. 18 and 19, the "host program" and the presentation application software may be installed on the personal computer attached to the projector and the ordinary network interface card may be attached to such personal computer).

In the above example, the "host program" and the "client program" contain the processing by which the client gets the presentation right. However, when the participant of the conference need not transmit the presentation data by the client in hand (e.g., announcement meeting in which a specific person makes a presentation in a one-sided fashion), "host program" and "client program" need not contain this processing.

In the above example, the presentation application software is stored in the network interface card. However, as other example, the presentation application software may not be stored in the network interface card, and the network interface card may be attached to the notebook size personal computer in which the presentation application software was installed.

In the above example, the network interface card is attached to the notebook size personal computer, thereby resulting in the client and the host being constructed. However, the present invention is not limited thereto, and the client and the host may be constructed by attaching the network interface card to suitable information

terminal devices to which the PC card can be attached (other personal computers than the notebook size personal computer, personal digital assistants which are highly-sophisticated electronic notes, printers, image writing devices having a built-in camera, etc.).

In the above example, the network interface card adopts the radio frequency system as the wireless LAN system. However, as other example, an infrared system may be adopted as the wireless LAN system.

In the above example, the network interface card is applied to the wireless LAN conference system. However, the present invention is not limited thereto, and the network interface card may be applied to other uses than the wireless LAN conference system. However, in that case, the network interface card may transmit and receive data through the wire LAN.

In the above example, the present invention is applied to the network interface card which is based on the PCMCIA standards. However, the present invention is not limited thereto, and the present invention may be applied to proper card type (including thin-chip type) network interface cards which can be attached to the information terminal devices.

The present invention is not limited to the above examples and it is needless to say that the present invention may take various arrangements without departing from the gist thereof.

As described above, according to the card type network interface of the present invention, there is achieved the effect that the network setting for connecting the information terminal device such

as the personal computer to the LAN can be executed without imposing a burden to users.

Accordingly, in the conference using the LAN, for example, if theses card type network interfaces are prepared in the conference hall and these card type network interfaces are attached to the information terminal devices such as the notebook size personal computers brought by the participants of the conference, then the network setting can be executed as the assumption that the participants are going to attend the conference without imposing a burden upon the participants. Moreover, the cost of equipment of the conference hall can be prevented from being increased unlike the case in which the information terminal devices such as the personal computers are attached to the respective seats as equipment.

According to this card type network interface, since the host of the LAN also is comprised of the information terminal device to which this card type network interface is attached, there is achieved the effect that the LAN system can be constructed without providing an exclusive-device as the host. Therefore, in the conference using the LAN, for example, the cost of equipment of the conference hall can be suppressed more.

According to this card type network interface, in the conference using the LAN, for example, the participant of the conference can make a presentation without leaving the seat.

According to this card type network interface, there are achieved effects that the host can accurately receive requests from a plurality of clients whose network settings were completed through the wireless LAN and that the host can accurately receive the

setting information request through the wireless LAN.

According to this card type network interface, in the conference using the LAN, for example, there is achieved the effect in which the information terminal device in which the presentation application software is not installed can display the present application data. Moreover, since the participant of the conference need not execute operations to activate the presentation application software, there is achieved the effect in which a burden imposed upon the participants can be alleviated more.

Next, according to the network conference terminal device of the present invention, there are achieved the effects in which the network setting used as the assumption that the participants are going to attend the conference using the wireless LAN can be executed without imposing a burden upon the participants and in which the cost of equipment of the conference hall can be prevented from being increased unlike the case in which the information terminal devices are provided at the respective seats as equipment.

According to the network conference terminal device, since the host of the wireless LAN also is comprised of this network conference terminal device, there is achieved the effect in which the wireless LAN conference system can be constructed without providing the exclusive-device as the host. Therefore, the cost of equipment of the conference hall can be suppressed more.

According to this network conference terminal device, in the conference using the wireless LAN, for example, the participant of the conference can make a presentation without leaving the seat.

According to this network conference terminal device, there are

achieved effects in which the host can accurately receive requests from a plurality of clients whose network settings were completed and in which the host can accurately receive the setting information request to set the network.

According to this network conference terminal device, in the conference using the wireless LAN, for example, there is achieved the effect in which the information terminal device in which the presentation application software is not installed can display the presentation data. Moreover, since the participant of the conference need not execute operations to activate the presentation application software, there is achieved the effect in which a burden imposed upon the participants can be alleviated more.

Next, according to the network conference system of the present invention, there are achieved the effects in which the network setting can be executed without imposing a burden upon the participants and in which the system can be constructed without increasing the cost of equipment of the conference hall.

According to the network conference system, since the host also is comprised of the same network conference terminal device as that of the client, there is achieved the effect in which the exclusive-device need not be provided as the host so that the cost of equipment of the conference hall can be suppressed more.

According to this network conference system, the participant of the conference can make a presentation without leasing the seat.

According to this network conference system, there are achieved the effects in which the host can accurately receive requests from a plurality of clients in which the network setting was completed and

in which the host can accurately receive the request of the setting information for setting the network.

According to this network conference system, there is achieved the effect in which the client or the host using the information terminal device in which the presentation application software is not installed can display the presentation data. Since the participant of the conference need not execute operations to activate the presentation application software, a burden imposed upon the participant can be suppressed more.

Next, according to another network conference system of the present invention, there are achieved the effects in which the network setting of the client can be executed without imposing a burden upon the participants of the conference, the system can be constructed without increasing the cost of equipment of the conference hall and in which the participant can make a presentation without leaving the seat.

According to another network conference system, there are achieved the effects in which the same presentation data as the presentation data displayed on the image display device can directly be transmitted from the image display device through the wireless LAN to the client and can be displayed on the client and in which the presentation data can directly be transmitted from the client through the wireless LAN to the image display device and such presentation data can be displayed on the image display device.

Further, according another network conference system, there are achieved the effects in which the image display device (host) can accurately receive the requests from a plurality of clients in which

the network setting was completed and in which the image display device can accurately receive the setting information request to set the network.

Furthermore, according to another network conference system, there is achieved the effect in which the client using the information terminal device in which the present application software is not installed and the image display device can display the presentation data. Since the participant of the conference need not execute operations to activate the presentation application software, there is achieved the effect in which a burden imposed upon the participants can be alleviated more.

CLAIMS

1. A card type network interface which can be attached to an information terminal device, comprising:

connecting means for connecting said information terminal device to a local area network; and

setting means for requesting a host of said local area network to transmit setting information necessary for executing a network setting to connect said information terminal device to said local area network based on the fact that said card type network interface can be attached to said information terminal device and executing said network setting by using said setting information transmitted from said host.

2. A card type network interface according to claim 1, further comprising:

determining means for determining based on the fact that said card type network interface can be attached to said information terminal device whether said information terminal device should be a host or a client of said local area network; and

processing means for transmitting said requested setting information to said client based on the fact that said information terminal device is determined as said host by said determining means, wherein said setting means requests said setting information based on the fact that said information terminal device is determined as said client by said determining means.

3. A card type network interface according to claim 1, wherein presentation application software for displaying and controlling presentation data is stored in said card type network interface.

4. A card type network interface according to claim 3, wherein said information terminal device automatically activates automatic activating application software stored in a hard disk and said card type network interface allows said information terminal device to recognize said card type network interface as a hard disk so that said presentation application software is automatically activated in said information terminal device.

5. A card type network interface according to claim 2, wherein said determining means determines said information terminal device as said host based on the fact that said card type network interface is attached to said information terminal device on condition that a command for inhibiting said information terminal device from being determined as said host is not received through said local area network and transmits a command for inhibiting said other information terminal device from being determined as said host through said local area network.

6. A card type network interface according to claim 2, further comprising:

processing means for requesting said host to get a presentation right based on the fact that said information terminal device is determined as said client by said determining means, said network

setting is completed by said setting means and a predetermined operation is executed by said information terminal device and transmitting presentation data to said host and said other client based on the fact that said presentation right is obtained; and

processing means for allowing said client to get said presentation right based on the fact that said information terminal device is determined as said host by said determining means and that said host is requested to get said presentation right.

7. A card type network interface according to claim 2, wherein said connecting means further includes processing means for connecting said information terminal device to a wireless local area network, receiving a request from said client in which said network setting was completed in a polling system based on the fact that said information terminal device is determined as said host by said determining means and awaiting a request of said setting information at the end of a polling cycle and wherein said setting means requests said setting information at the end of said polling cycle.

8. A card type network interface according to claim 2, wherein presentation application software for displaying and controlling presentation data is stored in said card type network interface.

9. A card type network interface according to claim 8, wherein said information terminal device automatically activates automatic activating application software stored in a hard disk and said card type network interface allows said information terminal device to

recognize said card type network interface as a hard disk so that said presentation application software is automatically activated in said information terminal device.

10. A network conference terminal device in which a card type network interface is attached to an information terminal device and which includes presentation processing means for displaying and controlling presentation data according to the need, said card type network interface including:

connecting means for connecting said information terminal device to a wireless local area network; and

setting means for requesting a host of said wireless local area network to transmit setting information necessary for executing a network setting to connect said information terminal device to said wireless local area network based on the fact that said card type network interface is attached to said information terminal device and executing said network setting by using said setting information transmitted from said host.

11. A network conference terminal device according to claim 10, wherein said card type network interface further includes:

determining means for determining based on the fact that said card type network interface is attached to said information terminal device whether said information terminal device is served as a host or a client of said wireless local area network; and

processing means for transmitting said requested setting information to said client and transmitting said presentation data

to said client in which said network setting was completed based on the fact that said information terminal device is determined as said host by said determining means and wherein said setting means requests said setting information based on the fact that said information terminal device is determined as said client by said determining means.

12. A network conference terminal device according to claim 10, wherein said presentation processing means displays said presentation data by executing presentation application software stored in said card type network interface.

13. A network conference terminal device according to claim 12, wherein said information terminal device automatically activates automatic activating application software stored in a hard disk and said card type network interface allows said information terminal device to recognize said card type network interface as a hard disk so that said presentation application software is automatically activated in said information terminal device.

14. A network conference terminal device according to claim 11, wherein said determining means determines said terminal device as said host and transmits a command for inhibiting said other terminal device from being determined as said host through said wireless local area network based on the fact that said network conference terminal is attached to said terminal device on condition that a command for inhibiting said terminal device from being determined as

said host is not received through said wireless local area network.

15. A network conference terminal device according to claim 11, wherein said card type network interface further includes:

processing means for requesting said host to get a presentation right based on the fact that said terminal device is determined as said client by said determining means, said network setting is completed by said setting means and that a predetermined operation is executed by said terminal device and transmitting said presentation data to said host and said other client based on the fact that said presentation right is obtained; and

processing means for allowing said client to get said presentation right based on the fact that said terminal device is determined as said host and that said host is requested to get said presentation right.

16. A network conference terminal device according to claim 11, wherein said card type network interface further includes:

processing means for receiving in a polling system a request from said client in which said network setting was completed based on the fact that said terminal device is determined as said host by said determining means and awaiting a request of said setting information at the end of a polling cycle and wherein said setting means requests said setting information at the end of said polling cycle.

17. A network conference terminal device according to claim 11,

wherein said presentation processing means displays said presentation data by executing presentation application software stored in said card type network interface.

18. A network conference terminal device according to claim 17, wherein said information terminal device automatically activates automatic activating application software stored in a hard disk and said card type network interface allows said information terminal device to recognize said card type network interface as a hard disk so that said presentation application software is automatically activated in said information terminal device.

19. A network conference system comprising:

a host of a wireless local area network;

a client of said wireless local area network, wherein said client includes an information terminal device to which a card type network interface is attached and presentation processing means for displaying and controlling presentation data according to the need, said card type network interface includes connecting means for connecting said information terminal device to said wireless local area network and setting means for requesting said host to transmit setting information necessary for executing a network setting to connect said information terminal device to said wireless local area network based on the fact that said card type network interface is attached to said information terminal device and executing said network setting by using said setting information transmitted from said host and said host transmits said setting information to said

client based on a request of said setting information and transmits said presentation data to said client in which said network setting was completed.

20. A network conference system according to claim 19, wherein said card type network interface further includes:

determining means for determining based on the fact that said card type network interface is attached to said information terminal device whether said information terminal device is served as a host or a client of said wireless local area network; and

processing means for transmitting said requested setting information to said client and transmitting said presentation data to said client in which said network setting was completed based on the fact that said information terminal device is determined as said host by said determining means and wherein said setting means requests said setting information based on the fact that said information terminal device is determined as said client by said determining means and said host is such one that an information terminal device to which said card type network interface is attached is determined as a host by said determining means.

21. A network conference system according to claim 19, wherein said presentation processing means displays said presentation data by executing presentation application software stored in said card type network interface.

22. A network conference system according to claim 21, wherein

said information terminal device automatically activates automatic activating application software stored in a hard disk and said card type network interface allows said information terminal device to recognize said card type network interface as a hard disk so that said presentation application software is automatically activated in said information terminal device.

23. A network conference system according to claim 20, wherein said determining means determines said information terminal device as said host and transmits a command for inhibiting said other information terminal device from being determined as said host through said wireless local area network based on the fact that said card type network interface is attached to said information terminal device on condition that a command for inhibiting said information terminal device from being determined as said host is not received through said wireless local area network.

24. A network conference system according to claim 20, wherein said card type network interface further includes:

processing means for requesting said host to get a presentation right based on the fact that said card type network interface is determined as said client by said determining means, said network setting is completed by said setting means and that a predetermined operation is executed by said information terminal device and transmitting said presentation data to said host and said other client based on the fact that said presentation right is obtained; and

processing means for allowing said client to get said presentation right based on the fact that said card type network interface is determined as said host by said determining means and that said host is requested to get said presentation right.

25. A network conference system according to claim 20, wherein said card type network interface further includes processing means for receiving in a polling system a request from said client in which said network setting was completed based on the fact that said card type network interface is determined as said host by said determining means and awaiting a request of said setting information at the end of a polling cycle and wherein said setting means requests said setting information at the end of said polling cycle..

26. A network conference system according to claim 20, wherein said presentation processing means displays said presentation data by executing presentation application software stored in said card type network interface.

27. A network conference system according to claim 26, wherein said terminal device automatically activates automatic activating application software stored in a hard disk and said card type network interface allows said terminal device to recognize said card type network interface as a hard disk so that said presentation application software is automatically activated in said terminal device.

28. A network conference system comprising an image display device and a client of a wireless local area network, wherein said image display device has an information terminal device to which a card type network interface can be attached, said information terminal device has said card type network interface attached thereto and includes a presentation processing means for displaying and controlling presentation data;

said client is constructed such that said card type network interface is attached to an information terminal device and includes said presentation processing means according to the need;

said card type network interface comprising:

connecting means for connecting said information terminal device to said wireless local area network;

determining means for determining based on the fact that said card type network interface is attached to said information terminal device whether said information terminal device is served as a host or a client of said wireless local area network;

setting means for requesting said host to transmit setting information necessary for executing a network setting to connect said information terminal device to said wireless local area network based on the fact that said information terminal device is determined as said client by said determining means and executes said network setting by using said setting information transmitted from said host;

processing means for transmitting said requested setting information to said client based on the fact that said information terminal device is determined as said host by said determining means

and transmitting said presentation data to said client in which said network setting was completed;

processing means for requesting said host to get a presentation right based on the fact that said information terminal device is determined as said client by said determining means, said network setting was completed by said setting means and that a predetermined operation is executed by said information terminal device and transmitting said presentation data to said host and said client based on the fact that said presentation right is obtained; and

processing means for allowing said client to get said presentation right based on the fact that said information terminal device is determined as said host by said determining means and that said host is requested to get said presentation right, and said image display device is constructed such that said information terminal device attached to said image display device is determined as a host by said determining means.

29. A network conference system according to claim 28, wherein said determining means determines said terminal device as said host based on the fact that said card type network interface is attached to said terminal device on condition that a command for inhibiting said information terminal device from being determined as said host is not received through said wireless local area network and transmits a command for inhibiting said other information terminal device from being determined as said host through said wireless local area network.

30. A network conference system according to claim 28, wherein said card type network interface further includes processing means for receiving in a polling system a request from said client in which said network setting was completed based on the fact that said information terminal device is determined as said host by said determining means and awaiting a request of said setting information at the end of a polling cycle and wherein said setting means requests said setting information at the end of said polling cycle.

31. A network conference system according to claim 28, wherein said presentation processing means displays said presentation data by executing presentation application software stored in said card type network interface.

32. A network conference system according to claim 31, wherein said terminal device automatically activates automatic activating application software stored in a hard disk and said card type network interface allows said terminal device to recognize said card type network interface as a hard disk so that said presentation application software is automatically activated in said terminal device.

FIG. 1

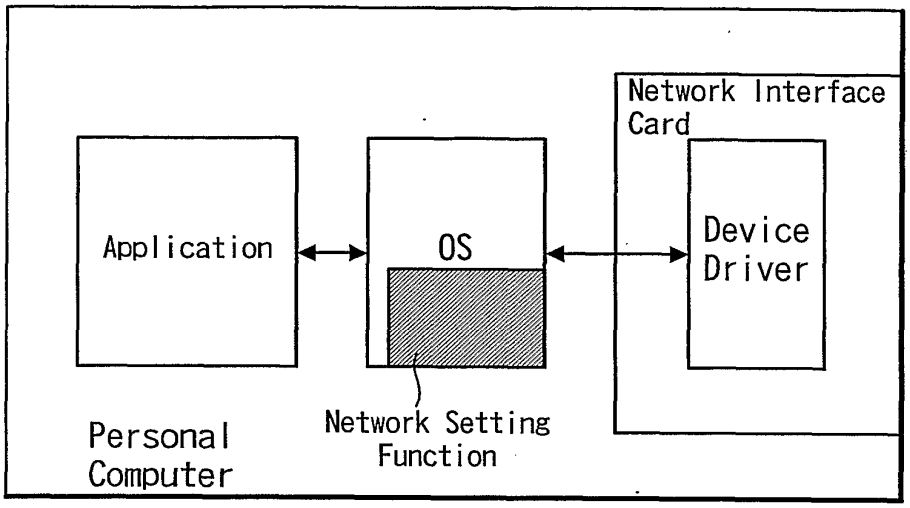
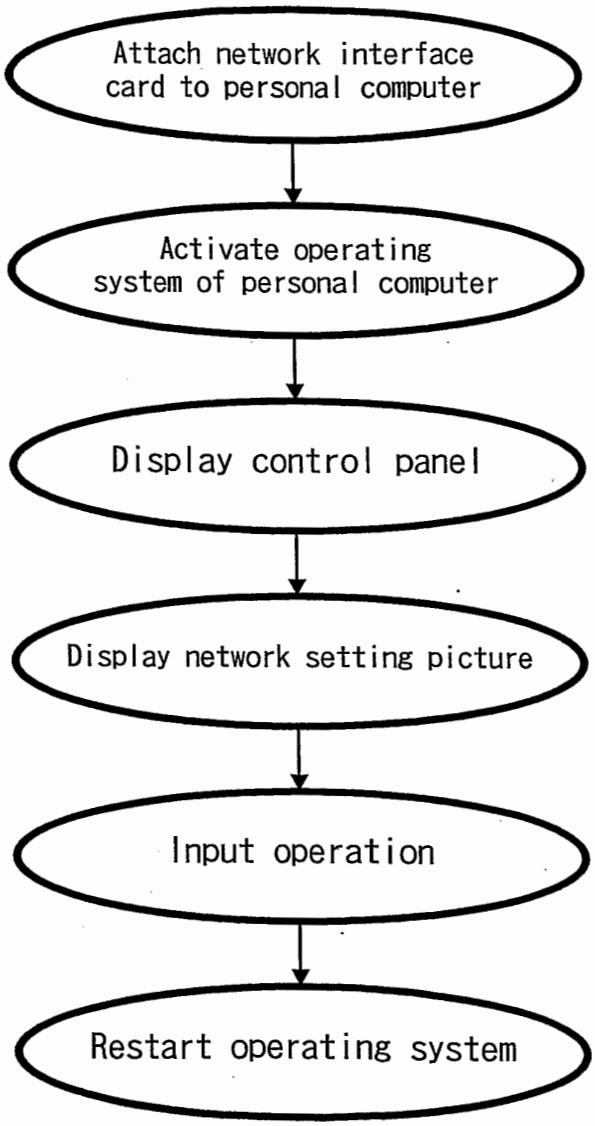

Network Interface Card
Application
OS
Device Driver
Network Setting Function
Personal Computer

FIG. 2


Attach network interface card to personal computer
Activate operating system of personal computer
Display control panel
Display network setting picture
Input operation
Restart operating system

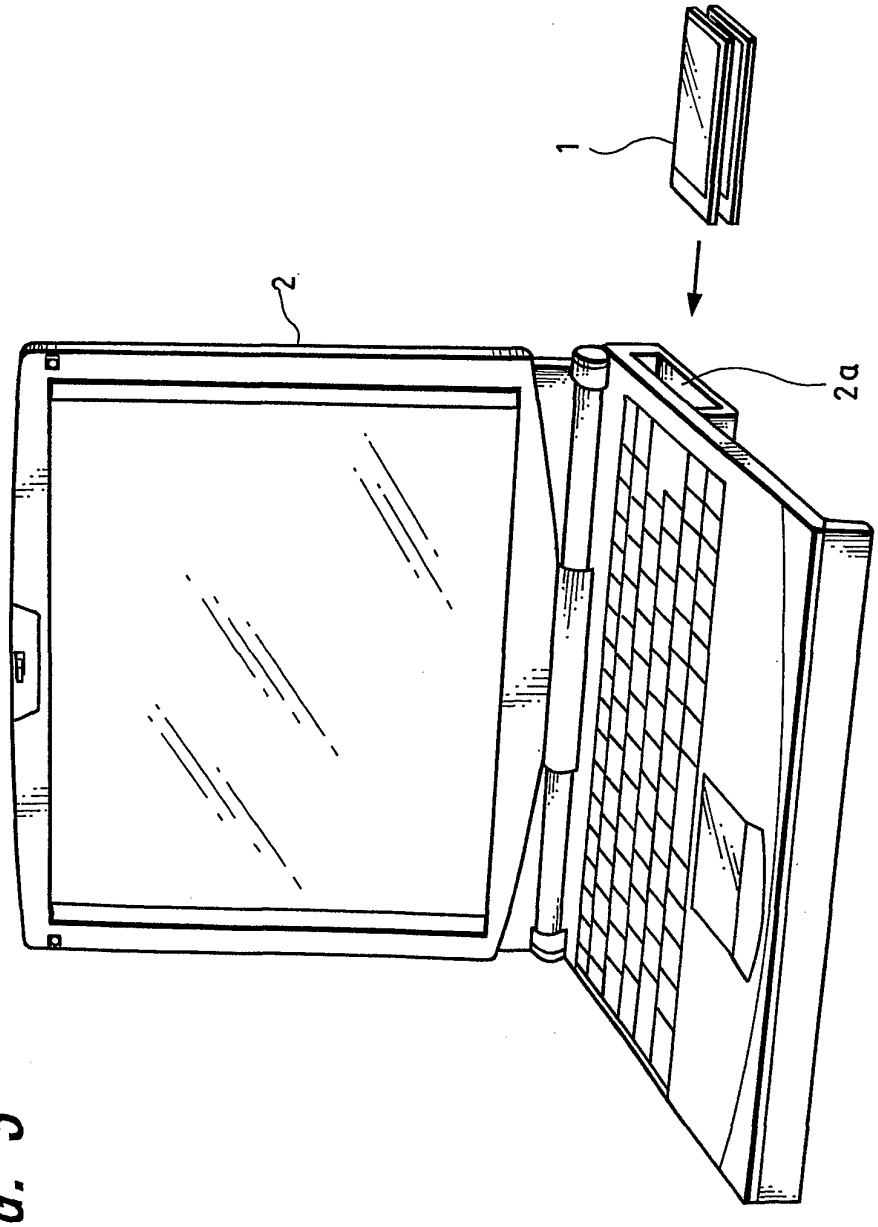


FIG. 3

FIG. 4

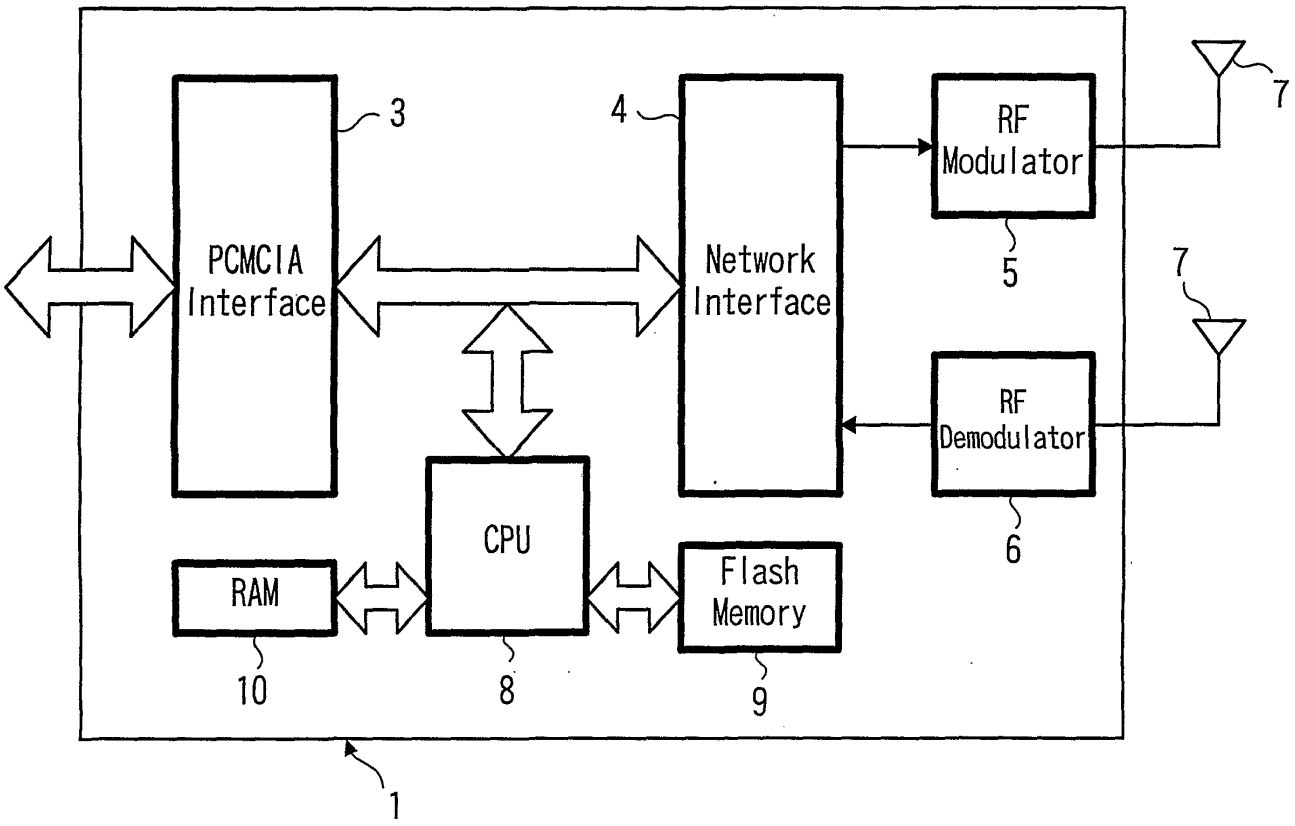

PCMCIA Interface
3
Network Interface
4
RF Modulator
5
RF Demodulator
6
7
7
CPU
RAM
10
8
Flash Memory
9
1

FIG. 5

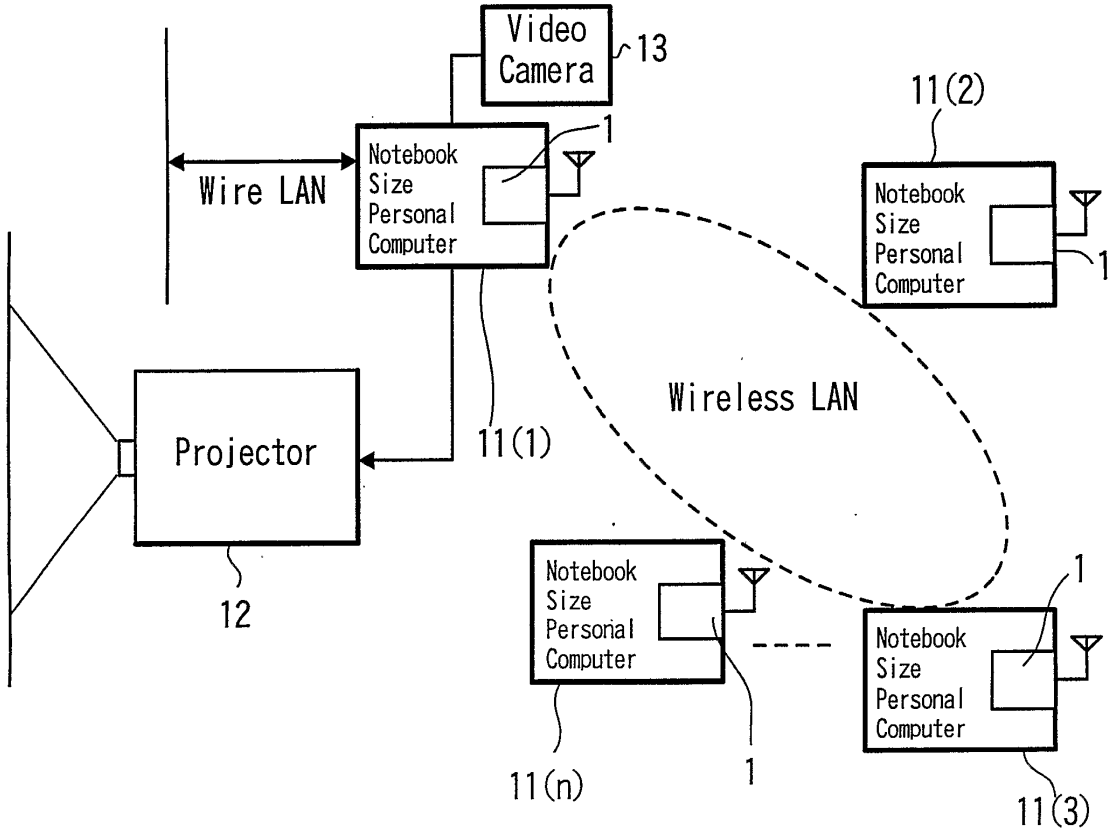

Video Camera
13
Wire LAN
Notebook Size Personal Computer
1
11(1)
11(2)
Notebook Size Personal Computer
1
Wireless LAN
Projector
12
Notebook Size Personal Computer
11(n)
1
Notebook Size Personal Computer
1
11(3)

FIG. 6

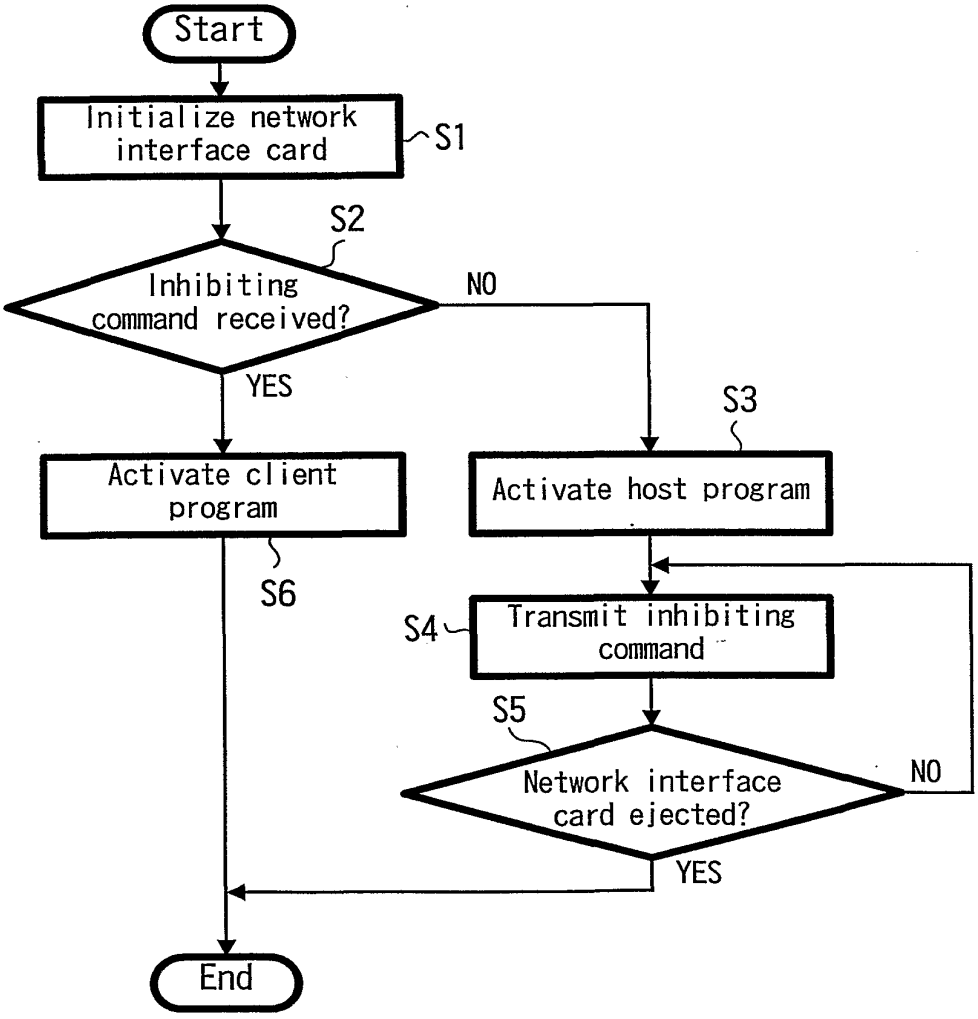

Start
Initialize network interface card
S1
S2
Inhibiting command received?
NO
YES
S3
Activate client program
Activate host program
S6
S4
Transmit inhibiting command
S5
Network interface card ejected?
NO
YES
End

FIG. 7

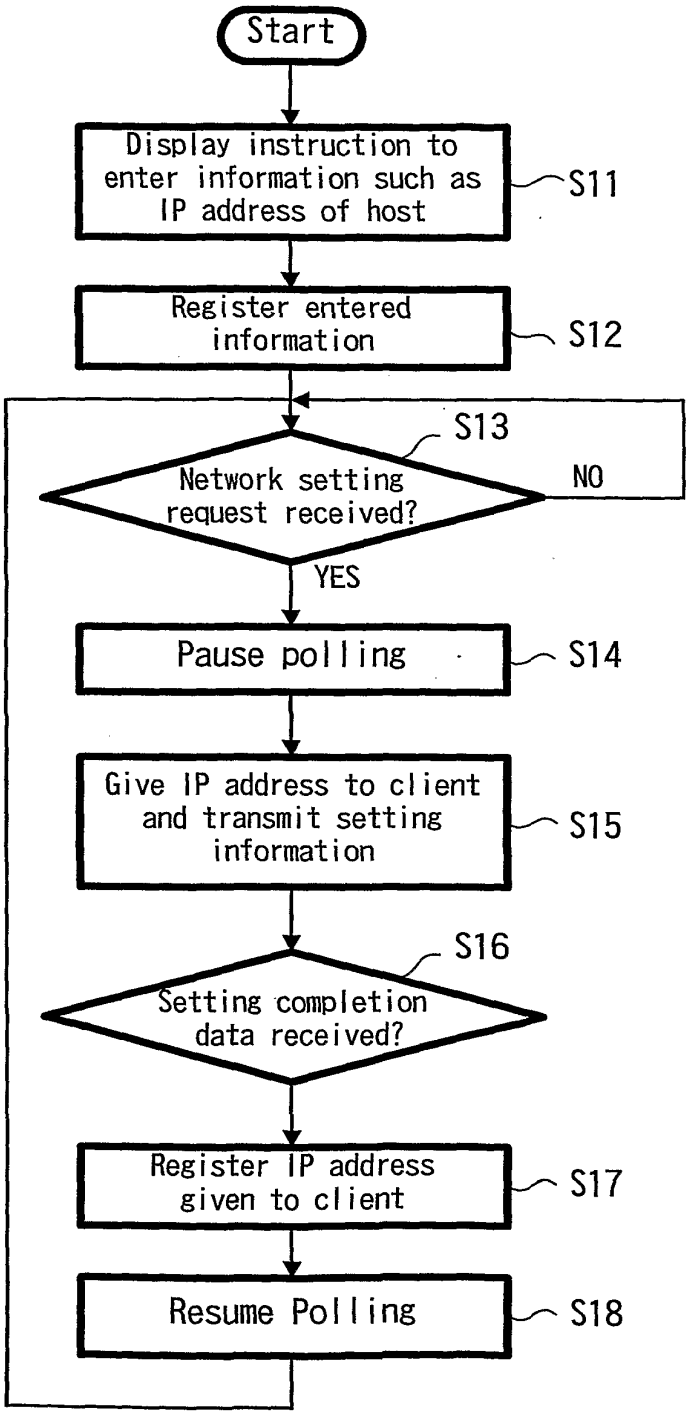

Start
Display instruction to enter information such as IP address of host
S11
Register entered information
S12
S13
Network setting request received?
NO
YES
Pause polling
S14
Give IP address to client and transmit setting information
S15
S16
Setting completion data received?
Register IP address given to client
S17
Resume Polling
S18

FIG. 8

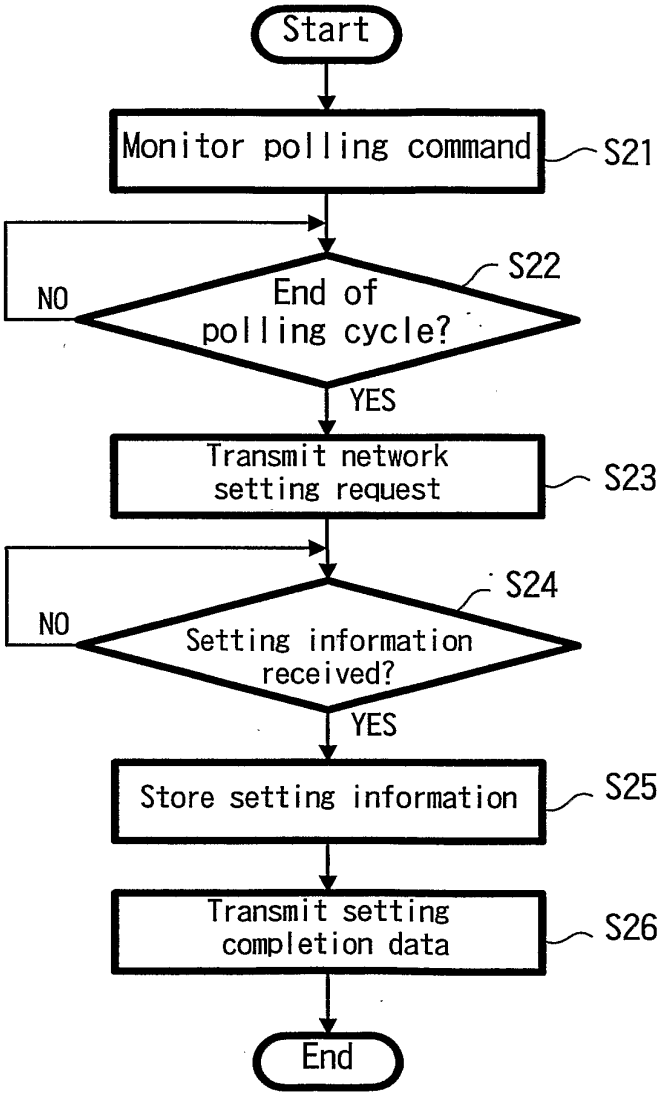

Start
Monitor polling command
S21
S22
End of polling cycle?
NO
YES
Transmit network setting request
S23
S24
Setting information received?
NO
YES
Store setting information
S25
Transmit setting completion data
S26
End

FIG. 9

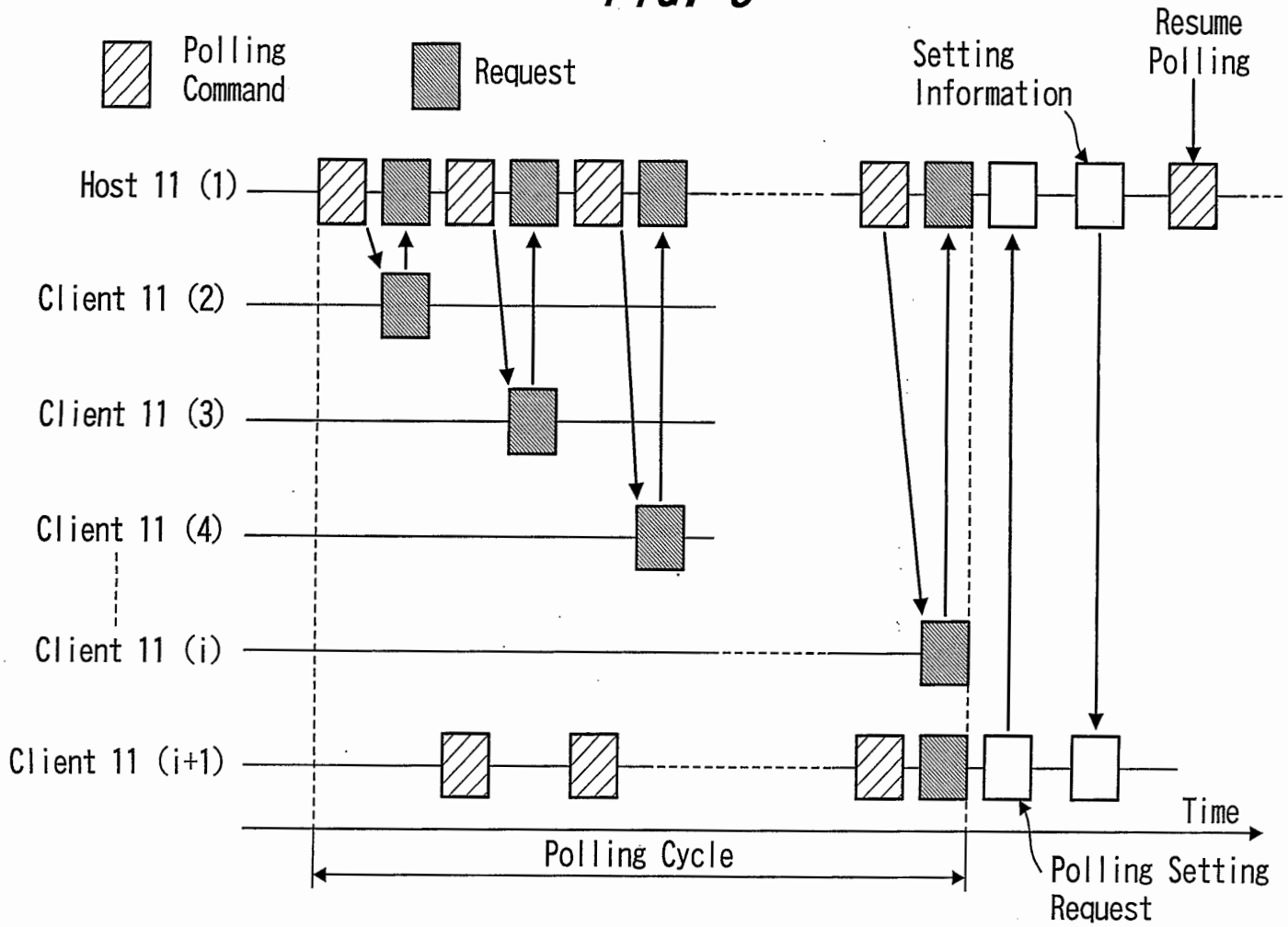

Polling Command
Request
Setting Information
Resume Polling
Host 11 (1)
Client 11 (2)
Client 11 (3)
Client 11 (4)
Client 11 (i)
Client 11 (i+1)
Time
Polling Cycle
Polling Setting Request

FIG. 10A

Address of Transmission Destination	Address of Transmission Source	Following Bytes	Data or Command	Checksum

FIG. 10B

Poling end
Request IP Address
Complete set IP Address

FIG. 11

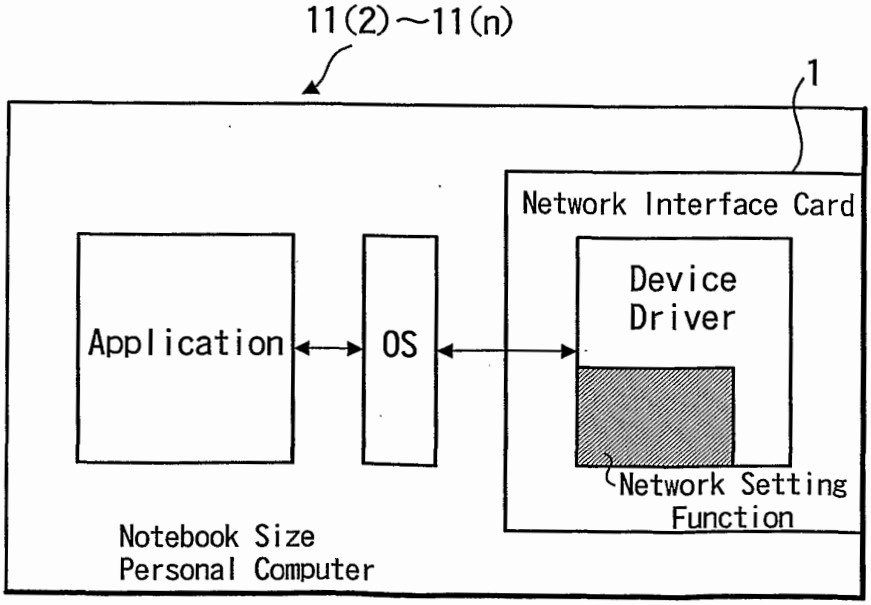


FIG. 12

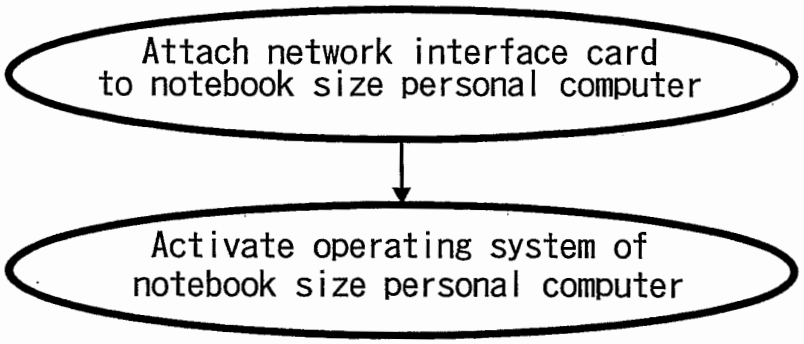

Attach network interface card to notebook size personal computer
Activate operating system of notebook size personal computer

FIG. 13

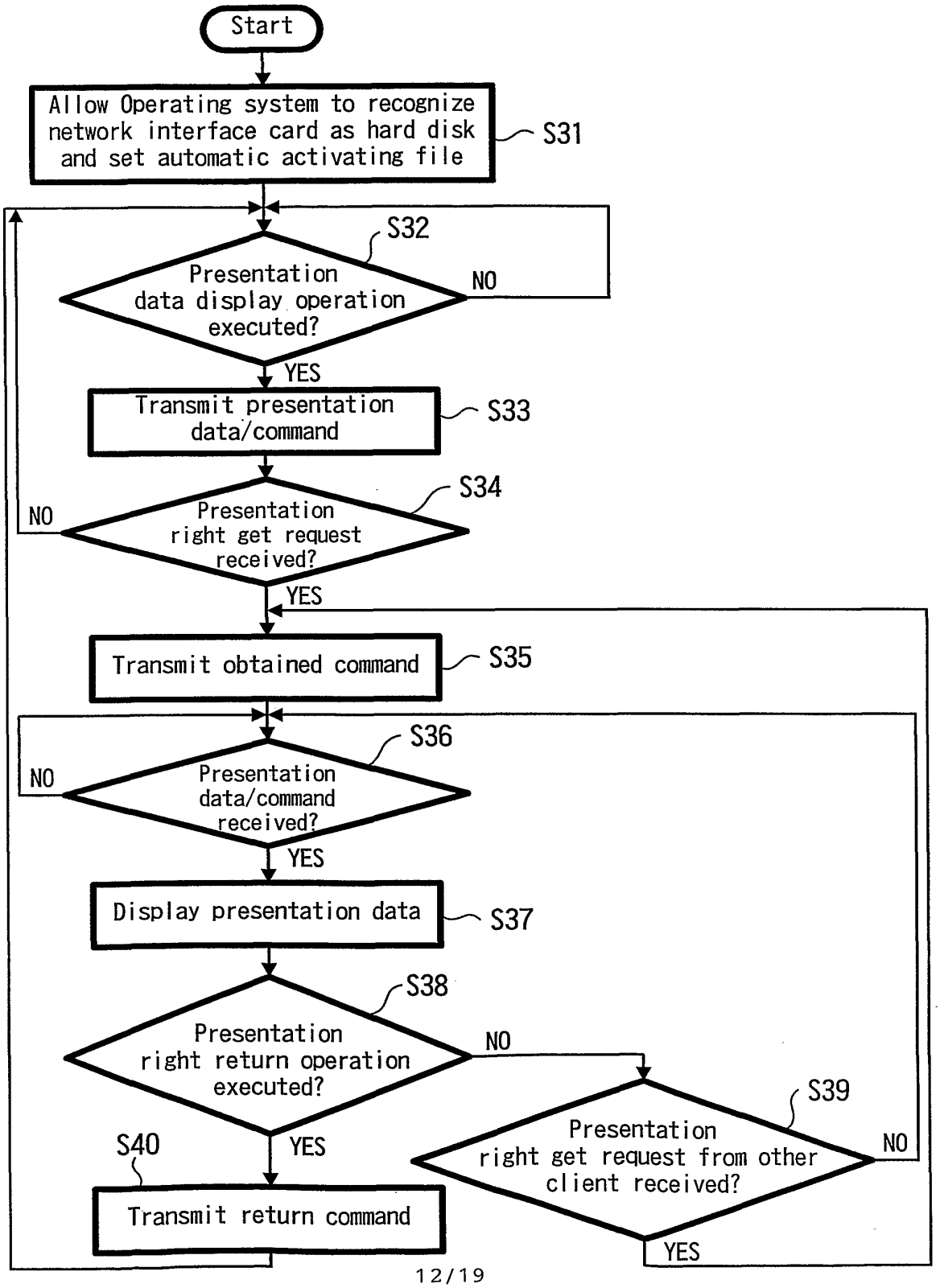

Start
Allow Operating system to recognize network interface card as hard disk and set automatic activating file
S31
S32
Presentation data display operation executed?
NO
YES
Transmit presentation data/command
S33
S34
NO
Presentation right get request received?
YES
Transmit obtained command
S35
S36
NO
Presentation data/command received?
YES
Display presentation data
S37
S38
Presentation right return operation executed?
NO
S39
Presentation right get request from other client received?
NO
S40
YES
Transmit return command
YES

FIG. 14

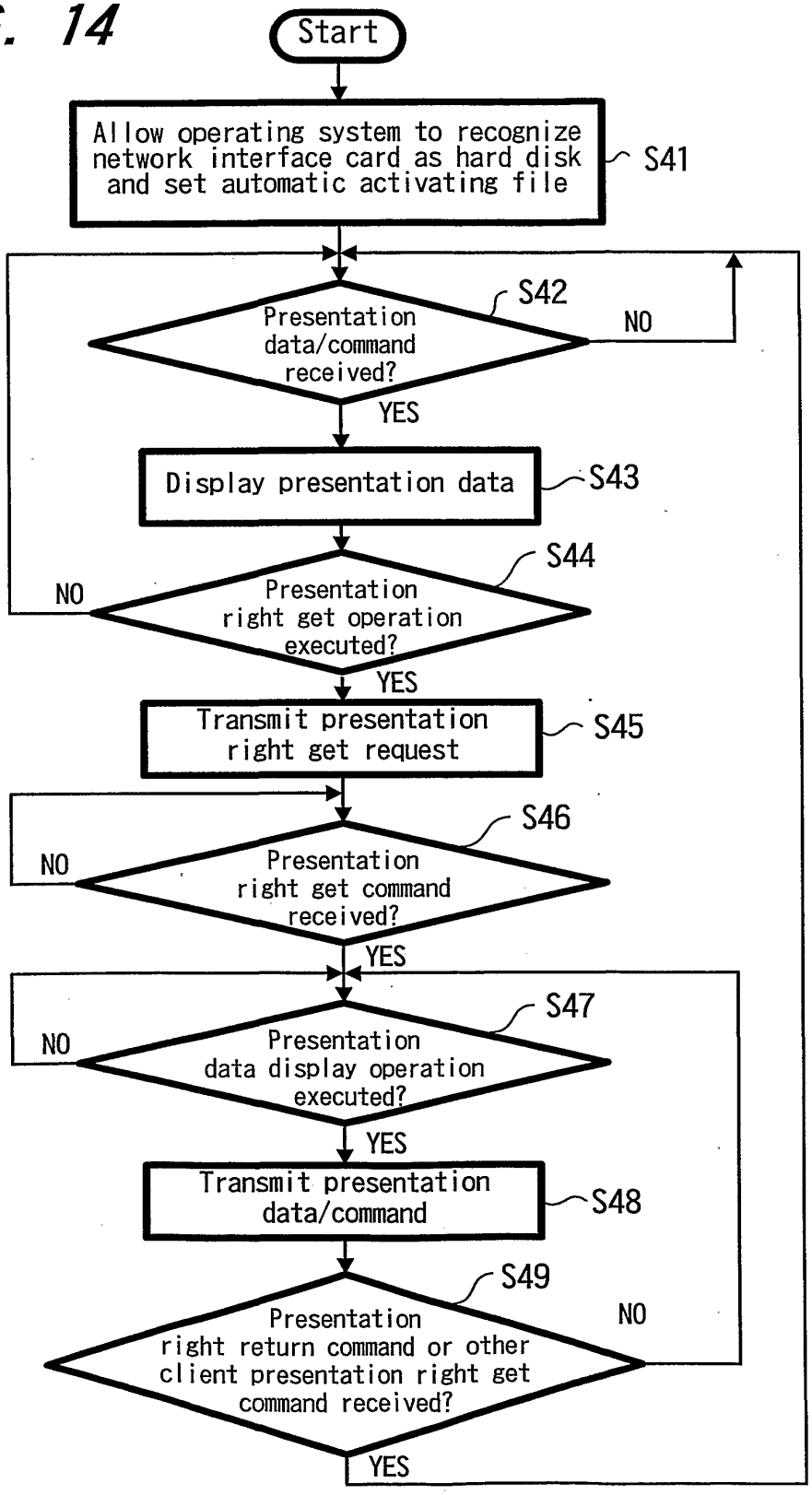

Start
Allow operating system to recognize network interface card as hard disk and set automatic activating file
S41
Presentation data/command received?
S42
NO
YES
Display presentation data
S43
Presentation right get operation executed?
S44
NO
YES
Transmit presentation right get request
S45
Presentation right get command received?
S46
NO
YES
Presentation data display operation executed?
S47
NO
YES
Transmit presentation data/command
S48
Presentation right return command or other client presentation right get command received?
S49
NO
YES

FIG. 15

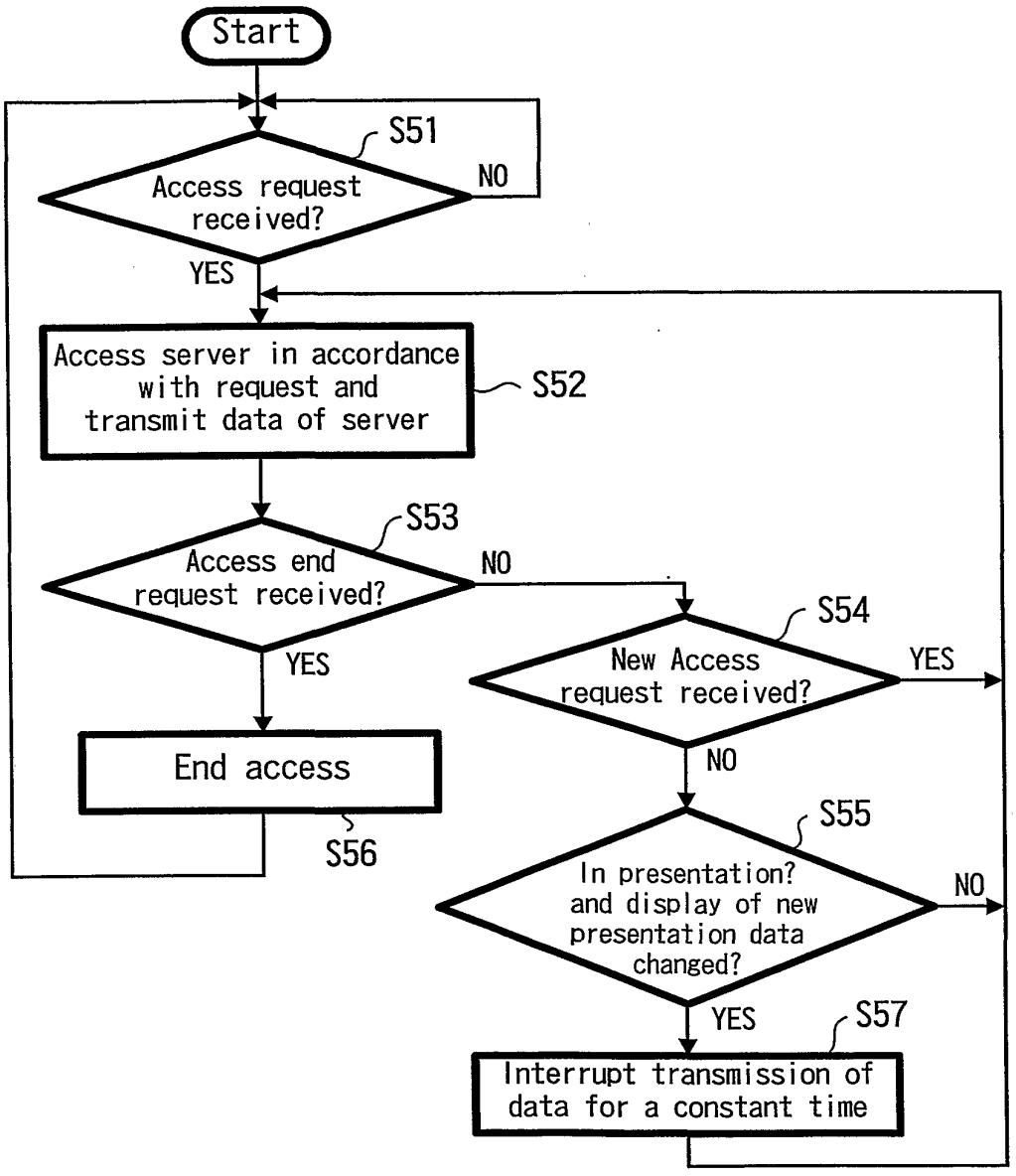

Start
S51
Access request received?
NO
YES
Access server in accordance with request and transmit data of server
S52
S53
Access end request received?
NO
YES
End access
S56
S54
New Access request received?
YES
NO
S55
In presentation? and display of new presentation data changed?
NO
YES
S57
Interrupt transmission of data for a constant time

FIG. 16

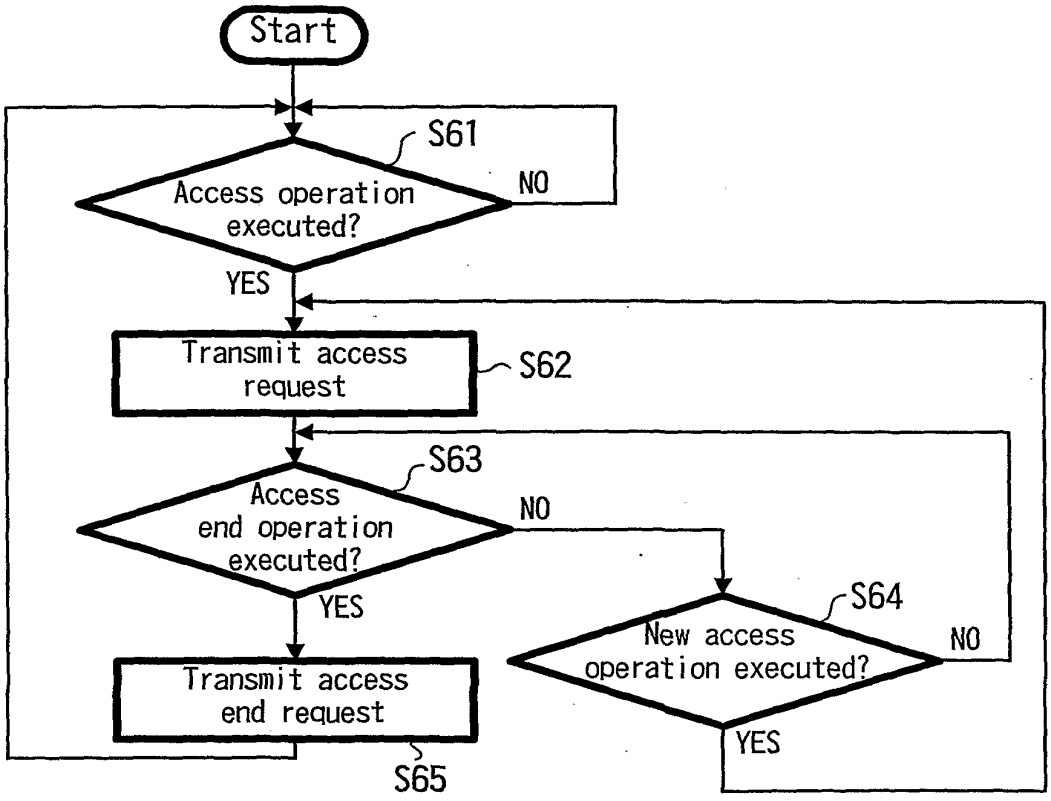

Start
S61
Access operation executed?
NO
YES
Transmit access request
S62
S63
Access end operation executed?
NO
YES
S64
New access operation executed?
NO
YES
Transmit access end request
S65

FIG. 17

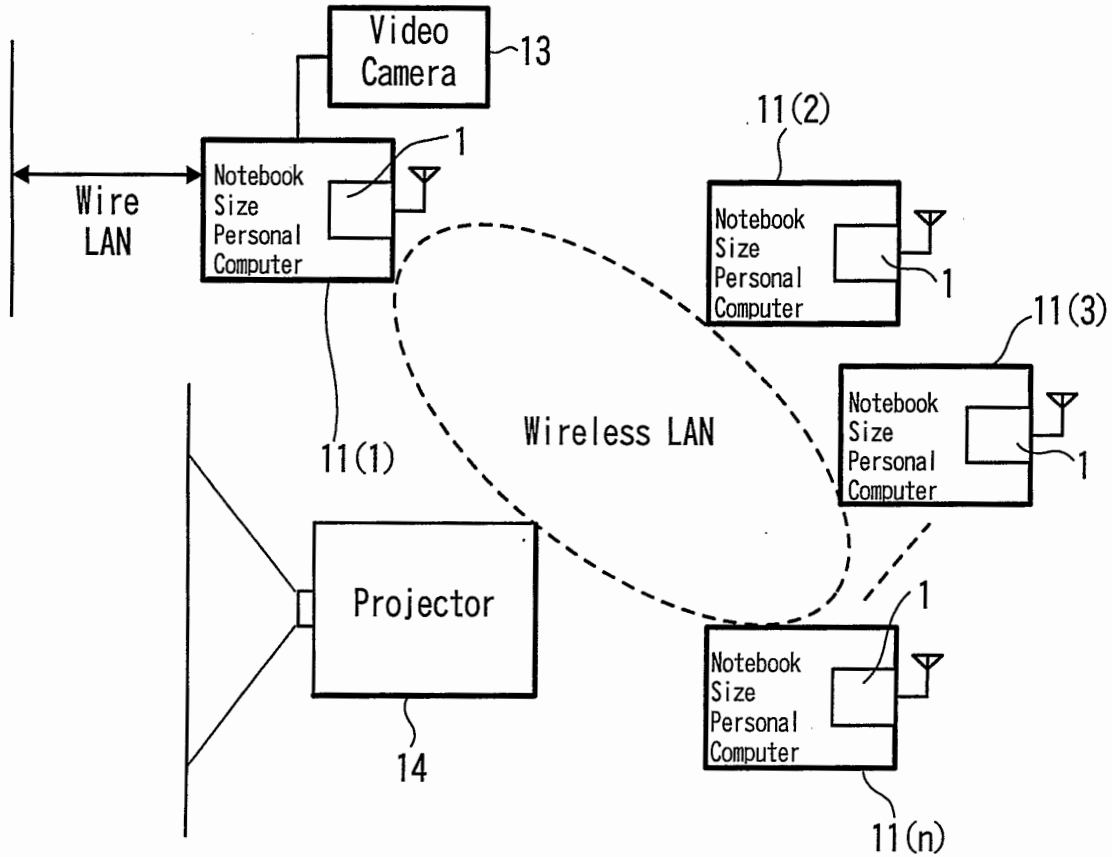

Video Camera
13
Wire LAN
Notebook Size Personal Computer
1
11(1)
Wireless LAN
11(2)
Notebook Size Personal Computer
1
11(3)
Notebook Size Personal Computer
1
Projector
14
1
Notebook Size Personal Computer
11(n)

FIG. 18

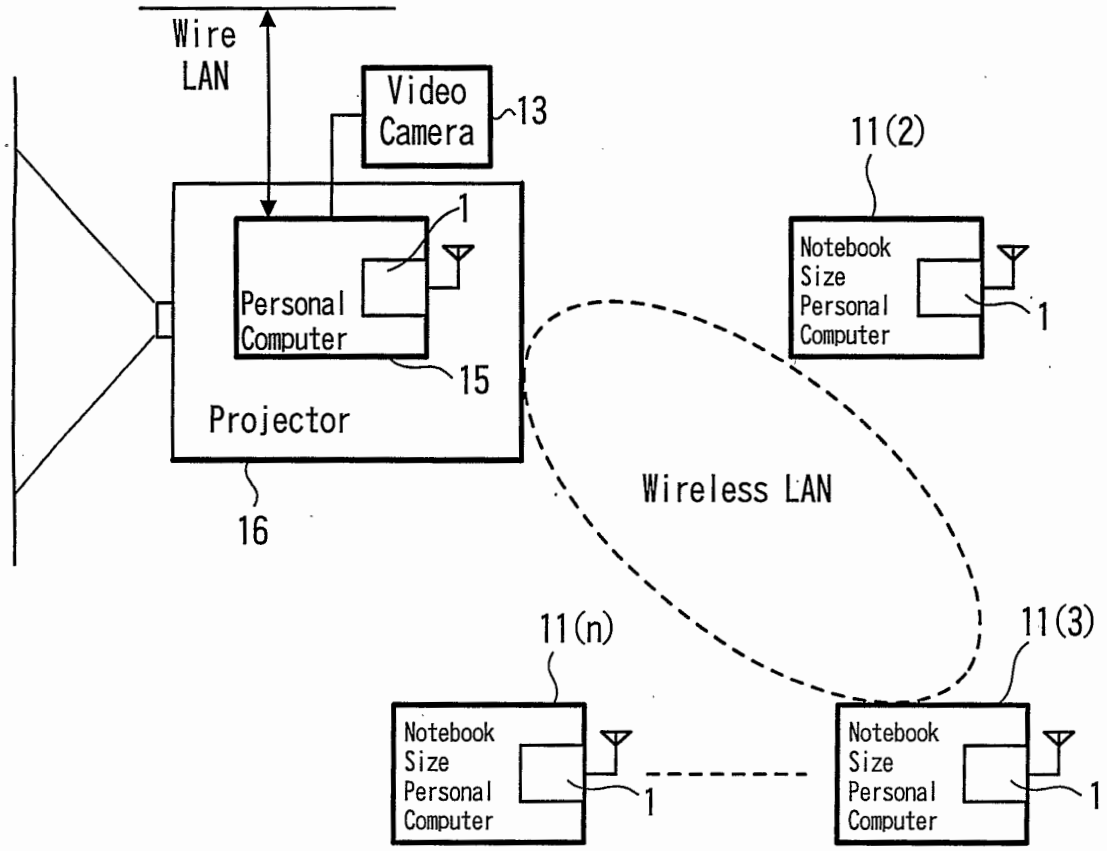
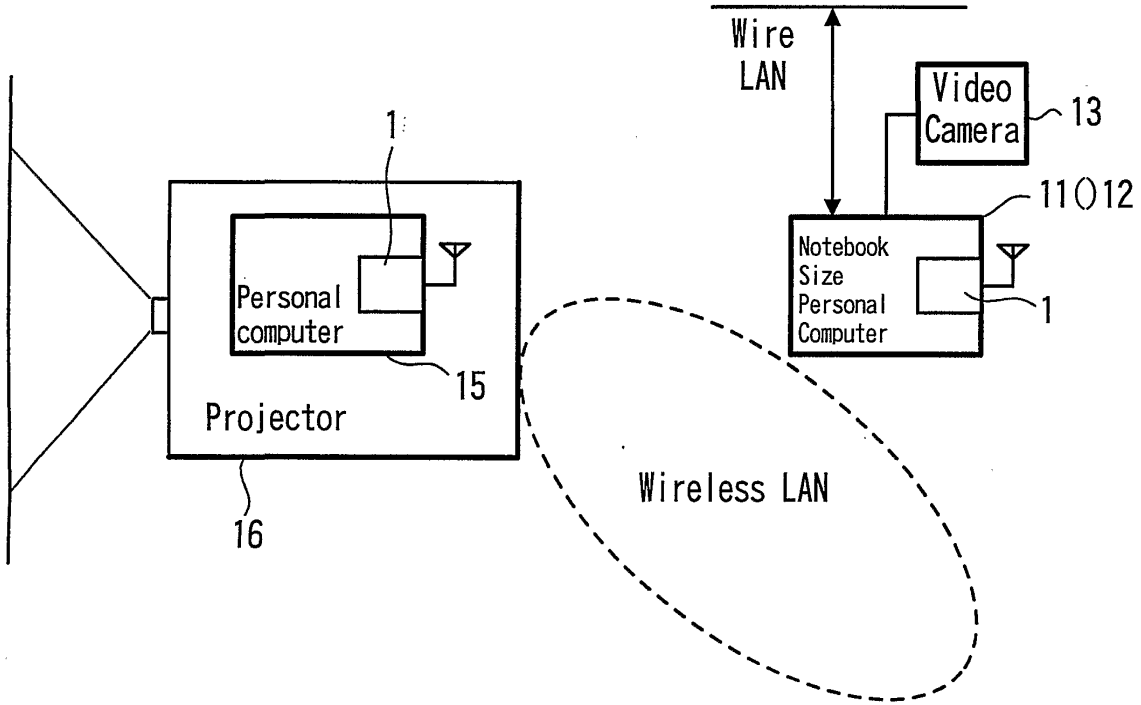

Wire
LAN
Video
Camera
13
1
Personal
Computer
15
Projector
16
11(2)
Notebook
Size
Personal
Computer
1
Wireless LAN
11(n)
Notebook
Size
Personal
Computer
1
11(3)
Notebook
Size
Personal
Computer
1

FIG. 19


Wire
LAN
Video
Camera
13
1
11012
Notebook
Size
Personal
Computer
1
Personal
computer
15
Projector
16
Wireless LAN

DESCRIPTION OF REFERENCE NUMERALS

1 ... network interface card

2 ... notebook size personal computer

2a ... PC card slot

3 ... PCMCIA interface

4 ... network interface

5 ... RF modulator

6 ... RF demodulator

7 ... antenna

8 ... CPU

9 ... flash ROM

10 ... RAM

11 (1) ... wireless LAN conference terminal device (host)

11 (2) to 11 (n) ... wireless LAN conference terminal devices (clients)

12, 14, 16 ... projectors

13 ... video camera

15 ... personal computer

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

U.S. APPLICATION NUMBER NO.	FIRST NAMED APPLICANT	ATTY. DOCKET NO.
14/344,836	Koen Simon Herman Beel	BEEL3004/BEU/TL

23364
BACON & THOMAS, PLLC
625 SLATERS LANE
FOURTH FLOOR
ALEXANDRIA, VA 22314-1176

INTERNATIONAL APPLICATION NO.	
PCT/EP2012/068167	
I.A. FILING DATE	PRIORITY DATE
09/14/2012	09/14/2011

CONFIRMATION NO. 1046
371 ACCEPTANCE LETTER

Date Mailed: 11/17/2017

NOTICE OF ACCEPTANCE OF APPLICATION UNDER 35 U.S.C 371 AND 37 CFR 1.495

The applicant is hereby advised that the United States Patent and Trademark Office, in its capacity as a Designated / Elected Office (37 CFR 1.495), has ACCEPTED the above identified international application for national patentability examination in the United States Patent and Trademark Office.

The United States Application Number assigned to the application is shown above and the relevant dates are:

03/03/2015	03/03/2015
DATE OF RECEIPT OF 35 U.S.C. 371(c)(1), (c)(2) and (c)(4) REQUIREMENTS	DATE OF COMPLETION OF ALL 35 U.S.C. 371 REQUIREMENTS

A Filing Receipt (PTO-103X) will be issued for the present application in due course. **THE DATE APPEARING ON THE FILING RECEIPT AS THE " FILING DATE" IS THE DATE ON WHICH THE LAST OF THE 35 U.S.C. 371 (c)(1), (c)(2) and (c)(4) REQUIREMENTS HAS BEEN RECEIVED IN THE OFFICE. THIS DATE IS SHOWN ABOVE.** *The filing date of the above identified application is the international filing date of the international application (Article 11(3) and 35 U.S.C. 363).*

The following items have been received:

- Copy of the International Application filed on 03/13/2014
- Copy of the International Search Report filed on 03/13/2014
- Copy of IPE Report filed on 03/13/2014
- Preliminary Amendments filed on 03/13/2014
- Information Disclosure Statements filed on 03/13/2014
- Inventor's Oath or Declaration filed on 03/03/2015
- Request for Immediate Examination filed on 03/13/2014
- U.S. Basic National Fees filed on 03/13/2014
- Priority Documents filed on 03/13/2014
- Power of Attorney filed on 02/24/2015
- Authorization to Permit Access filed on 03/03/2015
- Application Data Sheet (37 CFR 1.76) filed on 03/13/2014

FORM PCT/DO/EO/903 (371 Acceptance Notice)

Applicant is reminded that any communications to the United States Patent and Trademark Office must be mailed to the address given in the heading and include the U.S. application no. shown above (37 CFR 1.5)

CHARITTA S FLETCHER

Telephone: (571) 272-3926

FORM PCT/DO/EO/903 (371 Acceptance Notice)

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 NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
14/344,836	03/03/2015	2184	1700	BEEL3004/BEU/TL	21	3

CONFIRMATION NO. 1046

23364
BACON & THOMAS, PLLC
625 SLATERS LANE
FOURTH FLOOR
ALEXANDRIA, VA 22314-1176

FILING RECEIPT

OC000000093515506

Date Mailed: 11/17/2017

Receipt is acknowledged of this non-provisional 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 APPLICANT, 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 Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections 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**

Inventor(s)

Koen Simon Herman Beel, Eke, BELGIUM;
Yoav Nir, Komen, BELGIUM;
Filip Josephine Johan Louwet, Knesselare, BELGIUM;
Guy Coen, Aalst, BELGIUM;

Applicant(s)

Koen Simon Herman Beel, Eke, BELGIUM;
Yoav Nir, Komen, BELGIUM;
Filip Josephine Johan Louwet, Knesselare, BELGIUM;
Guy Coen, Aalst, BELGIUM;

Assignment For Published Patent Application

BARCO N.V., Kortrijk, BELGIUM

Power of Attorney: The patent practitioners associated with Customer Number 23364

Domestic Priority data as claimed by applicant

This application is a 371 of PCT/EP2012/068167 09/14/2012
which claims benefit of 61/534,592 09/14/2011
and claims benefit of 61/635,234 04/18/2012
and is a CIP of 13/270,659 10/11/2011 PAT 8756348

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: No

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: 03/10/2015

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 14/344,836**

Projected Publication Date: 12/07/2017

Non-Publication Request: No

Early Publication Request: No

Title

ELECTRONIC TOOL AND METHODS WITH AUDIO FOR 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

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The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

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.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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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 U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 14/344,836

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	280
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	480
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	720
TOTAL CLAIMS (37 CFR 1.16(i))	21 minus 20 =	* 1			OR	x 80 =	80
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3 minus 3 =	*				x 420 =	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	1560

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.

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U.S. APPLICATION NUMBER NO.	FIRST NAMED APPLICANT	ATTY. DOCKET NO.
14/344,836	Koen Simon Herman Beel	BEEL3004/BEU/TL

23364
BACON & THOMAS, PLLC
625 SLATERS LANE
FOURTH FLOOR
ALEXANDRIA, VA 22314-1176

INTERNATIONAL APPLICATION NO.	
PCT/EP2012/068167	
I.A. FILING DATE	PRIORITY DATE
09/14/2012	09/14/2011

CONFIRMATION NO. 1046
371 WITHDRAWAL NOTICE

Date Mailed: 11/17/2017

Letter Regarding a New Notice and/or the Status of the Application

If a new notice or Filing Receipt is enclosed, applicant may disregard the previous notice mailed on 03/13/2015. The time period for reply runs from the mail date of the new notice. Within the time period for reply, applicant is required to file a reply in compliance with the requirements set forth in the new notice to avoid abandonment of the application.

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web. https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html

For more information about EFS-Web please call the USPTO Electronic Business Center at **1-866-217-9197** or visit our website at http://www.uspto.gov/ebc.

If the reply is not filed electronically via EFS-Web, the reply must be accompanied by a copy of the new notice.

If the Office previously granted a petition to withdraw the holding of abandonment or a petition to revive under 37 CFR 1.137, the status of the application has been returned to pending status.

CHARITTA S FLETCHER

Telephone: (571) 272-3926

FORM PCT/DO/EO/WITH (371 Withdrawal Notice)

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/344,836	03/03/2015	Koen Simon Herman Beel	BEEL3004/BEU/TL	1046

23364 7590 10/20/2017

BACON & THOMAS, PLLC
625 SLATERS LANE
FOURTH FLOOR
ALEXANDRIA, VA 22314-1176

EXAMINER	
BARTELS, CHRISTOPHER A.	

ART UNIT	PAPER NUMBER
2184	

NOTIFICATION DATE	DELIVERY MODE
10/20/2017	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):

MAIL@BACONTHOMAS.COM

Office Action Summary	Application No. 14/344,836	Applicant(s) BEEL ET AL.	
	Examiner CHRISTOPHER BARTELS	Art Unit 2184	AIA (First Inventor to File) 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 *08/30/2017*.

☐ 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) *82-102* 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) *82-102* 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 _____ 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 *05/19/2017 and 08/30/2017*.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

1. The present application is being examined under the pre-AIA first to invent provisions.

DETAILED ACTION

Response to Amendment

2. This Action is responsive to the Applicant's Amendment/Remarks filed on 09/26/2017.

Note claims 82-102 are currently pending.

Information Disclosure Statement

3. The information disclosure statement (IDS) submitted on 05/19/2017 AND 08/30/2017. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of pre-AIA 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claim(s) 82-85, 87-95 and 97-102 are rejected under pre-AIA 35 U.S.C. 102(b) as being anticipated by Nuyttens et al.

(USPGPUB No. ***2007/0033289 A1***, *hereinafter referred to as Nuyttens*).

Referring to claim 82, Nuyttens discloses a method for connecting a processing device {CPU mezzanine board 47, see Fig. 8, [0116], lines 1-3} ***to a communications network*** {"eth 1000", see Fig. 7, [0112].}, ***the processing device having a memory*** {"flash 33", see Fig. 7.}, ***a display*** {Monitor coupled to graphic accelerator 44, see Fig. 8, [0117].} ***and an operating system*** {Windows or Linux, see Fig. 8, [0117].} ***with pre-installed generic drivers providing a generic communications protocol*** {PCI express to couple peripheral devices, [0116], first 4 lines, see Fig. 8.} ***for communication between processing device and a standard class of peripheral devices, the method comprising:***

a) coupling a peripheral device {peripheral device "drawing unit 40", see Fig. 8, [0116], lines 1-3.} ***to the processing device, the peripheral device having a transceiver*** {"panellink transmitter 51", see Fig. 8, -3.};

b) setting up, by means of a first pre-installed generic audio driver of the operating system, a means for audio communication {"proprietary busses used for transporting video, audio…", [0088].} ***between the peripheral device and the***

processing device and by means of a second pre-installed generic driver {multi-viewer driver 2, see Fig. 7, [0112].} ***of the operating system, a means for data communication*** {"metadata with building blocks based on standard IP and compression technologies", [0088].} ***between the peripheral device and the processing device;***

c) coupling the processing device to a communications network {RJ45 MAC PHY, see Figs. 7 and 8, last 4 lines of [0112].} ***via the peripheral device;***

d) routing audio data between the processing device and the communication network {"a characteristic of such a [communication] network is to… route data from one address to another", [0088].} ***via the means for audio communication, wherein the first pre-installed generic audio driver is used for transferring the audio data*** {"inserting the decoded image [and corresponding audio] on the internal bus of the [pre-installed generic audio driver] the multi-viewer driver 2", [0112].} ***between the processing device and the peripheral device.***

As per claim 83, the rejection of claim 82 is incorporated and Nuyttens discloses wherein Step b) comprises presenting the peripheral device to the processing device as a human interface

device {"proper mouse and keyboard", [0006].} ***and wherein the pre-installed generic driver is a human interface device driver*** {"human machine interface is composed of several displays", [0006].}.

As per claim 84, the rejection of claim 82 is incorporated and Nuyttens discloses wherein Step b) comprises presenting the peripheral device to the processing device as a mass storage device {"such as a storage device which is part of mass storage", [0252].} ***and wherein the pre-installed generic driver is a mass storage device driver.***

As per claim 85, the rejection of claim 82 is incorporated and Nuyttens discloses wherein Step b) comprises presenting the peripheral device to the processing device as a composite device {"human machine interface is [a composite] of several displays", [0006].} ***and wherein pre-installed generic drivers drive different device interfaces independently*** {"each compression decoding device 45 may work independently of the other compression decoding devices 45", [0138].}.

As per claim 87, the rejection of claim 86 is incorporated and Nuyttens discloses wherein the client application is a

portable application {"standard [portable] X.11 methods can be used to feed this information to the DGU 14", [0172], [0171].}.

As per claim 88, the rejection of claim 82 is incorporated and Nuyttens discloses wherein the peripheral device is adapted to anal se an incoming signal {the Examiner is presuming the claim language meant to say "analyse an incoming signal".} ***from the processing device and if no audio is received, the incoming signal is discarded*** {"monitoring elements within a [incoming signal] source (audio metering) in an effective way", [0175].}.

As per claim 89, the rejection of claim 88 is incorporated and Nuyttens discloses wherein if audio is received, the peripheral device will initiate an additional connection to the base unit {base unit "baseboard of the multi-viewer driver 2", [0112].} ***through the communications network.***

As per claim 90, the rejection of claim 82 is incorporated and Nuyttens discloses wherein further comprising time-stamping synchronously the audio with the data stream {time-stamping "Real time encoding at full frame rate… [for the data stream] in-sports events phases", [0109].}.

As per claim 91, the rejection of claim 90 is incorporated and Nuyttens discloses wherein further comprising encoding, optionally encrypting {encoding "the document [into] SGML, XML, SVG" and so on ([0044]), where the XML format is well-known for encrypting functionalities.} ***the audio data.***

Referring to claims 92-95, and 98-101 are system claims reciting claim language corresponding to the method claim of claims 81-85, 87-91, respectively, thereby rejected under the same rationale as claims 81-85, 87-91.

As per claim 97, the rejection of claim 96 is incorporated and Nuyttens wherein the client application is a portable application {"X.11 windows" known for its' portability and versatility in different platforms, [0171].}.

Referring to claims 102 is an apparatus claim reciting claim language corresponding to the method claim of claims 81-91, respectively, thereby rejected under the same rationale as claims 81-91.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 86 and 96 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nuyttens in view of Carlson et al. (USPGPUB No. ***2013/0060662 A1***, *hereinafter referred to as Carlson*).

As per claim 86, the rejection of claim 82 is incorporated however Nuyttens does not appear to disclose any limitation in this dependent claim.

Furthermore, Carlson discloses ***wherein a client application is stored on the peripheral device which when run on the processing device obtains screen scraped data*** {client application “Product catalog system 130” (see Fig. 1) obtaining screen scraped data “screen scraping mechanism", [0023].}.

Nuyttens and Carlson are analogous art because they are from the same field of endeavor, methods and systems communicating with networked peripherals.

At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Nuyttens and Carlson before him or her, to modify Nuyttens' "graphics accelerator 44" incorporating Carlson's "screen scraping mechanism".

The suggestion/motivation for doing so would have been to provide and facilitate the creation of user interfaces that organize results to reduce cognitive load on the user (Carlson [0003], lines 4-6).

Therefore, it would have been obvious to combine Carlson with Nuyttens to obtain the invention as specified in the instant claim(s).

As per claim 96, the rejection of claim 92 is incorporated however Nuyttens does not appear to disclose any limitation in this dependent claim.

Furthermore, Carlson discloses ***wherein a client application is stored on the peripheral device which when run on the processing device obtains screen scraped data*** {client application "Product catalog system 130" (see Fig. 1) obtaining screen scraped data "screen scraping mechanism", [0023].}.

The 103 motivation for this dependent claim relied upon as recited in claim 86 above.

Response to Arguments

8. Applicant's arguments filed on 08/30/2017 have been considered but are moot in view of the following explanation:

In the major argument, Applicant alleges that Nuyttens fails to disclose "the processing device having a memory, a display and an operating system" and "coupling a peripheral device the processing device" recited in claim 82 (Remarks page 3, 4th paragraph).

The "CPU unit 47 may run an off-the-shelf operating system such as e.g. Windows or Linux" ([0117], see Fig. 7) in conjunction with "UXGA graphic resolution" in the same paragraph.

For these reasons the current ground of rejection(s) is respectfully maintained.

Conclusion

9. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS

of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHRISTOPHER A. BARTELS whose telephone number is (571)270-3182. The examiner can normally be reached on Monday To Thursday; 7:30am to 5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Henry Tsai can be reached on (571) 272-4176. 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). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/C. B./

Examiner, Art Unit 2184

/HENRY TSAI/

Supervisory Patent Examiner, Art Unit 2184

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. 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	14344836
Filing Date	2015-03-03
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	Christopher A. Bartels
Attorney Docket Number	BEEL3004/BEU/TL

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/C.A.B/	1	2008-090561	JP	A	2008-04-17	BROTHER IND LTD	cited in EP Search Report, English abstract & mach translation	X
/C.A.B/	2	1329055	EP	A2	2003-07-23	SONY CORP	cited in EP Search Report, corresponds to WO 01/089156	☐

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	14344836
Filing Date	2015-03-03
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	Christopher A. Bartels
Attorney Docket Number	BEEL3004/BEU/TL

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]
/C.A.B/	1	Chinese Office Action dated June 28, 2017, for CN 201280074077.2, and English translation thereof.	☒
/C.A.B/	2	Chinese Office Action dated July 4, 2017, for CN 201280055667.0, and English translation thereof.	☒
/C.A.B/	3	Chinese Office Action dated July 21, 2017, for CN 20128001542.X, and English translation thereof.	☒
/C.A.B/	4	European Search Report dated August 1, 2017, for EP 16207123.	☐

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EXAMINER SIGNATURE

Examiner Signature	/CHRISTOPHER A BARTELS/	Date Considered	10/16/2017

*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. /C.A.B/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14344836
	Filing Date	2015-03-03
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	2184
	Examiner Name	Christopher A. Bartels
	Attorney Docket Number	BEEL3004/BEU/TL

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)	2017-08-30
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. /C.A.B/

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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Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. 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	14344836
Filing Date	2015-03-03
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	Christopher A. Bartels
Attorney Docket Number	BEEL3004/BEU/TL

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	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]	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]

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14344836
	Filing Date	2015-03-03
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	2184
	Examiner Name	Christopher A. Bartels
	Attorney Docket Number	BEEL3004/BEU/TL

/C.A.B/	1	Chinese Office Action dated April 5, 2017, for CN 201280055744.2, and English translation thereof.	

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/CHRISTOPHER A BARTELS/	Date Considered	10/16/2017

*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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	Filing Date	2015-03-03
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	Art Unit	2184
	Examiner Name	Christopher A. Bartels
	Attorney Docket Number	BEEL3004/BEU/TL

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)	2017-05-19
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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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14344836	BEEL ET AL.
	Examiner	Art Unit
	CHRISTOPHER BARTELS	2184

CPC- SEARCHED		
Symbol	Date	Examiner

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
inventor search performed in East (USPAT USOCR USPGPUB)	04/03/2017, 10/16/2017	C.A.B.
Text search performed in East (ALL DATABASES)	04/03/2017, 10/16/2017	C.A.B.

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

/C.B./ Examiner.Art Unit 2184	

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	3	"20150169477"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
L2	224	(audio near2 driver audio adj driver) and (hmi human near2 (machine interface)) and (usb with (mass storage class))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
L3	1	L2 and screen near2 scrap$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
L4	12797	(web data screen) near2 scrap$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
L5	98	(web data screen) near2 scrap$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2017/10/16 14:06
L6	13	"2007137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
L7	3	"20070137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
L8	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
L9	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
L10	1	(L6 L7 L8 L9) and screen near2 scrap$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06

L11	98	(web data screen) near2 scrap$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2017/10/16 14:06
L12	79	L11 and (portable cellular pda smartphone smart adj phone mobile)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
L13	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
L14	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
L15	8	L11 and usb	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2017/10/16 14:06
L16	11	(("BEEL") near3 ("Koen")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2017/10/16 14:06
L17	12	(("NIR") near3 ("Yoav")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2017/10/16 14:06
L18	11	(("LOUWET") near3 ("Filip")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2017/10/16 14:06
L19	16	(("COEN") near3 ("Guy")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2017/10/16 14:06
L20	3	"20150169477"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
L21	224	(audio near2 driver audio adj driver) and (hmi human near2 (machine interface)) and (usb with (mass storage class))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
L22	1	L21 and screen near2 scrap$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
L23	12797	(web data screen) near2 scrap$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
L24	98	(web data screen) near2 scrap$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2017/10/16 14:06

L25	13	"2007137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
L26	3	"20070137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
L27	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
L28	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
L29	1	(L25 L26 L27 L28) and screen near2 scrap$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
L30	98	(web data screen) near2 scrap$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2017/10/16 14:06
L31	79	L30 and (portable cellular pda smartphone smart adj phone mobile)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
L32	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
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L34	8	L30 and usb	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2017/10/16 14:06
L35	11	(("BEEL") near3 ("Koen")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2017/10/16 14:06
L36	12	(("NIR") near3 ("Yoav")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2017/10/16 14:06
L37	11	(("LOUWET") near3 ("Filip")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2017/10/16 14:06
L38	16	(("COEN") near3 ("Guy")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2017/10/16 14:06

EAST Search History (Interference)

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Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14344836	BEEL ET AL.
	Examiner	**Art Unit**
	CHRISTOPHER BARTELS	2184

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	04/27/2017	10/16/2017							
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CLAIM		DATE								
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	101	✓	✓							
	102	✓	✓							

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	Christopher A. Bartels
Attorney Docket Number	BEEL3004/BEU/TL

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14344836
	Filing Date	2015-03-03
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	2184
	Examiner Name	Christopher A. Bartels
	Attorney Docket Number	BEEL3004/BEU/TL

	2	2107463	EP	A2	2009-10-07	OPTION		☐
	3	2756668	EP	A0	2014-07-23	BARCO NV	corresponds to WO 2013/037979	☐

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	1	Chinese Office Action dated September 26, 2017, for CN 201280055744.2, and English translation thereof.	☒
	2	U.S. Office Action dated September 28, 2017, for U.S. Application No. 14/344,830	☐
	3	U.S. Office Action dated September 28, 2017, for U.S. Application No. 14/278,442.	☐
	4	"Quick Connect Wireless with Epson Projectors", retrieved from https://www.youtube.com/watch?v=9POz4-HyDXY, November 3, 2009.	☐
	5	"Remote Framebuffer Protocol (RFB)", Internet standard IETF RFC 6143 , March 2011	☐
	6	Richardson & Wood, "The RFB Protocol", Cambridge: ORL, 1998.	☐
	7	"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.	☐

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Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2017-10-16
Name/Print	THOMAS LEE	Registration Number	66396

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JP2008/271265

"To provide a peripheral device system for a radio projector, the peripheral device system being connected to the radio projector via a radio LAN. The peripheral device system for a radio projector includes a function of establishing a connection with a desired radio projector, based on only a simple button and luminescence information of an LED, without providing a display unit in a substance image capturing device.
A substance image capturing device 1 searches for, with a search button 50, a radio device having an SSID inherent to a radio projector, detects a using state of a detected radio projector 2, and displays a detection result by using a luminescent color of an LED 60. A user presses a selection button 51 according to the luminescent color information, and establishes a connection with a desired radio projector 2."

(54) [Title of the Invention] PERIPHERAL DEVICE SYSTEM FOR RADIO PROJECTOR

(57) [Abstract]

[Object] To provide a peripheral device system for a radio projector, the peripheral device system being connected to the radio projector via a radio LAN. The peripheral device system for a radio projector includes a function of establishing a connection with a desired radio projector, based on only a simple button and luminescence information of an LED, without providing a display unit in a substance image capturing device.

[Solving means] A substance image capturing device 1 searches for, with a search button 50, a radio device having an SSID inherent to a radio projector, detects a using state of a detected radio projector 2, and displays a detection result by using a luminescent color of an LED 60. A user presses a selection button 51 according to the luminescent color information, and establishes a connection with a desired radio projector 2.

[Selected drawing] Fig. 1

[Claims]

[Claim 1]

A peripheral device system for a radio projector, in a system which is configured by a substance image capturing device mounted with a radio function having no display unit, and by a radio projector which performs expanded projection, via an optional radio network, of image data captured by the substance image capturing device, wherein

the substance image capturing device is configured by

an image capturing unit that captures an image of an optional object, an image compression unit that compresses image data captured by the image capturing unit into an optional format, a first communication unit that transmits, via an optional radio network, image data compressed by the image compression unit to the radio projector, and a first control unit that performs control for establishing a connection of the radio projector to the first communication unit,

the radio projector is configured by

a second communication unit that receives image data transmitted via an optional radio network from the substance image capturing device, an image expansion unit that expands image data received by the second communication unit to an optional format, a display unit that performs expanded projection of image data output from the image expansion unit, and a second control unit that has an SSID inherent to a radio projector for establishing a connection with the substance image capturing device and controls the second communication unit, and

the first control unit

detects that a retrieval button is pressed during a search for a desired radio projector, searches for a radio device that has an SSID inherent to the radio projector in an optional radio channel, detects a using state of the radio projector by enquiring the second control unit via the second communication unit when a desired radio projector exists, and enables a user to know a detection result with a luminescent color or a number of luminescent light emitting elements provided in the substance image capturing device.

[Claim 2]

The peripheral device system for a radio projector according to claim 1, wherein

when other user is using a detected radio projector, the first control unit searches for other radio projector which exists in the same channel.

[Claim 3]

The peripheral device system for a radio projector according to claim 1, wherein

when a desired projector does not exist in a searched channel, the first control unit searches for a radio projector again by switching to other channel.

[Claim 4]

The peripheral device system for a radio projector according to any one of claims 1 to 3, wherein

after searching for a radio projector which is in an unused state, with this state being displayed by a light emitting element, when detecting that a

selection button is pressed by a user, the first control unit transmits to the radio projector an instruction for projecting predetermined image data.

[Claim 5]

The peripheral device system for a radio projector according to claim 4, wherein

when other user is using a detected radio projector, even when the second control unit receives an instruction for projecting predetermined image data transmitted from the substance image capturing device, the second control unit does not project the predetermined image data.

[Claim 6]

The peripheral device system for a radio projector according to any one of claims 1 to 5, wherein

when an optional password is set to a radio projector, and when a connection request is received from the first control unit, the second control unit projects from the radio projector a password screen or a software keyboard screen for character input.

[Claim 7]

The peripheral device system for a radio projector according to any one of claims 1 to 5, wherein

when it is detected that a storage medium that stores connection information of a radio projector is inserted in the substance image capturing device, the first control unit searches for only a radio projector that has inherent information which matches information stored in the storage medium, without searching for an optional radio projector, and displays a search result with a luminescent color or a number of luminescent light

emitting elements.

[Detailed Description of the Invention]

[Technical field]

[0001]

The present invention relates to a peripheral device system for a radio projector that transfers optional image data from a substance image capturing device to a projector and projects the optional image data, in the substance image capturing device and the projector which are connected to each other via a radio LAN.

[Background art]

[0002]

In recent years, there has been rapidly spread a peripheral device system for a radio projector that transfers, without using an RGB cable, an image displayed on a personal computer, via a network (especially, a radio LAN), to a projector which is mounted with a radio LAN function, and projects the image.

[0003]

A conventional peripheral device system for a radio projector will be described below.

[0004]

Conventionally, a peripheral device system for a radio projector as described in Patent Literature 1 is known. Fig. 10 shows a configuration diagram of the system.

[0005]

In Fig. 10, 100 denotes an image signal device which is represented

by a personal computer, 200 denotes a projector which is mounted with a radio LAN function, 300 denotes an optional radio network, and 400 denotes a screen on which an image projected by expansion from the projector 200 is displayed.

[0006]

The conventional peripheral device system for a radio projector having the above configuration will be described.

[0007]

Out of a plurality of projectors that exists, the image signal device 100 searches for a radio projector that is connectable using the radio network 300, and displays a search result as a connectable projector list 111 on a display unit 110 of the image signal device 100.

[0008]

A user selects "projector 1" from the connectable projector list 111, and selects the desired radio projector 200 that corresponds to the "projector 1". In this way, a connection between the image signal device 100 and the radio projector 200 is established.

[Patent Literature 1] Japanese Published Patent Application No. 2005-208823 (JP 2005-208823 A) (paragraph number "0035")

[Description of the Invention]

[Problems to be solved by the invention]

[0009]

However, according to the above conventional configuration, when a substance image capturing device represented by a calligraphy camera which has no display unit is used as a device to be connected to a radio

projector, a radio projector cannot be selected because there is no means for displaying the connectable projector list. Therefore, the user has a problem of being unable to make connection to a desired radio projector.

[0010]

In order to solve the above problems, a method of providing a display unit in the substance image capturing device can be considered. However, this method has a new problem in that there is a large increase in cost and that there arises a constraint in the design of the substance image capturing device.

[0011]

Further, among substance image capturing devices, there are some monitoring cameras that need to be operated at a position separate from the user. Even when a projector list is displayed by providing a display unit in the substance image capturing device itself, the user finds it difficult to look at the project list.

[0012]

The resent invention solves the above conventional problems, and has an object of providing, without providing a display unit in a substance image capturing device, a peripheral device system for a radio projector that includes a function of establishing a connection with a desired radio projector by only a simple button and luminescence information of an LED.

[Means for solving the problems]

[0013]

The invention according to claim 1 of the present invention provides a peripheral device system for a radio projector, in a system which is

configured by a substance image capturing device mounted with a radio function having no display unit, and by a radio projector which performs expanded projection, via an optional radio network, of image data captured by the substance image capturing device, wherein

the substance image capturing device is configured by

an image capturing unit that captures an image of an optional object, an image compression unit that compresses image data captured by the image capturing unit into an optional format, a first communication unit that transmits, via an optional radio network, image data compressed by the image compression unit to the radio projector, and a first control unit that performs control for establishing a connection of the radio projector to the first communication unit,

the radio projector is configured by

a second communication unit that receives image data transmitted via an optional radio network from the substance image capturing device, an image expansion unit that expands image data received by the second communication unit to an optional format, a display unit that performs expanded projection of image data output from the image expansion unit, and a second control unit that has an SSID (service set identifier) inherent to a radio projector for establishing a connection with the substance image capturing device and controls the second communication unit, and

the first control unit

detects that a retrieval button is pressed during a search for a desired radio projector, searches for a radio device that has an SSID inherent to the radio projector in an optional radio channel, detects a using state of

the radio projector by enquiring the second control unit via the second communication unit when a desired radio projector exists, and enables a user to know a detection result with a luminescent color or a number of luminescent light emitting elements provided in the substance image capturing device. The peripheral device system for a radio projector has an operation that enables establishment of a connection with a desired radio projector in a simple configuration without providing a display unit in the substance image capturing device.

[0014]

The invention according to claim 2 is the peripheral device system for a radio projector according to claim 1, wherein when other user is using a detected radio projector, the first control unit searches for other radio projector which exists in the same channel. The peripheral device system for a radio projector has an operation that enables establishment of a connection with a desired radio projector in a simple configuration without providing a display unit in the substance image capturing device.

[0015]

The invention according to claim 3 is the peripheral device system for a radio projector according to claim 1, wherein when a desired projector does not exist in a searched channel, the first control unit searches for a radio projector again by switching to other channel. The peripheral device system for a radio projector has an operation that enables establishment of a connection with a desired radio projector in a simple configuration without providing a display unit in the substance image capturing device.

[0016]

The invention according to claim 4 is the peripheral device system for a radio projector according to any one of claims 1 to 3, wherein after searching for a radio projector which is in an unused state, with this state being displayed by an LED, when detecting that a selection button is pressed by a user, the first control unit transmits to the radio projector an instruction for projecting predetermined image data. The peripheral device system for a radio projector has an operation that enables establishment of a connection with a desired radio projector in a simple configuration without providing a display unit in the substance image capturing device.

[0017]

The invention according to claim 5 is the peripheral device system for a radio projector according to claim 4, wherein when other user is using a detected radio projector, even when the second control unit receives an instruction for projecting predetermined image data transmitted from the substance image capturing device, the second control unit does not project the predetermined image data. Even when the substance image capturing device has connected by error to a radio projector other than a desired radio projector, the radio projector connected by error has an operation of disabling projection of unnecessary image data.

[0018]

The invention according to claim 6 is the peripheral device system for a radio projector according to any one of claims 1 to 5, wherein when an optional password is set to a radio projector, and when a connection request is received from the first control unit, the second control unit projects from the radio projector a password screen or a software keyboard screen for

character input. Even when a password is set to a desired projector, the peripheral device system for a radio projector has an operation that enables establishment of a connection with a desired radio projector in a simple configuration.

[0019]

The invention according to claim 7 is the peripheral device system for a radio projector according to any one of claims 1 to 5, wherein when it is detected that a storage medium that stores connection information of a radio projector is inserted in the substance image capturing device, the first control unit searches for only a radio projector that has inherent information which matches information stored in the storage medium, without searching for an optional radio projector, and displays a search result with a luminescent color or a number of luminescent LEDs. The peripheral device system for a radio projector has an operation that enables a secure connection by searching for a desired radio projector from information of the storage medium.

[Effects of the invention]

[0020]

As described above, according to the present invention, when there exist a plurality of radio projectors having the same SSID, an excellent effect of easily enabling a search for a desired radio projector is obtained, by only a simple button operation and a luminescent color or luminescence number information of an LED from which a state can be understood intuitively. Further, because it is unnecessity to provide a display unit represented by a liquid crystal panel in the substance image capturing device, there are

effects that the product can be manufactured at low cost and that there is a large flexibility in designing the substance image capturing device.

[Best Modes of Carrying Out the Invention]

[0021]

Hereinafter, embodiments of the present invention will be described with reference to Fig. 1 to 9.

[0022]

(First embodiment)

Fig. 1 is a configuration diagram of a peripheral device system for a radio projector according to a first embodiment of the present invention.

[0023]

In Fig. 1, 1 denotes a substance image capturing device represented by a calligraphy camera, 2 denotes a radio projector, 3 denotes an optional radio network that connects between the substance image capturing device 1 and the radio projector 2, and 4 denotes a screen for displaying a video projected by expansion from the radio projector 2. A reference numeral 50 denotes a search button for searching for a desired radio projector 2 from the substance image capturing device 1, 51 denotes a selection button for selecting the radio projector 2 searched for with the search button 50, and 60 denotes a light emitting diode (hereinafter, referred to as an LED). The LED 60 is configured by two LEDs that emit light in red and green colors respectively, and the two LEDs are used as a package.

[0024]

Fig. 2 is an internal configuration diagram of the substance image capturing device 1 and the radio projector 2.

[0025]

In Fig. 2, 11 denotes an image capturing unit that captures an image of an optional object. A reference numeral 12 denotes an image compression unit that compresses image data captured by the image capturing unit 11 into an optional format represented by JPEG or the MPEG system. A reference numeral 13 denotes a first communication unit that transmits, via an optional radio network 3, the image data compressed by the image compression unit 12 to the radio projector 2. A reference numeral 14 denotes a first control unit that controls the first communication unit 13 to establish a connection with the radio projector 2. A reference numeral 21 denotes a second communication unit that receives image data transmitted from the substance image capturing device 1. A reference numeral 22 denotes an image expansion unit that expands the image data received by the second communication unit 21 to an optional format. A reference numeral 23 denotes a display unit that performs expanded projection to the screen 4 of the image data expanded by the image expansion unit 22. A reference numeral 24 denotes a second control unit that has an SSID inherent to the radio projector 2 for establishing a connection with the substance image capturing device 1, and controls the second communication unit 21.

[0026]

An operation of the peripheral device system for a radio projector according to the present embodiment configured as described above will be described below with reference to a flowchart in Fig. 3.

[0027]

First, in order to transfer, via the optional radio network 3, the image data captured by the substance image capturing device 1 to the desired radio projector 2, the user needs to establish a connection between the substance image capturing device 1 and the radio projector 2.

[0028]

Then, the user presses the search button 50 included in the substance image capturing device 1 (step S1). The first control unit 14 that detects that the search button 50 is pressed instructs the first communication unit 13 to search for a radio projector that has a predetermined SSID.

[0029]

About a radio projector marketed at present, the user can easily establish a connection with a desired radio projector by using application software for connecting to the radio projector. However, this is a technique, by storing an SSID inherent to the radio projector into the software, that enables searching for only a radio projector manufactured by a manufacturer of the product.

[0030]

In this way, the substance image capturing device checks whether a radio projector that has the same SSID is detected (step S2).

[0031]

As an example of a technique of searching for a radio projector, there is a technique of searching each radio channel. For example, when a radio system based on the IEEE802.11b standard is used in Japan, a channel 1 to a channel 14 are assigned. Therefore, the substance image capturing device

1 first searches, in step S2, for a radio projector that has the same SSID within a range of the channel 1. In order to shorten the search time, the searching for a radio projector may be started from a radio channel which the radio projector has as a default value.

[0032]

In step S2, when any radio projector that has the same SSID is not detected, the substance image capturing device 1 searches for the next radio channel (step S3).

[0033]

In step S3, because the number of radio channels is limited, when any radio projector that has the same SSID is not detected even after all radio channels are checked, a connection inability display (for example, red color lighting of an LED 60) may be performed and the searching may be interrupted.

[0034]

In step S2, when a radio projector that has the same SSID is detected, the substance image capturing device 1 enquires the detected radio projector about the current connection state of the radio projector.

[0035]

In this case, when a plurality of radio projectors is detected, the first control unit 14 selects the latest item in the alphabetical order of detected inherent information such as radio projector names or MAC address numbers, for example, and performs the inquiry to the radio projector.

[0036]

In general, the SSID that a radio projector has is inherent to each

manufacturer. Further, a plurality of radio projectors is delivered to enterprises and educational facilities. Therefore, a plurality of radio projectors having the same SSID is often detected simultaneously.

[0037]

The second control unit 24 which receives the inquiry information via the second communication unit 21 responds the current state of the radio projector (step S4).

[0038]

As examples of information responded, there are

1) No user connection

2) Other user is connected

3) Used in an input channel other than a radio network (RGB cable input). When these states are displayed by changing the luminescent color of the LED 60 (step S5), the user becomes possible to easily understand the detected state of the radio projector detected (step S6).

[0039]

For the LED 60, by mounting an element having two-color light emitting diodes in one package, the above three modes can be displayed in different colors.

[0040]

For example, when the element that has in one package the light emitting diodes that respectively emit light in green and red colors is used, the element can be used in three colors of

1) No user connection ... green color

2) Other user is connected ... orange color (simultaneous light

emission in green and red colors)

3) Used in an input channel other than a radio network ... red color.

In step S6, when the luminescent color of the LED 60 is green, the user becomes connectable to the detected radio projector.

[0041]

On the other hand, in step S6, when the luminescent color of the LED 60 is different from the green color, the user can easily understand that the substance image capturing device 1 is connected to other radio projectors, or a setting state of the desired radio projector 2 is wrong.

[0042]

For checking a setting state of the radio projector 2, the user can easily understand what is to be checked by checking the luminescent color of the LED 60.

[0043]

For example, when

2) Other user is connected ... orange color

is displayed, the user may check whether other device such as a personal computer remains connected to the desired radio projector 2.

[0044]

When

3) Used in an input channel other than a radio network ... red color

is displayed, the user may check whether a desired radio projector 2 is set in a network (radio).

[0045]

After performing these checks, when there is no problem in the

setting, it is decided that the substance image capturing device 1 is connected to a radio projector that is disposed at other place. Therefore, the user presses the search button 50 again (step S7). The first control unit 14 that receives the pressed signal issues an instruction to the first communication unit 13 to search for other radio projector in the same radio channel (step S8).

[0046]

In step S8, as a search method for other radio projectors, there is a method of selecting a radio projector that has the next latest number in the alphabetical order described above.

[0047]

In order to ensure that a radio projector that is once detected is not detected next time, the first control unit 14 may include means for temporarily memorizing the information on the detected radio projector.

[0048]

In step S6, when the desired radio projector 2 is detected, the user presses the selection button 51 and establishes a connection with the radio projector 2 (step S9).

[0049]

The first control unit 14 that has detected that the selection button 51 is pressed instructs the radio projector 2 via the first communication unit 13 to project a radio-projector-information display screen 41 to the screen 4 (step S10).

[0050]

It is preferable that the radio-projector-information display screen 41

displays inherent information of the radio projector 2, such as a projector name of the radio projector 2, and a MAC address and an IP address.

[0051]

An example of the radio-projector-information display screen 41 is shown in the configuration diagram of the peripheral device system for a radio projector in Fig. 4.

[0052]

In step S10, when the luminescent color of the LED 60 in step S5 is

Orange color = Other user is connected

that is, when the user presses the selection button 51 by error when the substance image capturing device 1 is connected to other radio projector, the radio-projector-information display screen 41 is projected from the other radio projector, and this generates a problem that a person who is using the radio projector is interfered with the presentation.

[0053]

Therefore, in step S10, by the following arrangements, it is necessary to prevent a sudden projection of the radio-projector-information display screen 41 during the presentation. When the luminescent color of the LED 60 is orange, or red (in use in an input channel other than a radio network), even when the selection button 51 is pressed, the first control unit 14 disregards the pressing. Also, the second control unit 24 mounted on the radio projector disregards a display instruction of the radio-projector-information display screen 41 even when this display instruction is received in the state that certain image data is being projected to the screen 4 from the radio projector.

[0054]

The user who has confirmed in step S10 that the radio-projector-information display screen 41 is being projected from the radio projector 2 presses again the selection button 51 during the period when the radio-projector-information display screen 41 is being displayed on the screen 4 (step S11).

[0055]

The first control unit 14 that has detected the pressing of the selection button 51 transmits the image data captured by the substance image capturing device 1 to the radio projector 2 (step S12). In step S11, the user is requested to press the selection button 51 again in order to prevent the substance image capturing device 1 from transferring the image data not necessary to a radio projector other than the desired radio projector 2.

[0056]

For example, in step S5, even when the luminescent color of the LED 60 is green, the substance image capturing device 1 is not necessarily connected to the desired radio projector 2. This situation exists in the state where a power source of a radio projector disposed in other place is turned on, an input channel is a network (radio) input, and nobody is using the radio projector.

[0057]

When such a radio projector is detected, the LED 60 becomes a green display and the user cannot distinguish whether the substance image capturing device 1 is connected to the desired radio projector 2 or the substance image capturing device 1 is connected to an unused radio projector

disposed in other place.

[0058]

Then, as a discriminating method, there is a method of viewing whether the radio-projector-information display screen 41 in step S10 is displayed on the screen 4. However, from impatience of immediately connecting to the desired radio projector 2, the user has a possibility of pressing the selection button 51 without checking the radio-projector-information display screen 41.

[0059]

Also in this case, when the first control unit 14 is arranged not to receive that the selection button 51 is pressed except only during the period when the radio-projector-information display screen 41 is displayed, the possibility of erroneous connection can be substantially reduced because the user looks at the projector-information display screen 41 which is reliably projected to the screen 4.

[0060]

In order to more validate the effect of step S11, it is desirable that the radio-projector-information display screen 41 is projected to the screen 4 for the first time in one second to two seconds after the selection button 51 is pressed in step S9.

[0061]

When the radio-projector-information display screen 41 is displayed immediately after the selection button 51 is pressed, the user tends to try making connection to the radio projector by repeatedly pressing the selection button 51 without looking at anything. Therefore, the effect aimed at in

step S11 cannot be sufficiently exerted.

[0062]

On the other hand, in step S10, when the radio-projector-information display screen 41 is not displayed even after passing some time since the selection button 51 is pressed, the user has a possibility of misunderstanding that the substance image capturing device 1 is connected to a radio projector disposed at other place. Therefore, it is not preferable to display the radio-projector-information display screen 41 after passing an excessively long time, either.

[0063]

In step S10, it is preferable to set about three seconds to five seconds for the time when the radio-projector-information display screen 41 continues being displayed. When the selection button 51 is not pressed during the display period, it is preferable to erase the radio-projector-information display screen 41 from on the screen 4.

[0064]

This is because, as described above, it is assumed that a currently-unused radio projector disposed at other place is detected.

[0065]

In step S4, as an example of means for enabling the user to know a state that the substance image capturing device 1 is searching for an optional radio projector, as shown in a configuration diagram of a peripheral device system for a radio projector in Fig 5, it becomes possible to enable the user to know a search state by providing a search state LED 61 connected to the first control unit 14, and blinking the luminescence.

[0066]

A similar effect can be also acquired by blinking the luminescence of the LED 60 described above. By looking at the blink of the search state LED 61, the user can easily understand whether the substance image capturing device 1 is frozen due to a failure or is normally working, and this has an effect of reducing a psychological burden.

[0067]

In step S4, in searching for a radio projector, the desired radio projector 2 and the substance image capturing device 1 are disposed adjacently in general.

[0068]

A search range of a radio projector and radio wave field intensity of searching for a radio projector have a fixed relationship. When the radio wave intensity is lower, a search range of a radio projector becomes smaller.

[0069]

That is, when the radio wave intensity is lowered, it becomes impossible to search for a radio projector disposed at a place far from where the user is present. Therefore, the search time can be shortened substantially.

[0070]

That is, by lowering the radio wave intensity of the substance image capturing device 1 only when performing step S4, it becomes possible to quickly detect a desired radio projector 2.

[0071]

After the desired radio projector 2 is detected, it is preferable to

return the radio wave intensity lowered in step S4 to an original value.

[0072]

By arranging the present embodiment as described above, when a plurality of radio projectors having the same SSID exists, it becomes possible to reliably detect a desired radio projector only by a simple button operation and luminescent color information.

[0073]

When a desired radio projector is detected, by pressing the selection button provided in the substance image capturing device, projection of a radio-projector-information display screen to the screen is enabled, and the user can reliably establish a connection to the desired radio projector by checking the projected screen.

[0074]

By providing means for enabling projection of image data from the substance image capturing device to a radio projector for the first time when a selection button is pressed in the state that the radio-projector-information display screen is projected to the screen, a connection to a desired radio projector can be established more reliably and an erroneous connection can be prevented.

[0075]

Because it is not necessary to provide a display unit in the substance image capturing device, it is possible to further acquire effects that the substance image capturing device can be manufactured at low cost and that there is a large flexibility in designing the substance image capturing device.

[0076]

(Second embodiment)

Fig. 6 is a configuration diagram of a peripheral device system for a radio projector according to a second embodiment of the present invention.

[0077]

In Fig. 6, 42 denotes an inherent password display screen that the radio projector 2 has, 43 denotes a software keyboard display screen projected from the radio projector 2, and 52 denotes an operation button. A configuration which is the same as that in the first embodiment is indicated by using the same symbol, and a description of the configuration will be omitted.

[0078]

An operation of the peripheral device system for a radio projector according to the present embodiment configured as described above will be described below.

[0079]

In the rise of user consciousness to security, there is a case where a system is built in which the user sets up an inherent password to the radio projector 2 that can be connected to a network, and the radio projector cannot be connected to a desired radio projector or image data cannot be displayed unless the password is input.

[0080]

In handling such a system, the substance image capturing device 1 requires the input of the password from the radio projector 2. When the substance image capturing device 1 has neither a liquid crystal panel nor a keyboard, the input of the password is difficult.

[0081]

Then, by displaying a password display screen 42 and a software keyboard display screen 43 from the radio projector 2, the user can acquire password information which the radio projector 2 has requested from the password display screen 42. Also, the user can input an optional character by operating the operation button 52 by looking at the software keyboard display screen 43.

[0082]

An example of the operation button 52 is shown in Fig. 7. As shown in Fig. 7, it is desirable that a four-direction key and a decision key are provided as a configuration of the operation button 52. Further, a cancel key may be additionally provided as the operation button 52.

[0083]

Next, an example of a method of inputting a password will be described. The user recognizes the password by looking at the password display screen 42, and inputs the password by using the operation button 52.

[0084]

As the input method, a cursor displayed on the software keyboard display screen 43 is moved with the four-direction key, and the decision key is pressed when the cursor matches a desired character. In this way, the character is finalized. By repeating this operation by the number of characters, the input of a desired password becomes possible.

[0085]

It is desirable that projection of the password display screen 42 and the software keyboard display screen 43 is displayed after the selection

button 51 is pressed in step S10 or step S11. This is because in order to operate the cursor displayed on the software keyboard display screen 43 projected from the radio projector 2 from the four-direction key of the operation button 52 mounted on the substance image capturing device 1, it is necessary to once establish a radio connection. Because a radio connection is not established by only detecting by radio search like in step S6, such control of the cursor cannot be performed.

[0086]

As described above, according to the present embodiment, by having means for projecting the password display screen and the software keyboard display screen from a radio projector, the substance image capturing device can establish a connection with the desired radio projector by only a simple button operation and luminescent color information of the LED even when a certain password is set to the radio projector.

[0087]

Because it is not necessary to provide a display unit in the substance image capturing device, it is possible to further acquire effects that the substance image capturing device can be manufactured at low cost and that there is a large flexibility in designing the substance image capturing device.

[0088]

(Third embodiment)

Fig. 8 is a configuration diagram of a peripheral device system for a radio projector according to a second embodiment of the present invention.

[0089]

In Fig. 8, 7 denotes a storage medium represented by an SD card and

a USB memory. A configuration which is the same as that in the above embodiment is indicated by using the same symbol, and a description of the configuration will be omitted.

[0090]

An operation of the peripheral device system for a radio projector according to the present embodiment configured as described above will be described below with reference to a flowchart in Fig. 9.

[0091]

In enterprises and fields of education, it is general that a plurality of radio projectors of the same manufacturer exists. Therefore, it is common that a plurality of radio projectors having the same SSID is detected. However, from the viewpoint of users, radio projectors to be used are specified in many cases.

[0092]

When radio projectors to be used are always specified in this way, the time of searching for a radio projector like in step S2 is very useless. Therefore, in the present embodiment, a method of shortening the time required to make connection with a desired radio projector 2 by solving the above problem will be described.

[0093]

The first control unit 14 checks whether the storage medium 7 that stores connection information of the desired radio projector 2 is inserted in the substance image capturing device 1 (step S13).

[0094]

In this case, as information which should be stored in the storage

medium 7, it is necessary to prepare in advance all information necessary to establish a radio connection, such as an SSID of a radio projector with which the user desires a connection, a projector name, a MAC address, an IP address, a password, and a WEP (wired equivalent privacy) key.

[0095]

Although a user needs to prepare in advance the storage medium 7 that stores these pieces of information, this work is considerably difficult for a user who is not familiar with IT knowledge.

[0096]

Therefore, as methods of storing the information, there are the following methods. One method is that a desired radio projector 2 and a personal computer installed with a radio function are connected to each other via a radio LAN. Connection information is automatically stored in the storage medium 7 from optional application. Other method is that a desired radio projector 2 and the substance image capturing device 1 are connected to each other via a radio LAN in the steps shown in FIG. 3. In this case, connection information is written, by an optional operation, in the storage medium 7 inserted in the substance image capturing device 1.

[0097]

In this case, it is necessary to make such arrangement that secret data, such as a password and a WEP (Wired Equivalent Privacy) key, is not easily visible when the storage medium 7 is inserted in the personal computer. For example, there are a method of using a file completely invisible from Windows (registered trademark) OS, and a method of further applying encryption by AES (Advanced Encryption Standard) and the like

when storing the secret information.

[0098]

By using these methods, even a user who is not familiar with IT knowledge can store sufficient connection information necessary for the storage medium 7.

[0099]

In step S13, when the storage medium 7 is not inserted in the substance image capturing device 1 or when the storage medium 7 is inserted in the substance image capturing device 1 but the format of the connection information is different, it is decided that there is no connection information to the desired radio projector 2. Then, the process proceeds to step S2, and thereafter follows the flowchart in Fig. 3.

[0100]

On the other hand, in step S13, when the storage medium 7 that stores the connection information of the desired radio projector 2 is inserted in the substance image capturing device 1, the substance image capturing device 1 searches for the desired radio projector 2 following the connection information (step S14).

[0101]

In step S14, when the desired radio projector 2 is not detected, the detection result is displayed with the luminescent color of the LED 60, and the search for a radio projector is stopped (step S15).

[0102]

In step S15, other radio projector is not searched for, because the user may be confused when a connection with a radio projector other than the

radio projector 2 stored in the storage medium 7 is established.

[0103]

When the desired radio projector 2 stored in the storage medium 7 is not detected, the process may proceed to step S2 and other radio projector may be searched for. However, in this case, there is the above problem.

[0104]

In step S14, when the desired radio projector 2 is detected, the first control unit 14 performs detection of the state of the radio projector 2 detected via the first communication unit 13 (step S16), and displays the detected state with the luminescent color of the LED 60 (step S17).

[0105]

The user decides whether the detected radio projector 2 is usable, by looking at the luminescent color of the LED 60 (step S18).

[0106]

When the detected radio projector 2 is unusable because other user is using the detected radio projector 2 or when the input channel of the radio projector 2 is different, the user can easily understand, by checking the luminescent color of the LED 60, the cause of the detected radio projector 2 being unusable.

[0107]

In step S18, when the desired radio projector 2 becomes usable, when the user presses the selection button (step S19), the radio-projector-information display screen 41 is projected from the radio projector 2 (step S20). When the selection button 51 is pressed again during the period when the radio-projector-information display screen 41 is being

projected (step S21), optional image data captured by the substance image capturing device 1 is transmitted from the desired radio projector 2 (step S22), and projection becomes possible.

[0108]

As described above, according to the present embodiment, when the storage medium that stores the connection information of the desired radio projector is inserted in the substance image capturing device 1, and means is included that searches for a radio projector based on the connection information stored in the storage medium, there is an effect that the user can substantially shorten the time for searching for the desired radio projector.

[0109]

When a password and a WEP key for connecting to a radio projector are added to the connection information, there is an effect that the user can avoid each manual input work, and can quickly connect to the desired radio projector.

[0110]

In each of the above embodiments, display of the state of the radio projector by an LED provided in the substance image capturing device is decided with the luminescent color of the LED. Alternatively, by providing a plurality of LEDs, display of the state of the radio projector may be decided from a number of luminescent LEDs.

[0111]

Alternatively, display of the state of the radio projector may be decided from a number of times of light emission of one LED.

[0112]

Although the LED is used as a luminescent material in the present invention, the luminescent material is not limited to the LED, and it is needless to mention that a luminescent material may be any light emitting elements such as a laser diode and EL (electroluminescence).

[0113]

When the function is changed by the pressing time of the button, an interval, etc., a search button and a selection button can be also configured by one button.

[0114]

Although the search button and the selection button are provided in the substance image capturing device, a remote operation may be performed by connecting the search button and the selection button with a cable or by providing the search button and the selection button in a remote controller.

[0115]

With the above arrangement, a substance image capturing device located at a separate position from the user such as a monitoring camera, display of the state of the radio projector can be checked and a selection operation can be performed.

[Industrial applicability]

[0116]

The peripheral device system for a radio projector according to the present invention has an excellent effect that, when a plurality of radio projectors which have the same SSID exists, a desired radio projector can be easily searched for by a simple button operation and luminescence information of the LED from which a state can be understood intuitively.

The peripheral device system for a radio projector according to the present invention is useful as a peripheral device system that is connected, by using a radio LAN, to a radio projector of which distribution has gradually started.

[Brief Description of the Drawings]

[0117]

[Fig. 1] Fig. 1 is a configuration diagram of a peripheral device system for a radio projector according to a first embodiment of the present invention.

[Fig. 2] Fig. 2 is an internal configuration diagram of the peripheral device system for a radio projector according to the first embodiment.

[Fig. 3] Fig. 3 is a flowchart showing an operation of the peripheral device system for a radio projector according to the first embodiment.

[Fig. 4] Fig. 4 is a configuration diagram showing other example of a peripheral device system for a radio projector according to the first embodiment.

[Fig. 5] Fig. 5 is a configuration diagram showing other example of a peripheral device system for a radio projector according to the first embodiment.

[Fig. 6] Fig. 6 is a configuration diagram of a peripheral device system for a radio projector according to a second embodiment of the present invention.

[Fig. 7] Fig. 7 is a diagram showing an example of an operation button according to the second embodiment.

[Fig. 8] Fig. 8 is an internal configuration diagram of a peripheral device system for a radio projector according to a third embodiment of the

present invention.

[Fig. 9] Fig. 9 is a flowchart showing an operation of the peripheral device system for a radio projector according to the third embodiment.

[Fig. 10] Fig. 10 is a configuration diagram of a conventional peripheral device system for a radio projector.

[Description of reference numerals]

[0118]

1 Substance image capturing device

2 A radio projector

3 Optional radio network

4 Screen

7 Storage medium

11 Image capturing unit

12 Image compression unit

13, 21 Communication unit

14, 24 Control unit

22 Image expansion unit

23 Display unit

41 Projector-information display screen

42 Password display screen

43 Software keyboard display screen

50 Search button

51 Selection button

60, 61 LED

FIG. 1

4 SCREEN

2 RADIO PROJECTOR

3 RADIO NETWORK

FIG. 2

11 IMAGE CAPTURING UNIT

12 IMAGE COMPRESSION UNIT

13 COMMUNICATION UNIT

14 CONTROL UNIT

23 DISPLAY UNIT

22 IMAGE EXPANSION UNIT

FIG. 3

S1 PRESS SEARCH BUTTON 50

S2 IS RADIO PROJECTOR DETECTED?

S3 SEARCH FOR NEXT CHANNEL

S4 DETECT STATE OF RADIO PROJECTOR

S5 DISPLAY STATE IN LED 60

S6 USABLE?

S7 IS SEARCH BUTTON 50 PRESSED?

S8 SEARCH FOR NEXT PROJECTOR

S9 IS SELECTION BUTTON 51 PRESSED?

S10 PROJECT CONNECTION DISPLAY SCREEN

S11 IS SELECTION BUTTON 51 PRESSED?

S12 TRANSFER IMAGE DATA

FIG. 4

1 PROJECTOR

41 PROJECTOR-INFORMATION DISPLAY SCREEN

FIG. 5

1 SUBSTANCE IMAGE CAPTURING DEVICE

2 RADIO PROJECTOR

3 RADIO NETWORK

61 SEARCH STATE LED

50 SEARCH BUTTON

51 SELECTION BUTTON

FIG. 6

1 PROJECTOR

42 PASSWORD DISPLAY SCREEN

43 SOFTWARE KEYBOARD DISPLAY SCREEN

FIG. 8

11 IMAGE CAPTURING UNIT

12 IMAGE COMPRESSION UNIT

13 COMMUNICATION UNIT

14 CONTROL UNIT

7 STORAGE MEDIUM

23 DISPLAY UNIT

22 IMAGE EXPANSION UNIT

FIG. 9

S1 PRESS SEARCH BUTTON 50

S13 IS THERE STORAGE MEDIUM?

1 PROCEED TO S2

S14 IS RADIO PROJECTOR DETECTED?

S16 DETECT STATE OF RADIO PROJECTOR

S17 DISPLAY STATE IN LED 60

S18 USABLE?

S19 IS SELECTION BUTTON 51 PRESSED?

S20 PROJECT CONNECTION DISPLAY SCREEN

S21 IS SELECTION BUTTON 51 PRESSED?

S22 TRANSFER IMAGE DATA

FIG. 10

400 SCREEN

200 RADIO PROJECTOR

300 RADIO NETWORK

100 IMAGE SIGNAL DEVICE

114 CONNECTABLE PROJECTOR LIST

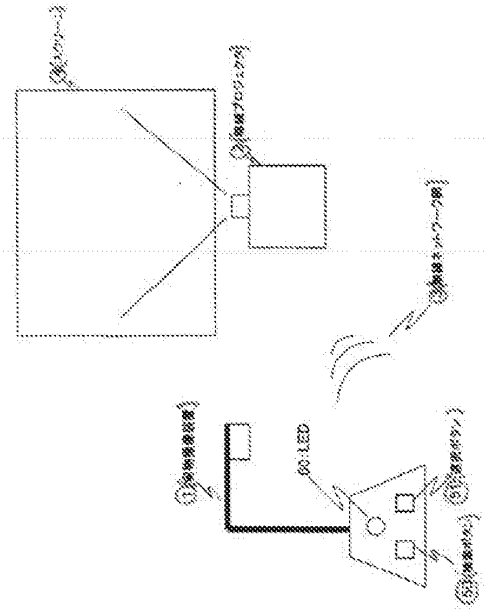
2 PROJECTOR LIST

PROJECTOR 1

PROJECTOR 2

	PROJECTOR 3
3	CONNECT
4	DISCONNECT
5	JOIN
110	DISPLAY UNIT

【図１】



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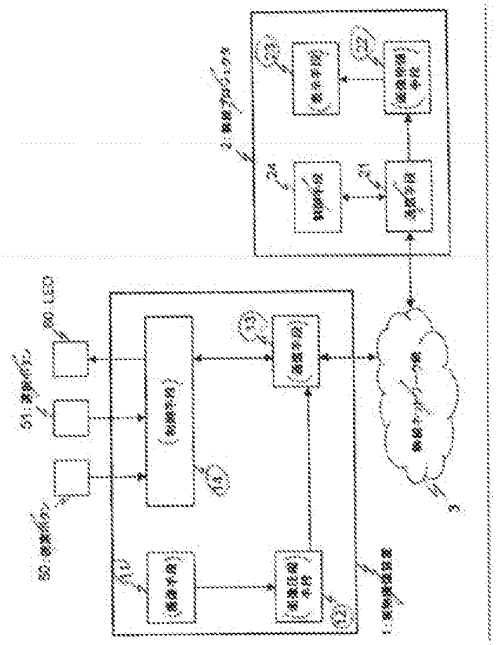

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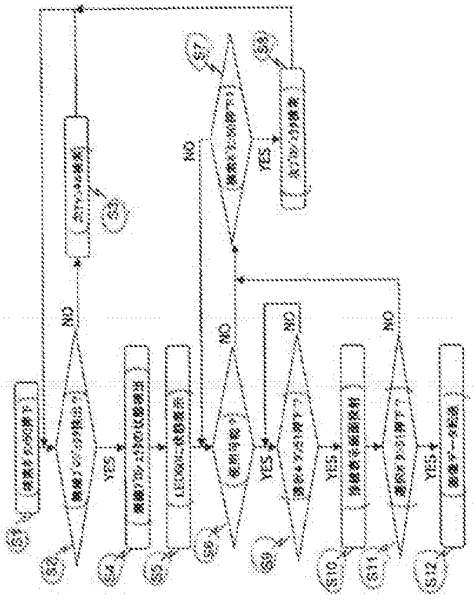

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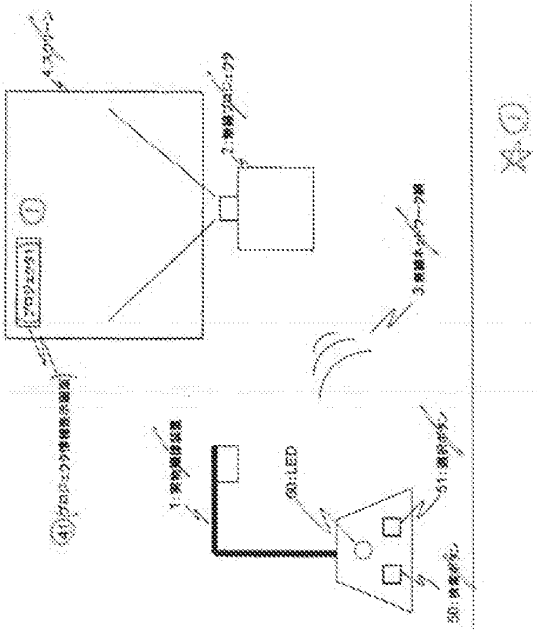

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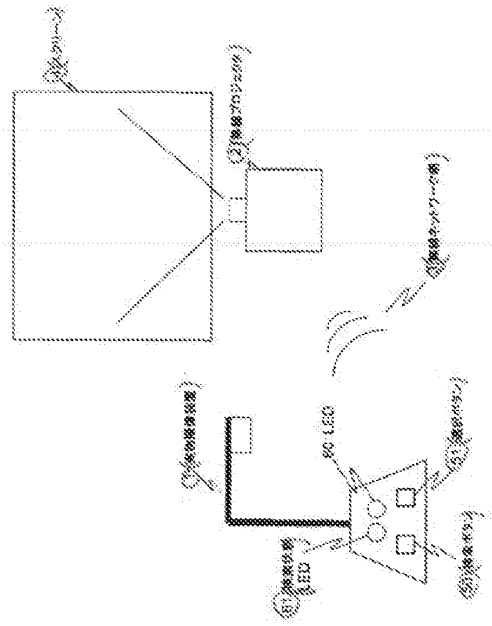

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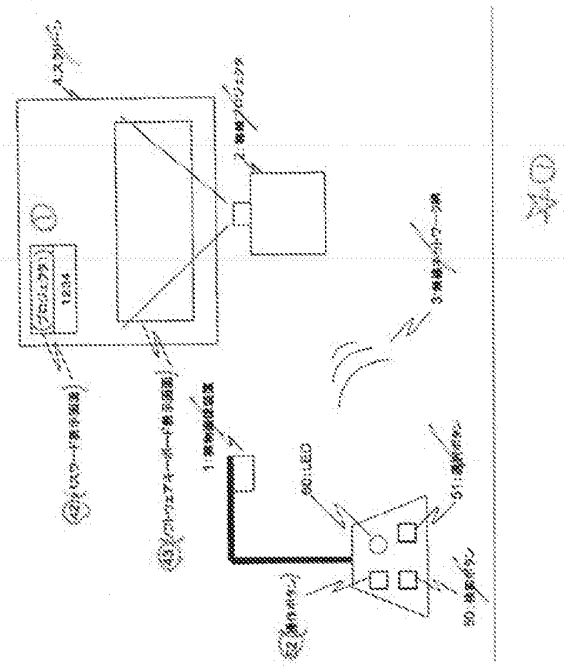

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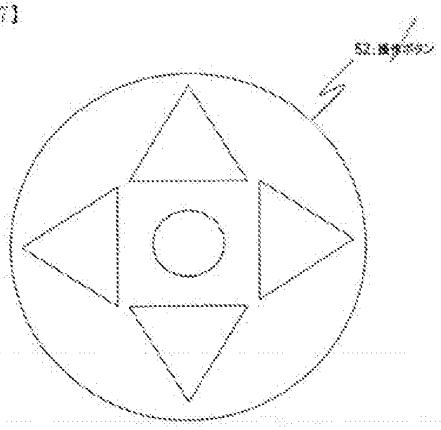

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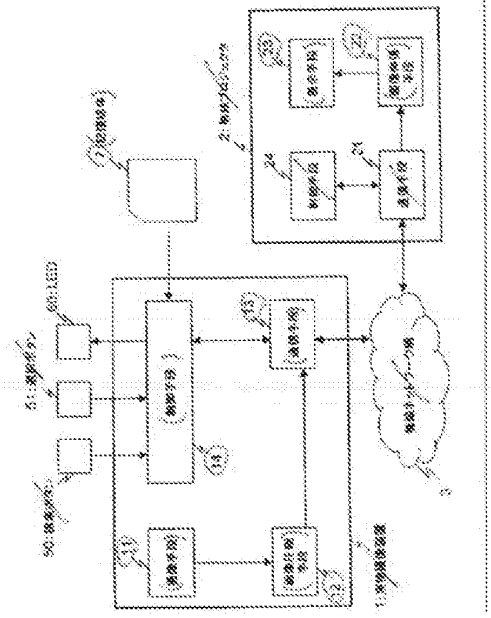

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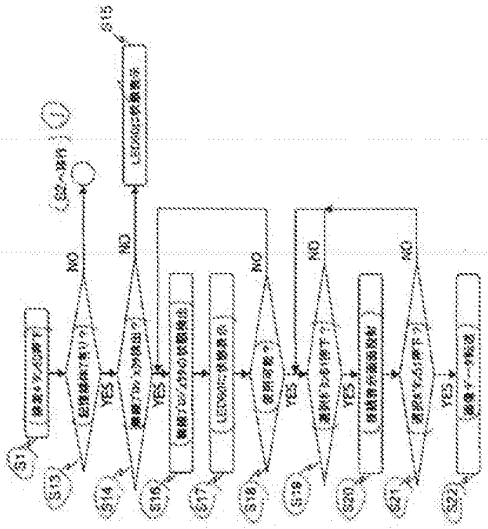

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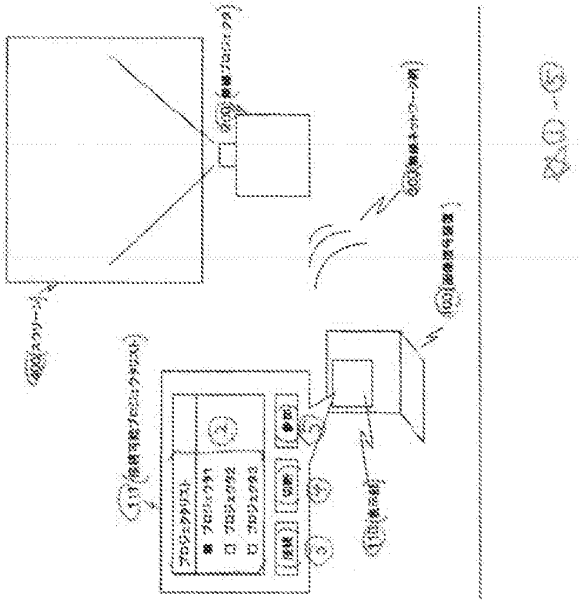

(19)日本国特許庁(JP)　(12)公開特許公報(A)　(11)特許出願公開番号
特開2008-271265
(P2008-271265A)
(43)公開日　平成20年11月6日(2008.11.6)

(51)Int.Cl.			F I			テーマコード（参考）
H04N	5/225	(2006.01)	H04N	5/225	F	2K103
G09G	5/00	(2006.01)	G09G	5/00	555D	5C058
G03B	21/00	(2006.01)	G03B	21/00	D	5C080
G09G	3/20	(2006.01)	G09G	3/20	680C	5C082
H04N	5/74	(2006.01)	G09G	3/20	633P	5C122

審査請求 未請求　請求項の数 7　OL　（全 18 頁）　最終頁に続く

(21)出願番号　特願2007-112543 (P2007-112543)
(22)出願日　平成19年4月23日 (2007.4.23)

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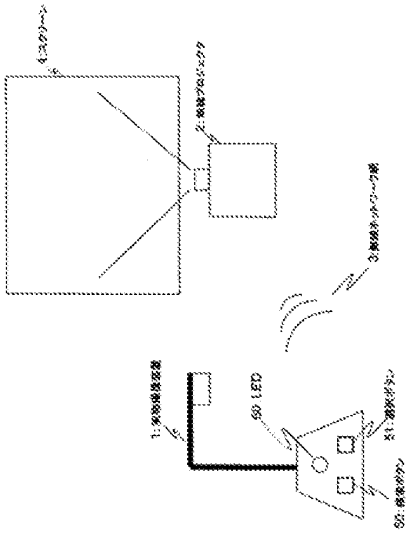
Ｆターム(参考)　2K103 AA22 AB10 BB09 CA01 CA53 CA62 CA73
5C058 BB25 EA02

最終頁に続く

(54)【発明の名称】無線プロジェクタ対応周辺機器システム

(57)【要約】
【課題】無線ＬＡＮを介して無線プロジェクタに接続する無線プロジェクタ対応周辺機器システムにおいて、実物撮像装置に表示部を設けることなく、簡単なボタンとＬＥＤの発光情報のみで所望の無線プロジェクタとの接続を確立する機能を備えた無線プロジェクタ対応周辺機器システムを提供することを目的とする。
【解決手段】実物撮像装置１は、検索ボタン５０により無線プロジェクタ固有のＳＳＩＤを有する無線機器の検索を行い、検索された無線プロジェクタ２に対しその使用状態を検出し、その検出結果をＬＥＤ６０の発光色により表示し、その発光色情報から使用者が選択ボタン５１を押下し、所望の無線プロジェクタ２との接続を確立する。
【選択図】図１



【特許請求の範囲】
【請求項1】
表示部を有さない無線機能を搭載した実物撮像装置と、前記実物撮像装置により撮像された画像データを任意の無線ネットワーク網を介して拡大投射する無線プロジェクタとから構成されるシステムにおいて、
前記実物撮像装置は、
任意の対象物を撮像する撮像手段と、前記撮像手段により撮像された画像データを任意のフォーマットに圧縮する画像圧縮手段と、前記画像圧縮手段により圧縮された画像データを任意の無線ネットワーク網を介して前記無線プロジェクタに送信する第一の通信手段と、第一の通信手段に対し前記無線プロジェクタとの接続を確立するための制御を行う第一の制御手段とから構成され、
前記無線プロジェクタは、
前記実物撮像装置から任意の無線ネットワーク網を介して送信された画像データを受信する第二の通信手段と、第二の通信手段により受信された画像データを任意のフォーマットに伸張する画像伸張手段と、前記画像伸張手段から出力された画像データを拡大投射する表示手段と、前記実物撮像装置との接続を確立するために無線プロジェクタ固有のＳＳＩＤを有すると共に第二の通信手段を制御する第二の制御手段とから構成され、
前記第一の制御手段は、
所望の無線プロジェクタを検索する際に、検索ボタンを押されたことを検知した後に、任意の無線チャンネル内に前記無線プロジェクタ固有のＳＳＩＤを有する無線機器の検索を行い、所望の無線プロジェクタが存在した場合に前記第二の通信手段を介して前記第二の制御手段に問い合わせ、前記無線プロジェクタの使用状態を検出し、その検出結果を前記実物撮像装置に設けられた発光素子の発光色または発光数により使用者に知らしめることを特徴とする無線プロジェクタ対応周辺機器システム。
【請求項2】
第一の制御手段は、
検索された無線プロジェクタを他使用者が使用していた場合、同一チャンネル内に存在する他の無線プロジェクタを検索することを特徴とする請求項１記載の無線プロジェクタ対応周辺機器システム。
【請求項3】
第一の制御手段は、
検索されたチャンネル内に所望のプロジェクタが存在しない場合、他のチャンネルに切り替えて再度無線プロジェクタを検索することを特徴とする請求項１記載の無線プロジェクタ対応周辺機器システム。
【請求項4】
第一の制御手段は、
未使用状態の無線プロジェクタを検索し発光素子にてその状態を表示した後に、選択ボタンを使用者から押された事を検知した場合、所定の画像データを投射するための命令を前記無線プロジェクタに送信することを特徴とする請求項１から請求項３のいずれかに記載の無線プロジェクタ対応周辺機器システム。
【請求項5】
第二の制御手段は、
検索された無線プロジェクタを他使用者が使用中の場合、実物撮像装置から送信された所定の画像データを投射するための命令を受信しても、前記所定の画像データを投射しないことを特徴とする請求項４記載の無線プロジェクタ対応周辺機器システム。
【請求項6】
第二の制御手段は、
無線プロジェクタに任意のパスワードが設定されていた場合、第一の制御手段から接続要求を受信したときに、そのパスワード画面または文字入力のためのソフトウェアキーボー

ド画面を前記無線プロジェクタから投射することを特徴とする請求項１から請求項５のいずれかに記載の無線プロジェクタ対応周辺機器システム。

【請求項7】

第一の制御手段は、

無線プロジェクタの接続情報が格納された記憶媒体が実物撮像装置に挿入されていることを検出した場合、任意の無線プロジェクタを検索せずに、前記記憶媒体に格納された情報と合致した固有情報を有する無線プロジェクタのみを検索し、その検索結果を発光素子の発光色または発光数にて表示することを特徴とする請求項１から請求項５のいずれかに記載の無線プロジェクタ対応周辺機器システム。

【発明の詳細な説明】

【技術分野】

【0001】

本発明は、無線ＬＡＮを介して接続された実物撮像装置とプロジェクタにおいて、実物撮像装置から任意の画像データをプロジェクタへ転送し投射する無線プロジェクタ対応周辺機器システムに関するものである。

【背景技術】

【0002】

近年、ＲＧＢケーブルを使用せずに、ネットワーク網（特に無線ＬＡＮ）を介してパソコン上に表示された画像を無線ＬＡＮ機能搭載のプロジェクタに転送し投射する無線プロジェクタ対応周辺機器システムが急速に広まっている。

【0003】

以下に従来の無線プロジェクタ対応周辺機器システムについて説明する。

【0004】

従来、無線プロジェクタ対応周辺機器システムは、特許文献１に記載されたものが知られている。そのシステムの構成図を図１０に示す。

【0005】

図１０において、１００はパソコンに代表される画像信号装置、２００は無線ＬＡＮ機能搭載のプロジェクタ、３００は任意の無線ネットワーク網、４００はプロジェクタ２００から拡大投射された画像を投影するスクリーンである。

【0006】

以上のように構成された従来の無線プロジェクタ対応周辺機器システムについて説明する。

【0007】

画像信号装置１００は、複数台の無線プロジェクタが存在している中、無線ネットワーク網３００を使用して接続可能な無線プロジェクタを検索し、その検索結果を画像信号装置１００の表示部１１０上に接続可能プロジェクタリスト１１１として表示する。

【0008】

使用者は、その接続可能プロジェクタリスト１１１の中から「プロジェクタ１」を選択し、「プロジェクタ１」に対応する所望の無線プロジェクタ２００を選択することにより、画像信号装置１００と無線プロジェクタ２００との間の接続を確立する。

【特許文献1】特開２００５－２０８８２３号公報（段落番号「００３５」）

【発明の開示】

【発明が解決しようとする課題】

【0009】

しかしながら上記従来の構成では、無線プロジェクタに接続する機器として、表示部を有していない書画カメラに代表される実物撮像装置を使用した場合、前述のような接続可能プロジェクタリストを表示させる手段が無く、無線プロジェクタを選択することができないため、使用者は、所望の無線プロジェクタに接続できないという課題を有していた。

【0010】

また、上記課題を解決するために、表示部を実物撮像装置に設ける方法が考えられるが、コストの大幅な上昇並びに実物撮像装置のデザイン設計に制約ができるという新たな課

題を有する。
【0011】
　また、実物撮像装置の中には、監視カメラなど使用者から離れた位置で操作せざるをえないものもあり、実物撮像装置自身に表示部を設けてプロジェクタリストを表示させても、使用者がそれを見ることが困難という問題もあった。
【0012】
　本発明は上記従来の課題を解決するもので、実物撮像装置に表示部を設けることなく、簡単なボタンとＬＥＤの発光情報のみで所望の無線プロジェクタとの接続を確立する機能を備えた無線プロジェクタ対応周辺機器システムを提供することを目的とする。
【課題を解決するための手段】
【0013】
　本発明の請求項１に記載の発明は、表示部を有さない無線機能を搭載した実物撮像装置と、前記実物撮像装置により撮像された画像データを任意の無線ネットワーク網を介して拡大投射する無線プロジェクタとから構成されるシステムにおいて、
前記実物撮像装置は、
任意の対象物を撮像する撮像手段と、前記撮像手段により撮像された画像データを任意のフォーマットに圧縮する画像圧縮手段と、前記画像圧縮手段により圧縮された画像データを任意の無線ネットワーク網を介して前記無線プロジェクタに送信する第一の通信手段と、第一の通信手段に対し前記無線プロジェクタとの接続を確立するための制御を行う第一の制御手段とから構成され、
前記無線プロジェクタは、
前記実物撮像装置から任意の無線ネットワーク網を介して送信された画像データを受信する第二の通信手段と、第二の通信手段により受信された画像データを任意のフォーマットに伸張する画像伸張手段と、前記画像伸張手段から出力された画像データを拡大投射する表示手段と、前記実物撮像装置との接続を確立するために無線プロジェクタ固有のＳＳＩＤを有すると共に第二の通信手段を制御する第二の制御手段とから構成され、
前記第一の制御手段は、
所望の無線プロジェクタを検索する際に、検索ボタンを押されたことを検知した後に、任意の無線チャンネル内に前記無線プロジェクタ固有のＳＳＩＤを有する無線機器の検索を行い、所望の無線プロジェクタが存在した場合に前記第二の通信手段を介して前記第二の制御手段に問い合わせ、前記無線プロジェクタの使用状態を検出し、その検出結果を前記実物撮像装置に設けられたＬＥＤの発光色または発光数により使用者に知らしめることを特徴とする無線プロジェクタ対応周辺機器システムとしたものであり、実物撮像装置に表示部を設けなくても簡単な構成で所望の無線プロジェクタとの接続を確立可能とする作用を有する。
【0014】
　請求項２に記載の発明は、第一の制御手段は、検索された無線プロジェクタを他使用者が使用していた場合、同一チャンネル内に存在する他の無線プロジェクタを検索することを特徴とする請求項１記載の無線プロジェクタ対応周辺機器システムとしたものであり、実物撮像装置に表示部を設けなくても簡単な構成で所望の無線プロジェクタとの接続を確立可能とする作用を有する。
【0015】
　請求項３に記載の発明は、第一の制御手段は、検索されたチャンネル内に所望のプロジェクタが存在しない場合、他のチャンネルに切り替えて再度無線プロジェクタを検索することを特徴とする請求項１記載の無線プロジェクタ対応周辺機器システムとしたものであり、実物撮像装置に表示部を設けなくても簡単な構成で所望の無線プロジェクタとの接続を確立可能とする作用を有する。
【0016】
　請求項４に記載の発明は、第一の制御手段は、未使用状態の無線プロジェクタを検索しＬＥＤにてその状態を表示した後に、選択ボタンを使用者から押された事を検知した場合

、所定の画像データを投射するための命令を前記無線アロジェクタに送信することを特徴とする請求項１から請求項３のいずれかに記載の無線アロジェクタ対応開迎機器システムとしたものであり、実物撮像装置に表示部を設けなくても簡単な構成で所望の無線アロジェクタとの接続を確立可能とする作用を有する。

【００１７】

請求項５に記載の発明は、第二の制御手段は、検索された無線アロジェクタを他使用者が使用中の場合、実物撮像装置から送信された所定の画像データを投射するための命令を受信しても、前記所定の画像データを投射しないことを特徴とする請求項４記載の無線アロジェクタ対応開迎機器システムとしたものであり、実物撮像装置が調べて所望の無線アロジェクタ以外の無線アロジェクタと接続した場合においても、その誤接続された無線アロジェクタを投射不可能とする作用を有する。

【００１８】

請求項６に記載の発明は、第二の制御手段は、無線アロジェクタに任意のパスワードが設定されている場合、第一の制御手段から接続要求を受信したときに、そのパスワード画面または文字入力のためのソフトウェアキーボード画面を前記無線アロジェクタから投射することを特徴とする請求項１から請求項５のいずれかに記載の無線アロジェクタ対応開迎機器システムとしたものであり、所望のアロジェクタにパスワードが設定されている場合においても、簡単な構成で所望の無線アロジェクタとの接続を確立可能とする作用を有する。

【００１９】

請求項７に記載の発明は、第一の制御手段は、無線アロジェクタの接続情報が格納された記憶媒体が実物撮像装置に挿入されていることを検出した場合、任意の無線アロジェクタを検索せずに、前記記憶媒体に格納された情報と合致した固有情報を有する無線アロジェクタのみを検索し、その検索結果を前記ＬＥＤの発光色または発光数にて表示することを特徴とする請求項１から請求項５のいずれかに記載の無線アロジェクタ対応開迎機器システムとしたものであり、記憶媒体の情報から所望の無線アロジェクタを検索する手間より確実に接続を確立可能とする作用を有する。

【発明の効果】

以上のように本発明は、同一のＳＳＩＤを有する無線アロジェクタが複数台存在する場合において、簡単なボタン操作と直感的に状態が分かるＬＥＤの発光色または発光数情報のみで、容易に所望の無線アロジェクタを検索可能とする優れた効果が得られる。また、液晶パネルに代表される表示部を実物撮像装置に設ける必要が無くなるため、製品を安価に製造できるとともに実物撮像装置のデザイン設計の自由度が大幅に広がるという優れた効果が得られる。

【発明を実施するための最良の形態】

【００２１】

以下、本発明の実施の形態について、図１から図９を用いて説明する。

【００２２】

（実施の形態１）

図１は本発明の実施の形態１における無線アロジェクタ対応開迎機システムの構成図である。

【００２３】

図１において、１は、書画カメラに代表される実物撮像装置、２は、無線アロジェクタ、３は、実物撮像装置１と無線アロジェクタ２を接続する任意の無線ネットワーク網、４は、無線アロジェクタ２から拡大投射された映像を投影するスクリーンである。また、５０は、実物撮像装置１から所望の無線アロジェクタ２を検索するための検索ボタン、５１は、検索ボタン５０により検索された無線アロジェクタ２を選択する選択ボタン、６０は、発光ダイオード（以下、ＬＥＤと称する）である。ＬＥＤ６０は赤色と緑色を発光する２つのＬＥＤから構成されており、１つのハウナーシとなっている。

【0024】
図２は、実物撮像装置１及び無線プロジェクタ２の内部構成図である。
【0025】
図２において、１１は、任意の対象物を撮像する撮像手段。１２は、撮像手段１１により撮像された画像データをＪＰＥＧやＭＰＥＧ方式に代表される任意のフォーマットに圧縮する画像圧縮手段、１３は、画像圧縮手段１２により圧縮された画像データを任意の無線ネットワーク網３を介して無線プロジェクタ２に送信する第一の通信手段。１４は、第一の通信手段１３に対して無線プロジェクタ２との接続を確立するために制御を行う第一の制御手段。２１は、実物撮像装置１から送信された画像データを受信する第二の通信手段、２２は、第二の通信手段２１で受信された画像データを任意のフォーマットに伸張する画像伸張手段。２３は、画像伸張手段２２により伸張された画像データをスクリーン４に対して拡大投射する表示手段、２４は、実物撮像装置１との接続を確立するために無線プロジェクタ２に固有のＳＳＩＤを有すると共に第二の通信手段２１を制御する第二の制御手段である。
【0026】
以上のように構成された本実施の形態の無線プロジェクタ対応周辺機器システムについて、図３のフローチャートを用いてその動作を以下に説明する。
【0027】
まず、実物撮像装置１で撮像された画像データを所望の無線プロジェクタ２に対し任意の無線ネットワーク網３を介して転送するために、使用者は、実物撮像装置１と無線プロジェクタ２との接続を確立する必要がある。
【0028】
そこで、実物撮像装置１に備えられた検索ボタン５０を使用者が押す（ステップＳ１）。検索ボタン５０が押下された事を検知した第一の制御手段１４は、第一の通信手段１３に対し所定のＳＳＩＤを有する無線プロジェクタの検索を指示する。
【0029】
現在、市販されている無線プロジェクタは、無線プロジェクタに接続するためのアプリケーションソフトを使用することにより、使用者が簡単に所望の無線プロジェクタとの接続を確立できるようになっているが、これは、無線プロジェクタ固有のＳＳＩＤを前記アプリケーションソフトに格納することにより、自社の無線プロジェクタのみを検索可能とする技術である。
【0030】
このようにして、実物撮像装置１が同一のＳＳＩＤを有する無線プロジェクタが検出されるか否かを検索する（ステップＳ２）。
【0031】
無線プロジェクタ検索の一例として、無線チャンネル毎に検索を行う手法がある。例えば、無線方式としてＩＥＥＥ８０２．１１ｂ規格に準拠し日本国内で使用の場合、チャンネル１からチャンネル１４までが割り当てられているため、実物撮像装置１は、まず、ステップＳ２でチャンネル１の範囲内で同一のＳＳＩＤを有する無線プロジェクタの検索を行う。勿論、検索時間を短縮するために無線プロジェクタがデフォルト値で有している無線チャンネルから検索を開始しても良い。
【0032】
ステップＳ２において、同一のＳＳＩＤを有した無線プロジェクタが１台も検出されなかった場合、実物撮像装置１は次の無線チャンネルを検索する（ステップＳ３）。
【0033】
ステップＳ３において、無線チャンネル数は有限であるため、全ての無線チャンネルを検出しても同一のＳＳＩＤを有した無線プロジェクタが１台も検出されない場合、そのまま接続不可表示（例えば、ＬＥＤ６０を赤色点灯）を行い、検索を中断しても良い。
【0034】
ステップＳ２において、同一のＳＳＩＤを有した無線プロジェクタが検出された場合、

実物撮像装置１は、検出された無線プロジェクタに対し、現在の無線プロジェクタの接続状態を問い合わせる。

【0035】

ここで、複数台の無線プロジェクタが検出された場合、第一の制御手段１４は、例えば、検出された無線プロジェクタ名、或いはＭＡＣアドレス番号などの固有情報のＡＢＣ順で最も若いものを選択し、その無線プロジェクタに対して前述の問い合わせを行う。

【0036】

一般的に、無線プロジェクタが有するＳＳＩＤは、メーカー毎に固有であり、且つ、無線プロジェクタは企業や教育機関に複数台で納品されることが多いため、このように同一のＳＳＩＤを有する無線プロジェクタが複数台同時に検出されることがよくある。

【0037】

この問い合わせ情報を第二の通信手段２１を介して受信した第二の制御手段２４は、現在の無線プロジェクタの状態を応答する（ステップＳ４）。

【0038】

応答される情報例としては、

１）ユーザ接続無し

２）他ユーザ接続中

３）無線ネットワーク以外の入力チャンネル（ＲＧＢケーブル入力等）で使用中

が挙げられる。これらの状態をＬＥＤ６０の発光色を変えて表示することにより（ステップＳ５）、使用者は簡単に検出された無線プロジェクタの状態を把握することが可能となる（ステップＳ６）。

【0039】

ＬＥＤ６０としては、２色の発光ダイオードを１パッケージにした素子を搭載すると、上記３モードをそれぞれ異なる色で表示可能となる。

【0040】

例えば、緑色と赤色を各々発光する発光ダイオードを１パッケージにした素子を使用した場合、

１）ユーザ接続無し・・・緑色

２）他ユーザ接続中・・・橙色（緑色と赤色を同時に発光）

３）無線ネットワーク以外の入力チャンネルで使用中・・・赤色

と３色で表示可能となる。ステップＳ６において、ＬＥＤ６０の発光色が緑色の場合、使用者はその検出された無線プロジェクタと接続が可能となる。

【0041】

一方、ステップＳ６において、ＬＥＤ６０の発光色が緑色と異なる場合、使用者は、実物撮像装置１が他の無線プロジェクタと接続している、或いは所望の無線プロジェクタ２の設定状態が間違っている事を容易に把握可能となる。

【0042】

無線プロジェクタ２の設定状態の確認は、ＬＥＤ６０の発光色を確認することにより、使用者は何を確認すれば良いのかを容易に把握可能となる。

【0043】

例えば、

２）他ユーザ接続中・・・橙色

と表示された場合、所望の無線プロジェクタ２にパソコンなど他の機器が接続されたままになっていないかを確認すればよい。

【0044】

また、

３）無線ネットワーク以外の入力チャンネルで使用中・・・赤色

と表示された場合、所望の無線プロジェクタ２の入力チャンネルがネットワーク（無線）入力に設定されていないかを確認すればよい。

【0045】

これらの確認を行い、設定に問題がない場合は、他場所に設置されている無線プロジェクタと接続されていると判断されるため、使用者は再度検索ボタン５０を押下する（ステップＳ７）。その押下された信号を受信した第一の制御手段１４は、第一の通信手段１３に対して同一無線チャンネル内の他の無線プロジェクタの検索を行うように命令を出す（ステップＳ８）。

【0046】

ステップＳ８において、他の無線プロジェクタの検索方法としては、前述したＡＢＣ順で次に若い番号を有した無線プロジェクタを選択する方法がある。

【0047】

また、一度検出した無線プロジェクタを、確実に次回検出しないようにするため、第一の制御手段１４は、検出された無線プロジェクタの情報を一時的に記憶する手段を備えても良い。

【0048】

ステップＳ６において、所望の無線プロジェクタ２が検出された場合、使用者は選択ボタン５１を押下し、無線プロジェクタ２との接続を確立する（ステップＳ９）。

【0049】

選択ボタン５１が押下されたことを検知した第一の制御手段１４は、第一の通信手段１３を介して無線プロジェクタ２に対し、無線プロジェクタ情報表示画面４１をスクリーン４に対して投射するように命令する（ステップＳ１０）。

【0050】

無線プロジェクタ情報表示画面４１としては、無線プロジェクタ２のプロジェクタ名、或いはＭＡＣアドレスやＩＰアドレス等の無線プロジェクタ２の固有情報を表示することが好ましい。

【0051】

無線プロジェクタ情報表示画面４１の一例を図４の無線プロジェクタ対応周辺機器システムの構成図に示す。

【0052】

ステップＳ１０において、ステップＳ５でＬＥＤ６０の発光色が、

橙色＝他ユーザ接続中

の場合、即ち実物撮像装置１は他の無線プロジェクタと接続の時に選択ボタン５１を使用者が誤って押下すると、無線プロジェクタ情報表示画面４１が他の無線プロジェクタから投射され、その無線プロジェクタを使用している人のプレゼンテーションを邪魔してしまうという課題を生じる。

【0053】

そこで、ステップＳ１０において、ＬＥＤ６０の発光色が橙色、或いは赤色（無線ネットワーク以外の入力チャンネルで使用中）の時は、選択ボタン５１が押下されても、第一の制御手段１４は無視する、或いは無線プロジェクタに搭載された第二の制御手段２４は、無線プロジェクタから何らかの画像データがスクリーン４に対して投射されている状態では、無線プロジェクタ情報表示画面４１の表示命令を受信しても無視する事により、プレゼンテーション中に不意に無線プロジェクタ情報表示画面４１がスクリーン上に投射されないような工夫が必要となる。

【0054】

ステップＳ１０により、無線プロジェクタ２から無線プロジェクタ情報表示画面４１が投射されていることを確認した使用者は、その無線プロジェクタ情報表示画面４１がスクリーン４上に表示されている期間に、選択ボタン５１を再度押下する（ステップＳ１１）。

【0055】

この選択ボタン５１が押下されたことを検知した第一の制御手段１４は、無線プロジェクタ２に対し、実物撮像装置１で撮像された画像データを送信する（ステップＳ１２）。ステップＳ１１において、再度選択ボタン５１の押下を使用者に要求するのは、誤接続を

行った状態で、所望の無線プロジェクタ２以外の無線プロジェクタに対し不要な画像データを実物撮像装置１から転送させないためである。

【0056】

例えば、ステップＳ５において、ＬＥＤ６０の発光色が緑色であったとしても、必ずしも所望の無線プロジェクタ２に実物撮像装置１が接続されていない場合がある。これは、他場所に設置された無線プロジェクタの電源が投入され、入力チャンネルがネットワーク（無線）入力で且つ誰も使用していない状態の時に存在する。

【0057】

このような無線プロジェクタを検出した場合，ＬＥＤ６０は緑色表示となり、使用者は所望の無線プロジェクタ２に接続されているのか、或いは他場所に設置された未使用の無線プロジェクタに接続されているのかを判別出来ない。

【0058】

そこで、判別方法として、ステップＳ１０の無線プロジェクタ情報表示画面４１がスクリーン４上に表示されるか否かを目視する方法があるが、使用者は早急に所望の無線プロジェクタ２に接続したいという焦りから、無線プロジェクタ情報表示画面４１を確認せずに選択ボタン５１を押下する可能性がある。

【0059】

このような場合においても、無線プロジェクタ情報表示画面４１が表示されている期間のみしか選択ボタン５１が押下された事を第一の制御手段１４が受信しないようにすれば、使用者は確実にスクリーン４に投射されたプロジェクタ情報表示画面４１を見るため、誤接続の可能性が大幅に低減できる。

【0060】

ステップＳ１１の効果をより有効にするためには、ステップＳ９で選択ボタン５１を押下された後から１秒から２秒後に初めて無線プロジェクタ情報表示画面４１がスクリーン４上に投射されることが望ましい。

【0061】

選択ボタン５１を押下された直後に無線プロジェクタ情報表示画面４１を表示すると、使用者は何も見ずに選択ボタン５１を連打し、無線プロジェクタへの接続を行おうとするため、ステップＳ１１で狙った効果が十分に発揮できなくなる。

【0062】

逆に、ステップＳ１０において、無線プロジェクタ情報表示画面４１が選択ボタン５１の押下後からしばらく経っても表示されない場合、使用者は他場所に設置された無線プロジェクタと接続されたものと勘違いをする可能性があるため、時間を空けすぎて無線プロジェクタ情報表示画面４１を表示する事も好ましくない。

【0063】

また、ステップＳ１０において、無線プロジェクタ情報表示画面４１が表示され続ける時間は３秒から５秒程度にし、その表示期間中に選択ボタン５１が押下されない場合は、その無線プロジェクタ情報表示画面４１をスクリーン４上から消去することが好ましい。

【0064】

これは、前述したように、他の場所に設置された現在未使用の無線プロジェクタが検索された場合が想定されるためである。

【0065】

ステップＳ４において、実物撮像装置１が任意の無線プロジェクタを検索している状態を知らしめる手段の一例として、図５の無線プロジェクタ対応周辺機器システムの構成図に示すように、第一の制御手段１４に接続された検索状態ＬＥＤ６１を設け、その発光を明滅させることにより、使用者に検索状態を知らしめることが可能となる。

【0066】

勿論、前述したＬＥＤ６０の発光を明滅させても同様の効果を得ることができる。使用者は、検索状態ＬＥＤ６１の明滅を見ることにより、実物撮像装置１が故障などでフリーズしているのか、正常に動作中なのかを容易に把握可能となり、心理的負担を軽減する効

果を得る。

【0067】

また、ステップＳ４において、無線プロジェクタを検索する際に、所望の無線プロジェクタ２と実物撮像装置１とは近くに配置されているケースが一般的である。

【0068】

また、無線プロジェクタの検索範囲と無線プロジェクタを検索するための無線電波強度は一定の相関関係があり、無線電波強度が低いほど、無線プロジェクタの検索範囲が狭まる。

【0069】

つまり、無線電波強度を下げると、現在使用者がいる場所から遠くに設置された無線プロジェクタを検索できなくなるため、検索時間が大幅に短縮可能となる。

【0070】

即ち、ステップＳ４を実行する時のみ実物撮像装置１の無線電波強度を下げることにより、より素早く所望の無線プロジェクタ２の検索が可能となる。

【0071】

また、所望の無線プロジェクタ２が検出された後に、ステップＳ４で下げた無線電波強度を元の値に戻すことが好ましい。

【0072】

以上のように本実施の形態によれば、同一のＳＳＩＤを有する無線プロジェクタが複数台存在する場合において、簡単なボタン操作とＬＥＤの発光色情報のみで確実に所望の無線プロジェクタを検出することが可能となる。

【0073】

また、所望の無線プロジェクタが検出された際に実物撮像装置に設けられた選択ボタンを押下することにより、無線プロジェクタ情報表示画面をスクリーンに投射可能とし、使用者は、その投射された画面を確認することで確実に所望の無線プロジェクタとの接続が確立可能となる。

【0074】

更に、無線プロジェクタ情報表示画面がスクリーンに投射された状態で選択ボタンを押下することで、初めて実物撮像装置から撮像された画像データを無線プロジェクタに投射可能とする手段を設けることにより、より確実に所望の無線プロジェクタとの接続を確立させ、誤接続を防ぐことが可能となる。

【0075】

また、実物撮像装置に表示部を設ける必要がないため、実物撮像装置を安価に製造可能とすると共に、デザイン設計の自由度が広がるという効果を更に得ることが可能となる。

【0076】

（実施の形態２）

図６は、本発明の実施の形態２における無線プロジェクタ対応周辺機器システムの構成図である。

【0077】

図６において、４２は、無線プロジェクタ２が有する固有のパスワード表示画面、４３は、無線プロジェクタ２から投射されたソフトウェアキーボード表示画面、５２は、操作ボタンである。尚、前述した実施の形態１と同じ構成については同一の符号を用い、説明を省略する。

【0078】

以上のように構成された本実施の形態の無線プロジェクタ対応周辺機器システムについて、以下その動作を説明する。

【0079】

セキュリティに対するユーザ意識の高まりの中、ネットワーク接続可能とする無線プロジェクタ２に対し、固有のパスワードを使用者が設定し、そのパスワードを入力しなければ、所望の無線プロジェクタと接続できない、或いは画像データが表示されないシステム

が構築される場合がある。

【0080】

このようなシステムに対応する場合、実物撮像装置１は無線プロジェクタ２から要求されたパスワードの入力が必要となるが、液晶パネルやキーボードを装備していない場合、前記パスワードの入力は困難である。

【0081】

そこで、無線プロジェクタ２からパスワード表示画面４２及びソフトウェアキーボード表示画面４３を表示させる事により、使用者は、パスワード表示画面４２から無線プロジェクタ２が要求したパスワード情報を入手可能となり、また、ソフトウェアキーボード表示画面４３を見ながら操作ボタン５２を操作することにより任意の文字入力が可能となる。

【0082】

操作ボタン５２の一例を図７に示す。図７に示すように、操作ボタン５２の構成としては、上下左右キー及び決定キーを備えることが望ましい。更に操作ボタン５２として、キャンセルキーを追加して備えても良い。

【0083】

次に、パスワードの入力方法の一例を示す。使用者は、パスワード表示画面４２を見ることによりパスワードを認識し、操作ボタン５２を使用して入力する。

【0084】

入力方法としては、ソフトウェアキーボード表示画面４３上に表示されたカーソルを上下左右キーで動かし、所望の文字にカーソルが合ったときに決定キーを押下することにより文字を確定する。この操作を文字の数だけ繰り返すことにより、所望のパスワードが入力可能となる。

【0085】

このパスワード表示画面４２やソフトウェアキーボード表示画面４３の投射は、ステップＳ１０或いはステップＳ１１で選択ボタン５１が押下された後に表示されることが望ましい。これは、実物撮像装置１に搭載された操作ボタン５２の上下左右キーから無線プロジェクタ２から投射されたソフトウェアキーボード表示画面４３上に表示されたカーソルを操作するには、一旦、無線接続を確立しておく必要があるためである。ステップＳ６のように無線検索で検出されたのみでは無線接続が確立されていないため、このようなカーソルの制御を行うことができない。

【0086】

以上のように本実施の形態によれば、無線プロジェクタからパスワード表示画面及びソフトウェアキーボード表示画面を投射させる手段を有することにより、無線プロジェクタに何らかのパスワードが設定されていた場合においても、実物撮像装置は、簡単なボタン操作とＬＥＤの発光色情報のみで所望の無線プロジェクタとの接続を確立することが可能となる。

【0087】

また、実物撮像装置に表示部を設ける必要がないため、実物撮像装置を安価に製造可能とすると共に、デザイン設計の自由度が広がるという効果を更に得ることが可能となる。

【0088】

（実施の形態３）

図８は本発明の実施の形態２における無線プロジェクタ対応周辺機器システムの構成図である。

【0089】

図８において、７は、ＳＤカードやＵＳＢメモリに代表される記憶媒体である。尚、前述した実施の形態と同じ構成については同一の符号を用い、説明を省略する。

【0090】

以上のように構成された本実施の形態の無線プロジェクタ対応周辺機器システムについて、以下その動作を図９のフローチャートを用いて説明する。

【0091】
企業や教育現場において、同一メーカーの無線プロジェクタが複数存在するケースが一般的であるため、同一のＳＳＩＤを有した無線プロジェクタが複数台検出されることは珍しくない。しかしながら、使用者の立場で見た場合、使用する無線プロジェクタが特定されている事が多い。
【0092】
このように使用する無線プロジェクタが常に特定されている場合、ステップＳ２のような無線プロジェクタの検索時間が非常に無駄である。そこで、本実施の形態では、上記課題を解決し、所望の無線プロジェクタ２との接続に要する時間を短縮する方法について説明を行う。
【0093】
第一の制御手段１４は、所望の無線プロジェクタ２の接続情報が格納された記憶媒体７が実物撮像装置１に挿入されているか否かの検出を行う（ステップＳ１３）。
【0094】
ここで、記憶媒体７に格納されるべき情報としては、使用者が接続を所望する無線プロジェクタのＳＳＩＤやプロジェクタ名、ＭＡＣアドレス、ＩＰアドレス、パスワード、ＷＥＰキーなどの無線接続を確立するために必要な情報を全て備えておく必要がある。
【0095】
これらの情報を格納した記憶媒体７を使用者は事前に用意する必要があるが、ＩＴ知識に精通していない使用者には相当困難な作業である。
【0096】
そこで、前記情報の格納の方法としては、所望の無線プロジェクタ２と無線機能を搭載したパソコンとを無線ＬＡＮを介して接続し、その接続情報を任意のアプリケーションから自動的に記憶媒体７に格納する方法や、一度、図３に示したステップで所望の無線プロジェクタ２と実物撮像装置１とを無線ＬＡＮを介して接続させ、その際に、任意の操作により実物撮像装置１に挿入された記憶媒体７に接続情報を書き込む手段などがある。
【0097】
ここで、パスワードやＷＥＰキーといった秘匿性のあるデータについては、記憶媒体７をパソコンに挿入したときに容易に見えないようにする工夫が必要である。例えば、ウィンドウズ（登録商標）ＯＳからは全く見えない隠しファイルにする方法や、これらの秘匿情報を格納する際は、ＡＥＳ等で更に暗号化をかけるといった方法が想定できる。
【0098】
これらの方法を使用することで、ＩＴ知識に精通していない使用者でも簡単に記憶媒体７に必要十分な接続情報を格納することが可能となる。
【0099】
ステップＳ１３において、記憶媒体７が実物撮像装置１に挿入されていない、或いは挿入されているが格納されている接続情報のフォーマットが異なる場合は、所望の無線プロジェクタ２に対する接続情報が無いと判断し、ステップＳ２へ移行し、以後、図３のフローチャートをたどる。
【0100】
一方、ステップＳ１３において、所望の無線プロジェクタ２の接続情報が格納された記憶媒体７が実物撮像装置１に挿入されている場合、実物撮像装置１は、その接続情報に従い、所望の無線プロジェクタ２を検索する（ステップＳ１４）。
【0101】
ステップＳ１４において、所望の無線プロジェクタ２が検出されなかった場合、その検出結果をＬＥＤ６０の発光色にて表示し、無線プロジェクタの検出を止める（ステップＳ１５）。
【0102】
ステップＳ１５において、他の無線プロジェクタの検索を行わないのは、記憶媒体７に格納された所望の無線プロジェクタ２以外の無線プロジェクタとの接続を確立すると使用

者が混乱を起こすためである。

【0103】

勿論、記憶媒体７に格納された所望の無線プロジェクタ２が検出されなかった場合に、ステップＳ２へ移行して他の無線プロジェクタを検索しても良いが、その場合は、上記課題が潜んでいる。

【0104】

ステップＳ１４において、所望の無線プロジェクタ２が検出された場合、第一の制御手段１４は、第一の通信手段１３を介して検出された無線プロジェクタ２の状態検出を行い（ステップＳ１６）、その検出した状態をＬＥＤ６０の発光色で表示する（ステップＳ１７）。

【0105】

使用者は、そのＬＥＤ６０の発光色を見て、使用可能か否かの判断を行う（ステップＳ１８）。

【0106】

他ユーザが使用、或いは無線プロジェクタ２の入力チャンネルが異なるなどにより使用不可の場合においても、実施の形態１に例として示したように、ＬＥＤ６０の発光色を確認する事により、使用者は使用不可の原因を容易に把握することが出来る。

【0107】

ステップＳ１８において、所望の無線プロジェクタ２が使用可となった場合、使用者が選択ボタンを押下すると（ステップＳ１９）、無線プロジェクタ２から無線プロジェクタ情報表示画面４１が投射され（ステップＳ２０）、その無線プロジェクタ情報表示画面４１が投射されている期間に再度選択ボタン５１を押下する（ステップＳ２１）事により、所望の無線プロジェクタ２から実物撮像装置１で撮像された任意の画像データが送信され（ステップＳ２２）、投射可能となる。

【0108】

以上のように本実施の形態によれば、所望の無線プロジェクタの接続情報が格納された記憶媒体を実物撮像装置１に挿入し、その記憶媒体に格納された接続情報をもとに無線プロジェクタを検索する手段を備えることにより、使用者は所望の無線プロジェクタを検索する時間を大幅に短縮できるという効果を得る。

【0109】

また、接続情報に、無線プロジェクタに対し接続するためのパスワードやＷＥＰキーを加えることにより、使用者がいちいち手入力する作業を無くし、素早く所望の無線プロジェクタと接続を可能とする効果を得る。

【0110】

なお、上記各実施の形態において、実物撮像装置に設けるＬＥＤによる無線プロジェクタの状態表示を、ＬＥＤの発光色により判別するようにしたが、これを、ＬＥＤを複数設け、その発光個数により判別するようにしてもよい。

【0111】

また、１つのＬＥＤの所定時間内の発光回数によって判別するようにしてもよい。

【0112】

また、本発明は発光体としてＬＥＤを用いたが、これに限定されるものではなく、例えば、レーザーダイオードやＥＬ（ｅｌｅｃｔｒｏｌｕｍｉｎｅｓｃｅｎｃｅ）等、発光素子であれば何でもよいことは言うまでもない。

【0113】

また、ボタンの押下時間、間隔等により、機能を変えるようにすれば、検索ボタンと選択ボタンを１つのボタンで構成することもできる。

【0114】

また、検索ボタンや選択ボタンを実物撮像装置に設けるようにしたが、これを、ケーブルで接続したり、またはリモコン等に設けることにより、遠隔操作するようにしてもよい。

【0115】
こうすれば、監視カメラなど使用者から離れた位置にある実物撮像装置であっても、無線プロジェクタの状態表示を確認、および選択操作することができる。
【産業上の利用可能性】
【0116】
本発明にかかる無線プロジェクタ対応周辺機器システムは、同一のＳＳＩＤを有する無線プロジェクタが多数存在する場合において、簡単なボタン操作と直感的に状態が分かるＬＥＤの発光情報のみで、容易に所望の無線プロジェクタを検索できるという優れた効果を有し、徐々に普及が始まっている無線プロジェクタに無線ＬＡＮを用いて接続する周辺機器システムとして有用である。
【図面の簡単な説明】
【0117】
【図1】本発明の実施の形態１における無線プロジェクタ対応周辺機器システムの構成図
【図2】同実施の形態１における無線プロジェクタ対応周辺機器システムの内部構成図
【図3】同実施の形態１における無線プロジェクタ対応周辺機器システムの動作を示すフローチャート
【図4】同実施の形態１における無線プロジェクタ対応周辺機器システムの他の例を示す構成図
【図5】同実施の形態１における無線プロジェクタ対応周辺機器システムの他の例を示す構成図
【図6】本発明の実施の形態２における無線プロジェクタ対応周辺機器システムの構成図
【図7】同実施の形態２における操作ボタンの一例図
【図8】本発明の実施の形態３における無線プロジェクタ対応周辺機器システムの内部構成図
【図9】同実施の形態３における無線プロジェクタ対応周辺機器システムの動作を示すフローチャート
【図10】従来の無線プロジェクタ対応周辺機器システムの構成図
【符号の説明】
【0118】
１　実物撮像装置
２　無線プロジェクタ
３　任意の無線ネットワーク網
４　スクリーン
７　記憶媒体
１１　撮像手段
１２　画像圧縮手段
１３、２１　通信手段
１４、２４　制御手段
２２　画像伸張手段
２３　表示手段
４１　プロジェクタ情報表示画面
４２　パスワード表示画面
４３　ソフトウェアキーボード表示画面
５０　検索ボタン
５１　選択ボタン
６０、６１　ＬＥＤ

【図1】

1:実物模倣装置
2:模倣プロジェクタ
3:無線ネットワーク網
4:スクリーン
50:検査ボタン
51:選択ボタン
60:LED

【図2】

1:実物模倣装置
2:模倣プロジェクタ
3
11
12
13
14
21
22
23
24
50:検査ボタン
51:選択ボタン
60:LED

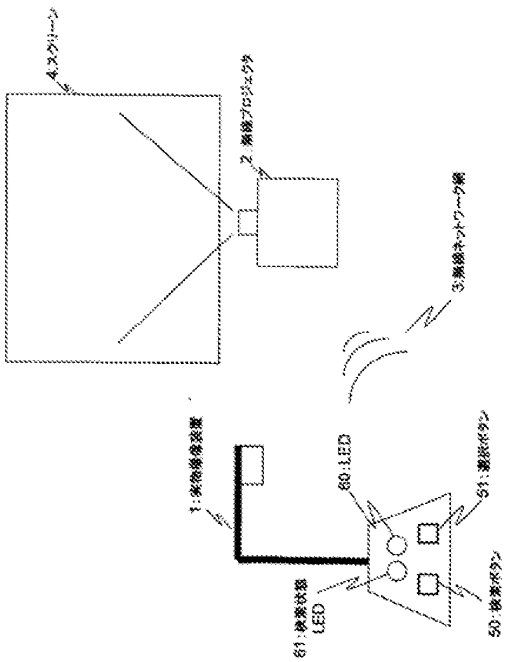
【図3】

S1
S2
S3
S4
S5
S6
S7
S8
S9
S10
S11
S12
YES
NO

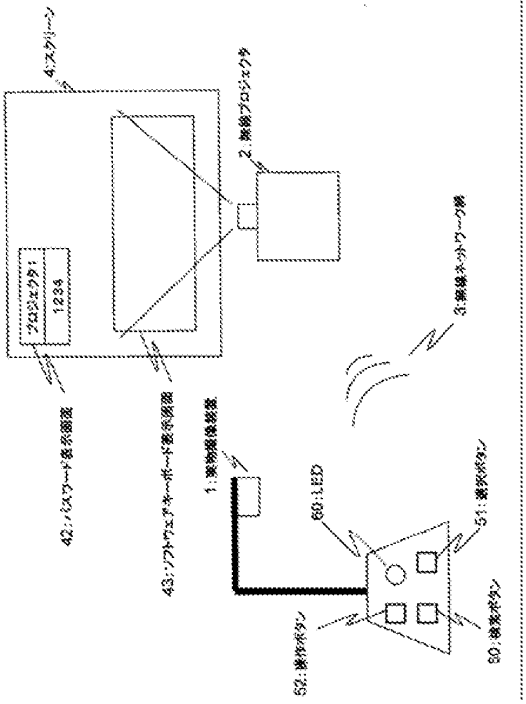
【図4】

1:実物模倣装置
2:模倣プロジェクタ
3:無線ネットワーク網
4:スクリーン
50:検査ボタン
51:選択ボタン
60:LED

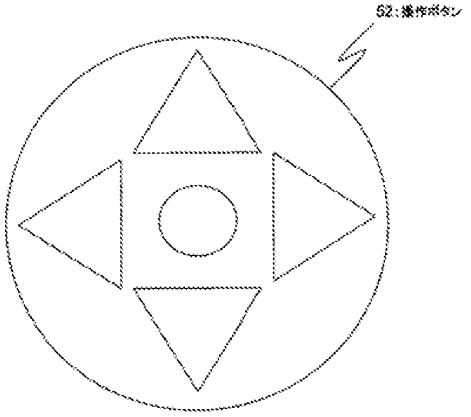
【図5】


4:スクリーン
2:無線プロジェクタ
3:無線ネットワーク網
1:無線機器装置
60:LED
51:選択ボタン
61:検索状態LED
50:検索ボタン

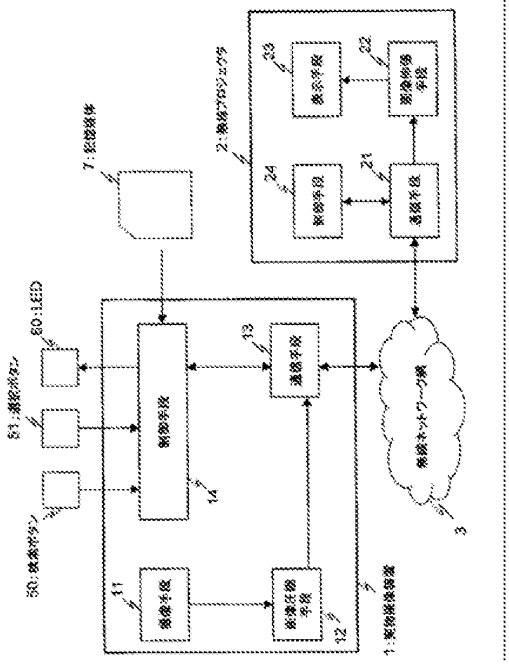
【図6】


4:スクリーン
2:無線プロジェクタ
プロジェクタ1
1234
42:パスワード表示画面
43:ソフトウェアキーボード表示画面
3:無線ネットワーク網
1:無線機器装置
60:LED
51:選択ボタン
52:操作ボタン
50:検索ボタン

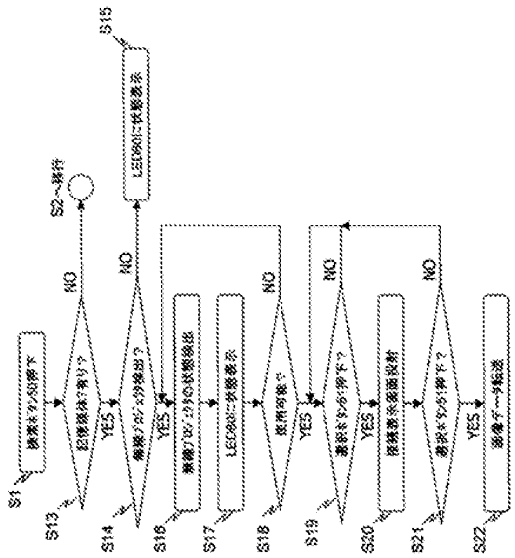
【図7】


52:操作ボタン

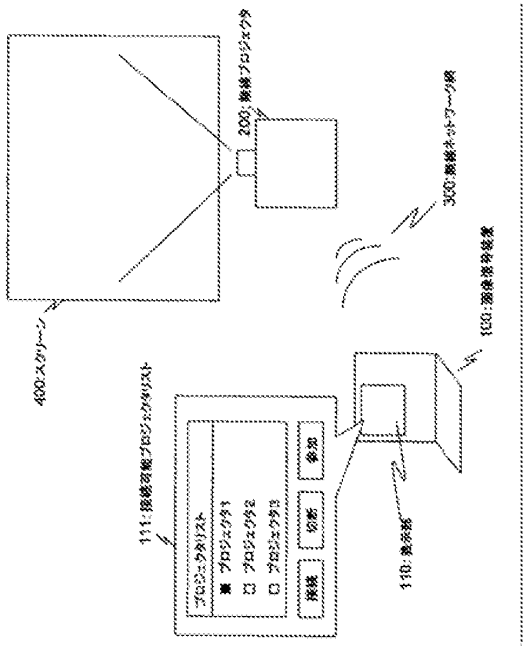
【図8】


7:記憶媒体
2:無線プロジェクタ
23
22
24
21
60:LED
51:選択ボタン
50:検索ボタン
13
14
11
12
3
1:無線機器装置

【図9】


S1
S13
S14
S15
S16
S17
S18
S19
S20
S21
S22
YES
NO

【図10】


400:スクリーン
200:無線プロジェクタ
300:無線ネットワーク網
100:画像情報装置
110:表示部
111:接続可能プロジェクタリスト
プロジェクタリスト
プロジェクタ1
プロジェクタ2
プロジェクタ3
接続
切断
参加

(51)Int.Cl.			FI			テーマコード（参考）
Ｈ０４Ｎ	5/222	(2006.01)	Ｇ０９Ｇ	3/20	６３３Ｋ	
			Ｇ０９Ｇ	3/20	６３２Ｂ	
			Ｇ０９Ｇ	3/20	６３３Ｄ	
			Ｇ０９Ｇ	3/20	６８０Ｄ	
			Ｇ０９Ｇ	5/00	５１０Ｖ	
			Ｇ０９Ｇ	5/00	５３０Ｍ	
			Ｇ０９Ｇ	5/00	５１０Ｈ	
			Ｇ０９Ｇ	5/00	５５０Ｄ	
			Ｇ０９Ｇ	5/00	５５５Ａ	
			Ｇ０９Ｇ	5/00	５１０Ｂ	
			Ｈ０４Ｎ	5/74	Ｚ	
			Ｈ０４Ｎ	5/222	Ｚ	

Fターム(参考)											
	5C080	BB05	DD13	DD27	EE01	EE17	JJ02	JJ07	KK02		
	5C082	AA01	AA03	AA22	AA27	AA34	BA02	BA12	BA26	BB01	BB44
		BD06	CA33	CA56	CB05	DA26	DA86	DA89	MM09		
	5C122	DA28	EA55	EA62	FK23	FL05	GC01	HB01			

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 107 463 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
07.10.2009 Bulletin 2009/41

(51) Int Cl.:
G06F 9/445 *(2006.01)*

(21) Application number: **09157439.2**

(22) Date of filing: **06.04.2009**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK TR

(30) Priority: **04.04.2008 EP 08154116**
09.10.2008 EP 08166258

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(54) Wireless modem device usable on computer device without driver installation

(57) Method for connecting a host computer device to a wireless communication network, the host computer device being provided with an operating system with at least one pre-installed generic driver providing a generic communication protocol (7) for communication between the host computer device and a standard class of computer peripheral devices other than wireless modem devices, the method comprising the steps of: (a) connecting a wireless modem device to the host computer device; (b) setting up, by means of a pre-installed generic driver of the operating system on the computer device, a modem/host communication interface (6) for communication between the wireless modem device and the computer device; (c) connecting the host computer device to a wireless communication network via the wireless modem device; (d) routing data traffic (8-9) between the host computer device and the wireless communication network over the modem/host communication interface (6). The generic communication protocol (7) is used in the modem/host communication interface (6) for transferring the data traffic (8-9) between the host computer device and the wireless modem device.

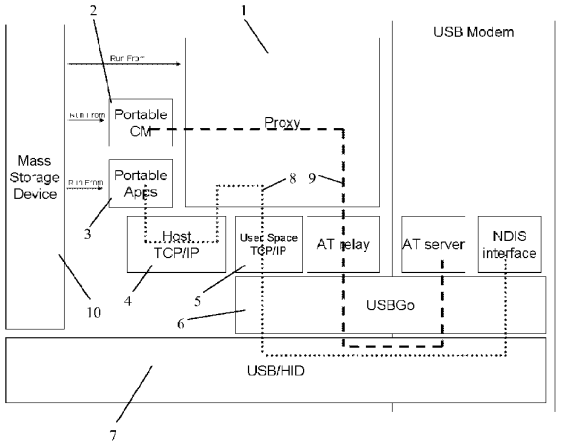

Fig. 1

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Printed by Jouve, 75001 PARIS (FR)

Description

Technical field

[0001] The present invention relates to a wireless modem device connectable to a computer device and a method for operating said wireless modem.

Background art

[0002] Today, when a wireless modem is connected for the first time to a computer device, installation of an appropriate driver is required before applications running on the computer device can use the functionality of the wireless modem to connect to wireless networks.

[0003] It is a disadvantage of existing wireless modem devices that users cannot use them on a foreign computer device, which may for example be a computer device in a hotel or on an airport, on which the user has no administrator rights and installation of the appropriate driver is not allowed.

Disclosure of the invention

[0004] It is an aim of the present invention to provide a wireless modem device and a method for operating same, with which the need for installation of an appropriate driver can be avoided.

[0005] This aim is achieved according to the invention with the method and device of the independent claims.

[0006] As used herein, with "wireless modem device" is intended to mean a computer peripheral device which has an electronic interface for connection to a complementary electronic interface of a computer device (host) and which comprises electronic components for establishing communication between said computer device to which it is connected and a remote device over a wireless communication network.

[0007] The electronic interface can for example be a USB interface, a firewire interface, a PCI express interface, a PCMCIA interface or any other electronic interface known to the person skilled in the art.

[0008] The wireless communication network can be WLAN, GSM, GPRS, UMTS, EDGE, HSUPA, HSDPA, 3G, 3.5G, 4G or any other wireless communication network known to the person skilled in the art. In preferred embodiments, the wireless modem device of the invention can have electronic components for communicating over two or more different wireless communication networks.

[0009] In the connection method and the wireless modem device of the invention, a pre-installed generic driver of an operating system installed on the computer device is used for setting up a modem/host communication interface by means of which the wireless modem device and the computer device can communicate with each other. Data traffic from the computer device towards the wireless communication network and vice versa is routed over this modem/host communication interface and uses the generic communication protocol provided by the pre-installed generic driver. This has the advantage that the need for a specific driver for the communication between the wireless modem device and the computer device can be avoided. This has the advantage that a user can use the wireless modem device on a computer device on which he has no administrator rights, i.e. a computer device on which his user rights are restricted so that he cannot install a specific driver for the wireless modem device, for example a computer device in a hotel, on an airport and the like.

[0010] As used herein, by "pre-installed generic driver" is intended to mean a driver which is installed on the computer device along with the installation of the operating system, i.e. a driver which is standard for the operating system and which is capable of driving a standard class of computer peripheral devices connected to the computer device without requiring installation of a specific driver for such a computer peripheral device. An example of such a generic driver is a human interface driver (HID), which has predetermined software components configured for driving a human interface device such as a mouse, a keyboard or other. Another example of such a generic driver is a mass storage device (MSD) driver, which has predetermined software components configured for driving mass storage devices such as USB memory sticks, external hard drives, or more generally readable and writable computer peripheral memory devices. HID and MSD drivers are known per se in the art an therefore need not be described in detail herein.

[0011] In the method and device of the invention, one of the pre-installed generic drivers of the operating system on the computer device is exploited for setting up the modem/host communication interface, i.e. the generic driver is used in connection with a computer peripheral device for which it is not actually intended. In other words, the wireless modem device of the invention does not belong to the standard class of computer peripheral devices for which the generic driver is foreseen in the operating system. Nevertheless, it has been found according to the invention that the wireless modem device can communicate with the computer device by using the generic communication protocol provided by the generic driver over the modem/host communication interface. In particular, the generic communication protocol is used as the lower layer communication protocol for exchanging information between the wireless modem device and the computer device, such as for example AT commands or IP data.

[0012] In preferred embodiments, the wireless modem device of the invention uses a proprietary protocol stack (e.g. a proprietary TCP/IP stack) rather than a kernel protocol stack (e.g. a kernel TCP/IP stack) which is otherwise generally used by the operating system and any applications running under the operating system on the computer device for any network communication.

[0013] In preferred embodiments, the proprietary pro-

tocol stack is preferably set up on the computer device, although in alternative embodiments the proprietary protocol stack may also be set up on the wireless modem device.

[0014] In preferred embodiments, the wireless modem device of the invention uses a proxy to move data traffic from the kernel protocol stack to the proprietary protocol stack, i.e. to indicate to running applications that network communication is to be performed using the proprietary protocol stack set up by the wireless modem device rather than the kernel protocol stack.

[0015] In preferred embodiments, the wireless modem device stores at least one application and is provided for launching said application as a portable application, meaning that the application keeps its data (cache) in the memory of the wireless modem device and no traces are left on the computer device. The application can for example be a web browser application, a document viewer application for viewing a.o. downloaded documents, or other. The web browser application preferably has predefined settings, such that it is configured to make use of the proxy server application with embedded proprietary protocol stack for connecting to the internet.

[0016] The above mentioned features of the wireless modem device and its operation method contribute to the advantage that any modification to settings in the kernel protocol stack or in the operating system can be avoided, or more in general that any traces on the computer device can be avoided, so that upon disconnecting the wireless modem device from the computer device, it is as if it has never been used on the computer device. As used herein, this effect is termed a "zero footprint", i.e. the wireless modem device leaves no trace or a "zero footprint" on the computer device.

[0017] In preferred embodiments of the device of the invention, software code portions are stored on the wireless modem device or on a separate memory device (e.g. a micro SD card) connectable to the wireless modem device, which are configured for performing one or more of the above mentioned steps, i.e. the use of a pre-installed generic driver, the setting up of a proprietary protocol stack, the use of a proxy, etc.. The software code portions are preferably stored in a read only partition.

[0018] In preferred embodiments of the method for operating the wireless modem device of the invention, the method comprises one or more of the following steps: (a) upon connection of the wireless modem device to a computer device, checking if a specific driver for the wireless modem device is present on the computer device; (b) if not, using the pre-installed generic driver of the operating system on the computer device for communication between the wireless modem device and the computer device; (c) setting up the proprietary protocol stack for establishing network communication between applications running on the computer device and the wireless communication network via the wireless modem device; (d) using the proxy to move data traffic from the kernel protocol stack to the proprietary protocol stack; (e) launching applications stored on the wireless modem device as portable applications.

[0019] The invention more generally relates to a method for connecting a computer device to a communication network, the host computer device being provided with an operating system using a kernel protocol stack to connect to a pool of first communication networks known to an administrator of the computer device, the method comprising the step of introducing a second protocol stack, aside from the kernel protocol stack, for connecting the computer device to a second communication network outside not belonging to the known pool of first communication networks. This may comprise the step of adding a tunnelling protocol to the second protocol stack without mediation of the administrator. Preferably, the second protocol stack is introduced by running a proxy server application with predefined connection parameters on the computer device, the proxy server application redirecting data traffic between the computer device and the second communication network from the kernel protocol stack to the second protocol stack.

Brief description of the drawings

[0020] The invention will be further elucidated by means of the following description and the appended drawings.

[0021] Fig. 1 shows a general view with the main components of a preferred embodiment of the invention.

[0022] Figs. 2 and 3 respectively show separate views of the data plane and the control plane of the embodiment of figure 1.

[0023] Fig. 4 shows a possible flow diagram for a preferred embodiment of the invention.

Modes for carrying out the invention

[0024] The present invention will be described with respect to particular embodiments and with reference to certain drawings but the invention is not limited thereto but only by the claims. The drawings described are only schematic and are non-limiting.

[0025] Furthermore, the terms first, second, third and the like in the description and in the claims, are used for distinguishing between similar elements and not necessarily for describing a sequential or chronological order. The terms are interchangeable under appropriate circumstances and the embodiments of the invention can operate in other sequences than described or illustrated herein.

[0026] Moreover, the terms top, bottom, over, under and the like in the description and the claims are used for descriptive purposes and not necessarily for describing relative positions. The terms so used are interchangeable under appropriate circumstances and the embodiments of the invention described herein can operate in other orientations than described or illustrated herein.

[0027] The term "comprising", used in the claims,

should not be interpreted as being restricted to the means listed thereafter; it does not exclude other elements or steps. It needs to be interpreted as specifying the presence of the stated features, integers, steps or components as referred to, but does not preclude the presence or addition of one or more other features, integers, steps or components, or groups thereof. Thus, the scope of the expression "a device comprising means A and B" should not be limited to devices consisting only of components A and B. It means that with respect to the present invention, the only relevant components of the device are A and B.

1. Introduction

[0028] Problem Definition: to provide a way to achieve USB (or other interface) modem functionality in any computer (Operating system independent) without leaving a footprint (Zero-Footprint). This means that the need can be avoided to install drivers and/or applications on PC's to give USB modem connectivity. This also means that the need can be avoided for the end user to have administrator rights on the computer. An advantage is the ease of use of e.g. USB modem products which can even be allowed usage in restricted conditions. The invention can give the end user connectivity on any personal computer (PC) without interfering on the PC itself.

[0029] A preferred solution according to the invention is to combine existing standard methods found in current Operating Systems (OS) to achieve the Zero Footprint objective. The concepts involved in this preferred solution are:

- Use of existing USB class drivers
- Use of a user space TCP/IP stack
- Use of a proxy between kernel and user space TCP/IP stack
- Use of portable applications running from a mass storage device.

[0030] Usually, the user needs to install proprietary drivers before he/she can use a USB network device. These drivers present a network/modem interface (+some other control interfaces) to the OS. In some OSes (i.e. Linux and Mac OS X), it is possible to use existing USB class drivers (e.g. USB CDC ACM and USB CDC Ethernet) already present in the OS but Windows OSes require some extra files and administrator rights to use these network class drivers. To avoid this, we propose to use other USB class drivers, not exhibiting a network/modem interface but supported without any extra installation in all OSes. The challenge is then to reroute network requests/answers from/to the applications. The normal flow would be to reroute the network request/packet at the bottom of the TCP/IP stack by creating a new network interface which would take packets from/to the TCP/IP stack and transfer them to the network device. But this creation of network interface requires administrator rights and thus is not possible for a full Zero Footprint concept which is aimed at in this preferred embodiment of the invention. In order to achieve this aim, a proprietary TCP/IP stack, running in user space, is used instead of the standard one available in host OSes. This enables to tune the proprietary TCP/IP stack to use the chosen USB class driver without requiring administrator rights. Standard network applications are built using the Socket interface and dynamic library which would then link it to the standard TCP/IP stack available on the OSes. According to this preferred embodiment of the invention they are linked to the proprietary TCP/IP stack and thus, for avoiding to have to modify/recompile the applications, preferably a Proxy is used which routes the information from the local host interface, connected to the host OS TCP/IP stack, to the proprietary stack. The applications are preferably modified by the configuration of a Proxy. The applications are preferably launched from the mass storage device as portable applications, which can avoid that any traces are left on the host OS.

[0031] A preferred implementation is discussed below, named the "ZeroFootprint solution".

2. Technical overview

2.1. Introduction

[0032] A general view with the main interfaces exposed is shown in Figure 1. From a protocol point of view, Figures 2 and 3 give a separate view of respectively the data plane and the control plane.

[0033] The ZeroFootprint solution is based on mainly 5 elements:

- a host/modem interface ("USBGo" 6) using the USB/HID protocol (7) to transport AT data (9) and IP data (8);
- an external TCP/IP stack (5) configured to send IP data through the above mentioned USB/HID channel (7);
- a TCP/IP proxy (1) configured to translate host TCP/IP stack (4) into external TCP/IP stack (5);
- a Connection Manager ("CM" 2) able to open a connection through the interface provided by the proxy;
- a program launcher and portable applications (3), a.o. a web browser application.

2.2 Generic description/use case

[0034]

1. The user plugs the USB modem (below also referred to as "the modem device". At this point, the modem presents itself as a USB modem with VID/PID. Additionally, this solution builds on top of one of the default (non network) USB HID device class drivers available in the most common OS (Windows XP, Vista, Mac OSX and Linux). At this point,

there are two alternatives on how the OS can react. If the USB modem drivers have not been installed, the OS recognizes the device as a MSD+HID generic device (the device is configured for presenting itself this way) and therefore loads those drivers. Alternatively, the USB modem drivers might have been installed, and then these drivers will handle the device. But let's concentrate on the 'nomadic' mode, in which OS generic drivers are used. At this point, the USB modem presents itself as a USB Mass Storage Device (10) presenting a CD Rom (exposing flash memory), a Generic Volume (exposing microSD) and a 3rd Generic Device to transport control and TCP/IP data between the host OS and the USB modem. Immediately after this configuration is shown in the OS, and now assuming a Windows OS, the CD Rom has an autorun that launches a launcher in which the user has the possibility to launch amongst other applications a web browser (e.g. Firefox) and a Connection Manager (CM). This launcher is based on portable application principles, as it is also done with other applications.

2. The user starts the Connection Manager and starts a connection. The Connection Manager opens a serial virtual port (interface provided by a proxy running from the modem device) to be able to send AT commands and therefore opening a packet data protocol (PDP).

3. When the connection is established using AT commands, a PDP is created and the network will return a set of IP configuration parameters. These network parameters are passed to a proprietary proxy server that contains an embedded TCP/IP stack that is adapted to work with the USB HID interface to pass IP and control data. This proxy sits also on top of the standard windows sockets to be able to listen to incoming request to the localhost (see following step).

4. The user starts the webbrowser and opens a site (e.g. http://www.google.com). This webbrowser is configured to use the previously mentioned proxy on the localhost. When the proxy receives the request, it will use the second proprietary interface (with the embedded TCP/IP stack) to transmit/receive data to/from the network.

2.3 USB

2.3.1 USB Endpoints and switching mechanism

[0035] Preferably, the ZeroFootprint capable devices offer the capabilities to work in dual mode, meaning that ZeroFootprint functionality can be used when no drivers are installed, and Standard (legacy) functionality can be used when drivers are installed. In the two cases, different USB endpoint structures are used.

[0036] A switching mechanism allows a ZeroFootprint device to present itself as a USB/HID+MSD device or USB modem device, depending on the availability of drivers in the system. The USB device can thus expose its USB interface in different ways: (1) A composite device with USB HID and USM Mass Storage Unit (UMS) device with UMS and HID USB ID; (2) UMS device with 3G USB ID.

2.3.2 USBGo interface

[0037] The USBGo interface is the interface enabling communication between the USB modem and the computer. The USBGo uses USB-HID as a lower layer to avoid having to install a specific driver for the modem.

[0038] The USBGo interface supports multiple channels, so that separate channels can be used for control data and user data. A flow control mechanism allows any endpoint of the USBGo interface to stop/restart data in a given channel, in case that it cannot handle the amount of data received. The flow control mechanism can be relatively simple as it is only used for the data channel (s). The control channel is used to send enable/disable frames for a given data channel.

[0039] In this way, the USBGo interface is tuned and optimized to allow transferring data with a minimum guaranteed speed between modem device and host computer and transferring data in packages on an event driven base. It optimises the USB resources (for instance the available bandwidth of the "USB/HID") and the power consumption on the USB physical layer.

2.4 Mass Storage Devices

[0040] The Zero Footprint concept doesn't impose any special requirements on the storage used. The concept provides a virtual CD ROM concept, i.e. a certain amount of read only memory (64 MB) is available to the OS when the modem device is inserted for first time and drivers have not been installed previously. This storage device is presented as a CD-ROM that contains an executable with the drivers/connection manager installer. The concept further provides memory in the form of microSD. This microSD is presented as a mass storage device.

[0041] The CD-ROM memory part is used to have a permanent copy of the basic applications needed (i.e. launcher, proxy and CM) (+specific drivers installer). Therefore, any configuration file needed by the launcher, proxy or CM is stored/modified on the writable storage device (i.e. microSD). To do so, these applications look for the driver on which the configuration is available. This can be achieved differently in the different OSes. In Windows, the two USB storage devices are under the same USB device (device manager). In Linux and MacOS X: On Unix based OS, the USB mass storage devices can be found under /dev/sdX.

2.6 TCP/IP stack

[0042] The host OS TCP/IP stack is used whenever the specific USB modem drivers are installed.

[0043] The proprietary TCP/IP stack used in the Zero-Footprint mode to bridge between the host OS TCP/IP stack and the USB/HID interface created to send data.

2.7 Proxy

2.7.1 General

[0044] Proxy is started at the beginning (from the launcher or any other method). As default configuration, it is using the standard OS TCP/IP stack, and will change to use the external TCP/IP stack whenever notified by the CM. For example, the proxy can restart itself using a different stack when the CM requests the change.

2.7.2 Interface CM - Proxy

[0045] To be able to send AT commands and configure the external TCP/IP protocol for the USB/HID interface, the proxy exposes an interface to 3rd party applications. This interface resembles a serial interface.

[0046] A possible flow diagram is the following (pre-condition - no drivers installed):

1. User inserts modem device
2. CD autolaunch launches Launcher
3. Launcher launches proxy
4. Proxy starts according to default configuration a. Default host TCP/IP stack
5. Proxy starts to listen for client request (virtual serial port)
6. User launches Connection Manager
7. CM connects to Proxy
8. Proxy returns OK(Restarting)
9. Proxy restarts using USB/HID (external TCP/IP) interface
10. CM reconnects to proxy and starts to send AT commands
11. (...)
12. User stops connection
13. CM closes connection with Proxy
14. Proxy returns OK(Restarting)
15. Proxy restarts using default host OS TCP/IP

2.8 Programs Launcher

[0047] The Program Launcher (launcher from now on) is responsible to provide an interface for the user to be able to launch the applications residing in the memory of the USB modem, and allow the modification of some basic settings. The launcher can be based on the functionality already provided by other 3rd party launchers.

[0048] For the launcher to recognise the list of programs available in the USB memory, the list is preferably generated dynamically. For doing that, the applications are copied into the modem device following a certain structure, and information related to the application and how it's shown in the launcher is made available.

2.9 Connection Manager

[0049] The CM listens for various insertion events and the queries the current list of devices. It looks for VID/PID and compares with its internal database.

2.10 Portable applications

[0050] It is preferred to use portable applications which run from the modem device without the need to install anything on the host (ideally, also no registry change is allowed). For applications to be able to run on the Zero-Footprint mode, support for communication with the proxy is provided.

3. Flow diagram

[0051] Another basic flow using the ZeroFootprint (USB/HID) concept is shown in figure 4.

[0052] The user inserts the modem device ("stick"). The following steps are performed.

1: The OS ("Windows") looks for a device specific driver and finds none. The OS links the USB/HID driver to the modem device.

2: Part of the memory on the modem device is presented as a CD-ROM. The OS launches "autorun" is the same way as it is commonly done when an OS detects a CD-ROM.

3: Calling autorun launches the Program Launcher.

4: The Launcher launches the proxy server application (provided on the modem device), which starts to listen on the localhost for incoming client requests. The proxy provides an open interface for 3rd party applications, such as the Connection Manager (CM).

5: The user launches the CM (provided on the modem device). The CM does not detect any legacy driver mode and assumes that the driver mode using USB/HID is active.

6: The CM opens a virtual serial port. The CM passes information about the modem device found to the Proxy.

7: The CM sends AT command to the proxy.

8: The proxy forwards the AT command (over the USB/HID interface) to the modem device, which performs the step for creating a PDP and receiving an IP configuration (these steps are well known in the art and therefore need not be described in detail here).

9: The modem device passes the IP configuration on to the CM, which sends AT commands to the modem device to establish the PDP.

10: The CM asks the proxy to configure the external TCP/IP stack.

11: The user launches a web browser application (e.g. modified version of Firefox).

12: The web browser application is preconfigured to use the external TCP/IP stack provided by the proxy.

13: IP data is exchanged between the modem device and the proxy through the external TCP/IP stack ("LWIP") and the USB/HID interface.
14: The user disconnects, using the CM, which sends commands to the modem device to close the connection.
15: The CM tells the proxy to unconfigure the IP stack.
16: The user safely removes the modem device from the host, which triggers the modem device to close the launcher (step 17), which closes the CM (step 18), which tells the proxy to close the connection (step 19) and subsequently closes the proxy (step 20).

4. Alternative embodiments

[0053] The principles of the embodiment described above can also be used in the following alternative embodiments of the invention, namely to connect a computer device to a second (wireless or non-wireless) communication network which does not belong to a pool of first (wireless or non-wireless) communication networks known to an administrator of the computer device. In a similar way as described above, a second protocol stack can be introduced next to the kernel protocol stack provided by the OS on the computer, to allow applications running on the computer device to get outbound connection to the second communication network. In a similar way as described above, a proxy server application with predefined connection parameters for using the second communication network can be used to tell the applications to redirect data traffic between the computer device and the second communication network from the kernel protocol stack to the second protocol stack.

[0054] In alternative embodiments, a tunnelling protocol stack, such as for example IPSEC, can be added to the second protocol stack (or also the proprietary protocol stack for the wireless modem device described above), for establishing secure networking sessions. Likewise, this does not require mediation of the administrator.

Claims

1. Method for connecting a host computer device to a wireless communication network, the host computer device being provided with an operating system with at least one pre-installed generic driver providing a generic communication protocol (7) for communication between the host computer device and a standard class of computer peripheral devices other than wireless modem devices, the method comprising the steps of:

   a) connecting a wireless modem device to the host computer device;
   b) setting up, by means of the pre-installed generic driver of the operating system, a modem/host communication interface (6) for communication between the wireless modem device and the computer device;
   c) connecting the host computer device to a wireless communication network via the wireless modem device;
   d) routing data traffic (8-9) between the host computer device and the wireless communication network over the modem/host communication interface (6),

   characterised in that the generic communication protocol (7) is used in the modem/host communication interface (6) for transferring the data traffic (8-9) between the host computer device and the wireless modem device.

2. Method according to claim 1, wherein step b) comprises presenting the wireless modem device to the host computer device as a human interface device and wherein the pre-installed generic driver is a human interface device driver.

3. Method according to claim 1, wherein step b) comprises presenting the wireless modem device to the host computer device as a mass storage device and wherein the pre-installed generic driver is a mass storage device driver.

4. Method according to any one of the previous claims, wherein a proxy server application (1) with predefined connection parameters is stored on the wireless modem device and step c) comprises running the proxy server application.

5. Method according to claim 4, wherein the proxy server application (1) comprises an embedded proprietary protocol stack (5) for the step d) of routing the data traffic (8) between the host computer device and the wireless communication network over the modem/host communication interface.

6. Method according to claim 4 or 5, wherein the proxy server application is run on the host computer device.

7. Method according to claim 4 or 5, wherein the proxy server application is run on the wireless modem device.

8. Method according to any one of the previous claims, wherein a web browser application (3) with predefined settings is stored on the wireless modem device and wherein the method further comprises the step of running the web browser application as a portable application on the wireless modem device.

9. Computer peripheral wireless modem device for providing wireless connectivity to a host computer device which is provided with an operating system with at least one pre-installed generic driver providing a generic communication protocol (7) for communication between the host computer device and a standard class of computer peripheral devices other than wireless modem devices, the wireless modem device comprising a memory (10) in which computer executable software code is stored, said computer executable software code comprising:

    a first software code portion for setting up, by means of the pre-installed generic driver of the operating system, a modem/host communication interface (6) for communication between the wireless modem device and the computer device;
    a second software code portion for connecting the host computer device to a wireless communication network via the wireless modem device;
    a third software code portion for routing data traffic between the host computer device and the wireless communication network over the modem/host communication interface;

    characterised in that the first software code portion uses the generic communication protocol (7) in the modem/host communication interface (6) for transferring the data traffic between the host computer device and the wireless modem device.

10. Computer peripheral wireless modem device according to claim 9, wherein the first software code portion presents the wireless modem device to the host computer device as a human interface device and wherein the pre-installed generic driver is a human interface device driver.

11. Computer peripheral wireless modem device according to claim 9, wherein the first software code portion presents the wireless modem device to the host computer device as a mass storage device and wherein the pre-installed generic driver is a mass storage device driver.

12. Computer peripheral wireless modem device according to any one of the claims 9-11, wherein the second software code portion comprises a proxy server application (1) with predefined connection parameters.

13. Computer peripheral wireless modem device according to claim 12, wherein the third software code portion comprises an proprietary protocol stack (5) embedded in the proxy server application.

14. Computer peripheral wireless modem device according to any one of the claims 9-13, wherein said computer executable software code comprises a web browser application (3) with predefined settings which is provided for being run as a portable application on the wireless modem device.

15. Method for connecting a computer device to a communication network, the host computer device being provided with an operating system using a kernel protocol stack (4) to connect to a pool of first communication networks known to an administrator of the computer device, the method comprising the step of introducing a second protocol stack (5), aside from the kernel protocol stack, for connecting the computer device to a second communication network outside not belonging to the known pool of first communication networks.

16. Method according to claim 15, further comprising the step of adding a tunnelling protocol to the second protocol stack without mediation of the administrator.

17. Method according to claim 15 or 16, wherein the second protocol stack is introduced by running a proxy server application (1) with predefined connection parameters on the computer device, the proxy server application redirecting data traffic between the computer device and the second communication network from the kernel protocol stack to the second protocol stack.

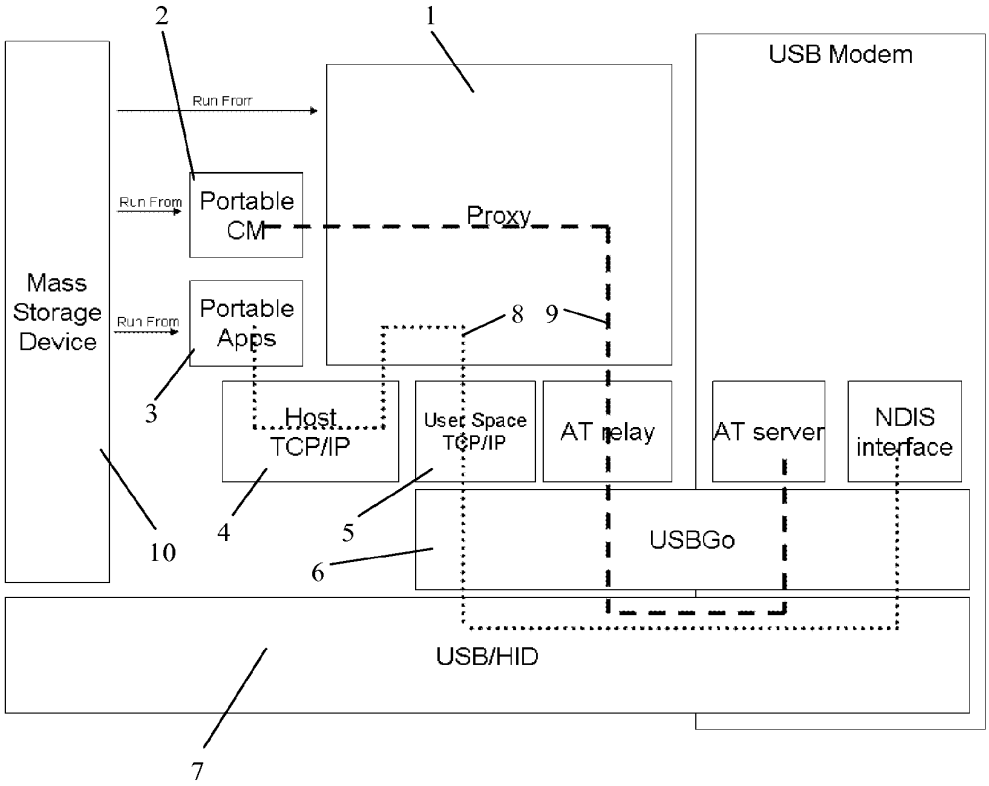

2
1
USB Modem
Run From
Run From
Portable CM
Proxy
Mass Storage Device
Run From
Portable Apps
8
9
3
Host TCP/IP
User Space TCP/IP
AT relay
AT server
NDIS interface
4
5
USBGo
10
6
USB/HID
7

Fig. 1

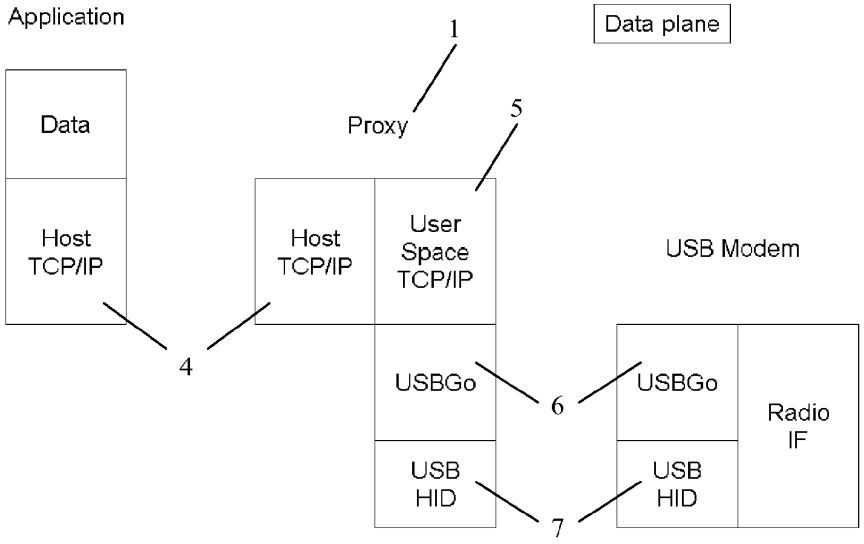


Figure 2

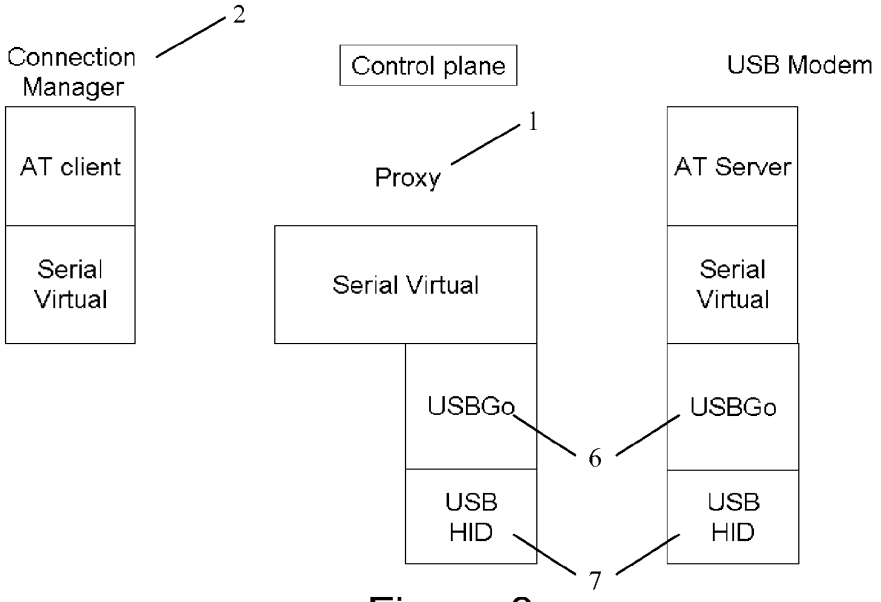


Figure 3

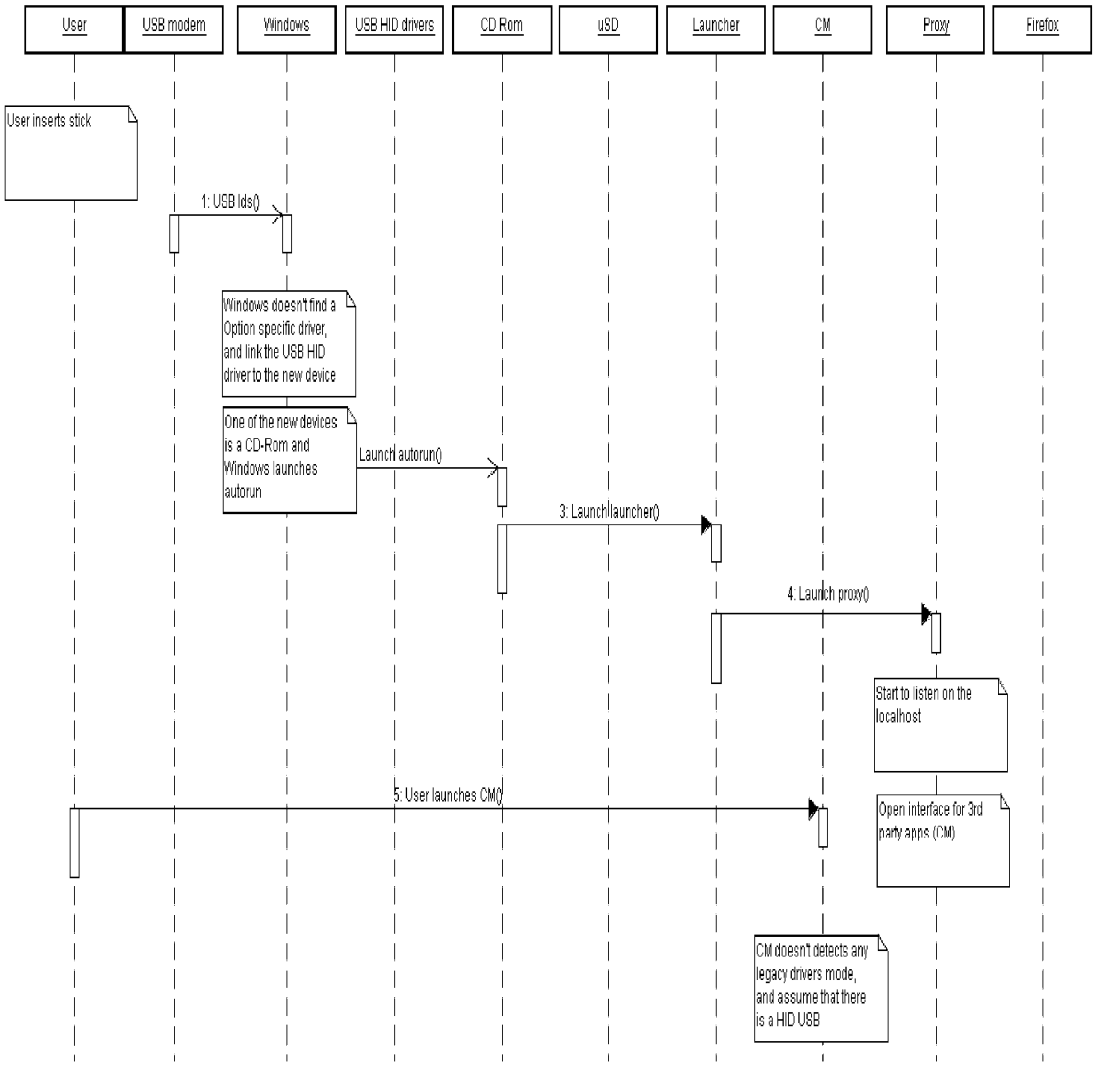
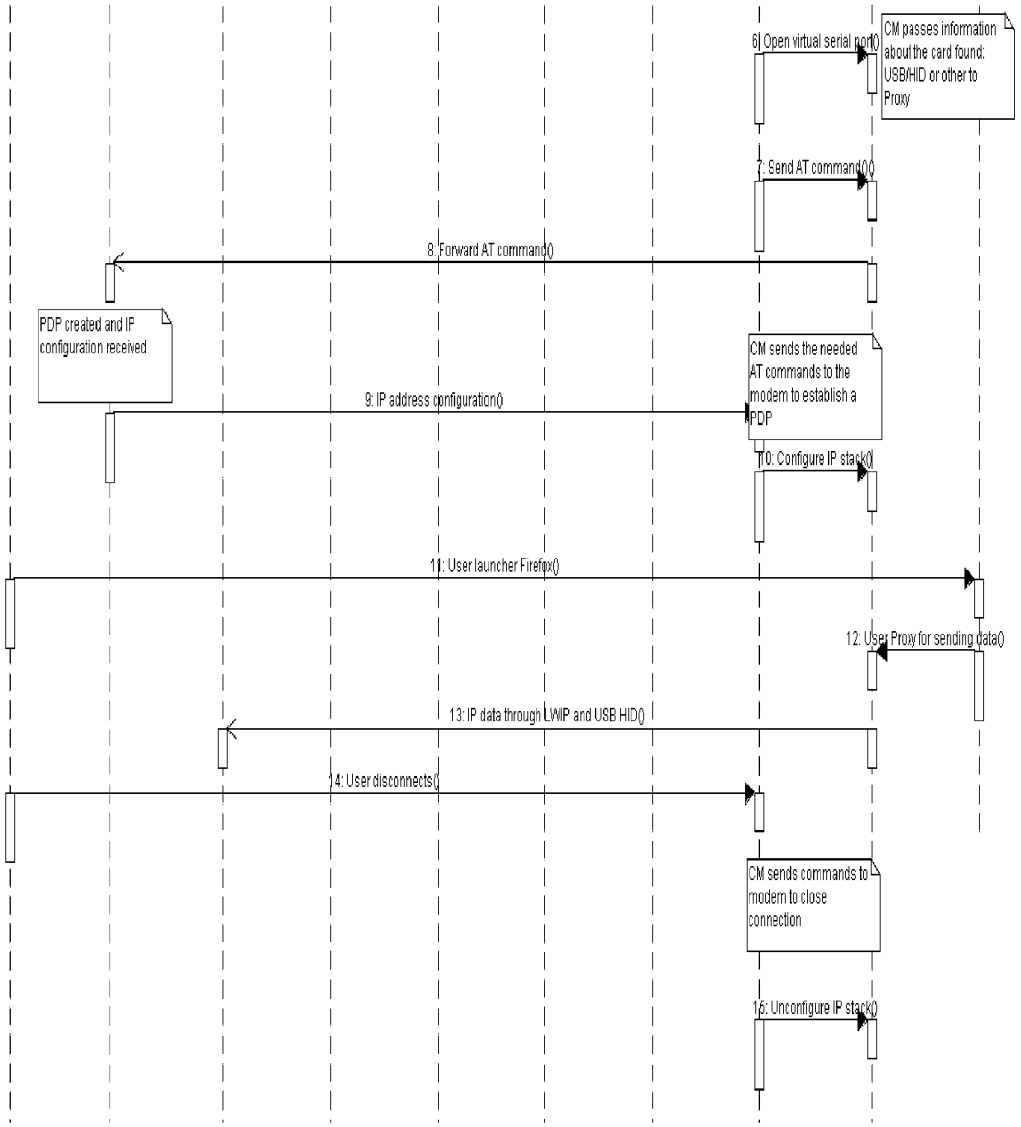

User
USB modem
Windows
USB HID drivers
CD Rom
uSD
Launcher
CM
Proxy
Firefox
User inserts stick
1: USB Ids()
Windows doesn't find a Option specific driver, and link the USB HID driver to the new device
One of the new devices is a CD-Rom and Windows launches autorun
Launch autorun()
3: Launch launcher()
4: Launch proxy()
Start to listen on the localhost
5: User launches CM()
Open interface for 3rd party apps (CM)
CM doesn't detects any legacy drivers mode, and assume that there is a HID USB

Figure 4a


6: Open virtual serial port()
CM passes information about the card found: USB/HID or other to Proxy
7: Send AT command()
8: Forward AT command()
PDP created and IP configuration received
CM sends the needed AT commands to the modem to establish a PDP
9: IP address configuration()
10: Configure IP stack()
11: User launcher Firefox()
12: User Proxy for sending data()
13: IP data through LWIP and USB HID()
14: User disconnects()
CM sends commands to modem to close connection
15: Unconfigure IP stack()

12

Figure 4b

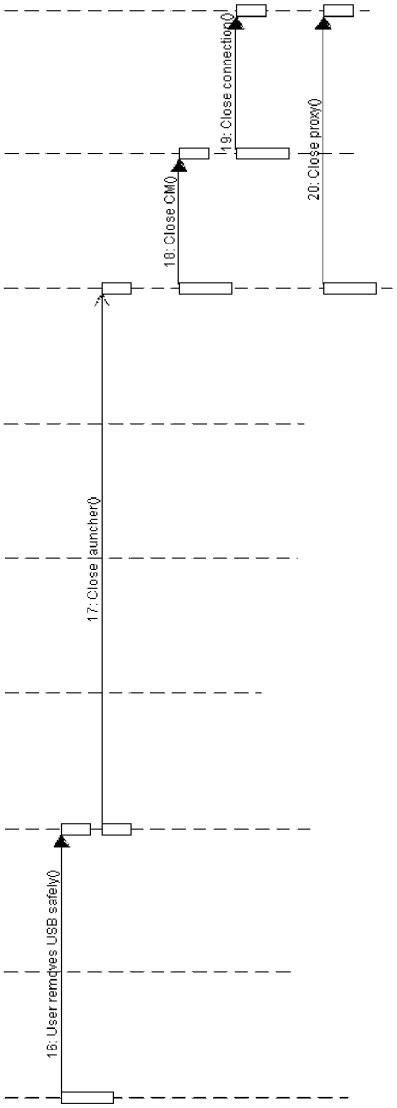

16: User removes USB safely()
17: Close launcher()
18: Close CM()
19: Close connection()
20: Close proxy()

Figure 4c

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Veröffentlichungsnummer:
(11) Publication number: **EP 2 756 668 A0**
(11) Numéro de publication:

Internationale Anmeldung veröffentlicht durch die Weltorganisation für geistiges Eigentum unter der Nummer:

WO 2013/037979 (Art. 153(3) EPÜ).

International application published by the World Intellectual Property Organization under number:

WO 2013/037979 (Art. 153(3) EPC).

Demande internationale publiée par l'Organisation Mondiale de la Propriété Intellectuelle sous le numéro:

WO 2013/037979 (art. 153(3) CBE).

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
21 March 2013 (21.03.2013)

WIPO | PCT

(10) International Publication Number
WO 2013/037979 A1

(51) International Patent Classification:
H04N 7/15 (2006.01) *G06F 9/54* (2006.01)
H04N 21/41 (2011.01) *H04M 3/56* (2006.01)

(21) International Application Number:
PCT/EP2012/068166

(22) International Filing Date:
14 September 2012 (14.09.2012)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/534,592 14 September 2011 (14.09.2011) US
13/270,659 11 October 2011 (11.10.2011) US
61/635,219 18 April 2012 (18.04.2012) US

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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

[Continued on next page]

(54) **Title**: ELECTRONIC TOOL AND METHODS FOR MEETINGS

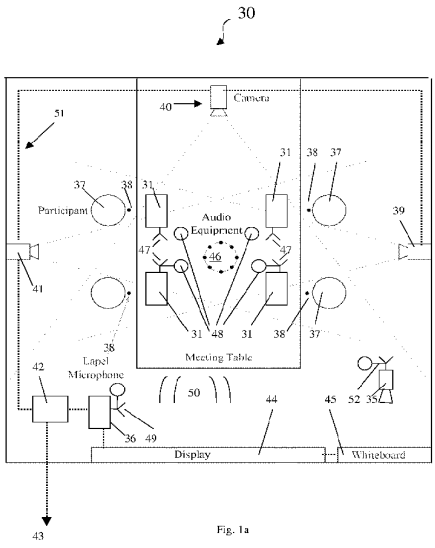

Fig. 1a

(57) **Abstract**: 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.

WO 2013/037979 A1

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

ELECTRONIC TOOL AND METHODS FOR MEETINGS

The present invention relates to electronic tools for meetings including methods or devices for providing connection to a communications network, to networks or methods of operating the network, methods or devices for use in displaying media content as well as software for performing any of these methods.

Technical background

Tools for collaboration

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.

Collaborative workspaces in corporate networks and on the Internet offer geographically distributed collaborators a virtual repository for documents related to a project or a meeting. Electronic meeting support systems, such as interactive network-

connected white boards and videoconferencing appliances, are available for the benefit of those who share the same room as well as those who are in remote locations.

The AMIDA Final Public Report describes the overall methodology behind the development of meeting support technologies. It reports that numerous studies confirm that meetings dominate the way people work. Namely, according to a study conducted by MCI Worldcom in 2003 a business person participates in 60 meetings per month. People meet in groups for a multitude of reasons. They interact in numerous predictable and unpredictable ways and the results of their interactions are as varied as the people who participate and the projects on which they are collaborating or communicating. Studies of business processes also reveal that approximately 80% of the "workload" associated with a project or process happens in preparation for a meeting. In other words, many people view the "live" meeting as a milestone or deadline by which they can pace and measure their productivity and that of their colleagues. Unfortunately, for many information managers, being in perpetual meetings has reduced their ability to prepare adequately for the next meeting, perpetuating a vicious and negative cycle.

However, Marc Al-Hames et al. report in "Audio-Visual Processing in Meetings: Seven Questions and Current AMI Answers", that although large parts of working days are consumed by meetings and conferences, unfortunately a lot of them are neither efficient, nor especially successful. They report a study in which people were asked to select emotion terms that they thought would be frequently experienced in a meeting. The top answer – mentioned from more than two third of the participants – was "boring"; furthermore nearly one third mentioned "annoyed" as a frequently perceived emotion.

The conclusion is that despite the plethora of electronic aids to meetings, fundamental problems in handling meetings have not been solved. In fact organising and conducting meetings in a business context involves a large number of factors.

Participation

A lack of efficiency of meetings is addressed in the article "Mood indicators on

electronic meeting tools" IBM, IP.com number: IPCOM000011711D, Publication Date: March 12, 2003. This article addresses the issue that the lack of direct feedback makes meetings clumsy, inefficient and often unproductive. It proposes a "mood indicator" as well as an "I want to ask a question" indicator which allow the presenter to choose an appropriate moment to pause, change track or field a question. It is argued that interrupting a presenter in full flow can be awkward; however, sometimes it is difficult to get an opportunity to ask a question or make a comment when many different people are trying to make their voices heard. In a similar vein, US6966035 suggests displaying a "murmur frame" for a participant to express a view. To increase user participation, US 2010/0087139 discloses a system for sending a selection to another computer, and US 2006/0095376 discloses a system for secure voting. Commenting, voting or selecting requires that a central authority provides the information that is to be selected or commented or voted on. Hence, these proposals still leave a central figure such as the presenter in a dominating position and the other members of the meeting are largely an audience with limited selection or voting or participation rights.

A further problem with meetings is that someone is usually late or has to leave early. With the person arriving late one has to decide if the meeting is interrupted and a summary of the proceedings so far is given. For the person leaving early (often a senior person), subsequent discussions can go missing. If there is a notes taker, this provides a personal summary of the meeting – but not an objective one.
Presents systems do not provide an optimal solution.

Legal and security issues
A legal requirement of a meeting is that presentations, comments and submissions need to be completely reproducible – in some circumstances, e.g. in a share holders' meeting, the events in the meeting should be subject to total recall. Computer-supported collaborative work technologies, particularly those which capture human verbal and non-verbal communications (audio and video interaction) in addition to text and graphics generated during a meeting, promise to have a long term impact on how people will prepare for and behave during and following meetings. In addition, connecting to a network brings the danger of virus, malware or spyware transfer in

either direction, and there is danger of copying of confidential information.

Practical Difficulties

Scalability and ease of use

There are even more fundamental problems with using electronic tools in meetings. If two persons want to make two presentations then usually either both presentations must be placed on one machine or there is a need to swap between the presenters' machines. To bring the display content of a computer to a projector, the most common ways are to use a cable that connects the display adapter of the graphics card to the video input of the projector [method 1] or to use a software that captures the display contents and sends it over a wired or wireless network to a remote base unit connected to the projector [method 2]. This is often called "remote desktop" and is mostly used for remote administration or remote IT assistance purposes.

Less common but also practiced methods are to use a special device connected to the display adapter of the graphics card, that captures, encodes and streams the display content over a wired or wireless network [method 3].

Method 1 has several practical problems and disadvantages. In meetings where people want to contribute content from their own computers, e.g. to project images on a display, typically a video cable such as a VGA cable is used to connect each PC one at a time to the projector. This is not only not scalable but also can be and often is quite a cumbersome process that typically wastes valuable meeting time and takes the dynamism out of the meeting. Connection can be made more difficult and time consuming for example if the computer has to be rebooted for it to detect the projector or when the format of the PC differs from the format of the projector. In addition changing format can leave the computer with a new format that is not compatible with its own screen so that on reboot of the PC alone, nothing is displayed on the computer screen. Without a visible screen image the necessary re-configuration can be difficult. These issues are aggravated by a number of elements:

- The use of many different video adapters, such as VGA, DVI-A, DVI-D, DVI-I, DP, HDMI, thunderbolt,…

- Reach depends on cable length: too long leaves a tangled cable "salad" in the meeting room, too short reduces flexibility, often necessitating people to move around in the meeting room when they want to present something.
- Cable connection is either point to point or requires tedious and extensive cabling and the use of complex and expensive video switches.
- It is often difficult and time consuming to find the right display resolution and refresh rate that both the computer and the display or projector support.
- Known technical solutions are expensive and not 100% reliable.

Method 2 also has many drawbacks. If the connection is made to a corporate LAN there is a danger of virus, malware or spyware transfer in either direction, there is danger of copying of confidential information, and there is the difficulty of making the connection, e.g. entry of a user code and password, as well the administration of such passwords and user codes. In business contexts, visitors to meeting rooms typically do find technical difficulty with such means to connect to a central projector or display in the meeting room.

Additional problems can occur with firewalls and proxies. Typically a visitor to a meeting will bring a computer such as a laptop that is set up for a different corporate networking environment and hence has different or incompatible networking settings. The setting up of a firewall can be complicated and if this is not done correctly, telecommunication software that has to pass through a firewall may be blocked. In order to solve problems associated with firewalls it may be necessary to open ports or identify or even add programs in an exception list. If, besides a network (hardware) firewall and an operating system firewall, there is any software based third-party firewall like Zonealarm, CA Internet Security Suite or McAfee Firewall, then it is necessary to follow that software developer's documentation to place programs on a safe list or adding exceptions to the firewall rules. Such activity is beyond the usual user. Fussing with computer settings, or having to call for IT support wastes valuable meeting time and takes the dynamism out of the meeting.

The advantage of method 3 is that the computer does not need to use its own

processing power to bring the display content in a form that is easily transported over a network. This advantage becomes less relevant as computers grow in processing power. A drawback of method 3 is that the same problems often encountered with method 1 of connecting to the display adapter remain. Another drawback is that the special device referred to requires significant processing power, which means that this device will consume much power and will require a separate power supply, be relatively big and certainly be relatively expensive.

An alternative method in the making today is to use the well known USB interface of the computer for extracting the display content of the computer. US 2009/0198839 discloses such a pluggable cable arrangement. US 2011/0115689 discloses a similar USB solution for wireless connection to a projector. Accordingly connecting a projector to a computer using the standard USB port might become commonplace with time. However, this usually requires special drivers and even special hardware in the computer. Connecting a projector to a computer using the standard USB port hence might become commonplace – but even when that happens there will be a mix of new and legacy machines for several years.

Conclusion

The following problems remain for holding a face-to-face meeting using advanced electronic tools at the present time:

- Complexity of the networking infrastructure.
- High demands on technical expertise of users in current systems that are supposed to be designed to support everyday use by the non-expert user.
- Barriers to the use of complicated technology in meetings.
- Great variety of possible collaborative software solutions – none of which seems to solve the fundamental problems of holding successful meetings.
- Meetings being boring or annoying for members of the meeting.
- Complexity of firewalls and other security measures employed in corporate networks.
- Lack of, or restriction of participation by members of a meeting.

- Time taken to prepare presentations for meetings.
- Need to record events in the proper time sequence at meetings without burdening a meeting more than necessary.

Although some tools solve some of these problems effectively, no electronic meeting tool solves all of them.

Summary of the invention

An object of the present invention is to provide network solutions including electronic tools for meetings as well as devices for providing connection to a communications network, to methods of operating the network, methods of displaying media content as well as software for performing any of these methods or for implementing such systems. There is also a need to capture what is actually shown or said in a meeting and not merely what might have been shown or said.

An aspect the present invention provides an electronic meeting tool for communicating arbitrary media content from users at a meeting comprising:
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 being adapted to receive user selected arbitrary media content and to control display of the user selected arbitrary media content on the first display; and
at least one peripheral device adapted to communicate the user selected arbitrary media content via the communications network, wherein the peripheral device is a connection unit comprising:

(a) a connector adapted to couple to a port of a processing device having a second display, a memory and an operating system; and
(b) a transmitter for communicating with the communications network,

a program 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, and
an input device 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.

Obtaining user selected arbitrary media content is preferably not obtained by application sharing but by the process of screen scrapping. Although software packages that provide screen scraping require installation on the target device, or at least require the installation of dedicated and/or custom drivers, embodiments of the present invention use software stored on the peripheral device which allows screen scraping when run on the processing device but leaves a zero footprint when terminated. Embodiments of the present invention can screen scrape full HD videos at 20fps without requiring any installation of a program on the processing device nor requiring configuring the processing device such as a PC that they run on for the connectivity to the network hence meeting "zero footprint" requirements.

The program adapted to be loaded onto the processing device and to run on the operating system of the processing device and being adapted to obtain user selected arbitrary media content can be stored on the peripheral device. The transmitter can be a wireless transmitter or transceiver. The peripheral device can be a plug-and-play device. The program can be adapted to screen scrape content of the second display.

The input device can be physical actuator coupled to the peripheral device. The physical actuator preferably has a surface area of between 100 and 14,400 square mm. Alternatively, the input device can be a key displayed on the second display. The key displayed on the second display can be one not screen scraped by the program.

On the peripheral device a mass storage device is provided that stores the software to be run on the processing device. The mass storage device can be logically closed once the software has been read and loaded and is running from RAM in the processing device. Also provided on the peripheral device is a further device such as an HID (human interface device) to capture user input and provide user feedback. In embodiments of the present invention, the peripheral device contains multiple internal logical devices that are combined:

An HID (human interface device) used for capturing user input (e.g. following a user action such as pressing or activating a button) and providing user feedback, e.g. by an optical indicator such as a light ring around the button e.g. an LED ring,

for streaming the screen scraped video content to the network and hence to a base unit and a display,

A mass storage device used to store the application,

An audio device that acts as a virtual sound card to a client PC over USB, using a generic driver such as a UAC1 or UAC2 device driver.

Embodiments of the present invention are not limited to application sharing but make use of screen scraping which is able to capture all material in a neutral manner rather than being limited by proprietary applications. Further the screen scraper application is zero footprint on termination rather than being fully installed on the processing device.

Embodiments of the present invention can provide arbitrary "full content" to the meeting room and participants can display in real-time,

The real-time content is shown on a central display rather than being broadcast to individual participants or archived.

Embodiments of the present invention "auto compose" arbitrary user data on a central display or screen so that full real-time content that is provided by multiple meeting participants who intentionally share this content in order to make the meeting more effective and efficient,

Embodiments of the present invention implement a principle of "democratic screen sharing", in which the meeting participants decide themselves on a peer-to-peer basis which content to share when and where. In particular in some embodiments a participant can obtain unilateral access to the display device, i.e. without agreement of other participants. Peer-to-peer data sharing differs from systems in which the content to be displayed is determined by a presenter or meeting director. The user determines where his content is routed to, and can do so without any software configuration on the user processing device.

Another aspect the present invention provides a method for connecting a processing device to a communications network, the processing device having a memory, a display and an operating system with at least one pre-installed generic driver providing a generic communications protocol for communication between processing device and a standard class of peripheral devices, the method comprising the steps of:

a) coupling a peripheral device to the processing device, the peripheral device having a

transceiver;

b) setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;

c) coupling the processing device to a communications network via the peripheral device;

d) routing screen scraped data between the processing device and the communication network via the means for communication, wherein the generic communication protocol is used for transferring the screen scraped data between the processing device and the peripheral device.

The routing of the screen scraped data can be to a defined network node such as a display node without user entry of configuration details. Thus the routing can be dedicated to a specific network node such as a display node, base station etc. This is achieved by pairing of the peripheral device to the relevant node before the communication starts.

In accordance with embodiments of the present invention users start an application from the peripheral device such as a USB dongle, thus making the connection in a 3 step process: (1) connect, e.g. plug in the peripheral device to the processing device, (2) start the screen scraping application, (3) perform a user action such as click on a button on the peripheral device to go allow content to be displayed on the central screen or display. To achieve step 2 Autorun or AutoPlay can be used with some Windows operating systems, but there are many different variants based on the OS version and which patches have been installed. Furthermore, this mechanism is generally considered a security hazard, which is why most IT departments will disable Autorun/Autoplay. Other OS providers have disabled this function, e.g. Apple removed a similar functionality entirely from its OS/X since Snow Leopard.

In an embodiment of the present invention a very small service - also called daemon on some OS's – is provided that requires installation on the processing device such as a laptop. This service is pre-installed on the processing device. The installation is required only once on every processing device such as a laptop. The role of this is to

provide a permanently running service that continuously monitors if a peripheral device according to the present invention has been offered up for connection to the processing device. When such a peripheral device is connected, the service will detect this and start the client application software residing in the mass storage area of the peripheral device. Once the service is installed, connectivity with the peripheral device becomes a 2 step process: connect, e.g. plug in the peripheral device to the processing device, and (2) perform a user action such as click on a button on the peripheral device to allow content to be displayed on the central screen or display. The application loaded from the processing device still leaves a zero footprint on termination

Step b) can comprise presenting the peripheral device to the processing device as a human interface device and wherein the pre-installed generic driver is a human interface device driver.

Alternatively or additionally step b) can comprise presenting the peripheral device to the processing device as a mass storage device and wherein the pre-installed generic driver is a mass storage device driver.

Alternatively, or additionally step b) comprises presenting the peripheral device to the processing device as a composite device and wherein pre-installed generic drivers drive different device interfaces independently.

A client application can be stored on the peripheral device which when run on the processing device obtains the screen scraped data. Such a client application can be a portable application and can leave a zero footprint on termination.

In another aspect the present invention provides a peripheral device for providing communication connectivity to a processing device which is provided with memory, a display and an operating system with at least one pre-installed generic driver providing a generic communication protocol for communication between the processing device and a standard class of peripheral devices, the peripheral device comprising a memory in which executable software code is stored for execution on the processing device, said executable software code comprising:

a first software code portion for setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;

a second software code portion for connecting the processing device to a communications network via the peripheral device, the peripheral device having a transceiver;

a third software code portion for screen scraping data from the processing device; and

a fourth software code for routing screen scraped data between the processing device and the communications network over the means for communication; wherein the first software code portion is adapted to use the generic communication protocol for transferring the screen scraped data between the processing device and the peripheral device.

The first software code portion can be adapted to present the peripheral device to the processing device as a human interface device and wherein the pre-installed generic driver is a human interface device driver. The first software code portion can be adapted to present the peripheral device to the processing device as a mass storage device and wherein the pre-installed generic driver is a mass storage device driver. The first software code portion can be adapted to present the peripheral device to the processing device as a composite device and wherein pre-installed generic drivers drive different device interfaces independently.

The executable software code can comprise fifth code for providing a means for connecting to the communications network including a base node. The third code can be for providing means for capturing video frame buffers of the processing device.

The executable software code can comprise sixth code for providing a means for encoding, compressing and optionally encrypting the screen scraped data and sending the screen scraped data the communication network. The executable software code can comprise seventh code for providing a means for handling the peripheral device. The executable software code can comprise eighth code for providing means for initiating connection to the base node. The executable software code can comprise ninth code for receiving inputs from an input device on the peripheral device. The executable

software code can comprise tenth code for providing a means for sending state changes to the visual indicator on the peripheral device. The executable software code can comprise eleventh code for providing a means for presenting to the user a GUI. The executable software code can comprise twelfth code for presenting a GUI for administration of the said executable software code when executed as a portable application. The executable software code can comprise thirteenth code for providing a means for displaying and activating a key on the display of the client processing device for allowing a user to input the start the transfer of data from the processing device to the base node.

In another aspect the present invention provides a peripheral device for providing communication connectivity to a processing device which is provided with memory, a display and an operating system with at least one pre-installed generic driver providing a generic communication protocol for communication between the processing device and a standard class of peripheral devices, the peripheral device comprising a memory in which executable software code is stored for execution on the processing device, said executable software code comprising:

a first software code portion for setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;

a second software code portion for connecting the processing device to a communications network via the peripheral device, the peripheral device having a transceiver; and

a third processing software code for routing data between the processing device and the communications network over the means for communication; wherein the first software code portion is adapted to use the generic communication protocol for transferring the data between the processing device and the peripheral device, and an input device coupled to the peripheral device, the input device being adapted to react to a user action to trigger the transfer of the data from the processing device to the peripheral device.

The first software code portion can be adapted to present the peripheral device to the processing device as a human interface device and wherein the pre-installed generic driver is a human interface device driver. The first software code portion can be

adapted to present the peripheral device to the processing device as a mass storage device and wherein the pre-installed generic driver is a mass storage device driver. The first software code portion can be adapted to present the peripheral device to the processing device as a composite device and wherein pre-installed generic drivers drive different device interfaces independently.

The input device is preferably a physical actuator coupled to the peripheral device. The physical actuator preferably has a surface area of between 100 and 14,400 square mm. The input device can be for example a key for display on the display. The executable software code can comprise fourth code for providing a means for connecting to the communications network including a base node. The executable software code can comprise fifth code for providing a means for capturing video frame buffers of the processing device. The executable software code can comprise sixth code for providing a means for encoding, compressing and optionally encrypting the video frames and sending them over a secure link to the base node. The executable software code can comprise seventh code for providing a means for handling the peripheral device. The executable software code can comprise eighth code for providing a means for initiating connection to the base node. The executable software code can comprises ninth code for receive inputs from an input device on the peripheral device. The executable software code can comprise tenth code for providing a means for sending state changes to the visual indicator on the peripheral device. The executable software code can comprise eleventh code for providing a means for presenting the user a GUI. The executable software code can comprise twelfth code for presenting GUI for administration of the executable software code when executed as a portable application. The executable software code can comprise thirteenth code for providing a means for displaying and activating a key on the display of the processing device for allowing a user input to start the transfer of data from the processing device to the base node.

In another aspect of the invention a peripheral device is provided for providing communication connectivity to a processing device which is provided with memory, a display and an operating system with at least one pre-installed generic driver providing a generic communication protocol for communication between the processing device

and a standard class of peripheral devices, the peripheral device comprising a memory in which executable software code is stored for execution on the processing device, said executable software code comprising:

a first software code portion for setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;

a second software code portion for connecting the processing device to a communications network via the peripheral device, the peripheral device having a transceiver;

a third software code portion for receiving media content from the network and for displaying the media content on the display in accordance with a set of rules; wherein the first software code portion is adapted to use the generic communication protocol for transferring the media content between the peripheral device and the processing device.

The executable software code can comprise fourth code for providing a means for correctly configuring a receiver as an access point. The executable software code can comprise fifth code for providing a means for listening for output of connection units trying to connect on a specific port. The executable software code can comprise sixth code for providing a means for a GUI for administration purposes. The executable software code can comprise seventh code for providing a means for publishing its presence over the network using the zeroconf protocol. The executable software code can comprise eighth code for providing a means for accepting and installing software updates. The executable software code can comprise ninth code for providing a means for providing facilities for pairing of connection units to the processing device. The executable software code can comprise tenth code for providing a means for auto-composing of different incoming arbitrary media streams and rendering of composited image on display. 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 can comprise twelfth code for scaling of incoming arbitrary media streams. The executable software code can comprise thirteenth code for providing a means for displaying incoming arbitrary media content in accordance with a set of rules.

The present invention also provides a method for communicating arbitrary media content from users at a meeting comprising:
operating a display node of a communications network, the display node being coupled to a first display, to receive user selected arbitrary media content and to control display of the user selected arbitrary media content on the first display; and
connecting a peripheral device to a port of a processing device and communicating the user selected arbitrary media content via the communications network,
loading a program onto the processing device and running the program on the operating system of the processing device to obtain user selected arbitrary media content, said program leaving a zero footprint on termination, and
triggering transfer of said user selected arbitrary media content to said transmitter through said port after a user action on an input device.

The present invention also provides a peripheral device comprising:
a base
a connector for connection to a plug and play port of a host processing device,
a flexible connection between the base and the connector for transferring data signals and power,
an actuator on the base for actuating a signal and for transferring the signal to the connector for transfer to the port, wherein the base has electronics comprising permanent storage for storing a portable application, a processing engine, a transceiver and a visual indicator.

The present invention also provides a method for providing communication connectivity from a processing device,
setting up a communications network between a base node of the communications network and a peripheral device coupled to the processing device;
transferring media content between the processing device and the peripheral device,
transmitting the media content from the peripheral device to the communications network,
receiving media content from the communications network at the base node and displaying the media content on a display in accordance with a set of rules.

Any of the above software code stored on a non-transitory storage medium.

Definitions

The term "unilateral electronic access to the display device" by a participant. means that the displaying process is obtained by the action of only one participant involved in the meeting, without requiring the agreement of another or the others. The term "unilateral" implies that the data for display is allowed to override or replace any data displayed on the screen by the same or another participant of the meeting.

"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.

"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 enable 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.

"Screen scraping" in our sense 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, Bluetooth or any other wireless communication network known to the person skilled in the art such as optical networks like LiFi.

"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 lap-top, 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 include 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.

Brief Descriptions of the drawings

Fig. 1a shows a meeting room that can be used with embodiments of the present invention. Fig. 1b shows a combination of a client processing device, a connection

unit, a base node and a display in accordance with an embodiment of the present invention.

Fig 2 shows a screen display in accordance with an embodiment of the present invention.

Figs. 3 to 5 show a base node and a peripheral device and a client processing device in accordance with embodiments of the present invention.

Fig 6 shows a display in accordance with an embodiment of the present invention.

Fig. 7 shows a peripheral device in accordance with an embodiment of the present invention.

Fig. 8 shows a client processing device in accordance with an embodiment of the present invention.

Fig. 9 shows a further client processing device in accordance with an embodiment of the present invention.

Fig. 10 shows an embodiment of a peripheral device in accordance with an embodiment of the present invention.

Detailed Description of the Embodiments of the present Invention

The present invention will be described with respect to particular embodiments and with reference to certain drawings but the invention is not limited thereto but only by the claims. The drawings described are only schematic and are non-limiting.

Furthermore, the terms first, second, third and the like in the description and in the claims, are used for distinguishing between similar elements and not necessarily for describing a sequential or chronological order. The terms are interchangeable under appropriate circumstances and the embodiments of the invention can operate in other sequences than described or illustrated herein.

Moreover, the terms top, bottom, over, under and the like in the description and the claims are used for descriptive purposes and not necessarily for describing relative positions. The terms so used are interchangeable under appropriate circumstances and the embodiments of the invention described herein can operate in other orientations than described or illustrated herein.

The term "comprising", used in the claims, should not be interpreted as being restricted to the means listed thereafter; it does not exclude other elements or steps. It needs to be interpreted as specifying the presence of the stated features, integers, steps or components as referred to, but does not preclude the presence or addition of one or more other features, integers, steps or components, or groups thereof. Thus, the scope of the expression "a device comprising means A and B" should not be limited to devices consisting only of components A and B. It means that with respect to the present invention, the only relevant components of the device are A and B.

Similarly, it is to be noticed that the term "coupled", also used in the description or claims, should not be interpreted as being restricted to direct connections only. Thus, the scope of the expression "a device A coupled to a device B" should not be limited to devices or systems wherein an output of device A is directly connected to an input of device B. It means that there exists a path between an output of A and an input of B which may be a path including other devices or means.

Elements or parts of the described devices may comprise logic encoded in media for performing any kind of information processing. Logic may comprise software encoded in a disk or other computer-readable medium and/or instructions encoded in an application specific integrated circuit (ASIC), field programmable gate array (FPGA), or other processor or hardware.

References to software can encompass any type of programs in any language executable directly or indirectly by a processor.

References to logic, hardware, processor or circuitry 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 so on.

Embodiments of the present invention provide solutions to three major problems with meetings:

a) the time taken to prepare for a meeting. This is mainly achieved by allowing "on-the-fly" presentation of any displayable information. This information does not have to be linked into any particular presentation software, nor to be compatible with any such presentation software,

b) the time taken to conduct the meeting using electronic meeting tools. This is achieved by reducing the time to connect computers to the display or projection system.

c) the time taken to reflect and review and document the meeting afterwards. This is achieved by providing the possibility of recording the course of the meeting in the same time sequence that it was carried out as well as be able to store all data presented and who presented it.

Fig. 1a is a schematic representation of a generic meeting room 30 with a meeting table that can be used with embodiments of the present invention. Participants 37 having some form of processing device 31 such as a laptop computer, a tablet, a PDA etc. Each of the processing devices 31 can be a host device and has a first connection unit 47 to which it is coupled. The first connection unit 47 provides access to a network 50 which in this case is a wireless network, but could be a wired network. The network can be a sheared resource network. Each connection unit 47 may be coupled to an input device 48 which will be described in more detail later. A user 37 will typically at a distance from the processing device 37 which is ergonomically satisfactory. This ergonomic boundary is typically an area of about 1000 sq cm to 4000 sq cm. This ergonomic boundary will typically have the user as one side of the boundary and the comfortable reach of the arms will determine an area on the left and right of the processing device which falls within the ergonomic boundary and the far edge of the boundary of the processing device (normally delimited by a display screen) will determine the other side of the ergonomic boundary. The area defined by the ergonomic boundary will overlap or include the processing device 31 itself. The processing device will also have an outer physical boundary. The input device 48 is preferably arranged to operate outside the boundary of the processing device 31 but within the ergonomic boundary. Preferably the input device is arranged to function when it is flat on the table. The input device preferably has an size of activation area of between 1 and 144 square cm.

In other embodiments of the present invention a wireless memory card can be provided to enable a second Wi-Fi link on a processing device such as a laptop or tablet. The wireless memory card stores data and media and fits into the laptop just like a regular SDHC card. The wireless memory card preferably has built-in Wi-Fi that effortlessly transfers data, photos and videos to another device or computer. For instance an Eye-Fi card (www.eye.fi) can be used to enable the latter,

Preferably the network 50 is a local area network, (e.g. a shared resources network) i.e. preferably local to the meeting room for security reasons but the network 50 may have access to other local or wide area networks such as 51 or to a larger corporate network or the internet 43, for example via a router 42. Another node of the network 50 is the base or display node 36. This node 36 may optionally be a wireless access point. The base node 36 may also be a processing device or host computer and may be coupled to a second connection unit 49 that provides access to the network 50 thus linking all of the processing devices 31, 36 together. The connection unit may have an input device as described above. Alternatively, network connections installed on the base node 36 can be used. Audio equipment 46 may be provided, e.g. a telephone that allows other members of the meeting to call in from remote destinations.

The display node 36 is coupled to and adapted to allow display of media on some kind of display 44. The display node is in embodiments of the present invention a base node of the communications network 50. The display 44 may be a projector and/or screen, the projector being coupled to the base node 36. A whiteboard 45 can optionally be provided that can be optionally coupled to the display 44 and/or the base node 36, e.g. when the whiteboard can record electronically what is written on it. Optionally, a camera 35 may be provided to record the entries on the whiteboard 45. The camera 35 may have a third connection unit 52 for connecting the camera 35 to the network 50 so that the data from the whiteboard can be recorded and stored or transmitted to other networks via router 42. The connection unit 52 may have an input device 53 as described above for the connection unit 47.

Optional equipment can be cameras 39, 40, 41 for recording the progress of the

meeting. These cameras can be linked by a network 51, e.g. a cable network to the router 42 and/or the base node 36. Another optional item is a microphone or microphones 38 that can be used to transfer audio, e.g. to the processing devices 31 and to loud speakers (not shown) attached to the base node 36 or part of the display 44.

Any or all of the outputs of the processing devices 31, the cameras, the whiteboard, etc. can be recorded and stored digitally, e.g. in node 36 or elsewhere to provide a complete record with correct time sequence.

Summarising the above, the present invention provides an electronic meeting tool for communicating arbitrary media content between different users 37 (with their own processing devices 31, e.g. PC, mobile phone, or tablet) and one display or projector or multiple displays or projectors 44 in the meeting room 30.

Referring to Figs. 1a and 1b embodiments of the present invention comprise a base or display node 36 being a processing device, e.g. a host computer adapted to receive user selected arbitrary media content, the base node 36 being coupled to a central display 44 which can be a fixed format display and/or a projector or similar. The arbitrary media content can be provided from any of the user processing devices 31. The base node 36 can be adapted to display the received user selected arbitrary media content in accordance with a set of rules, e.g. FIFO, automatically, on request or approval, forced to display, in accordance with a priority etc. Optionally the base node 36 is adapted to force display of the received user selected arbitrary media content, i.e. to allow participation in the meeting by an individual user displaying own selected content on display 44 independently of the person who is nominally responsible for giving a presentation or chairing the meeting. Forcing the display can also be considered as a rule. The phrase "unilateral electronic access to the display device" defines this kind of rule as "unilateral" means that the displaying process is obtained by the action of only one participant involved in the meeting, without requiring the agreement of another or the others. The term "unilateral" implies that the data for display is allowed to override or replace any data displayed on the screen by the same or another participant of the meeting. The meeting tool can also be adapted to allow a

priority setting. This means that a user can set a priority setting for the media to be displayed. A priority of "1" for example can be interpreted by the base node as a forced display, a priority "2" can be interpreted by the base node as display as soon as possible, priority "3" can be interpreted by the base node as place in queue and display as the time comes etc. Setting and using priorities for display are also considered to be working to rules. To execute the rules, the base node 36 may have a decision module. The base node 36 may be a host computer having a processing engine such as a microprocessor and a memory. Preferably, the base node 36 is adapted to treat media content passed to the base node 36 from any or all of the connection units 47 in an equal manner. The base node 36 may be adapted to auto compose the media content on the central display 44 connected to it, e.g. from one or more processing devices 31.

An independent aspect of the present invention is at least one connection unit 47, (optionally 49 for receiving or camera connection unit 52) adapted to communicate the user selected arbitrary media content to said base node 36. Preferably the connection units 47 and/or optionally 49 are physical plug-and-play devices. An example of a connection unit is shown schematically in Fig. 10.

The connection unit 47 (or optionally connection unit 52) may be integrated into a user processing device 31, e.g. as an internal peripheral device or may preferably be an external peripheral device comprising a connector adapted to couple to a port of a user processing device 31. The processing device 31 may have a client display, a processing engine such as a microprocessor, a memory and an operating system. The optional connection unit 49 may integrated into the base node 36, e.g. as an internal peripheral device or may be an external peripheral device comprising a connector adapted to couple to a port of the base node 36. The connection unit 49 may be fully integrated into the base node 36, e.g. is an internal network interface of the base node 36. The base node 36 may have a processing engine such as a microprocessor, a memory and an operating system.

In alternative embodiments of the present invention, the peripheral device can be coupled wirelessly to the processing device, and paired with the processing device such as a tablet or laptop through Near-Field Communication (NFC). In other

embodiments of the present invention, the pairing of the peripheral device can be performed additionally by providing means for receiving biometric data such as a microphone (voice) or a camera (face or iris) or a finger swipe (fingerprint) to the peripheral device. Then the peripheral device can be personalized, or paired, by means of voice or face recognition, respectively. The term voice recognition refers to finding the identity of "who" is speaking, rather than what they are saying. Recognizing the speaker by voice recognition can simplify the task of translating speech in systems that have been trained on specific person's voices or it can be used to authenticate or verify the identity of a speaker as part of a security process. "Voice recognition" means "recognizing by voice", something humans do all the time over the phone. As soon as someone familiar says "hello" the listener can identify them by the sound of their voice alone.

The user processing devices 31, the connection units 47, (optionally 49, 52) and the base node 36 co-operate to form a communication network 50 for linking between at least one of the plurality of processing devices 31, 36, 35 and the central display device 44. The communication network 50 is adapted to receive arbitrary media content from at least one of the plurality of processing devices 31 and to transmit the arbitrary media content of at least one of the plurality of processing devices to the central display device 44.

In some embodiments the storage means of the peripheral device can be adapted to record or share information. For instance, the peripheral device can be adapted to further comprise a private communication channel (e.g. to enable chatting), which can communication with a private communication channel of another participant of the meeting.

An independent aspect of the present invention is a portable application 60 adapted to be loaded onto a client processing device 31 and to be run on the operating system of the client processing device 31. The portable application 60 runs as a process on the client processing device 31 that is adapted to deliver an arbitrary media content from the client processing device 31 to the communication network 50 in response to a user action applied to an input device 48, the process leaving a zero footprint on the

processing device 31 on termination. The network 50 can be a shared resource network. Optionally the portable application 60 is stored on each connection unit 47 and optionally 49. Preferably the portable application 60 is adapted to "screen scrape" content of the client display of the client processing device 31. Optionally the portable application 60 when run on a processing device 31 is adapted to "screen scrape" content of the client display of this client processing device 31 and to transmit it via a connection unit 47. Optionally the portable application 60 when run on the processing device is adapted to "screen scrape" content of the client display of the client processing device 31 and to transmit it via a network interface of the processing device 31, for example if the connection unit 47 has no transmitter or it is not functioning.

The connection unit 47 for communicating with said base node 36 has a network interface e.g. comprising a transmitter 62. The transmitter 62 is preferably a transceiver. Optionally the transmitter/receiver can be a wireless transmitter/receiver.

The base node 36 for communicating with the connection unit 47 has a receiver 63 which can be included in the connection unit 49 or integrated into the base node 36. The receiver is preferably a transceiver. Optionally the transmitter/receiver can be a wireless transmitter/receiver.

The input device 48 allows a user interaction with the connection unit 47. Preferably the input device 48 is physical actuator coupled to the connection unit 47. The user action applied to the input device 48 generates a signal that can trigger transfer of data from the processing device 31 (to which the connection unit 47 is coupled) to the network 50. Preferably the input device 48 has an activating surface that is between 100 and 14,400 square mm. Optionally the input device 48 can be a key displayed on the client display 1 of a client processing device 31. This key can be activated, e.g. by use of a pointing device such as a mouse trigger transfer of data from the processing device 31 to the network 50.

The connection unit 47 is preferably provided with a visual indicator 61, e.g. for allowing user feedback from the connection unit 47 of the status of any activity.

The system also can include a server program 64 adapted to be loaded onto the base node 36, said program 64 being adapted to receive arbitrary media content from one or a plurality of client processing devices 31 through said connection units 47, (optionally 49), and to show this plurality of arbitrary media content streams on one or a plurality of displays 44. The server program 64 may be adapted to allow display in accordance with one or more rules, e.g. FIFO, automatically, on request, forced, in accordance with a priority etc. The forcing rule can be described as "unilateral electronic access to the display device" as "unilateral" means that the displaying process is obtained by the action of only one participant involved in the meeting, without requiring the agreement of another or the others. The term "unilateral" implies that the data for display is allowed to override or replace any data displayed on the screen by the same or another participant of the meeting. To execute the rules, the server program 64 may have a decision module.

Preferably, the server program 64 is adapted to treat media content passed to it from any or all of the connection units 47, 52 in an equal manner. The server program 64 may be adapted to auto compose the media content on the central display 44.

The server program 64 may be a portable application adapted to be loaded onto the base node 36 and to be run on the operating system of the base node 36. The portable application 64 runs a process on the base node 36 that is adapted to display an arbitrary media content received from the client processing device 31 via the communication network 50, the process leaving a zero footprint on the base node 36 on termination. Optionally the portable application 64 is stored on each connection unit 49 and optionally 47 and can be installed therefrom.

Meetings in which visual information is presented on a display or projector commonly suffer from a monopoly effect: one single presenter determines the display contents and thereby has a disproportionate power to influence the meeting dynamics and thereby its outcome. Embodiments of the present invention solve this problem by allowing multiple individuals to simultaneously show their information. The present invention provides according to some embodiments a method to override all currently displayed material. In a sense the method of the present invention transforms visual

communication into something akin to talking, i.e. full-duplex and with the option to shout and interrupt.

The system may also include a central display device 44 and optionally a whiteboard 45 or other display means such as a printer. The display 44 being adapted to receive user selected arbitrary media content, and may be adapted to allow display of the received user selected arbitrary media content in accordance with one or more rules, e.g. FIFO, automatic, forced, on request or approval, in accordance with a priority etc. The forcing rule can be described as "unilateral electronic access to the display device" as "unilateral" means that the displaying process is obtained by the action of only one participant involved in the meeting, without requiring the agreement of another or the others. The term "unilateral" implies that the data for display is allowed to override or replace any data displayed on the screen by the same or another participant of the meeting.

Optionally, one of the connection units 47 can be adapted to be a master connection unit. Such a master connection unit may be adapted to instruct the base node when media content from a client processing device 31 may be displayed or which of the processing devices may be allowed to send content for display.

In embodiments of the present invention, at least one portable application is used, e.g. for the client software on a client processing device 31 or optionally on the base node 36. In these embodiments, one of the pre-installed generic drivers of the operating system on the relevant computer device 31, 36 is exploited for setting up communication from the computer device 31, 36 to the network 50 via the connection unit 47, (optionally 49). The generic driver is used in connection with the connection unit 47, (optionally 49) operating as a peripheral device but the use can go beyond that of the standard class of peripheral devices for which the generic driver is intended. In some embodiments the connection unit 47, (optionally 49) operated as a peripheral device communicates with the relevant processing device 31, 36 by using a generic communication protocol provided by the pre-installed generic driver. Pre-installed USB drivers are examples. Preferably the setting up of the communication of network 50 using connection unit 47, (optionally 49) does not alter or affect the networking

capability of the relevant processing device 31, 36. For example, if a browser is started on the client processing device 31, this browser can use the standard network interfaces on the processing device 31. This means that transfer of data via the connection unit 47 (optionally 49) is independent of transfer of data over the network interfaces of processing device 31 or 36. This has the advantage that each user can carry out processing such as searching on the internet to gather data independently of the transfer of data to be displayed during a meeting, or receive emails etc.

The use of a portable application has the advantage that any modification to settings in the register or generally in the operating system can be avoided, so that upon any form of termination, e.g. disconnecting the electronic device, system crash, no trace is left. This is generally termed "zero footprint".

The present invention has the advantage of scalability. It can provide a display system for use by a plurality of users in meetings. Every user in the meeting thus can have a client processing device 31 for coupling to a connection unit 47. A first user action connects the client processing device 31 to the base node 36, e.g. by inserting a connection unit 47 into the relevant interface connector on the processing device 31, e.g. a USB interface. A second user action comprising activating a button or key on the input device (e.g. by depressing it) then starts the process of transmitting arbitrary media content from the client processing device 31 to the base node 36. This process preferably includes screen scraping data from the processing device. Using screen scraping avoids special programs being installed on the base node 36 to carry out graphical commands sent from the processing device 31. When the base node 36 receives the plurality of arbitrary media content, it can allow auto composition of this media content on the central display connected to it.

In some embodiments, the button or key can be virtual button which is displayed on the screen instead of a button or key on the input device, which for instance can be the peripheral device. Preferably, when the process of transmitting arbitrary media content has been activated, the screen scraping data from the processing device does not scrape the virtual button. The latter can be enable for instance by positioning the virtual button on a second layer which is not scraped.

The present invention will now be described further with reference to certain more specific embodiments.

The present invention in some embodiments provides a system and/or a method to which in one aspect can override all currently displayed material when arbitrary material is presented on a display device from more than one source processing devices such as a laptop, PDA, smartphone, computer, tablet etc . The present invention in one aspect controls the display of visual communication and information by a method akin to talking, i.e. full-duplex and with the option to interrupt or to obtain unilateral electronic access to a display device.

One embodiment the present invention can be implemented through a connectable peripheral device e.g. a USB compatible device, such that when the peripheral device is connected to a processing device that is used to provide arbitrary information such as text, video, pictures etc., each individual user with a processing device can to gain access to the display, e.g. screen. By being present at the meeting a user can pair the peripheral device to a processing device by inserting the peripheral device. The user can also pair the peripheral device to a base node or base unit that controls the display in the meeting room and which is connectable to the peripheral device via a communications network such as a wired or wireless communications network. The network is a shared resources communications network as different devices and participants can transmit data over the network. To achieve this, the peripheral device has a transceiver capable of transmitting the arbitrary data from the processing device to the display via the base node. In one option the information displayed on the local display of the processing device is screen scraped and transmitted. To allow this the peripheral device can include a portable application that is able to execute on the processing device leaving a zero-footprint on termination. Although a physically connectable peripheral device is convenient, the peripheral device could also be coupled to the processing device via a wireless connection, e.g. via the Bluetooth protocol.

For meetings with remote participants it is not possible to rely on the same hardware

connectable peripheral device to provide access from a remote location to the display in the meeting room directly. Typically, at home or in a hotel, the participant only has a phone and internet access on a laptop or some other kind of portable computing device. Remote participants lack context (e.g. non-verbal communications) and have less than ideal audio/video connections and consequently suffer from a power-asymmetry. Typically, remote participants also have no way of 'pushing' their contents on screen, since the meeting is controlled by a meeting organiser or director who orchestrates the sequence of presentations.

One of the key advantages of the present invention is to provide remote collaboration while maintaining a kind of 'situational awareness'. This means that what you see has a straightforward relationship with your internal mental map. This allows keeping track of multiple information flows and being able to correlate that quickly with any other information, e.g. with a search carried out on the local computing device.

In another aspect of the present invention confusion and frustration is avoided by:

1. retaining aspect ratio of any image that is sent from any location to the display in the meeting room or displays in meeting rooms (e.g. a long thing remains a long thing)
2. not overlapping images and/or windows on any of the display devices in the meeting rooms (e.g. you never have to guess or remember what's hidden)
3. showing the same arrangement of images on each screen (everyone sees the same things and can refer to them), this means that the topological arrangement of images on each screen of multiple screens is the same,
4. maximizing the use of screen real-estate (e.g. the images presented do not have borders containing no useful information), while preferably no allowing overlapping of the images
5. allowing local manipulation of zoom and pan but allowing to return to the default layout of item 3 above
6. arranging the images on each display taking into account the local display characteristics, such as any of resolution, pixel density, aspect ratio,
7. optionally also allowing an ongoing audio connection to be heard by all

participants, e.g. that verbal communications will be used to alter the contents of the screen.

With reference to Fig. 2, the base node software (6) running on a base node 36 can be adapted to display on the central display a splash screen (21) showing its readiness to receive arbitrary media content over its receiver. This splash screen (21) can also show instructions on how to use the system, as well as the configuration parameters (see later) to reach the base node 36. These configuration parameters are also shown in a transparent canvas at the bottom of the central display (22).

A client processing device 31 that wants to have its arbitrary media content displayed on the central display connected to the base node 36 is connected to a connection unit 47. The portable application 60 will be executed on the client processing device 31 as a host device. A first user interaction creates a connection between the portable application 60 and the base node 36 using the transmitter in the connection unit 47 and the receiver in the base node 36. This user action can be a connection of the connection unit 47 to the processing device 31. A second user interaction, this time on the input device 48, activates screen scraping by the portable application of the arbitrary media content from the client processing device display, which is then sent over the connector unit 47 to the base node.

The base node 36 receives the plurality of arbitrary media content coming from one or more connection units 47, and auto composes this media content for rendering on the central display.

The visual indicator 61 on the connection unit 47 indicates to the user and to other participants in the meeting that media content is being sent by that connection unit 47 to the base node 36 for display.

Repeating the second user interaction on the input device 48 of a connection unit 47 decouples the media content from that connection unit 47 from the base node 36. The base node 36 removes that media content from the composed image on the central display and recomposes the remaining content on the central display.

The content on the central display/projector is auto arranged as shown in figure 2. When user 1 adds content, his/her display will be scaled to fill the available central display canvas as much as possible, but without affecting the aspect ratio. When user 2 adds in, his content is added to the side of the first image. When user 3 adds his content, the arrangement is a suitable one such as triangle wise. Adding user 4, the image becomes a 2 by 2 tiling, which is the maximum available. When an additional user attempts to add content, he will be blocked. When a user initiates action to remove his/her content, his/her media content is removed from the central display and one moves backward in the composition sequence shown in figure 2.

Base node software

The base node software has one or more of the following features:

- First code for providing a means or a method step for correctly configuring the receiver of the base node.
- Second code for providing a means or a method step for listening for output of connection units trying to connect on a specific port.
- Optionally, third code for providing a means or a method step for a GUI for administration purposes, offered for example over a web interface.
- Optionally, fourth code for providing a means or a method step for publishing its presence over the network using the zeroconf protocol.
- Optionally, fifth code for providing a means or a method step for accepting and installing software updates of the base node as well as for the portable application software for the connection units.
- Sixth code for providing a means or a method step for providing facilities for pairing of connection units to the base node.
- Seventh code for providing a means or a method step for auto-composing of different incoming arbitrary media streams and rendering of composited image on display or projector screen.
- Eighth code for providing a means or a method step for receiving, decrypting and decoding incoming arbitrary media content.
- Optionally ninth code for providing a means or a method step for scaling of incoming arbitrary media streams

- Optionally tenth code for providing a means for displaying incoming arbitrary media content in accordance with a set of one or more rules.

Any of the above code may be stored on a non-transitory machine readable storage medium such as an optical disk, a magnetic disk, magnetic tape, solid state memory, USB mass storage device etc.

Portable application for the client processing device

The portable application comprises an algorithm for screen scraping. Screen scraping algorithms include VNC and RDP or similar. The algorithm may include a combination of algorithms such as VNC and RDP that are optimized for different content, e.g. static text or video. The portable application has one or more of the following features:

- Eleventh code for providing a means or a method step for connecting to a network including the base node.
- Twelfth code for providing a means or a method step for capturing video frame buffers of the client processing device, i.e. computer (C), also called screen scraping.
- Thirteenth code for providing a means or a method step for encoding, compressing and optionally encrypting these video frames and sending them over a secure link to the base node. Only changed areas such as rectangles or triangles of the screen (or any other suitable geometrical shape) need to be transferred, and different types of rectangles or triangles are encoded in different ways (e.g. RLE, JPEG,...) to optimise performance.
- Fourteenth code for providing a means or a method step for handling the connection unit.
- Fifteenth code for providing a means or a method step for initiating connection to base node.
- Sixteenth code for receive inputs from the input device on the connection unit.
- Seventeenth code for providing a means or a method step for sending state changes to the visual indicator on the connection unit.
- Optionally, eighteenth code for providing a means or a method step for

presenting the user a GUI (18).

- Optionally, nineteenth code for presenting GUI for administration of the portable application.
- Optionally, twentieth code for providing a means or a method step for displaying and activating a key on the display of the client processing device for allowing a user input to start the transfer of data from the client device to the base node.

Embodiments of the present invention provide a frame grabber. A frame grabber, known in the prior art, is an electronic device that captures individual, digital still frames from an analog video signal or a digital video stream. It is usually employed as a component of a computer vision system, in which video frames are captured in digital form and then displayed, stored or transmitted in raw or compressed digital form. In recent years, connections via USB, Ethernet and IEEE 1394 ("FireWire") interfaces have become prevalent. The frame grabber of the present invention, enables HDMI or Display Port capture instead via USB. The frame grabber preferably functions as follows:

- Connect to the base unit using a TCP/IP socket interface.
- Capture the video frame buffers of the computer,
- Encode, compress and encrypt these video frames and stream them over a secure link to the base unit. Only changed rectangles of the screen are transferred, and different types of rectangles are encoded in different ways (e.g. RLE, JPEG,…)
- Present the user a GUI

Any of the above code may be stored on a non-transitory machine readable storage medium such as an optical disk, a magnetic disk, magnetic tape, solid state memory, nand Flash, etc.

In this embodiment the portable application stored on the connection unit, and is executed in an execution context on the client processing device. The portable application does not need to be copied to or installed on the computer. It can be executed directly from the connection unit. It will only be copied temporarily into an execution context on the client processing device. There are also no changes in

configuration required or settings in the client processing device. This means that nothing will remain on the client processing device when the connection unit is removed. It also implies that the portable application will run on client processing devices where the user does not have the necessary access rights to install software.

The portable application is designed in such a way that

- No specific drivers need to be installed on the client processing device.
- Pre-installed drivers are used, e.g. for classes of peripheral devices.
- It is independent from vendor specific graphics hardware.
- It runs on at least one and preferably on a variety of different client processing devices, including Windows, Mac OS/X, Linux, Android, iOS and many others.

Advantages

The present application has one or more of the following advantages:

- No need for a master role in the meeting
- Standard plug and play connectivity of connection units to base node
- Simple and well known user actions are employed
- Own networking facilities of client processing devices not blocked
- No configuration changes on the client processing device
- Input devices are easily accessible; e.g. large size
- Program updates of portable application and server program can be performed locally
- Portable applications are used, no installation, multi-platform, no vendor specifics
- Particular implementation of screen scraping done by portable application avoids vendor specific graphics devices
- Standard drivers are used so no need to install extra drivers
- No configuration changes on the client processing devices
- Zero footprint applications on client processing devices – nothing to clear up or adjust or reset
- Own networking facilities of client processing devices not blocked

- No configuration changes on the user computers
- Low virus, malware and spyware risk

The portable application may be stored on a non-transitory machine readable storage medium such as an optical disk, a magnetic disk, magnetic tape, solid state memory, nand Flash etc.

Second Embodiment

In the second embodiment, referring to Figs. 2 to 5, the base node is a separate physical processing device called base unit (B), comprising permanent storage, memory, a processing engine, a wireless access point (4), a plug and play interface such as a USB port (11), a graphics display output adapter (5) like VGA/DP/DVI/HDMI, and optionally an audio output adapter (27). An input device having an actuator such as a button 13 and a visual indicator 14 are optional.

The connection unit is a physical device in the form of an external peripheral device (shown in the drawings as a "dongle" D) comprising permanent storage storing the portable application (7) and configuration parameters (12), memory, a processing engine (e.g. CPU, FPGA), a wireless transmitter such as WiFi (3) or other wireless transmitters such as LiFi, a plug and play interface such as a USB interface (2), a button as input device (9), an LED ring as visual indicator (10). The portable application is stored on the peripheral device (7).

The client processing device is host device, for example a computer or laptop comprising a display, a plug and play interface such as a USB port (2), memory, and a processing engine such as a microprocessor.

The system thus comprises

- an external peripheral device (D) that has a plug and play interface such as a USB interface (2) on one end and a communications interface such as a wireless interface configured as client (3) on the other end.
- a base unit (B) that has a communications interface such as a wireless interface

configured as access point on one end (4) and a video card adapter (5) like VGA, DVI, DP or HDMI on the other end.

- a portable application (7) stored on the peripheral device (D) but executed on the client processing device (C)
- a base node software (6) stored and executed on the base unit (B)

The external peripheral device (D) also preferably has any one or any combination of:

- a large button as actuator for the input device (9) allowing user interaction with the peripheral device. The button preferably has an actuation surface area of between 100 and 14,400 square mm.
- visual indication such as a LED (10) allowing user feedback from the peripheral device. The user feedback can be in the form of a light ring.

An advantage of embodiments of the present invention is to provide data transfer to the peripheral device via a peripheral interface such as a USB interface on any processing device such as a computer in a manner that is largely operating system independent and without leaving a footprint (Zero-Footprint). Installation of drivers and/or applications onto such a processing device as a computer is not necessary wherever pre-installed generic drivers are present. Administrator rights on the processing device such as a computer are preferably not necessary. To avoid the need for administrator rights, embodiments of the present invention use other peripheral device pre-installed drivers such as USB class drivers supported without any extra installation. Embodiments of the present invention route at least screen scraped data presented by client software running on the processing device for transfer to a communications network via a peripheral device such as a USB device. This bypasses any network interface of the processing device C (and hence many firewalls) but only for the specific client software. Other applications are not affected and can make use of the standard network interfaces, i.e. packets from/to the TCP/IP stack are transferred to a network device as normal. The client software is launched from the peripheral device such as a USB composite device or storage device as a portable application, which can avoid that any traces are left on the host OS.

Basic usage scenario of the second embodiment

The base node software (6) displays on the projector a splash screen – (21) in figure 5 - showing its readiness to receive arbitrary media content over its receiver (4). This splash screen (21) also shows instructions on how to use the system, as well as the configuration parameters (see later) to reach the base node. These configuration parameters can also be shown in a transparent canvas at the bottom of the central display (22).

To avoid user interaction for the configuration of the connection between peripheral device and base unit, a pairing process is used. This pairing process provides the peripheral device, i.e. the connection unit with networks parameters needed to set up the local network. As an example, the peripheral device can be briefly plugged into the USB port (11) of the base unit (B). The base unit then optionally does a software validity check, optionally does a software update of the portable application stored on the peripheral device, and writes the connection parameters on the peripheral device (D) required for the peripheral device and base unit to find each other to the permanent storage (8). For example, when using WiFi, this could be the SSID, WEP/WPA2 keys and IP address and port number of the base unit's receiver, as well as the port number used by the base node software, but not all of these are necessarily needed to be exchanged.

A client processing device that wants to have its arbitrary media content displayed on the central display connected to the base node (5) connects a peripheral device (D) to its USB port via (2). The peripheral device presents itself to the computer over interface (2) as a composite device comprising a mass storage device and a keypad. This has the major advantage that no specific driver is required, since all these devices are natively supported in every personal computer system that has a USB port. If autorun is enabled, then the computer will automatically execute the client software (7) stored in mass storage (8) on the peripheral device. The first user interaction mentioned in the general case is then just the connection of the peripheral device to the USB port. If security measures disabled auto-run, the user needs to explore the mass storage on the mass storage of the peripheral device and start the portable application

manually.

The portable application will use the wireless, e.g. WiFi or LiFi interface of the peripheral device (3) to connect to the correct base node. To know the right base unit to connect to, the configuration parameters needed to make this connection are stored in the database (12) on the mass storage device (8) during the pairing process described earlier.

Once the connection is made, the peripheral device goes into connected mode. This means that there is now at least one channel from the peripheral device to the base unit. The content is not shown yet. The LED (10) on the peripheral device now turns white to give a visual indication of this new state.

When the user at the computer (C) wants to show her content, she presses the button (9). When the button was previously in state "connected" (see figure 6), it will check the state of the base unit (P). If the base unit is not in state "full", the peripheral device will send the screen scraped arbitrary media content to the base unit (B), which will add the media content to the composition on the central display. The peripheral device LED (10) now turns red to indicate "showing" state (figure 6).

The button (9) acts as a toggle. When the user presses the button again, that computer displays content will be removed from the projector. The LED (10) goes back to white.

Use of the auto-run feature is optional if possible and enabled on the computer (C) to start the client software (7) as soon as the peripheral device is plugged in. On Windows for example, this means mounting the peripheral device as a mass storage device and using the autorun.inf file stored on the peripheral device.

In many cases however, this auto-run feature will be disabled for security reasons. In that case, we will, if possible and enabled on the computer (C), use the auto-play feature to show the logo of the connected peripheral device on the desktop of the computer. The user then needs to double click on that logo to start the client software.

If the auto-play feature as described above is also not possible or enabled, the user must browse to the file system of the connected peripheral device and start the application manually. This means double clicking the client.exe file on Windows, client.app on Mac OS/X or tapping the appropriate application icon on a tablet or any mobile device with touch screen.

Third Embodiment: Portable application stored on standard solid state memory such as a USB stick.

In the third embodiment, the portable application is stored on a solid state memory such as a regular USB memory stick (figure 7).

With a solid state memory such as a regular USB memory stick, there is no input device, visual indicator or transmitter of the kinds described above for the connection unit. This means that the system needs to:

- Use the transmitter/receiver from the client processing device.
- Use as input device a key or button on the client processing device like a physical key on the keyboard, a special mouse press, a button area on a touch screen, a button displayed on the screen to be clicked on with a mouse pointer.
- Present the visual indicator on the client processing device's display.

The client processing device then looks like figure 8.

This embodiment provides a peripheral interface such as the USB interface on any processing device acting as a host device such as a computer in a manner that is largely operating system independent. Installation of drivers and/or applications onto such a processing device as a computer is not necessary wherever pre-installed generic drivers are present. Administrator rights on the processing device such as a computer are preferably not necessary. To avoid the need for administrator rights, this embodiment uses other peripheral device pre-installed drivers such as USB class drivers supported without any extra installation. This embodiment of the present invention routes at least screen scraped data presented by client software running on the processing device for transfer to a communications network via a network connection of the processing device. The client

software is launched from the peripheral device such as the USB device as a portable application.

The first user operation then comprises:

- plugging in the solid state device such as a USB memory stick,
- starting the portable application (if autorun is disabled)
- configuring the transmitter, such as the wired or wireless network interface, on the client processing device to connect to the correct base node, using the configuration parameters (22) shown on the central display
- triggering the connection of the portable application with the base node, for example by interacting with an element on the GUI (18) of the portable application presented on the display of the client processing device.

Presenting visual feedback on user actions is in this embodiment also done using elements in the GUI of the display of the client operating device.

In this embodiment, the advantage of zero footprint is partly realized by the portable application in the sense that no software is installed on or copied to the client operating device, but there is a configuration change needed to connect the transmitter of the client operating device with the base node, which needs to be undone afterwards.

Optionally, the portable application can make the configuration changes to the transmitter for the user in the background.

Advantages lost in this embodiment

- Partial loss of zero footprint nature of portable application
- More complex first user interaction
- More expertise required from user
- GUI needed on client operating device display, which is possibly also shown on central display
- Need to find free key on client operating device when using physical key for second user action
- Network interface is blocked from other uses by portable application

Optionally, the last point can be avoided by using the base unit as a gateway to the network that the client operating device wanted to connect to through its own interface.

Advantages are:

- tight control of user connectivity to corporate network through settings on the base unit
- keep network connectivity intact even when transmitter is now also used for display purposes

Disadvantage is a higher vulnerability of the system because the display connection is now possible a doorway into the corporate network.

What remains as advantages are

- the availability of a physical medium to distribute the portable application to users
- no need to install or copy software to client operating device
- easy way to maintain software updates on the connection units (here: memory sticks) via the base unit
- possibility to write configuration data on the connection unit by the base unit, for example in the form of a configuration profile that can be read and used by the client operating device

Fourth Embodiment: Software only client installed on the client processing device.

This embodiment is similar to the third embodiment, with as only difference that the software is copied on the client operating device (figure 9). In this case, no plug and play port such as a USB port is required on the client operating device.

This embodiment will typically be used for tablet PC's and mobile devices. In that case

- there is often no USB port available
- application distribution is easy and widely accepted through application stores

Fifth embodiment: Base node software OEM'ed to projector or display equipment

In this embodiment, the base node is not realized as a separate physical box, but integrated

into the processing unit inside a display or projector. All other details are as previously described.

Sixth embodiment

In this embodiment, the base node is not realized as a separate physical box, but integrated into the codec of a video conferencing equipment. All other details are as previously described.

Seventh embodiment: Remote meeting participant

In this embodiment, one or multiple client operating devices are not in the direct vicinity of the base node but on a remote location.

To accommodate this case, the following adaptations are needed:

- further compression and or scaling of the arbitrary media content to allow use of low bandwidth connection
- possibility to communicate connection parameters of the base node to a remote user
- connectivity of the base node to the WAN network to which the remote user is connected

All other details are as previously described.

Eighth embodiment: multiple base nodes

In this embodiment, multiple base nodes are used. This can be done for different purposes:

- connectivity of multiple central displays
- extension of real estate of central display
- connectivity of base nodes in different remote locations

This provides the advantage that one can present on multiple base units from a single peripheral device. This is useful for a number of cases:

- personal peripheral device: user can have a personal peripheral device that is paired with

multiple meeting rooms that he regularly uses
- use in meeting room with multiple base units each controlling a different display in the same meeting room

The proposal uses a special variant of the peripheral device called a multi base peripheral device. The multi base peripheral device is equipped with a rotating wheel around the circular central "show me" button. This could be a mechanical rotating multi-position switch or something like the touch wheel on the iPod classic.

The pairing of this multi-base variant of the peripheral device:
- the rotation wheel is put in the position of the corresponding base unit.
- the peripheral device is paired to the base node in the regular way
- the configuration parameters are stored in a permanent storage location; every position of the rotating wheel has a corresponding set of connection parameters (e.g. different rows in a table) each corresponding with a particular base

The connection of the peripheral device is as follows:
- multi-base peripheral device X is plugged into a PC
- rotation wheel on peripheral device X is put in position A
- peripheral device X reads configuration parameters in position A of its internal memory
- peripheral device X connects to base node A
- base node A indicates connection of multi-base peripheral device X on central display screen
- rotation wheel on peripheral device X is put in position B
- peripheral device X reads configuration parameters in position B of its internal memory
- peripheral device X connects to base node B
- base node B indicates connection of multi-base peripheral device X on screen
- continue until correct base is selected with rotation wheel
- click the peripheral device input device e.g. button to show content on central display of base node
- rotating the wheel always first clicks away content from the base of the last position

Ninth embodiment

Fig. 10 shows a peripheral device 47 in accordance with an independent embodiment of the present invention including an input device. This embodiment can be used with any of the embodiments described above.

The peripheral device is configured as a connection unit and is a physical device in the form of a connector for a plug and play interface of a user processing device as a host computer such as a USB connection, a flexible data and power connection connected to the connector and a base, the base having an actuator, e.g. a button configured to be an input device with the functions as described above.

The base and/or the actuator is preferably large in size, e.g. having a surface area between 100 and 14,400 square mm. The base can be square, rectangular, round, hexagonal, oval, polygonal in shape or any other ergonomically suitable shape. The actuator is preferably round but can be square, rectangular, hexagonal, oval, polygonal in shape etc. there can be more than one actuator on one base.

The length of the flexible data and power connection, e.g. cable is preferably adapted to place the peripheral device (when in its connected in its operating position), especially the base and the actuator, in the region between the boundary of the connected user processing device and the ergonomic boundary as defined above. In addition 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 such as having permanent storage for storing the portable application and the network configuration parameters, memory, a processing engine (e.g. CPU, FPGA), a wireless transmitter/receiver such as for WiFi or LiFi, a plug and play interface such as a USB interface, a LED ring as visual indicator. The visual indicator can be used for the LiFi interface. The portable application can be stored on the peripheral device, i.e. in the base. 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, ...)
- 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

Alternative embodiments

In the above embodiments, once the connection is made between the connection device and a host computer, the peripheral device goes into connected mode. This means that there is at least one channel from the peripheral device to the base node. In accordance with any of the embodiments of the present invention a plurality of channels can be set up between the connection device and the base node. These channels may be logical channels.

Some examples for such a multichannel arrangement may include the first and one or more of the additional channels:

- First channel is for the Scraped image stream (XDS)
- Second channel is for GPU commands (OpenGL, DirectX)
- Third channel is for Mouse pointer coordinates (absolute, relative)
- Fourth channel is for Mouse pointer icons
- Fifth channel is for Image data files (JPEG, PNG, GIF, ...)
- Sixth channel is for Multimedia data files or streams (MPEG2, MPEG4, OGG, H.26x, ...)
- Seventh channel is for Audio data files or streams (MP3, MP4, AAC, WMA, ...)
- Eighth channel is for text or Document data files (DOC, DOCX, PPT, PPTX, ODT, ODS, PDF, ...)
- Ninth channel is for transmission of a priority value 1,2, 3... as described above.

In the above embodiments, a particular method of pairing the peripheral device with the base node has been described. Any of the embodiments of the present invention may include other pairing mechanisms of which some examples are given below.

- Some examples for pairing
  - Plug in the peripheral device, to a generic peripheral device port such as a USB port of the base node or other USB enabled device. Pairing info is transmitted over the generic peripheral interface such as USB.
  - The Signal strength of the wireless channel to the base node is used to identify which base nod is to be used
  - The Signal strength of the wireless channel or any other channel. Example is an NFC/RFID transmitter can be provided underneath the meeting room table. Putting the user processing device such as a laptop and the peripheral device plugged in on this table automatically pairs the peripheral device with the base of this meeting room
  - Manual pairing (e.g. by entering IP address, hostname, wireless ID (like SSID on WiFi)).

What is claimed is

1. An electronic meeting tool for communicating arbitrary media content from users at a meeting comprising:

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 being adapted to receive user selected arbitrary media content and to control display of the user selected arbitrary media content on the first display; and

at least one peripheral device adapted to communicate the user selected arbitrary media content via the communications network, wherein the peripheral device is a connection unit comprising:

(c) a connector adapted to couple to a port of a processing device having a second display, a memory and an operating system; and

(d) a transmitter for communicating with the communications network,

a program 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, and

an input device 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.

2. The electronic meeting tool of claim 1 wherein the program is stored on the peripheral device.

3. The electronic meeting tool of any previous claim wherein the transmitter is a wireless transmitter or transceiver.

4. The electronic meeting tool of any previous claim wherein the peripheral device is a plug-and-play device.

5. The electronic meeting tool of any previous claim wherein the program is adapted to screen scrape content of the second display.

6. The electronic meeting tool of any previous claim wherein the input device is physical actuator coupled to the peripheral device.

7. The electronic meeting tool of claim 6 wherein the physical actuator has a surface area of between 100 and 14,400 square mm.

8. The electronic meeting tool of any previous claim wherein the input device is a key displayed on the second display.

9. The electronic meeting tool of claim 8 wherein the key displayed on the second display is not screen scraped by the program.

10. A method for connecting a processing device to a communications network, the processing device having a memory, a display and an operating system with at least one pre-installed generic driver providing a generic communications protocol for communication between processing device and a standard class of peripheral devices, the method comprising the steps of:
a) coupling a peripheral device to the processing device, the peripheral device having a transceiver;
b) setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;
c) coupling the processing device to a communications network via the peripheral device;
d) routing screen scraped data between the processing device and the communication network via the means for communication, wherein the generic communication protocol is used for transferring the screen scraped data between the processing device and the peripheral device.

11. The method of claim 10 wherein Step b) comprises presenting the peripheral device to the processing device as a human interface device and wherein the pre-installed generic driver is a human interface device driver.

12. The method of claim 10 wherein Step b) comprises presenting the peripheral device to the processing device as a mass storage device and wherein the pre-installed generic driver is a mass storage device driver.

13. The method of claim 10 wherein Step b) comprises presenting the peripheral device to the processing device as a composite device and wherein pre-installed generic drivers drive different device interfaces independently.

14. The method of any of claims 10 to 13 wherein a client application is stored on the peripheral device which when run on the processing device obtains the screen scraped data.

15. The method of claim 14 wherein the client application is a portable application.

16. A peripheral device for providing communication connectivity to a processing device which is provided with memory, a display and an operating system with at least one pre-installed generic driver providing a generic communication protocol for communication between the processing device and a standard class of peripheral devices, the peripheral device comprising a memory in which executable software code is stored for execution on the processing device, said executable software code comprising:
a first software code portion for setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;
a second software code portion for connecting the processing device to a communications network via the peripheral device, the peripheral device having a transceiver;
a third software code portion for screen scraping data from the processing device; and
a fourth software code for routing screen scraped data between the processing device and the communications network over the means for communication; wherein the first software code portion is adapted to use the generic communication protocol for transferring the screen scraped data between the processing device and the peripheral device.

17. The peripheral device of claim 16, wherein the first software code portion is adapted to present the peripheral device to the processing device as a human interface device and wherein the pre-installed generic driver is a human interface device driver.

18. The peripheral device of claim 16, wherein the first software code portion is adapted to

present the peripheral device to the processing device as a mass storage device and wherein the pre-installed generic driver is a mass storage device driver.

19. The peripheral device of claim 16, wherein the first software code portion is adapted to present the peripheral device to the processing device as a composite device and wherein pre-installed generic drivers drive different device interfaces independently.

20. The peripheral device of any of the claims 16 to 19 wherein said executable software code comprises fifth code for providing a means for connecting to the communications network including a base node.

21. The peripheral device of any of the claims 16 to 20 wherein said executable software code comprises sixth code for providing means for capturing video frame buffers of the processing device.

22. The peripheral device of any of the claims 156to 21 wherein said executable software code comprises seventh code for providing a means for encoding, compressing and optionally encrypting the screen scraped data and sending the screen scraped data the communication network.

23. The peripheral device of any of the claims 16 to 21 wherein said executable software code comprises eighth code for providing a means for handling the peripheral device.

24. The peripheral device of any of the claims 20 to 23 wherein said executable software code comprises ninth code for providing means for initiating connection to the base node.

25. The peripheral device of any of the claims 16 to 24 wherein said executable software code comprises tenth code for receiving inputs from an input device on the peripheral device.

26. The peripheral device of any of the claims 16 to 25 wherein said executable software code comprises eleventh code for providing a means for sending state changes to the visual indicator on the peripheral device.

27. The peripheral device of any of the claims 16 to 26 wherein said executable software code comprises Twelfth code for providing a means for presenting to the user a GUI.

28. The peripheral device of any of the claims 16 to 27 wherein said executable software code comprises thirteenth code for presenting a GUI for administration of the said executable software code when executed as a portable application.

29. The peripheral device of any of the claims 16 to 28 wherein said executable software code comprises fourteenth code for providing a means for displaying and activating a key on the display of the client processing device for allowing a user to input the start the transfer of data from the processing device to the base node.

30. A peripheral device for providing communication connectivity to a processing device which is provided with memory, a display and an operating system with at least one pre-installed generic driver providing a generic communication protocol for communication between the processing device and a standard class of peripheral devices, the peripheral device comprising a memory in which executable software code is stored for execution on the processing device, said executable software code comprising:
a first software code portion for setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;
a second software code portion for connecting the processing device to a communications network via the peripheral device, the peripheral device having a transceiver; and
a third processing software code for routing data between the processing device and the communications network over the means for communication; wherein the first software code portion is adapted to use the generic communication protocol for transferring the data between the processing device and the peripheral device, and
an input device coupled to the peripheral device, the input device being adapted to react to a user action to trigger the transfer of the data from the processing device to the peripheral device.

31. The peripheral device of claim 30, wherein the first software code portion is adapted to present the peripheral device to the processing device as a human interface device and

wherein the pre-installed generic driver is a human interface device driver.

32. The peripheral device of claim 30, wherein the first software code portion is adapted to present the peripheral device to the processing device as a mass storage device and wherein the pre-installed generic driver is a mass storage device driver.

33. The peripheral device of claim 30, wherein the first software code portion is adapted to present the peripheral device to the processing device as a composite device and wherein pre-installed generic drivers drive different device interfaces independently.

34. The peripheral device of any of the claims 30 to 33 wherein the input device is physical actuator coupled to the peripheral device.

35. The peripheral device of claim 34 wherein the physical actuator has a surface area of between 100 and 14,400 square mm.

36. The peripheral device of any of the claims 30 to 35 wherein the input device is a key for display on the display.

37. The peripheral device of any of the claims 30 to 36 wherein said executable software code comprises fourth code for providing a means for connecting to the communications network including a base node.

38. The peripheral device of any of the claims 30 to 36 wherein said executable software code comprises fifth code for providing a means for capturing video frame buffers of the processing device.

39. The peripheral device of claim 38 wherein said executable software code comprises sixth code for providing a means for encoding, compressing and optionally encrypting the video frames and sending them over a secure link to the base node.

40. The peripheral device of any of the claims 30 to 39 wherein said executable software code comprises seventh code for providing a means for handling the peripheral device.

41. The peripheral device of claim 39 or 40 wherein said executable software code comprises eighth code for providing a means for initiating connection to the base node.

42. The peripheral device of any of the claims 30 to 41 wherein said executable software code comprises ninth code for receive inputs from an input device on the peripheral device.

43. The peripheral device of any of the claims 30 to 42 wherein said executable software code comprises tenth code for providing a means for sending state changes to the visual indicator on the peripheral device.

44. The peripheral device of any of the claims 30 to 43 wherein said executable software code comprises eleventh code for providing a means for presenting the user a GUI.

45. The peripheral device of any of the claims 30 to 44 wherein said executable software code comprises twelfth code for presenting GUI for administration of the executable software code when executed as a portable application.

46. The peripheral device of any of the claims 37 to 45 wherein said executable software code comprises thirteenth code for providing a means for displaying and activating a key on the display of the processing device for allowing a user input to start the transfer of data from the processing device to the base node.

47. A peripheral device for providing communication connectivity to a processing device which is provided with memory, a display and an operating system with at least one pre-installed generic driver providing a generic communication protocol for communication between the processing device and a standard class of peripheral devices, the peripheral device comprising a memory in which executable software code is stored for execution on the processing device, said executable software code comprising:
a first software code portion for setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;
a second software code portion for connecting the processing device to a communications network via the peripheral device, the peripheral device having a transceiver;

a third software code portion for receiving media content from the network and for displaying the media content on the display in accordance with a set of rules; wherein the first software code portion is adapted to use the generic communication protocol for transferring the media content between the peripheral device and the processing device.

48. The peripheral device of claim 47 wherein said executable software code comprises fourth code for providing a means for correctly configuring a receiver as an access point.

49. The peripheral device of claim 47 or 48 wherein said executable software code comprises fifth code for providing a means for listening for output of connection units trying to connect on a specific port.

50. The peripheral device of any of the claims 47 to 49 wherein said executable software code comprises sixth code for providing a means for a GUI for administration purposes.

51. The peripheral device of any of the claims 47 to 50 wherein said executable software code comprises seventh code for providing a means for publishing its presence over the network using the zeroconf protocol.

52. The peripheral device of any of the claims 47 or 51 wherein said executable software code comprises eighth code for providing a means for accepting and installing software updates.

53. The peripheral device of any of the claims 47 or 52 wherein said executable software code comprises ninth code for providing a means for providing facilities for pairing of connection units to the processing device.

54. The peripheral device of any of the claims 47 or 53 wherein said executable software code comprises tenth code for providing a means for auto-composing of different incoming arbitrary media streams and rendering of composited image on display.

55. The peripheral device of any of the claims 47 or 54 wherein said executable software code comprises eleventh code for providing a means for receiving, decrypting and decoding incoming arbitrary media content.

56. The peripheral device of any of the claims 47 or 55 wherein said executable software code comprises twelfth code for scaling of incoming arbitrary media streams.

57. The peripheral device of any of the claims 47 or 56 wherein said executable software code comprises thirteenth code for providing a means for displaying incoming arbitrary media content in accordance with a set of rules.

58. A method for communicating arbitrary media content from users at a meeting comprising:
operating a display node of a communications network, the display node being coupled to a first display, to receive user selected arbitrary media content and to control display of the user selected arbitrary media content on the first display; and
connecting a peripheral device to a port of a processing device and communicating the user selected arbitrary media content via the communications network,
loading a program onto the processing device and running the program on the operating system of the processing device to obtain user selected arbitrary media content, said program leaving a zero footprint on termination, and
triggering transfer of said user selected arbitrary media content to said transmitter through said port after a user action on an input device.

59. A peripheral device comprising:
a base
a connector for connection to a plug and play port of a host processing device,
a flexible connection between the base and the connector for transferring data signals and power,
an actuator on the base for actuating a signal and for transferring the signal to the connector for transfer to the port, wherein the base has electronics comprising permanent storage for storing a portable application, a processing engine, a transceiver and a visual indicator.

60. A method for providing communication connectivity from a processing device,
setting up a communications network between a base node of the communications network and a peripheral device coupled to the processing device;

transferring media content between the processing device and the peripheral device, transmitting the media content from the peripheral device to the communications network, receiving media content from the communications network at the base node and displaying the media content on a display in accordance with a set of rules.

61. Any of the above software code stored on a non-transitory storage medium.

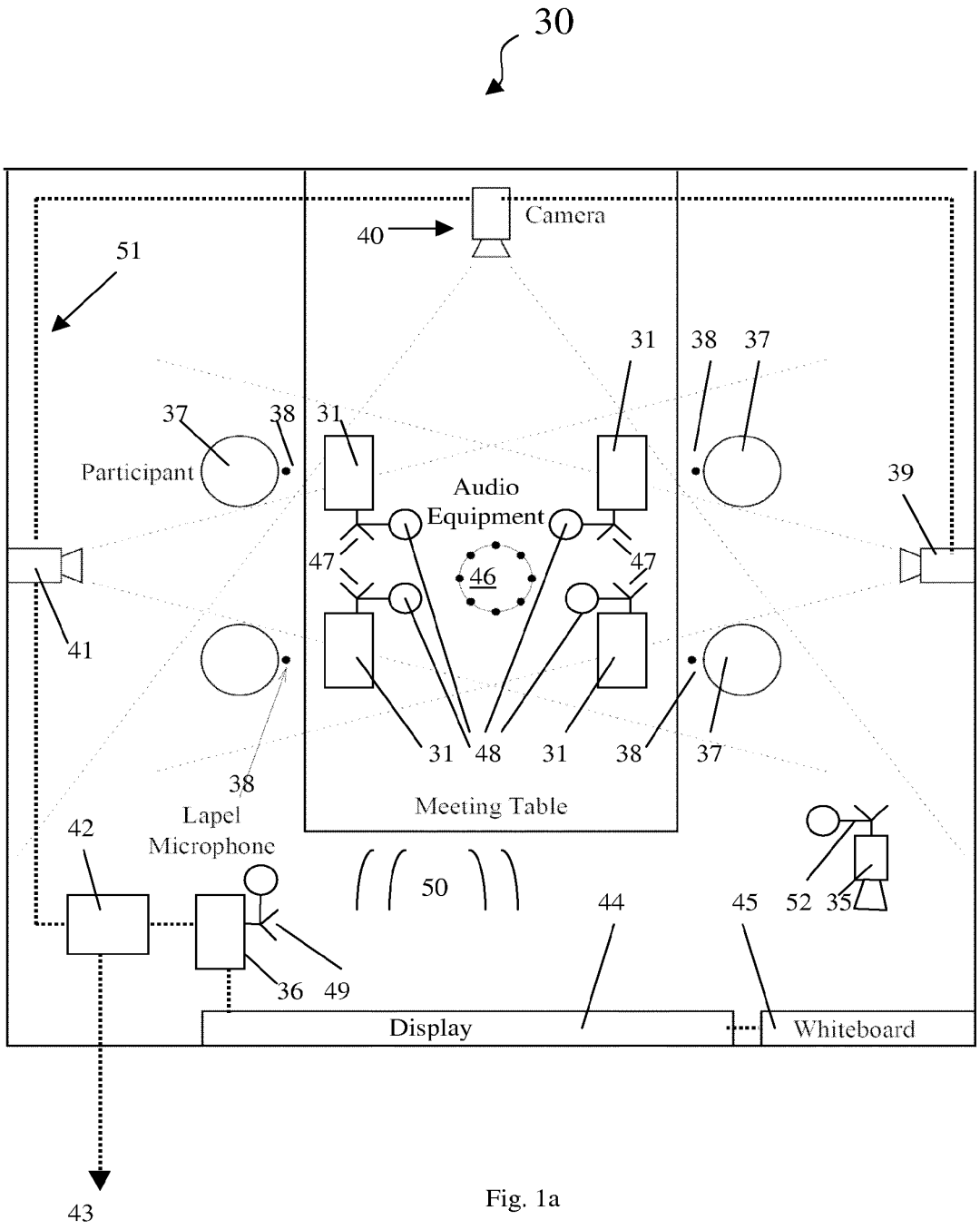
30
Camera
40
51
31
38
37
37
38
31
Participant
Audio
Equipment
39
47
47
46
41
31
48
31
38
37
38
Lapel
Microphone
Meeting Table
42
50
44
45
52
35
36
49
Display
Whiteboard
43

Fig. 1a

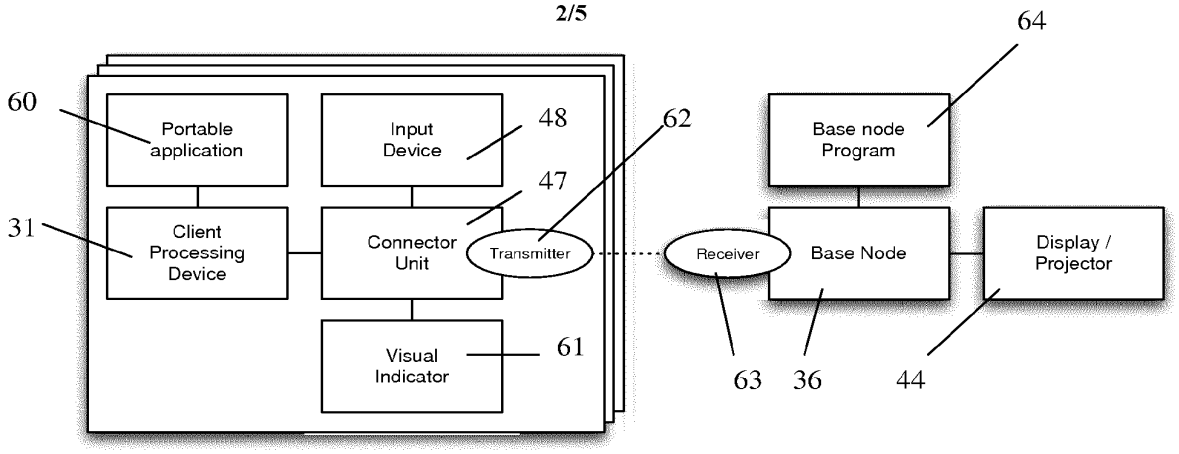
60
Portable application
Input Device
48
62
64
Base node Program
31
Client Processing Device
Connector Unit
47
Transmitter
Receiver
Base Node
Display / Projector
Visual Indicator
61
63
36
44

Fig. 1b

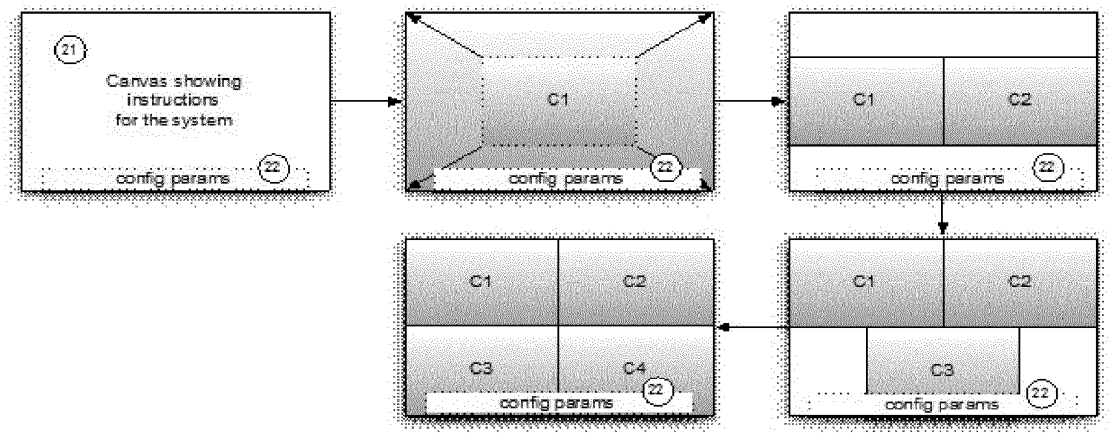
21
Canvas showing instructions for the system
config params
22
C1
C2
C3
C4

Fig. 2

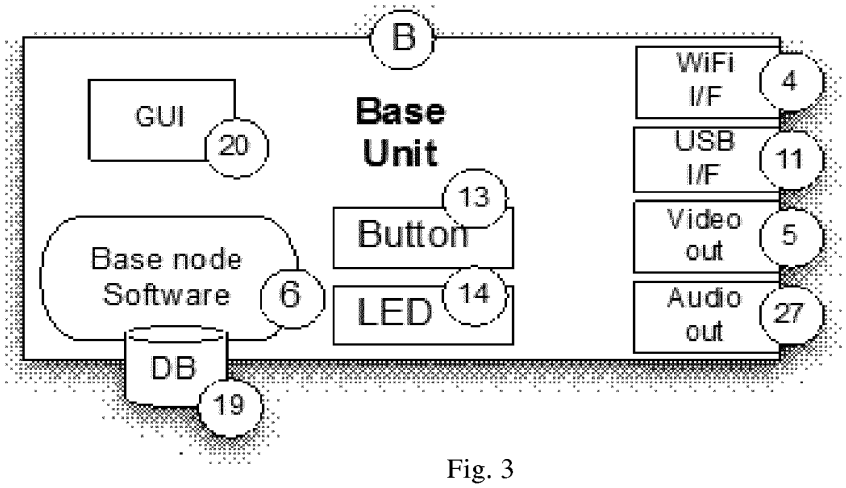

Fig. 3

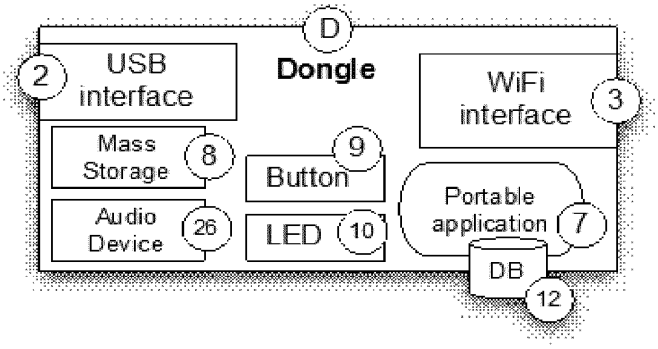

Fig. 4

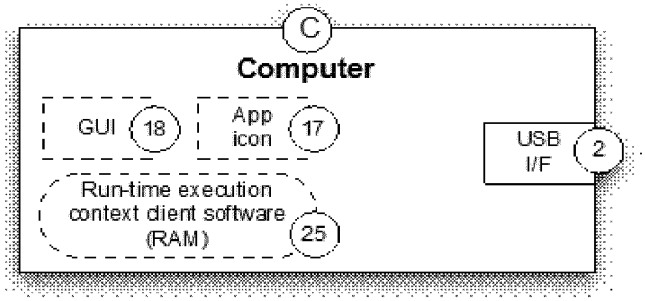

Fig. 5

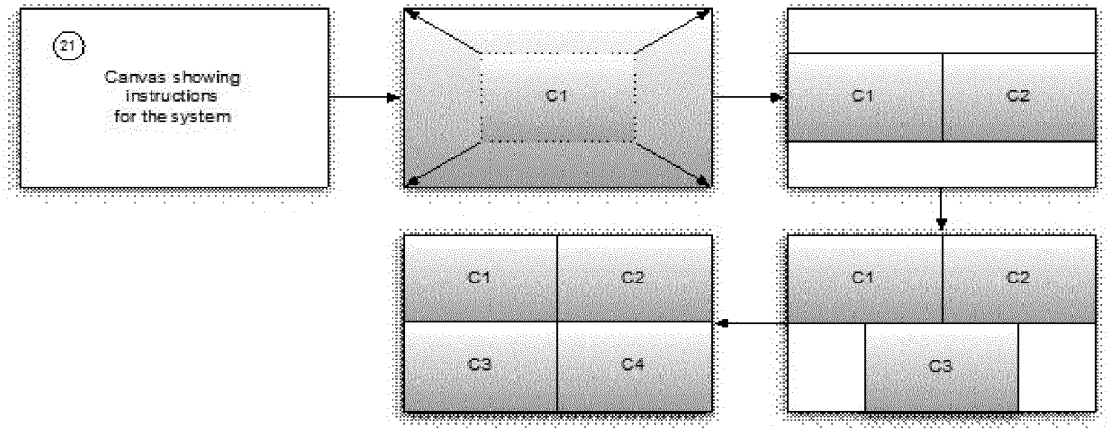

Fig. 6

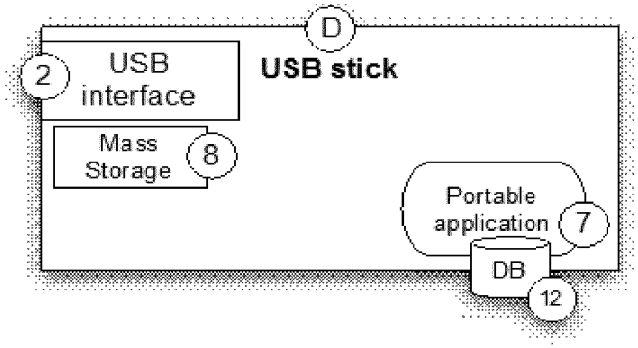

Fig.7

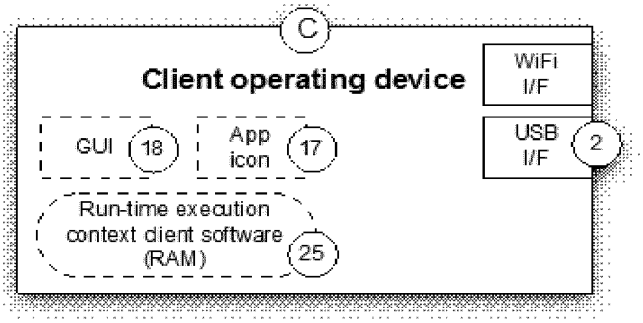

Fig. 8

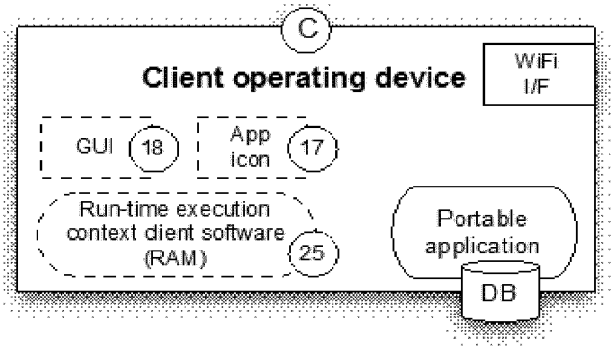
C
Client operating device
WiFi I/F
GUI
18
App icon
17
Run-time execution context client software (RAM)
25
Portable application
DB

Fig. 9

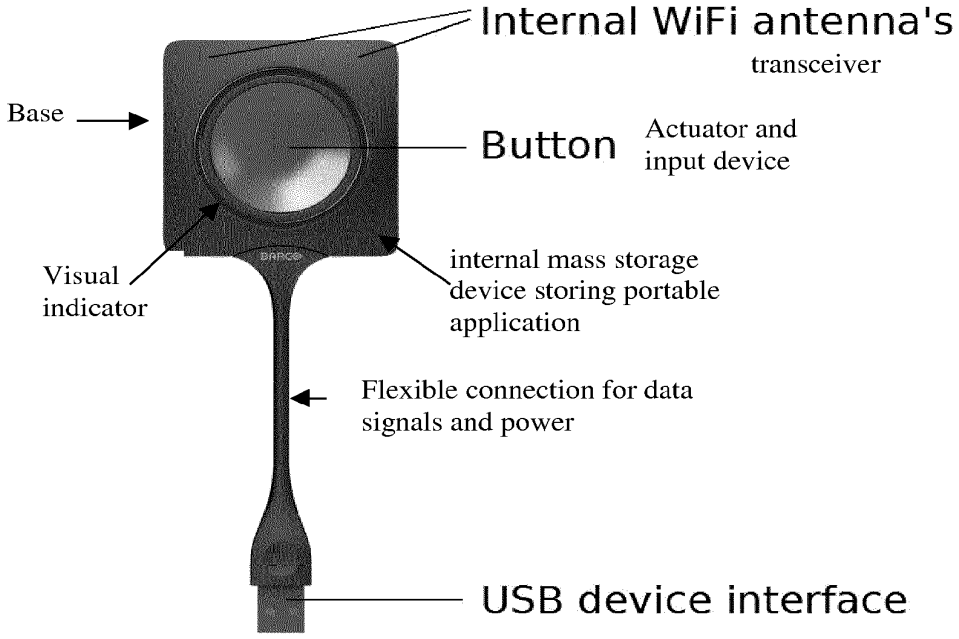
Internal WiFi antenna's
transceiver
Base
Button
Actuator and input device
Visual indicator
internal mass storage device storing portable application
Flexible connection for data signals and power
USB device interface

Fig. 10

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2012/068166

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04N7/15 H04N21/41 G06F9/54 H04M3/56
ADD.

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)
H04N G06F H04M

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)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2005/036509 A1 (ACHARYA SHRIKANT [US] ET AL) 17 February 2005 (2005-02-17) paragraph [0036] - paragraph [0044] figures 1,2	1-61
A	EP 1 187 480 A1 (TELESUITE CORP [US]) 13 March 2002 (2002-03-13) paragraph [0070] - paragraph [0089] figures 1, 5a - 6d	1-61
A	US 2004/263636 A1 (CUTLER ROSS [US] ET AL) 30 December 2004 (2004-12-30) paragraph [0046] - paragraph [0048] paragraph [0106] - paragraph [0108] paragraph [0142] - paragraph [0153] paragraph [0168] - paragraph [0193] figures 1-4,7-10	1-61

☐ 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 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
26 February 2013	06/03/2013

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Van der Zaal, Robert

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2012/068166

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2005036509 A1	17-02-2005	NONE	
EP 1187480 A1	13-03-2002	AT 220838 T	15-08-2002
		AT 311724 T	15-12-2005
		AU 697578 B2	08-10-1998
		AU 3634495 A	09-04-1996
		CA 2200477 A1	28-03-1996
		DE 69527440 D1	22-08-2002
		DE 69527440 T2	20-02-2003
		DE 69534660 D1	05-01-2006
		DE 69534660 T2	27-07-2006
		EP 0806115 A1	12-11-1997
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		JP H10508990 A	02-09-1998
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		US 5751337 A	12-05-1998
		US 6160573 A	12-12-2000
		US 6445405 B1	03-09-2002
		US 2003020805 A1	30-01-2003
		US 2004100553 A1	27-05-2004
		US 2007120954 A1	31-05-2007
		WO 9609722 A1	28-03-1996
US 2004263636 A1	30-12-2004	US 2004263636 A1	30-12-2004
		US 2009046139 A1	19-02-2009

Form PCT/ISA/210 (patent family annex) (April 2005)

Electronic Acknowledgement Receipt

EFS ID:	30670222
Application Number:	14344836
International Application Number:	
Confirmation Number:	1046
Title of Invention:	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS
First Named Inventor/Applicant Name:	Koen Simon Herman Beel
Customer Number:	23364
Filer:	Thomas Lee
Filer Authorized By:	
Attorney Docket Number:	BEEL3004/BEU/TL
Receipt Date:	16-OCT-2017
Filing Date:	03-MAR-2015
Time Stamp:	17:40:24
Application Type:	U.S. National Stage under 35 USC 371

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)	BEEL3004_IDS_SB08.pdf	613181 aeb48b812fa4b7551e5db4e21c649cb07046572e	no	5

Warnings:

Information:					
2	Foreign Reference	JP2008271265_filing.pdf	12121038 183f1c1640ed2fb1216525a989cfe689ec3648b0	no	61
Warnings:					
Information:					
3	Foreign Reference	EP2107463A2.pdf	672857 3cce45a8a72215ca81cb94ff89652adaf49d1773	no	13
Warnings:					
Information:					
4	Foreign Reference	EP2756668A1.pdf	3651161 1e5ed923e72997b418c1efa551f695438c129ce9	no	71
Warnings:					
Information:					
5	Non Patent Literature	CN_3rdOA_translation_26SEP17_filing.pdf	1761437 af7dcb2e46a9dae1e45edbfa6e43ff0d60e05f22	no	8
Warnings:					
Information:					
6	Non Patent Literature	NPL_ManualEpsonProjectors_14FEB11.pdf	402700 ea3a2066a9546c35ee0bbbe8c2437d4bdd8968a	no	1
Warnings:					
Information:					
7	Non Patent Literature	NPL_TheRFBProtocol_1998.pdf	79094 22390402b10c752e67bd3b5fb8cee3e3358060e6	no	26
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Information:					
8	Non Patent Literature	NPL_RemoteFramebufferProtocol_MAR11.pdf	79677 8f47e4aca0a70f9ad67c8d4d8b17abedb371e820	no	39
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Information:					

9	Non Patent Literature	NPL_QuickConnectWirelessEpsonProjectors_YouTube.pdf	1489862 1e8c9519bcfd7966abae6b9bac119fd6421ebb54	no	2
Warnings:					
The page size in the PDF is too large. The pages should be 8.5 x 11 or A4. If this PDF is submitted, the pages will be resized upon entry into the Image File Wrapper and may affect subsequent processing					
Information:					
10	Non Patent Literature	BEEL3001C_NFOA_28SEP17.pdf	476130 6ac2d76bf4f8b7dd7d70b0f2dc0429ea7553d53b	no	14
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Warnings:					
Information:					
		Total Files Size (in bytes):	22849007		

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.

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/344,836	03/03/2015	Koen Simon Herman Beel	BEEL3004/BEU/TL

CONFIRMATION NO. 1046

23364
BACON & THOMAS, PLLC
625 SLATERS LANE
FOURTH FLOOR
ALEXANDRIA, VA 22314-1176

PUB REQUEST ACCEPTANCE LETTER

OC000000094506183

Date Mailed: 10/04/2017

NOTICE OF ACCEPTANCE OF PUBLICATION REQUEST

The request for voluntary publication, amended publication, early publication, redacted publication, republication, corrected publication or revised publication has been received for this application. The request, including payment of any necessary fee(s), is in compliance with 37 CFR 1.215, 1.217, 1.219 or 1.221.

The projected publication date is 01/11/2018.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/dterry/

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Application No.:	14/344,836	**Confirm. No.:**	1046
Filing Date:	March 3, 2015	**Art Unit:**	2184
First Inventor:	Koen Simon Herman BEEL	**Customer No.:**	23364
Attorney No.:	BEEL3004/BEU/TL	**Examiner:**	Christopher A. Bartels
For:	**ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS**		

REPLY UNDER 37 C.F.R. § 1.111 TO OFFICE ACTION OF MAY 3, 2017

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

INTRODUCTORY COMMENTS

This is responsive to the Office Action dated May 3, 2017 in the above application.

In view of the following remarks, reconsideration of the application is respectfully requested.

A petition and appropriate fee to extend the period of reply by one month are concurrently filed herewith.

REMARKS

Reconsideration of the pending application is respectfully requested on the basis of the following particulars.

1. Rejection of claims 82-85, 87-95, and 97-102 under 35 U.S.C. § 102(b) as being anticipated by U.S. publication 2007/0033289 (*Nuyttens*)

Reconsideration of this rejection is respectfully requested on the basis *Nuyttens* fails to disclose or suggest each and every recited element of claims 82, 92, and 102, from which the remaining claims depend.

Specifically, *Nuyttens* fails to at least disclose or suggest "the processing device having a memory, a display and an operating system" and "coupling a peripheral device to the processing device," as previously recited in claim 82.

Rather, *Nuyttens* discloses solving the distribution problems using an off-the-shelf network, e.g., using an IP based or similar data protocol, such as an IP network based distributed system architecture to bring the display controller functionality closer to the source and to replace proprietary busses used for transporting video, audio, RGB, graphical information and/or metadata with building blocks based on standard IP and compression technologies (para. [0088]). The following functional blocks can be used in this DGU 14: the drawing unit 40, the decoding unit 41 and the CPU unit 47 (para. [0116]). These building blocks are connected together via a switching means 46, e.g. via PCI express switch (para. [0116]). For example, as seen in Fig. 8, the decoding unit 41 receives the encoded information across the gigabit interface, decodes the information and forwards it to the drawing unit 40 (para. [0116]). The drawing unit 40 renders the information requested in the graphics configuration file, e.g., tagged mark-up language configuration document 61 (para. [0116]). The drawing unit 40 comprises a graphic accelerator 44, and may comprise a memory element 50 such as a DDR SRAM and one or more panellink, DVI or SDVO transmitters 51 for transmitting data signals to the display units 15 (para. [0121]). In other words, *Nuyttens* discloses a DGU having a drawing unit, a decoding unit

and a CPU unit, where the drawing unit 40 has a graphic accelerator and one or more panellink, DVI or SDVO transmitters, but fails to disclose "the processing device having a memory, a display and an operating system" and "coupling a peripheral device to the processing device."

Although the Examiner suggests on pages 3-4 of the Office Action dated May 3, 2017 that *Nuyttens* discloses the recited features, Applicant submits that the skilled person would not have observed the necessary evidence to support this conclusion. Rather, the skilled person would have appreciated that Fig. 7 of *Nuyttens* shows connections to Ethernet networks at the top and to the mezzanine boards at the bottom. From Fig. 8, the network, is on the left and the video will be passed through to the drawing unit 40 on the top right with a connection to a monitor 15 for display. In so doing, the skilled person would have understood that this is a standard structure in the sense that the video comes in from the network, is decoded, rendered and then displayed, which is not the invention recited in the claims.

Initially, Applicant submits that the skilled person would have appreciated that a "peripheral device" is a term of art having a specific meaning (*see, for example,* https://en.wikipedia.org/wiki/Peripheral), especially in light of the specification. In so doing, the skilled person would have appreciated that *Nuyttens* fails to disclose or suggest that any device in *Nuyttens* is a peripheral device, as would have been understood by the skilled person in light of the specification. For example, the skilled person would not have observed any evidence in paragraph [0116] of *Nuyttens* that the functional blocks are in fact peripheral devices. In fact, the skilled person would have appreciated that since paragraph [0116] of *Nuyttens* makes reference to a PCI express switch, the skilled person would have understood that the functional blocks are installed cards that are part of the computer, as opposed to a peripheral device.

Moreover, Applicant submits that the Examiner has improperly relied on the teachings of *Nuyttens* in view of the interpretation that the CPU mezzanine board is the processing device, while the peripheral device is the drawing unit 40. For example,

although the Examiner suggests on page 3 of the Office Action that the processing device has a display (monitor coupled to graphic accelerator 44, see Fig. 8, [0117]), the skilled person would have understood from Fig. 8 of *Nuyttens* that the monitor 15 is in fact connected to the drawing unit 40 and graphic accelerator 44. In so doing, the skilled person would have appreciated that the monitors 15 are not connected to the CPU mezzanine board, which the Examiner suggests is the processing device, but rather connected to the drawing unit 40, which the Examiner considers the peripheral device. Therefore, Applicant submits that the Examiner has improperly relied on the teachings of *Nuyttens* and *Nuyttens*, in fact, fails to disclose that the processing device has a display.

In so doing, Applicant submits that, when considering each and every feature recited in the claims in judging the patentability of the claim over the prior art, the skilled person would have understood that *Nuyttens* fails to disclose or suggest "the processing device having a memory, a display and an operating system" and "coupling a peripheral device to the processing device," as required by claim 82.

Furthermore, Applicant submits that the Examiner is relying on multiple distinct embodiments in *Nuyttens* to reach an incorrect conclusion that *Nuyttens* discloses the recited features (*see Net MoneyIn, Inc. v. Verisign, Inc.*, 545 F.3d 1359, 1369 (Fed. Cir. 2008) ("Thus, it is not enough [in an anticipation rejection] that the prior art reference discloses part of the claimed invention, which an ordinary artisan might supplement to make the whole, or that it includes multiple, distinct teachings that the artisan might somehow combine to achieve the claimed invention.")).

For example, Applicant submits that *Nuyttens* fails to disclose or suggest "setting up, by means of a first pre-installed generic audio driver of the operating system, a means for audio communication between the peripheral device and the processing device and by means of a second pre-installed generic driver of the operating system, a means for data communication between the peripheral device and the processing device," as recited in claim 82.

Although the Examiner suggests on pages 3-4 of the Office Action that the proprietary busses used for transporting video, audio and the multi-viewer driver discloses the recited features, Applicant submits that the skilled person would not have observed the necessary evidence to support this conclusion. Rather, the skilled person would have appreciated that the features recited in the claims are at least directed to, in one embodiment of the invention, the means for audio communication being between the peripheral device and the processing device.

On the other hand, Applicant submits that the skilled person would have appreciated that the Examiner is improperly interpreting the teachings of *Nuyttens*. For example, the skilled person would have understood that *Nuyttens* only generally discloses in paragraph [0088] that the proprietary busses used for transporting video, audio, RGB, graphic information and/or metadata are replaced. The Examiner has also suggested that the generic drivers are provided by the PCI express. In so doing, the skilled person would have understood, in view of the Examiner's interpretation of *Nuyttens*, that the Examiner is suggesting that the audio is being communicated between the drawing unit 40 and the mezzanine board 47 of Fig. 2 of the second embodiment of the invention of *Nuyttens*. However, the skilled person would have appreciated that the Examiner then relies on the teachings of the first embodiment shown in Fig. 7 of the multi-viewer driver 2, where in Fig. 4, Hydra 2 is provided for the first embodiment. The Examiner then argues that the metadata disclosed in paragraph [0088] of *Nuyttens* also discloses the means for data communication. The skilled person, however, would not have observed any evidence in *Nuyttens* that a single embodiment discloses the specific combination of features or why the skilled person would have modified the different teachings to reach in the same combination of features recited in claim 82.

Similarly, Applicant submits that *Nuyttens* fails to disclose or suggest "coupling the processing device to a communications network via the peripheral device," as recited in claim 82.

Although the Examiner suggests on page 4 of the Office Action that the RJ45 MAC PHY of *Nuyttens* discloses the recited features, Applicant submits that the skilled person would not have observed the necessary evidence to support this conclusion. Rather, the skilled person would have appreciated that such disclosure in paragraph [0112] belongs to the first embodiment of *Nuyttens*, and would not have observed any evidence in *Nuyttens* or that can be derived from general knowledge that the skilled person would have used such disclosure in the second embodiment of *Nuyttens* as disclosed in Fig. 8. In fact, Applicant submits that the skilled person would have appreciated that since the Examiner is relying on the mezzanine board 47 as being the processing device and the drawing unit 40 as being the peripheral device, the skilled person would have understood that the processing device is not coupled to the network on the left by the peripheral device. Rather, Fig. 8 of *Nuyttens* only shows that the drawing unit is coupled to the monitor 15, and not to a network.

Additionally, Applicant submits that *Nuyttens* fails to disclose or suggest "routing audio data between the processing device and the communication network via the means for audio communication, wherein the first pre-installed generic audio driver is used for transferring the audio data between the processing device and the peripheral device," as recited in claim 82.

Although the Examiner argues on page 4 of the Office Action that inserting the decoded image [and corresponding audio] on the internal bus of the [pre-installed generic audio driver] the multi-viewer driver 2 of *Nuyttens* discloses the recited features, Applicant submits that the skilled person would not have observed the necessary evidence to support this conclusion. Rather, the skilled person would have appreciated that paragraph [0112] of *Nuyttens*, as relied on by the Examiner, refers to the first embodiment, whereas paragraph [0088] only generally discloses that proprietary busses are used for transporting video, audio. The skilled person, however, would not have observed any evidence that *Nuyttens* in fact discloses or suggests routing audio data between the processing device and the communication network, as required by claim 82.

In other words, Applicant submits that not only has the Examiner improperly relied on multiple distinct embodiments in rejecting the claims, the Examiner has improperly interpreted the teachings of the drawing unit and mezzanine board of *Nuyttens* to improperly result in the claimed features.

Since *Nuyttens* fails to disclose or suggest each and every features in the same combination as recited in claim 82, *Nuyttens* cannot anticipate claim 82.

Claims 92 and 102 are allowable over the cited prior art at least for reciting similar features as recited in claim 82, as well as their individually recited features.

The remaining claims are allowable over the cited prior art least for their dependency on claims 82 and 92, as well as their individually recited features.

Accordingly, withdrawal of this rejection is respectfully requested.

2. Rejection of claims 86 and 96 under 35 U.S.C. § 103(a) as being unpatentable over U.S. publication 2007/0033289 (*Nuyttens*) in view of U.S. publication 2013/0060662 (*Carlson*)

Reconsideration of this rejection is requested on the basis that the rejection fails to establish obviousness with respect to claims 82 and 92, from which claims 86 and 96 depends.

Specifically, the teachings of *Carlson* fail to cure the deficiencies of *Nuyttens* with respect to claims 82 and 92. At most, *Carlson* discloses a product catalog system includes a product catalog having product offers received from various merchants (abstract). In so doing, the skilled person would have appreciated that *Carlson* only relates to crawling around the internet and scraping webpages, which has little to do with the present invention which relates to screen scraping data from a processing device, as defined in the specification, for example, at least on page 22, lines 10-13. Therefore, the proposed modification of the invention of *Nuyttens* in accordance with the teachings of *Carlson* fails to result in each and every feature recited in claims 82 and 92, from which claims 86 and 96 depend, and obviousness cannot be established.

Accordingly, withdrawal of this rejection is requested.

3. Conclusion

In view of the foregoing remarks, it is respectfully submitted that the application is in condition for allowance. Accordingly, it is requested that the currently presented claims be approved and the application passed to issue.

Please charge any additional fees required or credit any overpayments in connection with this paper to Deposit Account No. 02-0200.

If any issues remain that may be resolved by a telephone or facsimile communication with the applicant's attorney, the examiner is invited to contact the undersigned at the numbers shown below.

BACON & THOMAS, PLLC
625 Slaters Lane, Fourth Floor
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Date: August 30, 2017

Respectfully submitted,

/Thomas Lee/

THOMAS LEE
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PTO/AIA/22 (03-13)
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PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)	Docket Number (Optional) BEEL3004/BEU/TL
Application Number 14/344,836	Filed March 3, 2015
For ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS	
Art Unit 2184	Examiner Christopher A. Bartels

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))	$200	$100	$50	$ 200.00
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☐	Five months (37 CFR 1.17(a)(5))	$3,000	$1,500	$750	$

☐ 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.

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I am the

☐ applicant.

☐ attorney or agent of record. Registration number _____.

☑ attorney or agent acting under 37 CFR 1.34. Registration number 66,396.

/Thomas Lee — Signature

August 30, 2017 — Date

THOMAS LEE — Typed or printed name

703-683-0500 — 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*.

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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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Application Number	14344836
Filing Date	2015-03-03
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	Christopher A. Bartels
Attorney Docket Number	BEEL3004/BEU/TL

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	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	2184
	Examiner Name	Christopher A. Bartels
	Attorney Docket Number	BEEL3004/BEU/TL

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	1	Chinese Office Action dated June 28, 2017, for CN 201280074077.2, and English translation thereof.	☒
	2	Chinese Office Action dated July 4, 2017, for CN 201280055667.0, and English translation thereof.	☒
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	Application Number	14344836
	Filing Date	2015-03-03
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	2184
	Examiner Name	Christopher A. Bartels
	Attorney Docket Number	BEEL3004/BEU/TL

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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.

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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)	2017-08-30
Name/Print	THOMAS LEE	Registration Number	66396

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(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Veröffentlichungsnummer:
(11) Publication number: **EP 1 329 055 A0**
(11) Numéro de publication:

Internationale Anmeldung veröffentlicht durch die Weltorganisation für geistiges Eigentum unter der Nummer:

WO 01/089156 (art. 158 des EPÜ).

International application published by the World Intellectual Property Organisation under number:

WO 01/089156 (art. 158 of the EPC).

Demande internationale publiée par l'Organisation Mondiale de la Propriété sous le numéro:

WO 01/089156 (art. 158 de la CBE).

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
22 November 2001 (22.11.2001)

PCT

(10) International Publication Number
WO 01/89156 A2

(51) International Patent Classification[7]: H04L 12/28, 29/06

(21) International Application Number: PCT/JP01/04082

(22) International Filing Date: 16 May 2001 (16.05.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2000-143822 16 May 2000 (16.05.2000) JP

(71) Applicant *(for all designated States except US)*: **SONY CORPORATION** [JP/JP]; 7-35, Kitashinagawa 6-chome, Shinagawa-ku, Tokyo 141-0001 (JP).

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(81) Designated States *(national)*: CA, CN, KR, US.

(84) Designated States *(regional)*: European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR).

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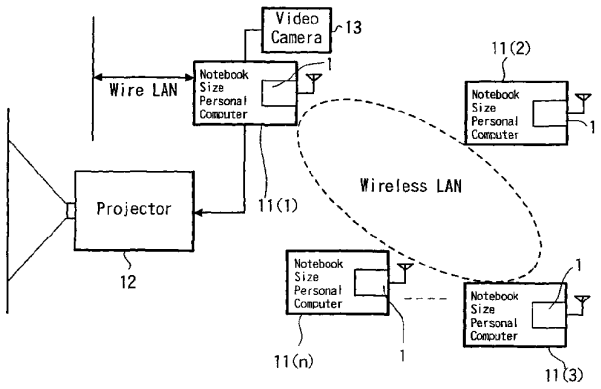
(54) Title: CARD TYPE NETWORK INTERFACE, NETWORK CONFERENCE TERMINAL DEVICE AND NETWORK CONFERENCE SYSTEM



(57) Abstract: A wireless LAN conference system can be constructed without increasing the cost of equipment of a conference hall and without imposing a burden upon participants to execute a network setting. There are provided network conference terminal devices (11 (2) to 11 (n)) in which network interface cards (1) are attached to information terminal devices. The network interface card (1) includes a connecting means for connecting the information terminal device to a wireless LAN, a determining means for determining whether the information terminal device is served as a host or a client of the wireless LAN, a setting means for requesting the host to transmit setting information necessary for executing the network setting to connect the information terminal device to the wireless LAN based on the fact that the information terminal device is determined as the client and executing the network setting by using the setting information transmitted from the host and a processing means for transmitting a requested setting information to the client based on the fact that the information terminal device is determined as the host and transmitting presentation data to the client in which the network setting was completed.

WO 01/89156 A2

DESCRIPTION

CARD TYPE NETWORK INTERFACE, NETWORK CONFERENCE TERMINAL DEVICE AND NETWORK CONFERENCE SYSTEM

TECHNICAL FIELD

The present invention relates to a card type network interface attached to an information terminal device such as a personal computer, a network conference terminal device using such card type network interface and a network conference system using this network conference terminal device.

BACKGROUND ART

Network I/F (interface) cards which are PC cards based on the standards of PCMCIA (personal computer memory card interface adapter) and which are capable of connecting personal computers to a LAN (local area network) are spreading increasingly. When this network interface card is inserted into a PC card slot of a personal computer, it becomes possible to connect this personal computer to the LAN.

In order to connect a personal computer (hereinafter referred to as a "personal computer") to the LAN, it is necessary to execute in advance a setting for connecting personal computers to the LAN (hereinafter referred to as a "network setting"). This network setting contains a setting of an IP address (identification information and location information for controlling a path) of such personal computer in the LAN and a setting of an IP address of a DNS server (server for providing a translation between IP addresses and domain names).

FIG. 1 shows a personal computer to which a conventional network

interface card is connected and to which reference will be made in explaining a function of a portion used to execute this network setting. In the operating system (e.g., Windows 95 or Windows 98 ("Windows" is a registered trademark)) of personal computer, there is supported a network function. This network function contains a function which displays a network setting picture to execute a network setting based on user's input operations.

On the other hand, a device driver which is software to control a conventional network interface card does not contain a network setting function. For this reason, a network setting of a personal computer is executed by using a network function of the operating system of the personal computer.

FIG. 2 shows a working procedure executed by users to connect the personal computer shown in FIG. 1 to the LAN. Users insert the network interface card into the personal computer and activate the operating system of the personal computer to display a control panel on the screen of the personal computer. Then, users select a network setting icon from the control panel and enters data in accordance with instructions of a network setting picture displayed when users select the corresponding icon. Thereafter, users restarts the operating system and the network setting is completed.

As described above, in order to attach the conventional network interface card to the personal computer so that the personal computer may be connected to the LAN, users have to activate the operating system of the personal computer to make operations to execute the network setting. Accordingly, these operations are difficult to understand for users who have little knowledge of the

operating system. When the notebook size personal computer, for example, are carried into various places and is connected to the LAN, the above operations should be made at every place so that such operations become troublesome for users who are rich in knowledge of the operating system.

Under circumstances in which a DHCP which is a protocol capable of managing information to execute the network setting in a centralized fashion is supported by the operating system, since the operating system side automatically executes the network setting processing, users need not do operations to execute the network setting. However, in actual practice, most of the users have personal computers in which the DHCP is not supported by the operating system.

In view of the aforesaid aspect, the first problem to be solved by the present invention is that, when the network interface card is attached to the personal computer to thereby connect the personal computer to the LAN, even though the DHCP is not supported by the operating system of the personal computer, the network setting can be executed without troubling users.

On the other hand, in the places such as various kinds of meetings, presentations and lecture meetings (these meetings, presentations and lecture meetings will be generally referred to as a "conference" in this specification), heretofore, the presentation is made by displaying presentation data such as images and illustrations on a projector. However, depending on the scale of the conference hall and the size of the screen of the projector, those who have been seated distant from the projector cannot always watch

presentation data displayed on the projector well.

In recent years, there is increasingly spread such a form in which presentation data can be displayed on a personal computer connected to the LAN at each seat in the conference hall. As described above, if the conference is held by effectively utilizing the LAN, then participants on all seats become able to watch presentation data satisfactorily.

However, if the personal computer is provided at each seat as equipment, then it is unavoidable that the cost of equipment in the conference hall will be increased. If notebook size personal computers brought by the participants of the conference are connected to the LAN within the conference hall, then the cost of equipment can be prevented from being increased. In that case, the operations for executing the network setting become troublesome for the participants.

In view of the aforesaid aspect, the second problem to be solved by the present invention is that a conference system using the LAN can be constructed without increasing the cost of equipment of the conference hall and also without imposing a burden on the participants in order to execute the network setting.

DISCLOSURE OF INVENTION

In order to solve the above first problem, there is proposed a card type network interface which can be attached to an information terminal device such as a personal computer. This card type network interface includes a connecting means for connecting this information terminal device to a LAN and a setting means for requesting a host of the LAN to transmit setting information

necessary for setting a network to connect the information terminal device to the LAN and setting the network by using setting information transmitted from the host based on the fact that this card type network interface is attached to the information terminal device.

This card type network interface includes not only the connecting means for connecting the information terminal device to the LAN (i.e., function to connect the information terminal device to the LAN) but also the setting means for setting the network. Then, when this card is attached to the information terminal device, this setting means requests the host of the LAN to transmit the setting information necessary for setting the network and sets the network by using the setting information transmitted from the host.

As described above, when the card type network interface is attached to the information terminal device, since the network is automatically set by this setting means, the network can be set without troubling users.

Therefore, in the conference using the LAN, for example, if the card type network interfaces are prepared in the conference hall and these card type network interfaces are attached to the information terminal devices such as notebook size personal computers brought by those who attended the conference, the network by which members are assumed to attend the conference can be set without troubling those who attend the conference. Simultaneously, the cost of equipment in the conference hall can be prevented from being increased unlike the case in which the information terminal device such as the personal computer should be provided in each seat as equipment.

This card type network interface further includes a determining means for determining based on the fact that this card type network interface is attached to the information terminal device whether the information terminal device is served as a host or a client of the LAN and a processing means for transmitting requested setting information to the client if it is determined by this determining means that the information terminal device is served as the host. The setting means requests the setting information if it is determined by this determining means that the information terminal device is served as the client.

Consequently, the host of the LAN also is comprised of the information terminal device to which this card type network interface is attached. Accordingly, the system of the LAN can be constructed without providing an exclusive-device as a host independently of this card type network interface and the information terminal device. Therefore, in the conference using the LAN, for example, the cost of equipment in the conference hall can be suppressed more.

Based on the fact that the card type network interface is attached to the information terminal device and on the condition that the command for inhibiting the information terminal device from being determined as the host is not received through the LAN, this determining means determines this information terminal device as the host and transmits the command for inhibiting other information terminal device from being determined as the host through the LAN. As a result, the first information terminal device to which the card type network interface is attached within the area of the LAN is

determined as the host.

This card type network interface further includes a processing means for requesting the host to get a presentation right based on the fact that the information terminal device is determined as the client by the determining means, the setting of the network is completed by the setting means and that a predetermined operation is carried out by the information terminal device and transmitting presentation data to the host and other clients based on the fact that the host got the presentation right and a processing means for allowing the client to get the presentation right based on the fact that the information terminal device is determined as the host by the determining means and that the processing means requests the host to get the presentation right.

Consequently, in the conference using the LAN, for example, those who attended the conference can get the presentation right by operating the information terminal devices in hand and can transmit presentation data. Therefore, those who attend the conference can make a presentation without leaving the seats.

When the connecting means connects the information terminal device to the wireless LAN, this card type network interface further includes a processing means for receiving in a polling system a request from the client in which the setting of the network was completed based on the fact that the information terminal device is determined as the host by the determining means and wherein the setting means requests the setting information at the end of the polling cycle.

Consequently, the host can accurately receive requests

transmitted through the wireless LAN from a plurality of clients in which the setting of the network was completed. Simultaneously, the host can accurately receive the setting information request through the wireless LAN.

Presentation application software (program in which a processing for displaying and controlling presentation data is written) is stored in this card type network interface.

As a result, in the conference using the LAN, for example, when those who attend the conference bring information terminal devices in which the presentation application software is not installed, if this card type network interface is attached to such information terminal device, then the information terminal device becomes able to execute this presentation application software and to display the presentation data.

When the information terminal device is such one which automatically activates the application software stored in the hard disk (e.g., a personal computer in which the operating system for automatically activating the application software stored in the hard disk is installed), the card type network interface allows the information terminal device to recognize the card type network interface as the hard disk so that the presentation application software may be automatically activated in the information terminal device.

Consequently, those who attend the conference need not carry out operations to activate this presentation application software and a burden imposed upon those who attend the conference can be alleviated more.

In order to solve the above second problem, there is proposed a network conference terminal device in which a card type network interface is attached to an information terminal device such as a personal computer, for example, and which includes a presentation processing means for displaying and controlling presentation data. This card type network interface includes a connecting means for connecting this information terminal device to the wireless LAN and a setting means for requesting a host of this wireless LAN to transmit setting information necessary for setting the network to connect this information terminal device to this wireless LAN based on the fact that the card type network interface is attached to this information terminal device and setting the network by using the setting information transmitted from the host.

This network conference terminal device is constructed by using the card type network interface for the wireless LAN of the above card type network interface. Accordingly, if the card type network interface is prepared in the conference hall and the information terminal devices are brought by those who attend the conference, then the network by which participants are assumed to attend the conference using the wireless LAN can be set without troubling those who attend the conference. At the same time, the cost of equipment of the conference hall can be prevented from being increased unlike the case in which the information terminal device should be provided in each seat as equipment.

This network conference terminal device includes a presentation processing means for displaying and controlling presentation data. This network conference terminal device can display presentation

data by this presentation processing means.

Also in this network conference terminal device, this card type network interface further includes a determining means for determining based on the fact that this card type network interface is attached to the information terminal device whether the information terminal device is served as a host or a client of the LAN and a processing means for transmitting requested setting information to the client if it is determined by this determining means that the information terminal device is served as the host. The setting means requests the setting information if it is determined by this determining means that the information terminal device is served as the client.

Consequently, the host of the LAN also is comprised of the network conference terminal device. Accordingly, the wireless LAN conference system can be constructed without providing an exclusive-device as a host independently of this network conference terminal device. Therefore, the cost of equipment in the conference hall can be suppressed more.

As mentioned before, this determining means determines the first information terminal device to which the card type network interface is attached within the area of the wireless LAN as the host.

This network conference terminal device further includes a processing means for requesting the host to get a presentation right based on the fact that the information terminal device is determined as the client by the determining means, the setting of the network is completed by the setting means and that a predetermined operation is carried out by the information terminal device and transmitting

presentation data to the host and other clients based on the fact that the host got the presentation right and a processing means for allowing the client to get the presentation right based on the fact that the information terminal device is determined as the host by the determining means and that the processing means requests the host to get the presentation right.

Consequently, in the conference using the LAN, for example, those who attended the conference can get the presentation right by operating the information terminal devices in hand and can transmit presentation data. Therefore, those who attend the conference can make a presentation without leaving the seats.

Also in this network conference terminal device, this card type network interface further includes a processing means for receiving in a polling system a request from the client in which the setting of the network was completed based on the fact that the information terminal device is determined as the host by the determining means and wherein the setting means requests the setting information at the end of the polling cycle.

Consequently, the host can accurately receive requests transmitted through the wireless LAN from a plurality of clients in which the setting of the network was completed. Simultaneously, the host can accurately receive the setting information request through the wireless LAN.

In this network conference terminal, the presentation processing means can be realized when the information terminal device executes the presentation application software stored in the network interface card.

Consequently, the information terminal device in which the presentation application software is not installed becomes able to display the presentation data.

When the information terminal device is such one which automatically activates the application software stored in the hard disk, the card type network interface allows the information terminal device to recognize the card type network interface as the hard disk so that the presentation application software may automatically be activated in the information terminal device.

Consequently, those who attend the conference need not carry out the operations to activate this presentation application software and a burden imposed upon those who attend the conference can be alleviated more.

In order to solve the above second problem, there is proposed a network conference system (wireless LAN conference system) in which there are provided a host of a wireless LAN and a client of the wireless LAN, the client is constructed such that a card type network interface is attached to an information terminal device and includes a presentation processing means for displaying and controlling presentation data. This card type network interface includes a connecting means for connecting this information terminal device to the wireless LAN and a setting means for requesting a host of this wireless LAN to transmit setting information necessary for setting the network to connect this information terminal device to this wireless LAN based on the fact that the card type network interface is attached to this information terminal device and setting the network by using the setting information transmitted

from the host. The host transmits the setting information to the client based on this setting information request and also transmits the presentation data to the client in which the setting of the network was completed.

This network conference system is constructed by using the above network conference terminal device as the client (i.e., the above wireless LAN card type network interface).

Therefore, the network of the clients can be set without troubling those who attend the conference, and the system can be constructed without increasing the cost of equipment of the conference hall.

Also in this network conference system, the card type network interface further includes a determining means for determining based on the fact that this card type network interface is attached to the information terminal device whether the information terminal device is served as a host or a client of the LAN and a processing means for transmitting requested setting information to the client if it is determined by this determining means that the information terminal device is served as the host. The setting means requests the setting information if it is determined by this determining means that the information terminal device is served as the client.

Consequently, since the host of the LAN also is comprised of the same network conference terminal device, an exclusive-device need not be provided within the system as the host, and hence the cost of equipment in the conference hall can be suppressed more.

As mentioned before, this determining means determines the first information terminal device to which the card type network interface

is attached within the area of the wireless LAN as the host.

Also in this network conference system, this card type network interface further includes a processing means for requesting the host to get a presentation right based on the fact that the information terminal device is determined as the client by the determining means, the setting of the network is completed by the setting means and that a predetermined operation is carried out by the information terminal device and transmitting presentation data to the host and other clients based on the fact that the host got the presentation right and a processing means for allowing the client to get the presentation right based on the fact that the information terminal device is determined as the host by the determining means and that the processing means requests the host to get the presentation right.

Consequently, those who attend the conference can get the presentation right by operating the network conference terminal devices in hand and can transmit presentation data. Therefore, those who attended the conference can make a presentation without leaving the seats.

Also in this network conference system, this card type network interface further includes a processing means for receiving in a polling system a request from the client in which the setting of the network was completed based on the fact that the information terminal device is determined as the host by the determining means and wherein the setting means requests the setting information at the end of the polling cycle.

Consequently, the host can accurately receive the requests

transmitted through the wireless LAN from a plurality of clients in which the setting of the network was completed. Simultaneously, the host can accurately receive the setting information request through the wireless LAN.

Also in this network conference system, the presentation processing means can be realized when the information terminal device executes the presentation application software stored in the network interface card.

Consequently, the client and the host using the information terminal device in which the presentation application software is not installed become able to display the presentation data.

When the information terminal device is such one which automatically activates the application software stored in the hard disk, the card type network interface allows the information terminal device to recognize the card type network interface as the hard disk so that the presentation application software may be automatically activated in the information terminal device.

Consequently, those who attend the conference need not carry out the operations to activate this presentation application software and a burden imposed upon those who attend the conference can be alleviated more.

In order to solve the above second problem, there is proposed a network conference system in which there are provided an image display device and a client of the wireless LAN. This image display device includes an information terminal device to which a card type network interface can be attached. This card type network interface is attached to this information terminal device and this information

terminal device includes a presentation processing means for displaying and controlling presentation data. The client is constructed such that a card type network interface is attached to an information terminal device and includes this presentation processing means. This card type network interface includes a connecting means for connecting this information terminal device to the wireless LAN, a determining means for determining based on the fact that the card type network interface is attached to this information terminal device whether this information terminal device is served as a host or a client of the wireless LAN, a setting means for requesting the host of this wireless LAN to transmit setting information necessary for setting the network to connect this information terminal device to this wireless LAN based on the fact that the information terminal device is determined as the client by the determining means and setting the network by using the setting information transmitted from the host, a processing means for transmitting the requested setting information to the client based on the fact that the information terminal device is determined as the host by the determining means and transmitting presentation data to the client in which the setting of the network was completed, a processing means for requesting the host to get a presentation right based on the fact that the information terminal device is determined as the client by the determining means, the setting of the network was completed by the setting means and a predetermined operation was executed by the information terminal device and transmitting presentation data to the host and the client based on the fact that the host got the presentation right and a processing means for

allowing the client to get the presentation right based on the fact that the information terminal device is determined as the host by the determining means and that the host is requested to get the presentation right. The image display device is such one in which the information terminal device belonging to the image display device is determined as the host by the determining means.

This network conference system has the arrangement in which the above network conference terminal device is used as the client (i.e., the above wireless LAN card type network interface is used), the image display device having the information terminal device to which the card type network interface can be attached is provided as the image display device such as the projector and this image display device serves both as an image display device and a host.

Accordingly, the network of the clients can be set without troubling those who attend the conference, and the system can be constructed without increasing the cost of equipment of the conference hall. Moreover, those who attend the conference can make a presentation without leaving the seats.

Then, the same presentation data as the presentation data displayed on the image display device can be directly transmitted from the image display device through the wireless LAN to the client and thereby displayed on the client. At the same time, the presentation data can be directly transmitted from the client through the wireless LAN to the image display device and thereby the presentation data can be displayed on the image display device.

Also in this network conference system, the card type network interface further includes a processing means for receiving in a

polling system a request from the client in which the setting of the network was completed based on the fact that the information terminal device is determined as the host by the determining means and awaiting the request of the setting information at the end of the polling cycle and wherein the setting means requests the setting information at the end of the polling cycle.

Consequently, the host can accurately receive requests transmitted through the wireless LAN from a plurality of clients in which the setting of the network was completed. Simultaneously, the host can accurately receive the request of the setting information through the wireless LAN.

Also in this network conference system, the presentation processing means can be realized when the information terminal device executes the presentation application software stored in the network interface card.

Consequently, the client and the host using the information terminal device in which the presentation application software is not installed become able to display the presentation data.

When the information terminal device is such one which automatically activates the application software stored in the hard disk, the card type network interface allows the information terminal device to recognize the card type network interface as the hard disk so that the presentation application software may automatically be activated in the information terminal device.

Consequently, those who attend the conference need not carry out the operations to activate this presentation application software and a burden imposed upon those who attend the conference can be

alleviated more.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a functional block diagram showing a portion of a personal computer having a conventional network interface card and which portion is used to execute a network setting.

FIG. 2 is a diagram showing a working procedure necessary to execute a network setting of the personal computer shown in FIG. 1.

FIG. 3 is a perspective view showing an example of an outward appearance of a network interface card to which the present invention is applied.

FIG. 4 is a block diagram showing an example of a circuit arrangement of the network interface card shown in FIG. 3.

FIG. 5 is a diagram showing an example of an overall arrangement of a network conference system according to the present invention.

FIG. 6 is a flowchart to which reference will be made in explaining processing contents of a "host/client decision program".

FIG. 7 is a flowchart to which reference will be made in explaining processing contents of a "host program" corresponding to a network setting processing of a "client program".

FIG. 8 is a flowchart to which reference will be made in explaining a network setting processing which is a part of the processing contents of the "client program".

FIG. 9 is a timing chart showing the manner in which a request signal is transmitted or received in accordance with a polling system.

FIG. 10A is a diagram showing formats of the polling command and the request signal shown in FIG. 9.

FIG. 10B is a diagram showing examples of contents of data or command.

FIG. 11 is a functional block diagram showing a portion, of the client shown in FIG. 5, used to execute the network setting.

FIG. 12 is a diagram showing a working procedure which is used to execute the network setting of the client shown in FIG. 5.

FIG. 13 is a flowchart to which reference will be made in explaining a part of the processing contents of the "host program".

FIG. 14 is a flowchart to which reference will be made in explaining a part of the processing contents of the "client program".

FIG. 15 is a flowchart to which reference will be made in explaining a part of the processing contents of the "host program".

FIG. 16 is a flowchart to which reference will be made in explaining a part of the processing contents of the "client program".

FIG. 17 is a diagram showing other example of an overall arrangement of a network conference system according to the present invention.

FIG. 18 is a diagram showing a further example of an overall arrangement of a network conference system according to the present invention.

FIG. 19 is a diagram showing yet a further example of an overall arrangement of a network conference system according to the present invention.

BEST MODE FOR CARRYING OUT THE INVENTION

Embodiments according to the present invention will be described

below with reference to the drawings.

FIG. 3 shows an example of an outward appearance and an arrangement of a network interface card, to which the present invention is applied, together with a notebook size personal computer to which this network interface card can be attached. This network interface card 1 has a shape and a dimension based on a type 2 or a type 3 of the standards of the PCMCIA. A notebook size personal computer 2 includes a personal computer card slot 2a into which there can be inserted the network interface card 1.

FIG. 4 shows an example of a circuit arrangement of this network interface card 1. The network interface card 1 includes a PCMCIA interface 3, a network interface 4, an RF modulator 5, an RF demodulator 6, an antenna 7, a CPU 8, a flash ROM 9 and a RAM 10.

The PCMCIA interface 3 is an interface section which interacts with a personal computer having a PC card slot like the notebook size persona computer 2 shown in FIG. 3. Through this PCMCIA interface 3, data and commands are transmitted and received between the personal computer having the network interface card 1 and the network interface card 1.

The network interface 4 transforms data and commands, transmitted thereto from the personal computer through the PCMCIA interface 3, into data and commands conforming to the format of predetermined wireless LAN standards (e.g., the standards of 11 works groups in 802 of the IEEE 802), transmits the data and commands thus transformed into the RF modulator 5, and inverse-transforms data and commands, transmitted from the RF demodulator 6, and transmits the data and commands thus inverse-transformed to the

PCMCIA interface 3.

The RF modulator 5 modulates data and commands, transmitted from the network interface 4, into a radio frequency signal based on the standards and transmits the radio frequency signal from the antenna 7. The RF demodulator 6 demodulates the radio frequency signal received at the antenna 7 to provide data and commands, and transmits the data and the commands to the network interface 4. While FIG. 3 shows the arrangement of the outward appearance in which the antenna 7 is an internal antenna, the present invention is not limited thereto and an antenna having a shape exposed to the outside may be used in response to a frequency band and the like.

The CPU 8 controls the PCMCIA interface 3 by executing a microprogram (firmware) stored in the flash ROM 9 so that data and command may be transmitted and received between the network interface card and the personal computer having the network interface card 1, and also controls the network interface 4 so that data and commands may be transmitted and received through the wireless LAN in accordance with a predetermined communications protocol (e.g., TCP/IP protocol).

As the features of the present invention, the flash ROM 9 stores therein the following microprograms (1) to (4). Contents processed by the programs (1) to (3) will be described in the examples of operations of a host and a client of a network conference system as will be described later on.

(1): A program which ha described processing for enabling the personal computer having the network interface card 1 to function as a host for managing the wireless LAN (hereinafter referred to as a

"host program").

(2): A program which has described processing for enabling the personal computer having the network interface card 1 to function as a client using the wireless LAN under management of the host (hereinafter referred to as a "client program").

(3): A program which has described processing for deciding whether the host program or the client program should be executed (hereinafter referred to as a "host/client decision program).

(4): Presentation application software (program which has described processing for displaying and controlling presentation data such as images and graphical. This application software contains graphic viewer which is software for displaying images, software for creating, displaying and controlling graphical (e.g., "Microsoft PowerPoint" manufactured by Microsoft, "Microsoft" and "PowerPoint" are registered trademarks of Microsoft) and WWW browser which is software used to access WWW server on the Internet to display images of Web pages and the like.

The RAM 10 stores therein various data in a process during which the CPU 8 executes microprograms within the flash ROM 9.

Next, FIG. 5 shows an example of an arrangement of a network conference terminal device (wireless LAN conference terminal device) according to the present invention and an example of an overall arrangement of a network conference system (wireless LAN conference system) according to the present invention.

This wireless LAN conference system is comprised of a plurality of (e.g., about 30 to 50) wireless LAN conference terminal devices 11 (11 (1) to 11 (n)), a projector 12 and a video camera 13.

Each wireless LAN conference terminal device 11 is constructed in such a manner that the network interface card 1 shown in FIGS. 3 and 4 is attached to a notebook size personal computer (Windows 95 or Windows 98, for example, is installed as the operating system) like the notebook size personal computer 2 shown in FIG. 3. Participants bring the notebook size personal computer with them and the network interface cards 1 are prepared in the conference hall.

One (11 (1)) of the wireless LAN conference terminal devices 11 is served as a host of the wireless LAN, and remaining (n-1) terminal devices (11 (2) to 11 (n)) are served as clients of the wireless LAN.

The wireless LAN conference terminal device 11 is determined when the network interface card 1 starts the "host/client decision program" stored in the aforementioned flash ROM 9 based on the fact that the operating system of the notebook size personal computer is activated after the network interface card 1 has been attached to the notebook size personal computer (or based on the fact that the network interface card 1 has been attached to the notebook size personal computer whose operating system was activated).

FIG. 6 shows the processed contents of this "host/client decision program". First, the network interface card 1 is initialized (data stored when this network interface card was attached to and used by the notebook size personal computer is erased (step S1). Subsequently, it is determined whether or not a command for inhibiting the activation of the "host program" is received through the wireless LAN (step S2).

If this command is not received, then the "host program" is

activated (step S3). Then, until the network interface card 1 is ejected from the notebook size personal computer or the operating system of the notebook size personal computer is ended, the command for inhibiting the activation of the "host program" is continuously transmitted through the wireless LAN (steps S4, S5). Then, when the network interface card 1 is ejected from the notebook size personal computer or the operating system is ended, control is ended.

If on the other hand the above command is received at the step S2, then the "client program" is activated (step S6), and control is ended.

As a consequence, the wireless LAN conference terminal device 11 which was the first terminal device to which the network interface card 1 was attached and in which the operating system of the notebook size personal computer was activated within the conference hall (within the wireless LAN area) is served as the host after the "host program" was activated by executing the steps S2 to S4.

Since the wireless LAN conference terminal device 11 which was the second terminal device to which the network interface card 1 was attached and in which the operating system of the notebook size personal computer was activated receives the command transmitted from the first wireless LAN conference terminal device 11 to which the network interface card 1 was attached and in which the operating system of the notebook size personal computer was activated, this terminal device is served as the client after the "client program" was activated by executing the steps S1, S2 and S5.

In actual practice, a participant who plays a part of a coordinator in the conference first attaches the network interface

card 1 to the notebook size personal computer or the participant first activates the operating system of the notebook size personal computer to make its own wireless LAN conference terminal device 11 become the host.

As shown in FIG. 5, the host 11 (1) is connected through an external display output terminal of the notebook size personal computer to the projector 12 located within the conference hall and is also connected through a DV terminal of the notebook size personal computer to the video camera 13.

The host 11 (1) is connected through a network port of the notebook size personal computer to a wire LAN (e.g., Ethernet) which was constructed in advance within a building in the conference hall. This wire LAN is connected to the Internet through a gateway, not shown.

The "client program" contains processings used to execute the network setting to connect the clients 11 (2) to 11 (n) to the wireless LAN. The network interface cards 1 of the clients 11 (2) to 11 (n) whose "client programs" were activated immediately start this network setting processing.

The "host program" contains processings to transmit setting information necessary for the network setting to the clients 11 (2) to 11 (n) in response to the network setting processing of this "client program". The host 11 (1) immediately starts the processing of the "host program".

FIG. 7 shows processed contents of the "host program" corresponding to the network setting processing. FIG. 8 shows the contents of the network setting processing. As shown in FIG. 7, the

network interface card 1 of the host 11 (1) displays pictures which instruct the notebook size personal computer to enter the following information (a) to (d):

(a): Enter net mask (information for dividing the IP address into a previously-determined network portion and a host portion which can be set freely);

(b): Enter IP address of host;

(c): Enter IP address of DNS server (server for providing a translation between IP addresses and domain names); and

(d): Enter IP address of gateway (a means placed at the connected portion between the wire LAN and the Internet in FIG. 3)

Then, when the coordinator of the conference enters these information by operating the notebook size personal computer in accordance with the instructions displayed on the screen, these information are registered on the RAM 10 as the database (step S12). Subsequently, the host is placed in the standby mode for awaiting the network setting request from the client (step S13).

The "host program" contains a processing for receiving various kinds of requests from the network interface card 1 of the client in which the network setting was already completed (client whose IP address was already registered as the database) in the polling system for sequentially calling these clients. Moreover, the "client program" contains a processing for transmitting a request, generated after the network setting has been completed, in response to this calling.

FIG. 9 shows the manner in which the requests are transmitted and received in accordance with this polling system. The network

interface card 1 of the host 11 (1) transmits a polling command for permitting the transmission of the request to one client 11 (2) of the clients 11 (2) to 11 (i) in which the network setting was already completed. Then, this network interface card awaits the request during a constant time t.

The network interface card 1 of the client 11 (2) learns that it is permitted to transmit the request, and transmits the request within a time t1 if it has any request. On the other hand, the network interface cards 1 of the clients 11 (3) to 11 (i) are not permitted to transmit the requests, and hence they do not transmit the requests. Accordingly, within this time t1, only the request from the client 11 (2) is received by the host 11 (1).

Subsequently, the network interface card 1 of the host 11 (1) transmits the polling command for permitting the transmission of the request to the next one client 11 (3) and awaits the request during the time t1. Within this time t1, only the request from the client 11 (3) is received by the host.

In a like manner, the host sequentially transmits the polling commands to the clients 11 (4) to 11 (i) one by one and awaits their requests during the time t1. As a consequence, since the requests are transmitted one by one from the clients 11 (2) to 11 (i) and received by the host 11 (1), the host can accurately receive the requests from those clients without being affected by an interference caused when the requests from a plurality of clients are received through the wireless LAN at the same time.

Data "Polling end" indicating that one cycle of calling the clients in which the network setting was completed was finished

(indicating the end of the polling cycle) is added to the polling command which is to be transmitted to the last client 11 (i). Then, after the host has awaited the request from the client 11 (i) during the time t1, the host is further placed in the standby mode during a constant time t2. If the request is not received by the host during this time t2, then the host immediately calls the next client (i.e., the host sequentially transmits the polling commands again to the clients 11 (2) to 11 (i) one by one and awaits the request during the time t1).

FIG. 10A shows formats of the polling command and the request signal. The polling command and the request signal contain an IP address of a transmission destination, an IP address of a transmission source, a value indicating bytes of the following signal, data or a command indicating the contents of the polling command and the request signal and a checksum, in that order.

FIG. 10B shows examples of the contents of the data or the command shown in FIG. 10A. The "Polling end" is data which is added to the polling command transmitted to the last client in order to indicate the end of the polling cycle.

A network interface card 1 of a client 11 (i + 1) attached to the notebook size personal computer (of which the network setting was not yet executed) in somewhere of this polling cycle continues monitoring this polling command until the polling command with the data "Polling end" attached thereto is received (i.e., up to the end of the polling cycle) as shown in FIG. 8 (steps S21, S22). Then, at the end of the polling cycle, after only the time t1 during which the client 11 (i) in FIG. 9 is allowed to transmit the request

signal has elapsed, the network setting request signal is transmitted to the host 11 (1) during the time t2 (when the request signal transmitted from the client 11 (i) is received within this time t1, the request signal may be transmitted to the host before the time t1 elapses) (step S23).

This network setting request signal is transmitted in accordance with the signal format shown in FIG. 10A. However, since the IP address is not given to the client 11 (i + 1) from the host 11 (1), the IP address of the transmission source is set to a dummy address which is determined by the network interface card 1 of the client 11 (i + 1), for example. In this network setting request signal, as shown in FIG. 10B, the contents of the data or the command are set to "Request IP address".

The network interface card 1 of the host 13 (1) awaits this network setting request at every time t2 after the end of the polling cycle in FIG. 9 at the step S13 shown in FIG. 7. Consequently, the client can accurately receive the network setting request without being affected by the interference caused when the request from the client in which the network setting was already completed and this network setting request are received simultaneously.

Then, if the host receives the network setting request within this time t2, then the polling system request receiving processing shown in FIG. 9 is paused (step S14). Then, the IP address is given to the client 11 (i + 1), and as shown in FIG. 9, that IP address and the IP addresses of the host registered at the step S12 and the DNS server are transmitted to the client 11 (i + 1) as setting

information for the network (step S15).

These IP addresses are transmitted in accordance with the signal format shown in FIG. 10A. The IP address of the transmission destination is set to a dummy address which is determined by the network interface card 1 of the aforementioned client 11 (i + 1).

As shown in FIG. 8, the client 11 (i + 1) which has transmitted the network setting request signal awaits the reception of these IP addresses (step S24). Then, if these IP addresses are received, then the setting used to connect the client 11 (i + 1) to the wireless LAN is executed by storing these IP addresses in the RAM 10 (step S25). Then, data indicating that the network setting was completed is transmitted through the wireless LAN (step S26). Then, control is ended.

The data indicating that the network setting was completed also is transmitted in accordance with the signal format shown in FIG. 10A. Then, the IP address of the transmission source is set to the IP address given from the host 11 (1). In this data, as shown in FIG. 10B, the contents of the data or the command are set to a "Complete set IP Address".

As shown in FIG. 7, the network interface card 1 of the host 11 (1) awaits the reception of the data indicating that this network setting was completed (step S16). Then, when this data is received, the IP address given to the client 11 (i + 1) is registered as a database (step S17).

Subsequently, the polling system request reception processing which was temporarily interrupted is resumed (step S18). In the resumed polling system request reception processing, the clients 11

(2) to 11 (i + 1) including the client 11 (i + 1) in which the network setting was completed are called sequentially.

Then, referring back to the step S13, the host awaits the fact that another client executes the network setting. The processing shown in FIG. 7 is executed until the network interface card 1 is ejected from the notebook size personal computer or the operating system of the notebook size personal computer is ended.

In the resumed polling system request reception processing, the clients 11 (2) to 11 (i + 1) including the new client in which the network setting was completed are called sequentially.

In the stage in which the network setting of even one client is not yet completed, the network interface card 1 of the host 11 (1) does not receive the request signal in accordance with the polling system. Therefore, at that stage, while the network interface card 1 of the host 11 (1), for example, is constantly awaiting the network setting request from the client at the step S13 shown in FIG. 7, the network interface card 1 of the client transmits the network setting request at any time on condition that the host 11 (1) does not yet transmit the polling command.

By the processing shown in FIGS. 7 and 8, the network setting for connecting the respective clients 11 (2) to 11 (n) of FIG. 5 to the wireless LAN is completed as an assumption that the participants are to attend the wireless LAN.

FIG. 11 shows a function of any portion of the clients 11 (2) to 11 (n) used to execute this network setting. The device driver (microprogram stored within the flash ROM 9 shown in FIG. 4) for controlling the network interface card 1 contains the network

setting function (the "host program" and the "client program"). The network setting of the clients 11 (2) to 11 (n) is executed by using the device driver function of this network interface card 1.

Accordingly, as is clear from the contrast with FIG. 1 which shows the conventional network interface card, the network setting can be carried out without using the operating system of the notebook size personal computer to which the network interface card 1 is attached.

FIG. 12 shows a procedure of operations that should be executed by the participants of the conference in order to execute the network setting of the clients 11 (2) to 11 (n). When the network interface card 1 is attached to the notebook size personal computer and the operating system of the notebook size personal computer is activated (the network interface card 1 may be attached to the notebook size personal computer after the operating system of the notebook size personal computer has been activated), the network setting is automatically executed by the processings shown in FIGS. 7 and 8.

Accordingly, as is clear from the contrast with FIG. 2 which shows the conventional network interface card, the network setting of the clients 11 (2) to 11 (n) as the assumption that the participants are to attend the wireless LAN can be carried out without imposing a burden on the participants of the conference.

The "host program" and the "client program" respectively contain processings in which a presentation is executed by using presentation application software stored within the flash ROM 9. The network interface card 1 of the host 11 (1) which has activated the

"host program" immediately starts this processing after the network setting of any one client has been completed. The network interface card 1 of the clients 11 (2) to 11 (n) which have activated the "client program" also starts this processing after the respective network settings have been completed.

FIGS. 13 and 14 show the contents of the processings at the "host program" and the "client program", respectively. As shown in FIG. 13, the network interface card 1 of the host 11 (1) enables the operating system of the notebook size personal computer of the host 11 (1) to recognize this network interface card 1 as a hard disk. At the same time, this network interface card sets an automatic activation file (step S31).

The Windows 95 and the Windows 98 have a function in which application software stored within the hard disk can automatically be activated when the automatic activating file is set to the hard disk. Accordingly, the notebook size personal computer of the host 11 (1) recognizes the network interface card 1 as the hard disk based on the processing at this step S31 so that the presentation application software stored within the flash ROM 9 is activated automatically.

The processing at this step S31 may be the existing processing which is adopted by "MEMORY STICK", for example.

The coordinator of the conference can display the presentation data on the notebook size personal computer of the host 11 (1) by operating the notebook size personal computer of the host 11 (1) in accordance with the presentation application software which was activated automatically and can display the same presentation data

on the projector 12 (FIG. 5) through the external display output terminal of the notebook size personal computer of the host 11 (1).

Specifically, by using "Microsoft PowerPoint", for example, illustrations and the like reproduced from the hard disk and the floppy disk of the notebook size personal computer of the host 11 (1) and illustrations and the like transmitted from the server of the wire LAN can be displayed on the notebook size personal computer of the host 11 (1) and the projector 12.

Images reproduced from the hard disk and the floppy disk of the notebook size personal computer of the host 11 (1) by using the graphic viewer, images transmitted from the server of the wire LAN and images picked up by the video camera 13 (FIG. 5) can be displayed on the notebook size personal computer of the host 11 (1) and the projector 12 shown in FIG. 5 by using the graphic viewer.

Moreover, images and the like of the web page can be displayed on the notebook size personal computer of the host 11 (1) and the projector 12 shown in FIG. 5 by accessing the WWW of the Internet through the wire LAN with the WWW browser.

As shown in FIG. 14, the network interface cards 1 of the clients 11 (2) to 11 (n) enable the notebook size personal computers of the clients 11 (2) to 11 (n) to recognize this network interface card 1 as a hard disk, respectively. At the same time, the above network interface cards set the automatic activating file (step S41).

Accordingly, the notebook size personal computers of the clients 11 (2) to 11 (n) recognize the network interface card 1 as the hard disk so that the presentation application software stored in the

flash ROM 9 may be activated automatically.

Other participants of the conference than the coordinator can display presentation data on the notebook size personal computers of the clients 11 (2) to 11 (n) by operating the notebook size personal computers of the clients 11 (2) to 11 (n) with this presentation application software, respectively.

As shown in FIG. 13, the network interface card 1 of the host 11 (1) awaits the operation in which the presentation data is displayed on the notebook size personal computer of the host 11 (1) by using the presentation application software (step S32).

Then, when that operation is carried out (i.e., the presentation data is displayed on the notebook size personal computer of the host 11 (1) and the projector 12), the same presentation data is transmitted to the clients 11 (2) to 11 (n), and a command for displaying the presentation data by using the presentation application software (e.g., graphic viewer in case of images) corresponding to that presentation data and a command for displaying that presentation data in synchronism with the host 11 (1) (page switching timing and the like are made coincident) are transmitted to the clients 11 (2) to 11 (n).

As shown in FIG. 14, the network interface cards 1 of the clients 11 (2) to 11 (n) await the reception of this presentation data and the commands (step S42). Then, if the network interface cards receive the presentation data and the commands, then this presentation data is displayed on the notebook size personal computers of the clients 11 (2) to 11 (n) by using the presentation application software in accordance with this command, respectively

(step S43).

Consequently, the same presentation data as that displayed on the projector 12 is also displayed on the notebook size personal computers of the clients 11 (2) to 11 (n).

As shown in FIG. 13, while executing the steps S32 and S33, the network interface card 1 of the host 11 (1) repeatedly determines whether or not a presentation right get request from any of the clients 11 (2) to 11 (n) is received (step S34). The request signals are transmitted and received in the polling system shown in FIG. 9 in the processings shown in FIGS. 13 and 14.

As shown in FIG. 14, while executing the steps S42 and S43, the network interface cards 1 of the clients 11 (2) to 11 (n) repeatedly determine whether or not the notebook size personal computers of the clients 11 (2) to 11 (n) execute the predetermined operation in order to get the presentation right (step S44). If this operation is executed, then the presentation right get request is transmitted to the host 11 (1) (step S45).

As shown in FIG. 13, if the presentation right get request from any of the clients 11 (2) to 11 (n) is received, then the network interface card 1 of the host 11 (1) transmits the presentation right get command to the corresponding client (step S35).

As shown in FIG. 14, after the network interface card 1 of the client which has transmitted the presentation right get request transmitted the presentation right get request, this network interface card 1 awaits that the presentation right get command is received (step S46).

When this command is received, the network interface card awaits

that the notebook size personal computer of the client concerned displays presentation data by using the presentation application software (step S47).

If such operation is carried out (i.e., if the presentation data is displayed on the notebook size personal computer of the client concerned), then the same presentation data is transmitted to the host 11 (1) and other clients, and the command for displaying the presentation data by using the presentation application software corresponding to that presentation data and the command for displaying that presentation data in synchronism with the client concerned are transmitted to the host 11 (1) and other clients (step S48).

As shown in FIG. 13, it is determined by the network interface card 1 of the host 11 (1) whether the presentation data and the command are received (step S36). If they are received, then this presentation data is displayed on the notebook size personal computer of the host 11 (1) and the projector 12 by using the presentation application software (step S37). The network interface cards 1 of other clients display this presentation data at the steps S42, S43 shown in FIG. 14.

As a result, the same presentation data as that displayed on the notebook size personal computer of the client who got the presentation right is displayed on the notebook size personal computers of the host 11 (1) and other clients and the projector 12.

As shown in FIG. 13, while executing the steps S36 and S37, the network interface card 1 of the host 11 (1) repeatedly determines whether or not the notebook size personal computer of the host 11

(1) executes a predetermined operation for returning the presentation right (step S38) and also repeatedly determines whether or not a new presentation right get request from other client is received (step S39).

Then, if the presentation return operation is executed, then a command for returning the presentation right is transmitted to the client which got the presentation right (step S40). Then, control goes back to the step S32.

If the presentation right get request from any one of other clients is received, then at a step S35, a new presentation right get command is transmitted to that client.

As shown in FIG. 14, while executing the steps S47 and S48 and transmitting the presentation data and the command, it is repeatedly determined by the network interface card 1 of the client which got the presentation right whether or not the presentation right return command or the command for enabling other client to get the presentation right is received (step S49). Then, if any command is received, then control goes back to the step S42.

Consequently, the presentation right is again transferred to the host 11 (1) or other client and the presentation data transmitted from the host 11 (1) or the client is displayed on the notebook size personal computers of the host 11 (1) and the clients 11 (2) to 11 (n) and the projector 12.

The processings shown in FIGS. 13 and 14 are continuously executed until the network interface card 1 is ejected from the notebook size personal computer or the operating system of the notebook size personal computer is ended.

By the processings shown in FIGS. 13 and 14, the same presentation data as that displayed on the projector 12 is displayed on the notebook size personal computers of the clients 11 (2) to 11 (n). Moreover, the presentation data transmitted from the client (client which has got the presentation right) is displayed on the notebook size personal computers of other clients and the projector 12.

Therefore, the participant on the seat distant from the projector can visually confirm the presentation data well by watching the screen of the notebook size personal computer of the client on hand. The participant on the seat which is not distant from the projector 12 is able to watch the presentation data from either the projector 12 or the notebook size personal computer of the client (e.g., the participant can watch the image through the projector 12 having the large-size screen and can also watch small illustrations through the notebook size personal computer of the client on hand).

Moreover, while being seated, the participant of the conference can obtain the presentation right by the client on hand and can transmit the presentation data. Therefore, the participant can make a presentation without leaving the seat.

The "host program" and the "client program" contain processings which are used to individually display data from the server of the wire LAN (FIG. 5) and data from the WWW server of the Internet on the notebook size personal computers of the individual clients 11 (2) to 11 (n). The network interface cards 1 of the host 11 (1) and the clients 11 (2) to 11 (n) start these processings immediately

after the presentation application software has automatically been activated in the presentation processings shown in FIGS. 13, 14.

FIGS. 15 and 16 show the contents of these processings on the "host program" and the "client program", respectively. As shown in FIG. 15, it is determined by the network interface card 1 of the host 11 (1) whether or not the access request to the server of the wire LAN or the WWW server of the Internet are received from the individual clients 11 (2) to 11 (n) (step S51). The requests are transmitted and received in accordance with the polling system shown in FIG. 7 in the processings shown in FIGS. 15 and 16.

As shown in FIG. 16, it is determined by the network interface cards 1 of the clients 11 (2) to 11 (n) whether or not the notebook size personal computers of the clients 11 (2) to 11 (n) concerned access the server of the wire LAN or the WWW server of the Internet (step S61). If this operation is executed, then the access request to this server is transmitted to the host 11 (1) (step S62).

As shown in FIG. 15, if the access request from the client is received, then the network interface card 1 of the host 11 (1) accesses the server (the server of the wire LAN or the WWW server of the Internet) in accordance with this access request, and transmits the data transmitted from this server to that client (step S52).

As a consequence, data of the server of the wire LAN or data of the WWW server of the Internet is individually displayed on the notebook size personal computer of that client.

If the presentation is now being executed by the processings shown in FIGS. 13 and 14, data of this server is transmitted to that client at the step S52 instead of the presentation data that has

been transmitted so far. Consequently, instead of the presentation data that has been displayed so far, data of this server (i.e., data different from the presentation data displayed on the notebook size personal computers of the host 11 (1) and other clients and the projector 12) is displayed on the notebook size personal computer of that client.

While executing the step S52, it is repeatedly determined by the network interface card 1 of the host 11 (1) whether or not an access end request from that client is received (step S53), whether or not the new access request is received (step S54) and whether or not the presentation is now being executed and whether or not the display of new presentation data is changed (switching of page and the like) (step S55).

As shown in FIG. 16, after having transmitted the access request, it is repeatedly determined by the network interface cards 1 of the clients 11 (2) to 11 (n) whether or not the notebook size computers of the clients 11 (2) to 11 (n) concerned end the access (step S63) and whether or not they access a new server (step S64).

Then, if it is determined that the access end operation is executed, then the access end request is transmitted to the host 11 (1) (step S65), and control goes back to the step S61. If it is determined that the operation for accessing another server is executed, then control goes back to the step S62.

As shown in FIG. 15, if the access end request is received, then the network interface card 1 of the host 11 (1) ends the access of the server (step S56), and control goes back to the step S51. As a result, when the presentation is being executed, the presentation

data is again displayed on the notebook size personal computer of that client.

If a new access request is received, then this time the server is accessed at the step S52 in accordance with the access request, and data is transmitted to the client.

If the presentation is now being executed and the display of the new presentation data is changed, then the transmission of data from the server is interrupted during a constant time (step S57).

While the transmission of the data from the server is being interrupted at the step S57, the presentation data is transmitted to that client by the processings shown in FIGS. 13 and 14. Thus, each time the display of the presentation data is changed, the changed presentation data is displayed on the notebook size personal computer of the client, which displays data of the server of the wire LAN and data of the WWW server of the Internet, during a constant time.

The processings shown in FIGS. 15 and 16 are continuously executed until the network interface card 1 is ejected from the notebook size personal computer or the operating system of the notebook size personal computer is ended.

Owing to the processings shown in FIGS. 15 and 16, when the participants of the conference want to examine data of the server of the wire LAN and data of the WWW server of the Internet before they make a presentation, they can examine the data of that server by the client on hand.

While the participant is examining data during other participant is making a presentation, since the changed presentation data is

displayed during a constant time each time the display of the presentation data is altered, the presentation data can be prevented from being overlooked for a mistake.

As described above, in this wireless LAN conference system, since the card type network interface 1 is prepared at the conference hall and the clients are each comprised of the notebook size personal computers brought by the participants of the conference and this card type network interface 1, the network of the clients can be set without imposing the burden upon the participants of the conference, and the system can be constructed without increasing the costs of equipment of the conference hall unlike the case in which personal computers are installed at respective seats as equipment.

Moreover, since the host also is comprised of the same network conference terminal device as that of the client, an exclusive device need not be provided as the host, and hence the costs of equipment of the conference hall can be suppressed more.

In addition, since the presentation application software is stored in the network interface card 1, even when the participant of the conference brings a notebook size personal computer in which the presentation application software is not installed, such notebook size personal computer also can display the presentation data.

Further, this presentation application software can be activated automatically. Accordingly, the participant of the conference need not execute operations to activate this presentation application software, and hence a burden imposed upon the participants can be alleviated more.

Since the host and the clients are connected by the wireless LAN, a wire transmission medium such as a coaxial cable and an optical fiber cable need not be laid over the conference hall, and hence the cost of equipment can be reduced from this viewpoint. Further, the position of the wireless LAN conference terminal device 11 within the conference hall is not fixed unlike the case in which the wire transmission medium is laid over (accordingly, the layout of seats is not fixed), and hence the layout of seats can be determined freely.

Moreover, the LAN conference system can be constructed without changing at all the wire LAN which is constructed in advance within a building in which a conference hall is prepared.

In the above example, the processing content of the "host/client decision program" is that the first wireless LAN conference terminal device 11 to which the network interface card 1 is attached and in which the operating system of the notebook size personal computer is activated in the conference hall as the host.

However, the processing content of the "host/client decision program" is not limited thereto and may be a processing content in which any one of the wireless LAN conference terminal devices 11 is determined as the host by a proper method (e.g., a picture for urging the participant to select the host or the client is displayed on the notebook size personal computer and the host or the client is determined in accordance with the operations of the notebook size personal computer).

While the projector is provided in the above example, as another example, the wireless LAN conference system may be constructed

without providing the projector and presentation data may be displayed only on the notebook size personal computers of the host and the clients.

Since the projector is connected only to the host through the external display output terminal of the notebook size personal computer in the above example, when other participant than the coordinator of the conference makes a presentation, the host transmits presentation data, transmitted from the client to the host, to the projector.

However, as another example, as shown in FIG. 17, by using a projector that can be connected to the wireless LAN (e.g., projector with a personal computer, which can be connected to the wireless LAN, attached thereto) 14, the presentation data may directly be transmitted to the projector 14 through the wireless LAN from the clients 11 (2) to 11 (n) (the host 11 (1) also may transmit the presentation data to the projector 14 through the wireless LAN) (in FIG. 17, parts common to those of FIG. 5 are marked with the identical reference numerals and this relationship applies for the following FIGS. 18, 19 as well).

In the above example, the host and the projector are provided as separate sections. However, as other example, as shown in FIG. 18, there may be provided a projector 16 with a personal computer 15 having a PC card slot attached thereto. The network interface card 1 may be attached to this personal computer 15 and this personal computer may be served as the host, whereby the projector may be served also as the host.

In the wireless LAN conference system shown in FIG. 18, the same

presentation data as that displayed on the projector 16 is directly transmitted to the clients 11 (2) to 11 (n) from the projector 16 through the wireless LAN and thereby is displayed on the clients 11 (2) to 11 (n). Similarly to the wireless LAN conference system shown in FIG. 17, presentation data may directly be transmitted to the projector 16 from the clients 11 (2) to 11 (n) through the wireless LAN and thereby such presentation data can be displayed on the projector 16.

Further, in the example shown in FIG. 18, when the presentation data displayed on the projector 16 can be well watched from all seats and only one participant makes a presentation, as shown in FIG. 19, for example, there is provided only one wireless LAN conference terminal device (client) 11 (2). Then, this wireless LAN conference terminal device 11, the wire LAN and the video camera 13 may be connected together, whereby the participant which will make a presentation gets the presentation right by this client 11 (2) from beginning to end and may transmit the presentation data to the projector 16.

In the above example, not only the "client program" but also the "host/client decision program" and the "host program" are stored in the network interface card, whereby the notebook size personal computer with the network interface card attached thereto may be served as the host.

However, as other example, the "host/client decision program" and the "host program" may not be stored in the network interface card and the "client program" may constantly be activated based on the fact that the network interface card is attached to the notebook

size personal computer. In that case, as the host, there may be used such one in which an ordinary (not relating to the present invention) network interface card is attached to the personal computer in which the "host program" and the presentation application software are installed (in the examples shown in FIGS. 18 and 19, the "host program" and the presentation application software may be installed on the personal computer attached to the projector and the ordinary network interface card may be attached to such personal computer).

In the above example, the "host program" and the "client program" contain the processing by which the client gets the presentation right. However, when the participant of the conference need not transmit the presentation data by the client in hand (e.g., announcement meeting in which a specific person makes a presentation in a one-sided fashion), "host program" and "client program" need not contain this processing.

In the above example, the presentation application software is stored in the network interface card. However, as other example, the presentation application software may not be stored in the network interface card, and the network interface card may be attached to the notebook size personal computer in which the presentation application software was installed.

In the above example, the network interface card is attached to the notebook size personal computer, thereby resulting in the client and the host being constructed. However, the present invention is not limited thereto, and the client and the host may be constructed by attaching the network interface card to suitable information

terminal devices to which the PC card can be attached (other personal computers than the notebook size personal computer, personal digital assistants which are highly-sophisticated electronic notes, printers, image writing devices having a built-in camera, etc.).

In the above example, the network interface card adopts the radio frequency system as the wireless LAN system. However, as other example, an infrared system may be adopted as the wireless LAN system.

In the above example, the network interface card is applied to the wireless LAN conference system. However, the present invention is not limited thereto, and the network interface card may be applied to other uses than the wireless LAN conference system. However, in that case, the network interface card may transmit and receive data through the wire LAN.

In the above example, the present invention is applied to the network interface card which is based on the PCMCIA standards. However, the present invention is not limited thereto, and the present invention may be applied to proper card type (including thin-chip type) network interface cards which can be attached to the information terminal devices.

The present invention is not limited to the above examples and it is needless to say that the present invention may take various arrangements without departing from the gist thereof.

As described above, according to the card type network interface of the present invention, there is achieved the effect that the network setting for connecting the information terminal device such

as the personal computer to the LAN can be executed without imposing a burden to users.

Accordingly, in the conference using the LAN, for example, if theses card type network interfaces are prepared in the conference hall and these card type network interfaces are attached to the information terminal devices such as the notebook size personal computers brought by the participants of the conference, then the network setting can be executed as the assumption that the participants are going to attend the conference without imposing a burden upon the participants. Moreover, the cost of equipment of the conference hall can be prevented from being increased unlike the case in which the information terminal devices such as the personal computers are attached to the respective seats as equipment.

According to this card type network interface, since the host of the LAN also is comprised of the information terminal device to which this card type network interface is attached, there is achieved the effect that the LAN system can be constructed without providing an exclusive-device as the host. Therefore, in the conference using the LAN, for example, the cost of equipment of the conference hall can be suppressed more.

According to this card type network interface, in the conference using the LAN, for example, the participant of the conference can make a presentation without leaving the seat.

According to this card type network interface, there are achieved effects that the host can accurately receive requests from a plurality of clients whose network settings were completed through the wireless LAN and that the host can accurately receive the

setting information request through the wireless LAN.

According to this card type network interface, in the conference using the LAN, for example, there is achieved the effect in which the information terminal device in which the presentation application software is not installed can display the present application data. Moreover, since the participant of the conference need not execute operations to activate the presentation application software, there is achieved the effect in which a burden imposed upon the participants can be alleviated more.

Next, according to the network conference terminal device of the present invention, there are achieved the effects in which the network setting used as the assumption that the participants are going to attend the conference using the wireless LAN can be executed without imposing a burden upon the participants and in which the cost of equipment of the conference hall can be prevented from being increased unlike the case in which the information terminal devices are provided at the respective seats as equipment.

According to the network conference terminal device, since the host of the wireless LAN also is comprised of this network conference terminal device, there is achieved the effect in which the wireless LAN conference system can be constructed without providing the exclusive-device as the host. Therefore, the cost of equipment of the conference hall can be suppressed more.

According to this network conference terminal device, in the conference using the wireless LAN, for example, the participant of the conference can make a presentation without leaving the seat.

According to this network conference terminal device, there are

achieved effects in which the host can accurately receive requests from a plurality of clients whose network settings were completed and in which the host can accurately receive the setting information request to set the network.

According to this network conference terminal device, in the conference using the wireless LAN, for example, there is achieved the effect in which the information terminal device in which the presentation application software is not installed can display the presentation data. Moreover, since the participant of the conference need not execute operations to activate the presentation application software, there is achieved the effect in which a burden imposed upon the participants can be alleviated more.

Next, according to the network conference system of the present invention, there are achieved the effects in which the network setting can be executed without imposing a burden upon the participants and in which the system can be constructed without increasing the cost of equipment of the conference hall.

According to the network conference system, since the host also is comprised of the same network conference terminal device as that of the client, there is achieved the effect in which the exclusive-device need not be provided as the host so that the cost of equipment of the conference hall can be suppressed more.

According to this network conference system, the participant of the conference can make a presentation without leasing the seat.

According to this network conference system, there are achieved the effects in which the host can accurately receive requests from a plurality of clients in which the network setting was completed and

in which the host can accurately receive the request of the setting information for setting the network.

According to this network conference system, there is achieved the effect in which the client or the host using the information terminal device in which the presentation application software is not installed can display the presentation data. Since the participant of the conference need not execute operations to activate the presentation application software, a burden imposed upon the participant can be suppressed more.

Next, according to another network conference system of the present invention, there are achieved the effects in which the network setting of the client can be executed without imposing a burden upon the participants of the conference, the system can be constructed without increasing the cost of equipment of the conference hall and in which the participant can make a presentation without leaving the seat.

According to another network conference system, there are achieved the effects in which the same presentation data as the presentation data displayed on the image display device can directly be transmitted from the image display device through the wireless LAN to the client and can be displayed on the client and in which the presentation data can directly be transmitted from the client through the wireless LAN to the image display device and such presentation data can be displayed on the image display device.

Further, according another network conference system, there are achieved the effects in which the image display device (host) can accurately receive the requests from a plurality of clients in which

the network setting was completed and in which the image display device can accurately receive the setting information request to set the network.

Furthermore, according to another network conference system, there is achieved the effect in which the client using the information terminal device in which the present application software is not installed and the image display device can display the presentation data. Since the participant of the conference need not execute operations to activate the presentation application software, there is achieved the effect in which a burden imposed upon the participants can be alleviated more.

CLAIMS

1. A card type network interface which can be attached to an information terminal device, comprising:

connecting means for connecting said information terminal device to a local area network; and

setting means for requesting a host of said local area network to transmit setting information necessary for executing a network setting to connect said information terminal device to said local area network based on the fact that said card type network interface can be attached to said information terminal device and executing said network setting by using said setting information transmitted from said host.

2. A card type network interface according to claim 1, further comprising:

determining means for determining based on the fact that said card type network interface can be attached to said information terminal device whether said information terminal device should be a host or a client of said local area network; and

processing means for transmitting said requested setting information to said client based on the fact that said information terminal device is determined as said host by said determining means, wherein said setting means requests said setting information based on the fact that said information terminal device is determined as said client by said determining means.

3. A card type network interface according to claim 1, wherein presentation application software for displaying and controlling presentation data is stored in said card type network interface.

4. A card type network interface according to claim 3, wherein said information terminal device automatically activates automatic activating application software stored in a hard disk and said card type network interface allows said information terminal device to recognize said card type network interface as a hard disk so that said presentation application software is automatically activated in said information terminal device.

5. A card type network interface according to claim 2, wherein said determining means determines said information terminal device as said host based on the fact that said card type network interface is attached to said information terminal device on condition that a command for inhibiting said information terminal device from being determined as said host is not received through said local area network and transmits a command for inhibiting said other information terminal device from being determined as said host through said local area network.

6. A card type network interface according to claim 2, further comprising:

processing means for requesting said host to get a presentation right based on the fact that said information terminal device is determined as said client by said determining means, said network

setting is completed by said setting means and a predetermined operation is executed by said information terminal device and transmitting presentation data to said host and said other client based on the fact that said presentation right is obtained; and

processing means for allowing said client to get said presentation right based on the fact that said information terminal device is determined as said host by said determining means and that said host is requested to get said presentation right.

7. A card type network interface according to claim 2, wherein said connecting means further includes processing means for connecting said information terminal device to a wireless local area network, receiving a request from said client in which said network setting was completed in a polling system based on the fact that said information terminal device is determined as said host by said determining means and awaiting a request of said setting information at the end of a polling cycle and wherein said setting means requests said setting information at the end of said polling cycle.

8. A card type network interface according to claim 2, wherein presentation application software for displaying and controlling presentation data is stored in said card type network interface.

9. A card type network interface according to claim 8, wherein said information terminal device automatically activates automatic activating application software stored in a hard disk and said card type network interface allows said information terminal device to

recognize said card type network interface as a hard disk so that said presentation application software is automatically activated in said information terminal device.

10. A network conference terminal device in which a card type network interface is attached to an information terminal device and which includes presentation processing means for displaying and controlling presentation data according to the need, said card type network interface including:

connecting means for connecting said information terminal device to a wireless local area network; and

setting means for requesting a host of said wireless local area network to transmit setting information necessary for executing a network setting to connect said information terminal device to said wireless local area network based on the fact that said card type network interface is attached to said information terminal device and executing said network setting by using said setting information transmitted from said host.

11. A network conference terminal device according to claim 10, wherein said card type network interface further includes:

determining means for determining based on the fact that said card type network interface is attached to said information terminal device whether said information terminal device is served as a host or a client of said wireless local area network; and

processing means for transmitting said requested setting information to said client and transmitting said presentation data

to said client in which said network setting was completed based on the fact that said information terminal device is determined as said host by said determining means and wherein said setting means requests said setting information based on the fact that said information terminal device is determined as said client by said determining means.

12. A network conference terminal device according to claim 10, wherein said presentation processing means displays said presentation data by executing presentation application software stored in said card type network interface.

13. A network conference terminal device according to claim 12, wherein said information terminal device automatically activates automatic activating application software stored in a hard disk and said card type network interface allows said information terminal device to recognize said card type network interface as a hard disk so that said presentation application software is automatically activated in said information terminal device.

14. A network conference terminal device according to claim 11, wherein said determining means determines said terminal device as said host and transmits a command for inhibiting said other terminal device from being determined as said host through said wireless local area network based on the fact that said network conference terminal is attached to said terminal device on condition that a command for inhibiting said terminal device from being determined as

said host is not received through said wireless local area network.

15. A network conference terminal device according to claim 11, wherein said card type network interface further includes:

processing means for requesting said host to get a presentation right based on the fact that said terminal device is determined as said client by said determining means, said network setting is completed by said setting means and that a predetermined operation is executed by said terminal device and transmitting said presentation data to said host and said other client based on the fact that said presentation right is obtained; and

processing means for allowing said client to get said presentation right based on the fact that said terminal device is determined as said host and that said host is requested to get said presentation right.

16. A network conference terminal device according to claim 11, wherein said card type network interface further includes:

processing means for receiving in a polling system a request from said client in which said network setting was completed based on the fact that said terminal device is determined as said host by said determining means and awaiting a request of said setting information at the end of a polling cycle and wherein said setting means requests said setting information at the end of said polling cycle.

17. A network conference terminal device according to claim 11,

wherein said presentation processing means displays said presentation data by executing presentation application software stored in said card type network interface.

18. A network conference terminal device according to claim 17, wherein said information terminal device automatically activates automatic activating application software stored in a hard disk and said card type network interface allows said information terminal device to recognize said card type network interface as a hard disk so that said presentation application software is automatically activated in said information terminal device.

19. A network conference system comprising:

a host of a wireless local area network;

a client of said wireless local area network, wherein said client includes an information terminal device to which a card type network interface is attached and presentation processing means for displaying and controlling presentation data according to the need, said card type network interface includes connecting means for connecting said information terminal device to said wireless local area network and setting means for requesting said host to transmit setting information necessary for executing a network setting to connect said information terminal device to said wireless local area network based on the fact that said card type network interface is attached to said information terminal device and executing said network setting by using said setting information transmitted from said host and said host transmits said setting information to said

client based on a request of said setting information and transmits said presentation data to said client in which said network setting was completed.

20. A network conference system according to claim 19, wherein said card type network interface further includes:

determining means for determining based on the fact that said card type network interface is attached to said information terminal device whether said information terminal device is served as a host or a client of said wireless local area network; and

processing means for transmitting said requested setting information to said client and transmitting said presentation data to said client in which said network setting was completed based on the fact that said information terminal device is determined as said host by said determining means and wherein said setting means requests said setting information based on the fact that said information terminal device is determined as said client by said determining means and said host is such one that an information terminal device to which said card type network interface is attached is determined as a host by said determining means.

21. A network conference system according to claim 19, wherein said presentation processing means displays said presentation data by executing presentation application software stored in said card type network interface.

22. A network conference system according to claim 21, wherein

said information terminal device automatically activates automatic activating application software stored in a hard disk and said card type network interface allows said information terminal device to recognize said card type network interface as a hard disk so that said presentation application software is automatically activated in said information terminal device.

23. A network conference system according to claim 20, wherein said determining means determines said information terminal device as said host and transmits a command for inhibiting said other information terminal device from being determined as said host through said wireless local area network based on the fact that said card type network interface is attached to said information terminal device on condition that a command for inhibiting said information terminal device from being determined as said host is not received through said wireless local area network.

24. A network conference system according to claim 20, wherein said card type network interface further includes:

processing means for requesting said host to get a presentation right based on the fact that said card type network interface is determined as said client by said determining means, said network setting is completed by said setting means and that a predetermined operation is executed by said information terminal device and transmitting said presentation data to said host and said other client based on the fact that said presentation right is obtained; and

processing means for allowing said client to get said presentation right based on the fact that said card type network interface is determined as said host by said determining means and that said host is requested to get said presentation right.

25. A network conference system according to claim 20, wherein said card type network interface further includes processing means for receiving in a polling system a request from said client in which said network setting was completed based on the fact that said card type network interface is determined as said host by said determining means and awaiting a request of said setting information at the end of a polling cycle and wherein said setting means requests said setting information at the end of said polling cycle..

26. A network conference system according to claim 20, wherein said presentation processing means displays said presentation data by executing presentation application software stored in said card type network interface.

27. A network conference system according to claim 26, wherein said terminal device automatically activates automatic activating application software stored in a hard disk and said card type network interface allows said terminal device to recognize said card type network interface as a hard disk so that said presentation application software is automatically activated in said terminal device.

28. A network conference system comprising an image display device and a client of a wireless local area network, wherein said image display device has an information terminal device to which a card type network interface can be attached, said information terminal device has said card type network interface attached thereto and includes a presentation processing means for displaying and controlling presentation data;

said client is constructed such that said card type network interface is attached to an information terminal device and includes said presentation processing means according to the need;

said card type network interface comprising:

connecting means for connecting said information terminal device to said wireless local area network;

determining means for determining based on the fact that said card type network interface is attached to said information terminal device whether said information terminal device is served as a host or a client of said wireless local area network;

setting means for requesting said host to transmit setting information necessary for executing a network setting to connect said information terminal device to said wireless local area network based on the fact that said information terminal device is determined as said client by said determining means and executes said network setting by using said setting information transmitted from said host;

processing means for transmitting said requested setting information to said client based on the fact that said information terminal device is determined as said host by said determining means

and transmitting said presentation data to said client in which said network setting was completed;

processing means for requesting said host to get a presentation right based on the fact that said information terminal device is determined as said client by said determining means, said network setting was completed by said setting means and that a predetermined operation is executed by said information terminal device and transmitting said presentation data to said host and said client based on the fact that said presentation right is obtained; and

processing means for allowing said client to get said presentation right based on the fact that said information terminal device is determined as said host by said determining means and that said host is requested to get said presentation right, and said image display device is constructed such that said information terminal device attached to said image display device is determined as a host by said determining means.

29. A network conference system according to claim 28, wherein said determining means determines said terminal device as said host based on the fact that said card type network interface is attached to said terminal device on condition that a command for inhibiting said information terminal device from being determined as said host is not received through said wireless local area network and transmits a command for inhibiting said other information terminal device from being determined as said host through said wireless local area network.

30. A network conference system according to claim 28, wherein said card type network interface further includes processing means for receiving in a polling system a request from said client in which said network setting was completed based on the fact that said information terminal device is determined as said host by said determining means and awaiting a request of said setting information at the end of a polling cycle and wherein said setting means requests said setting information at the end of said polling cycle.

31. A network conference system according to claim 28, wherein said presentation processing means displays said presentation data by executing presentation application software stored in said card type network interface.

32. A network conference system according to claim 31, wherein said terminal device automatically activates automatic activating application software stored in a hard disk and said card type network interface allows said terminal device to recognize said card type network interface as a hard disk so that said presentation application software is automatically activated in said terminal device.

FIG. 1

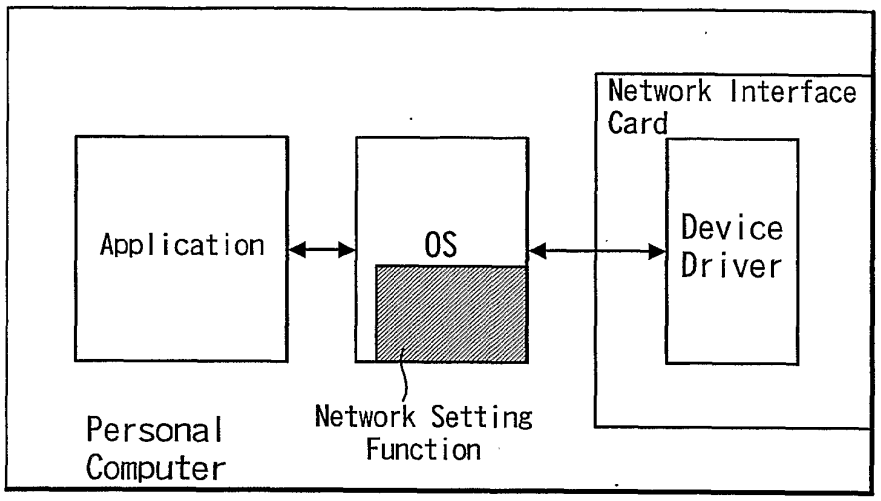
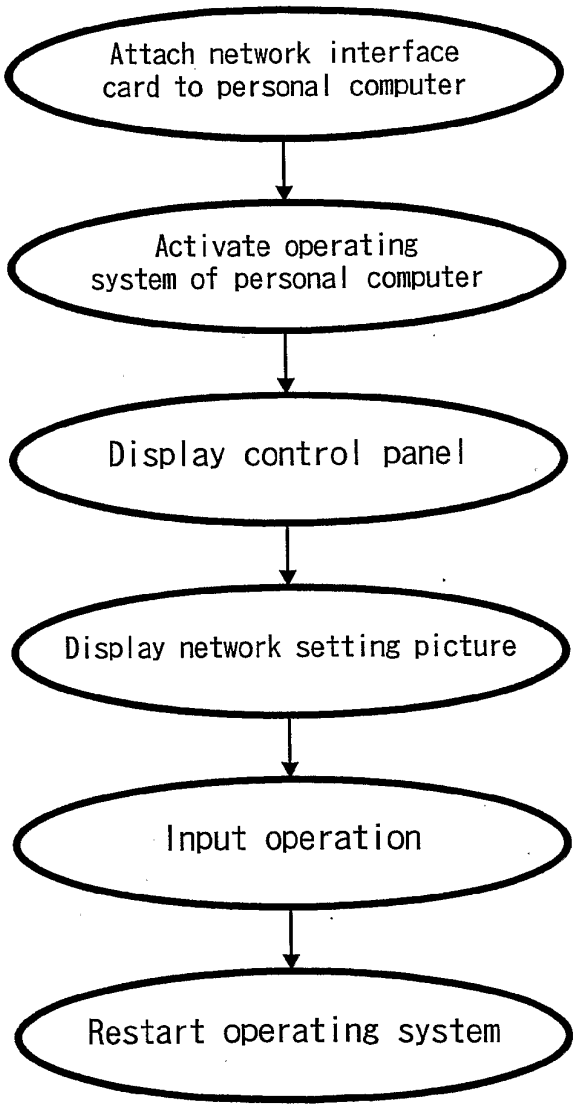

Network Interface Card
Application
OS
Device Driver
Network Setting Function
Personal Computer

FIG. 2


Attach network interface card to personal computer
Activate operating system of personal computer
Display control panel
Display network setting picture
Input operation
Restart operating system

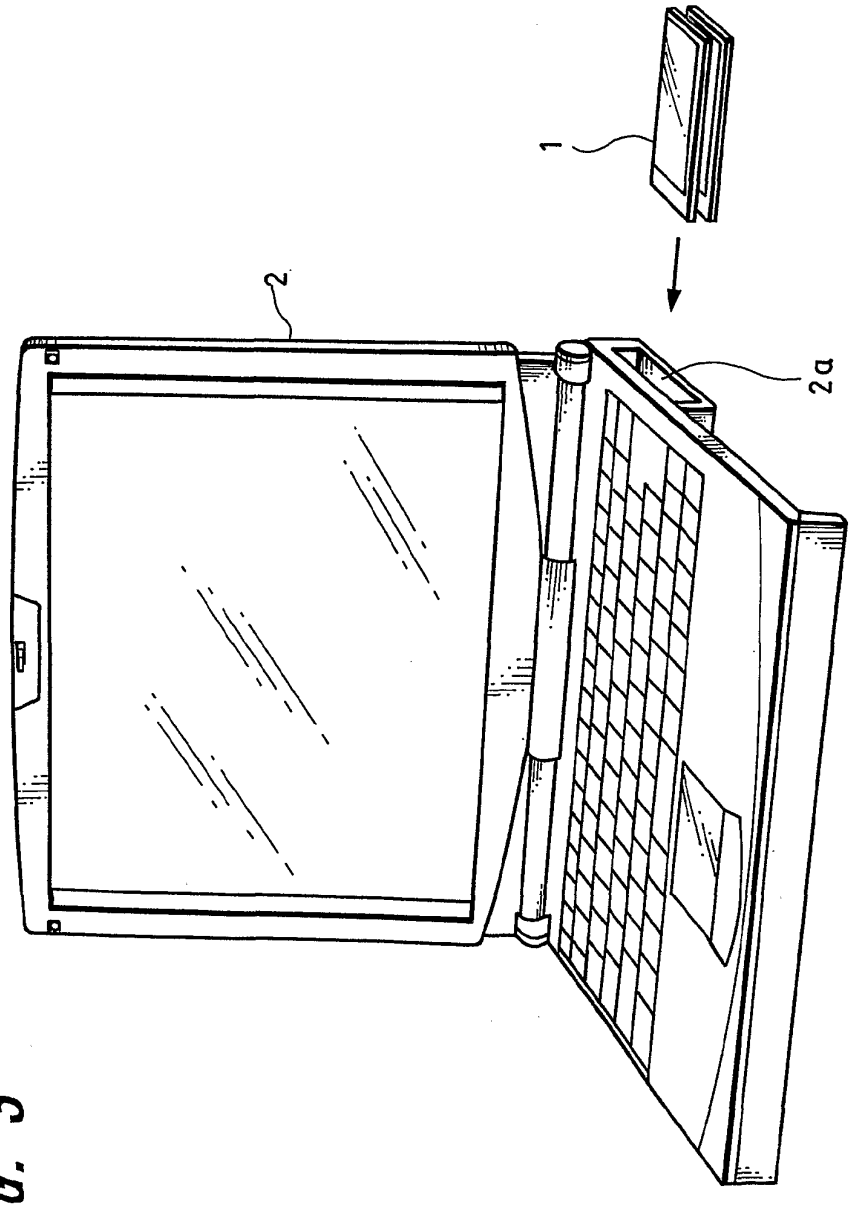


FIG. 3

FIG. 4

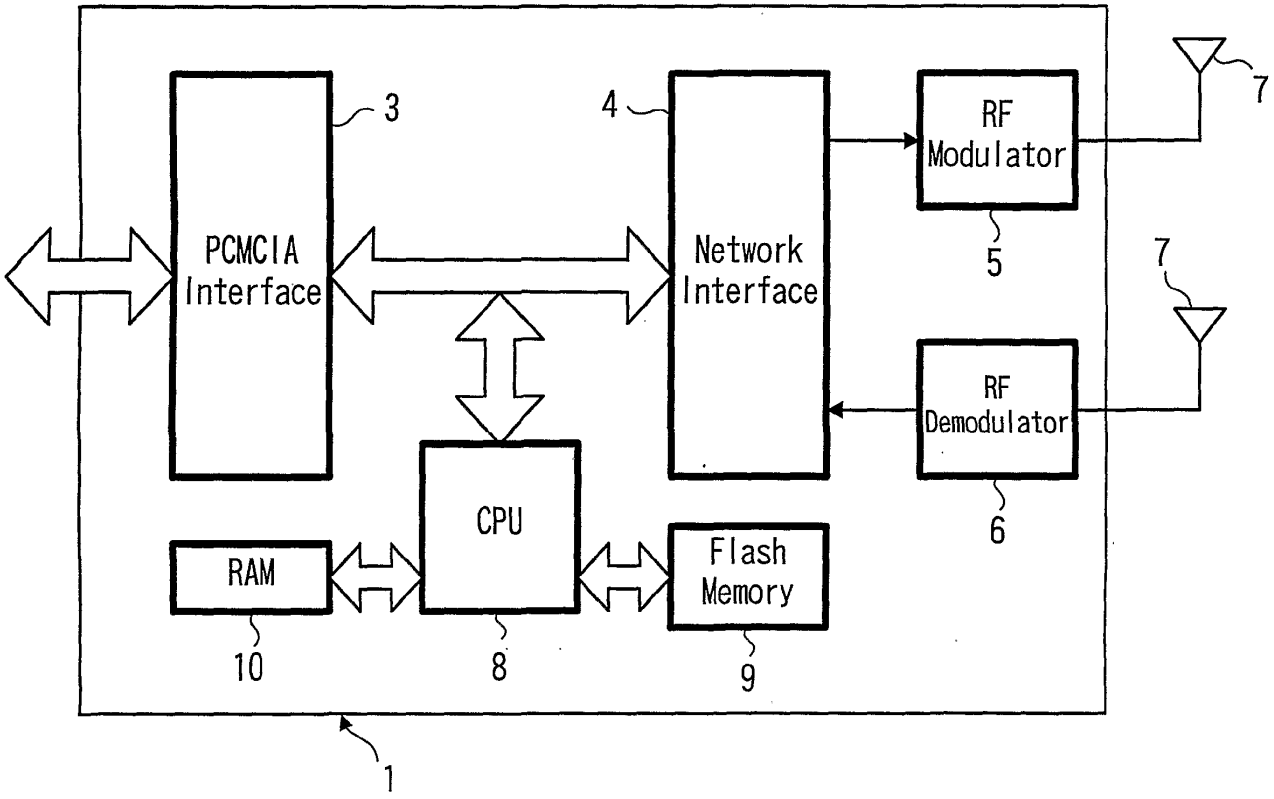

PCMCIA Interface
3
Network Interface
4
RF Modulator
5
RF Demodulator
6
7
7
CPU
8
RAM
10
Flash Memory
9
1

FIG. 5

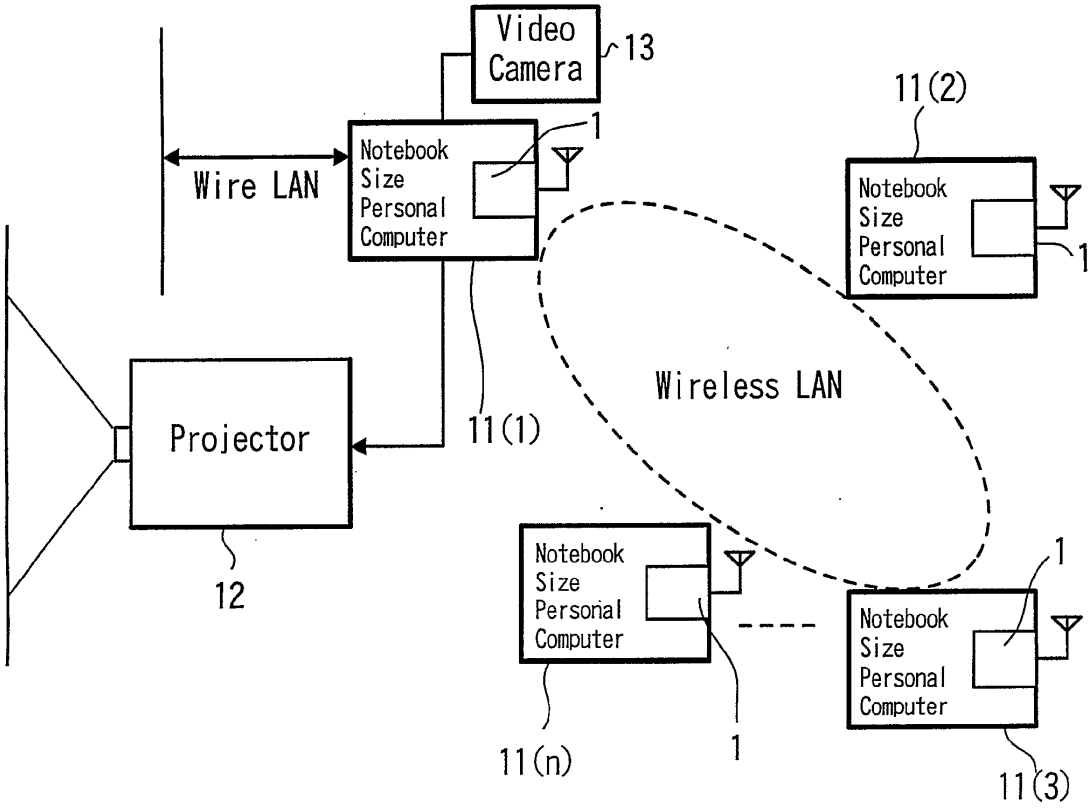

Video Camera
13
Wire LAN
Notebook Size Personal Computer
1
11(1)
11(2)
Notebook Size Personal Computer
1
Wireless LAN
Projector
12
Notebook Size Personal Computer
11(n)
1
Notebook Size Personal Computer
1
11(3)

FIG. 6

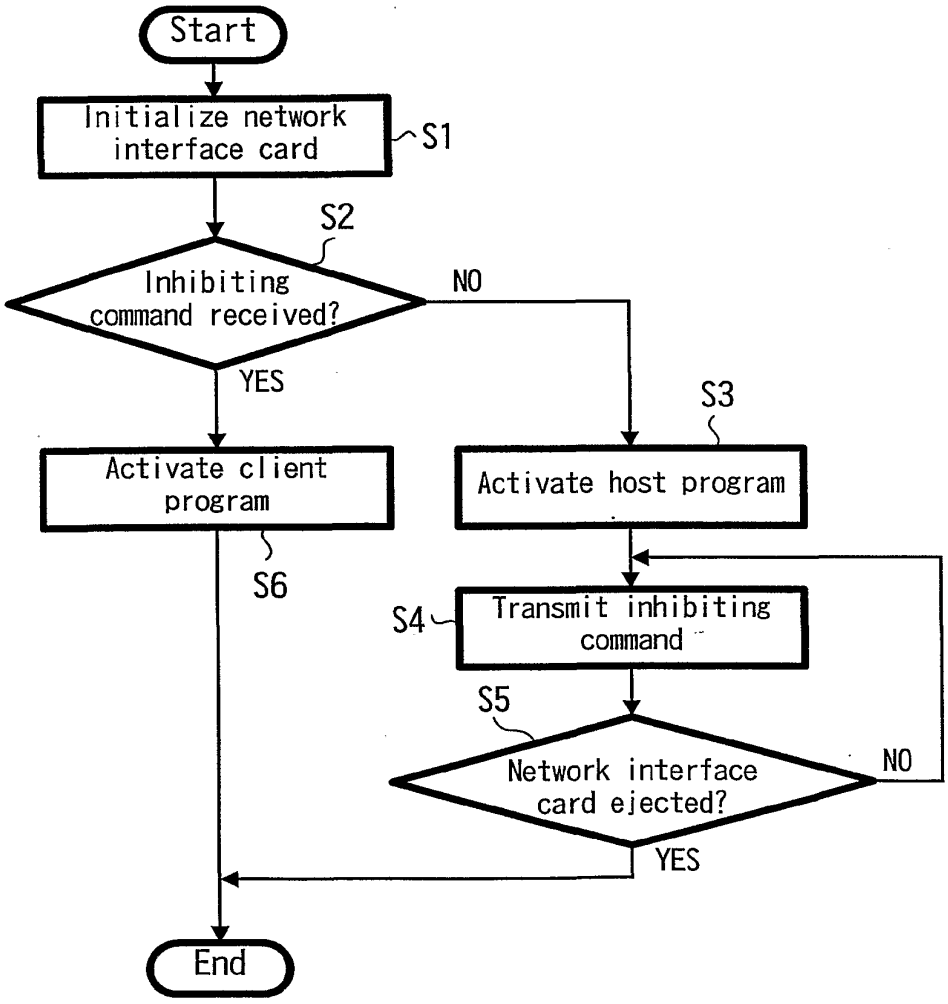

Start
Initialize network interface card
S1
S2
Inhibiting command received?
NO
YES
S3
Activate client program
Activate host program
S6
S4
Transmit inhibiting command
S5
Network interface card ejected?
NO
YES
End

FIG. 7

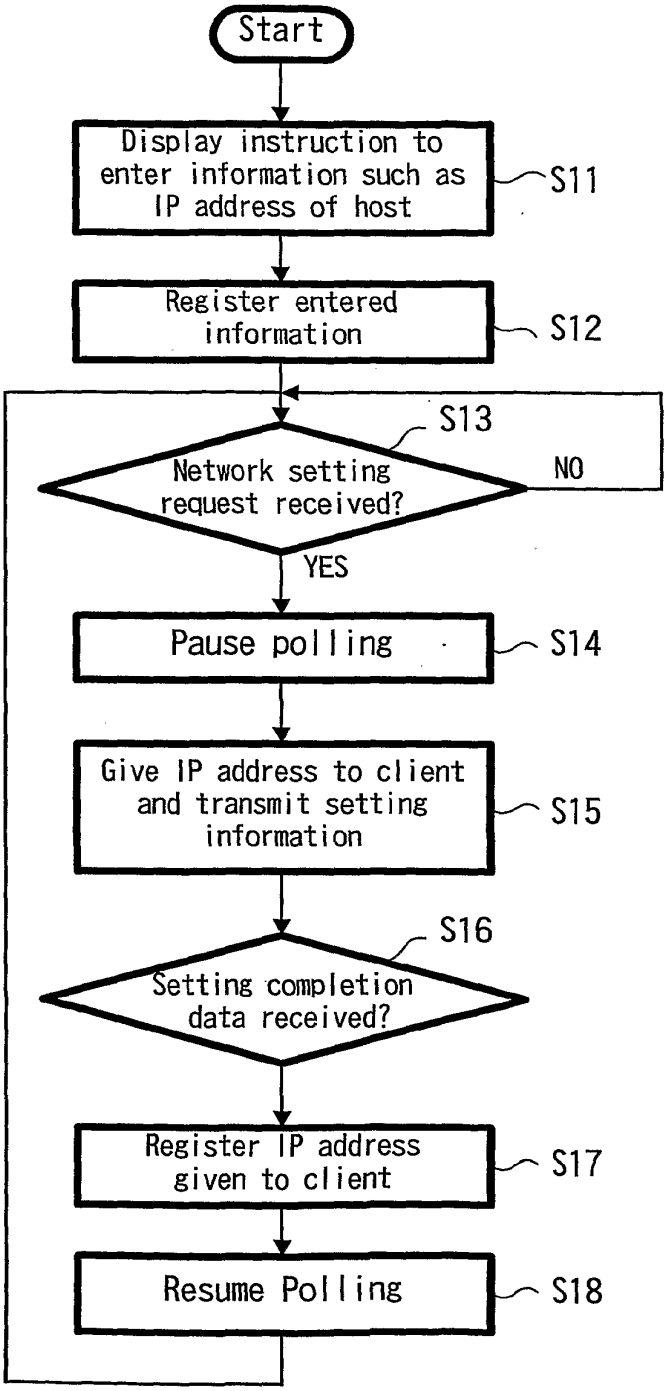

Start
Display instruction to enter information such as IP address of host
S11
Register entered information
S12
S13
Network setting request received?
NO
YES
Pause polling
S14
Give IP address to client and transmit setting information
S15
S16
Setting completion data received?
Register IP address given to client
S17
Resume Polling
S18

FIG. 8

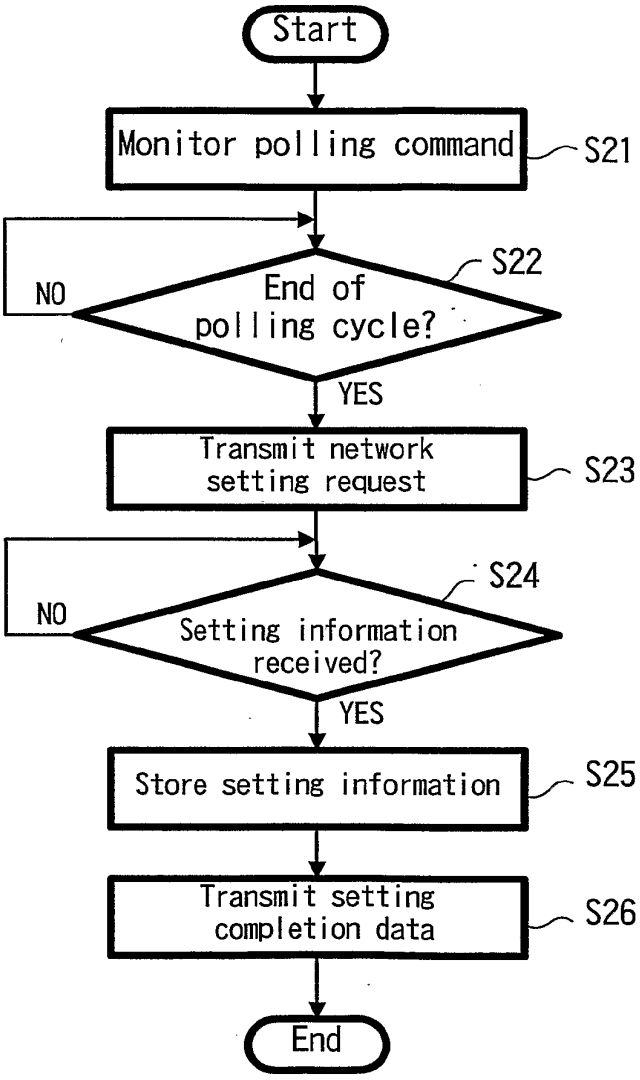

Start
Monitor polling command
S21
End of polling cycle?
S22
NO
YES
Transmit network setting request
S23
Setting information received?
S24
NO
YES
Store setting information
S25
Transmit setting completion data
S26
End

FIG. 9

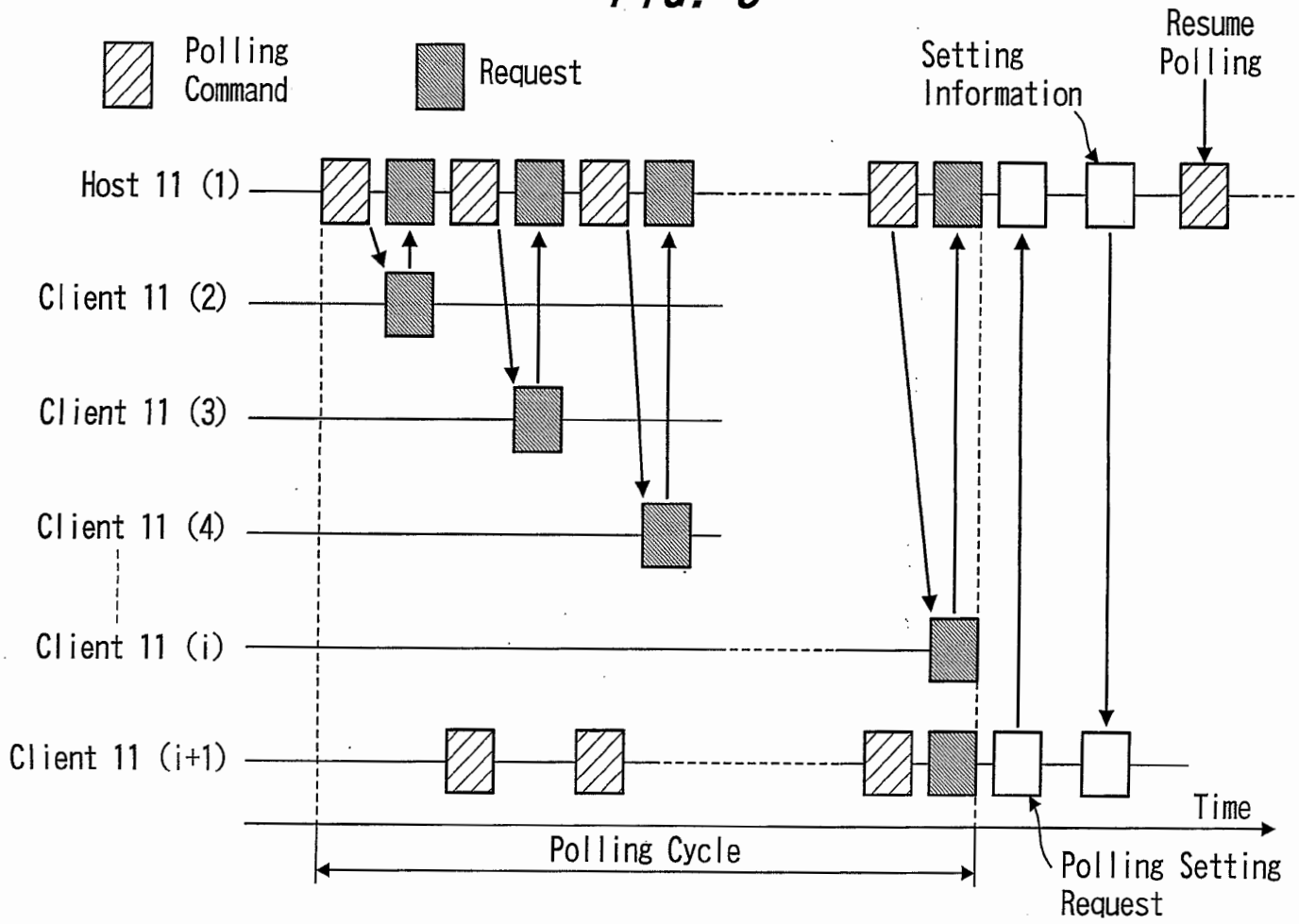

Polling Command
Request
Setting Information
Resume Polling
Host 11 (1)
Client 11 (2)
Client 11 (3)
Client 11 (4)
Client 11 (i)
Client 11 (i+1)
Time
Polling Cycle
Polling Setting Request

FIG. 10A

Address of Transmission Destination	Address of Transmission Source	Following Bytes	Data or Command	Checksum

FIG. 10B

Poling end
Request IP Address
Complete set IP Address

FIG. 11

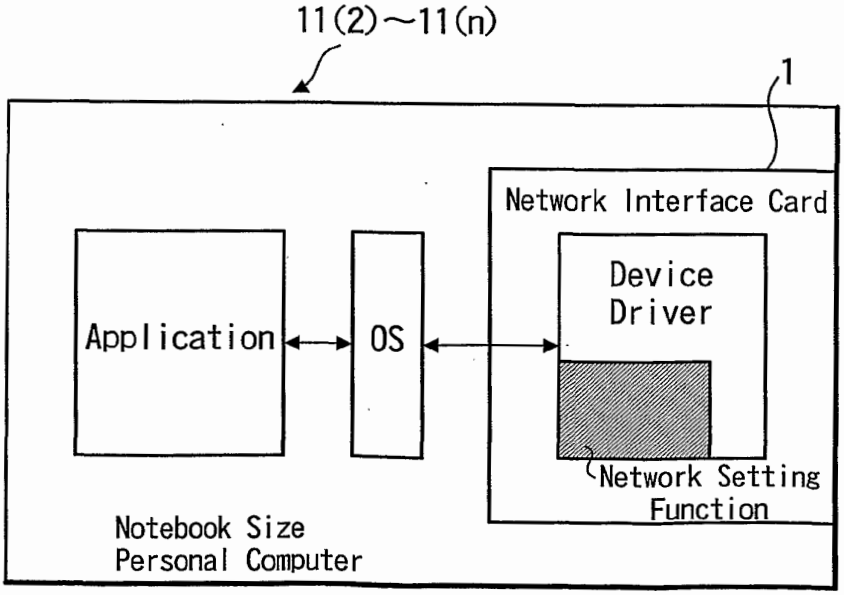


FIG. 12

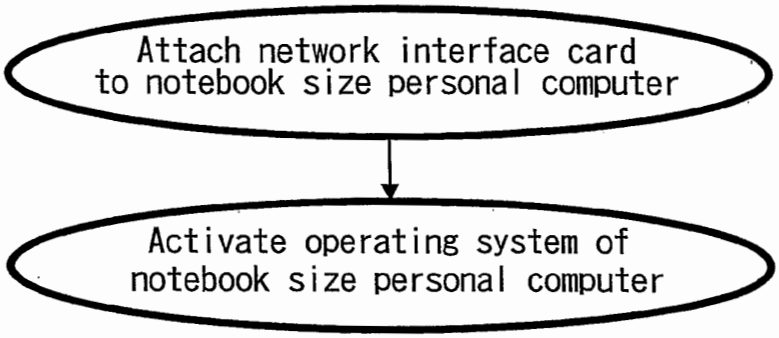

Attach network interface card to notebook size personal computer
Activate operating system of notebook size personal computer

FIG. 13

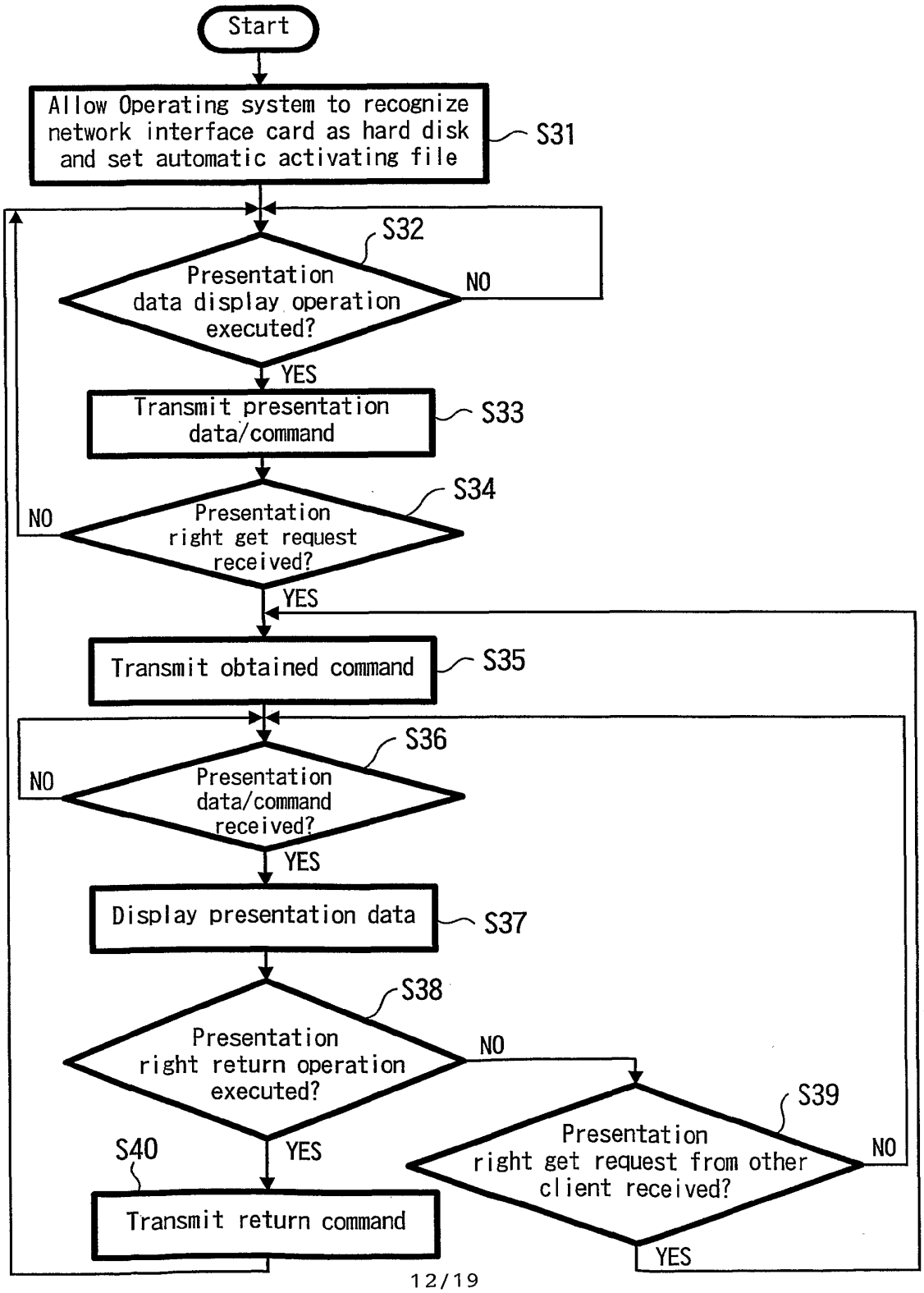

Start
Allow Operating system to recognize network interface card as hard disk and set automatic activating file
S31
S32
Presentation data display operation executed?
NO
YES
Transmit presentation data/command
S33
S34
NO
Presentation right get request received?
YES
Transmit obtained command
S35
S36
NO
Presentation data/command received?
YES
Display presentation data
S37
S38
Presentation right return operation executed?
NO
S39
Presentation right get request from other client received?
NO
YES
S40
YES
Transmit return command

FIG. 14

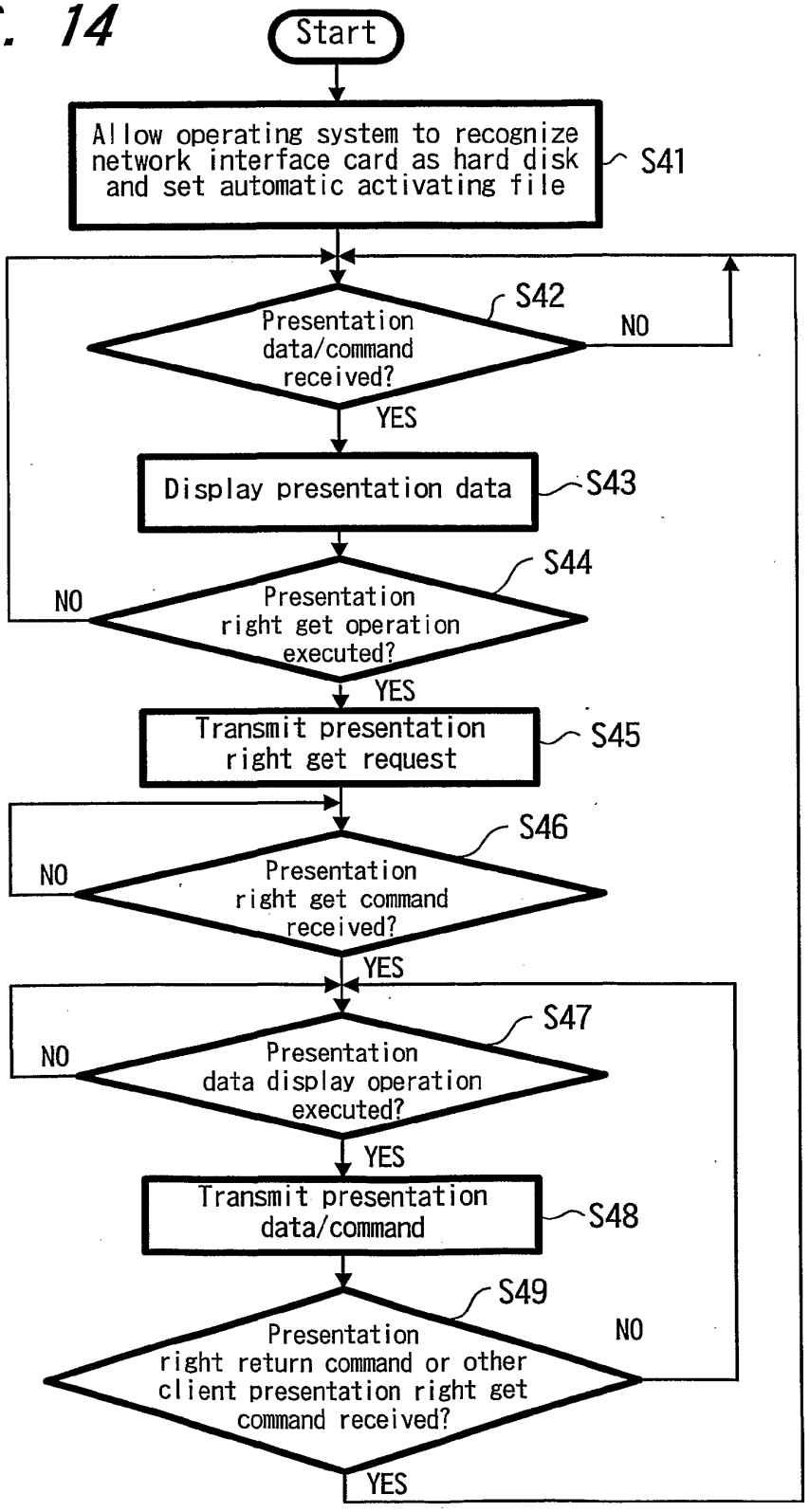

Start
Allow operating system to recognize network interface card as hard disk and set automatic activating file
S41
Presentation data/command received?
S42
NO
YES
Display presentation data
S43
Presentation right get operation executed?
S44
NO
YES
Transmit presentation right get request
S45
Presentation right get command received?
S46
NO
YES
Presentation data display operation executed?
S47
NO
YES
Transmit presentation data/command
S48
Presentation right return command or other client presentation right get command received?
S49
NO
YES

FIG. 15

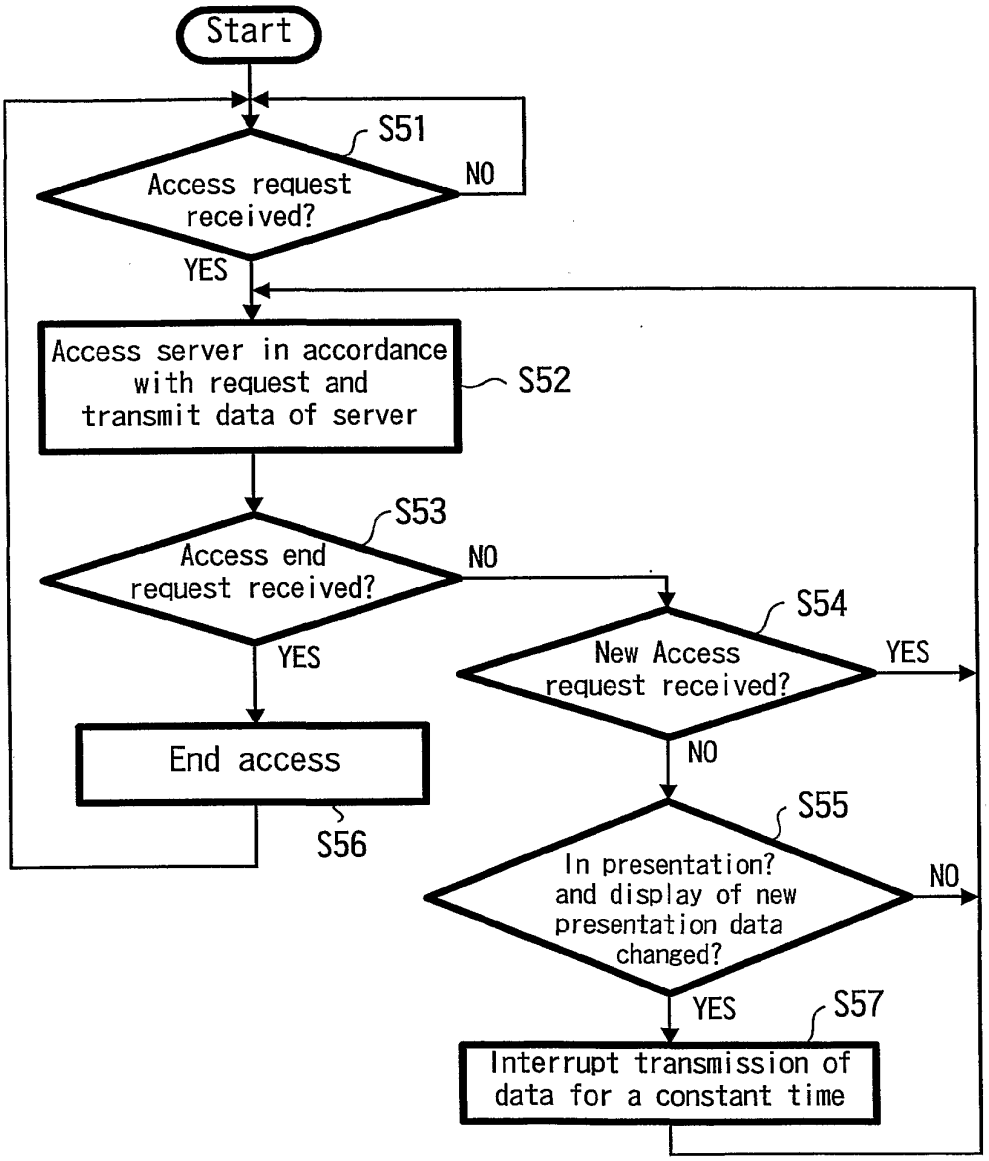

Start
S51
Access request received?
NO
YES
Access server in accordance with request and transmit data of server
S52
S53
Access end request received?
NO
YES
End access
S56
S54
New Access request received?
YES
NO
S55
In presentation? and display of new presentation data changed?
NO
YES
S57
Interrupt transmission of data for a constant time

FIG. 16

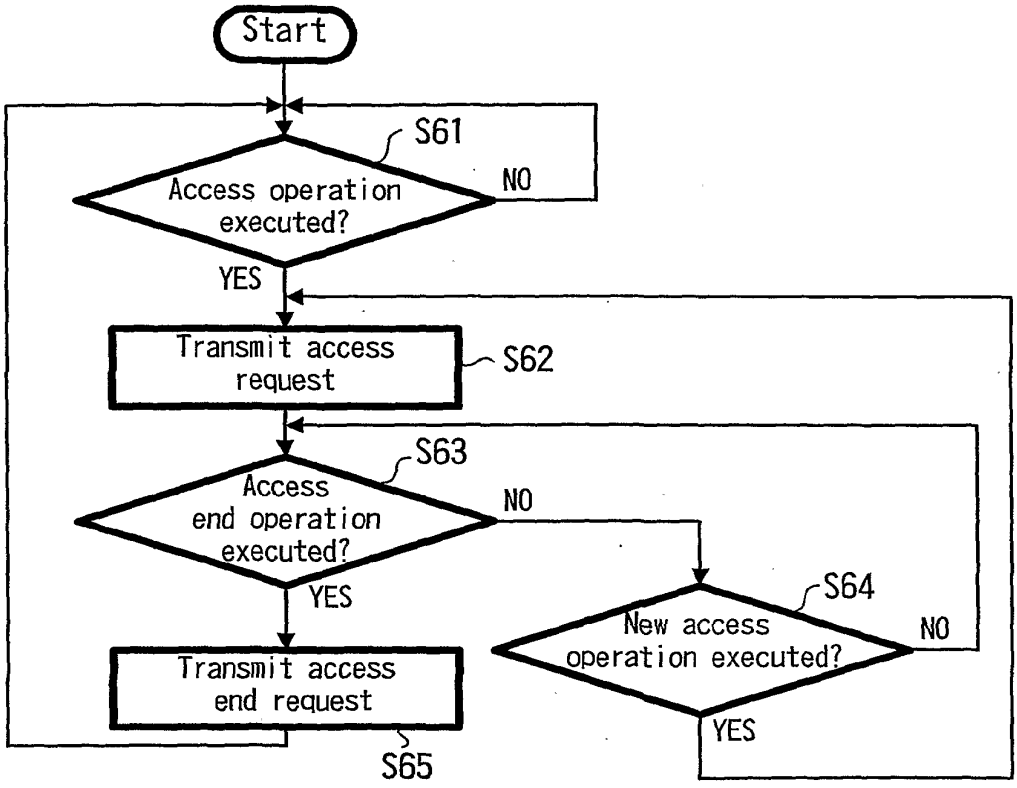

Start
S61
Access operation executed?
NO
YES
Transmit access request
S62
S63
Access end operation executed?
NO
YES
S64
New access operation executed?
NO
YES
Transmit access end request
S65

FIG. 17

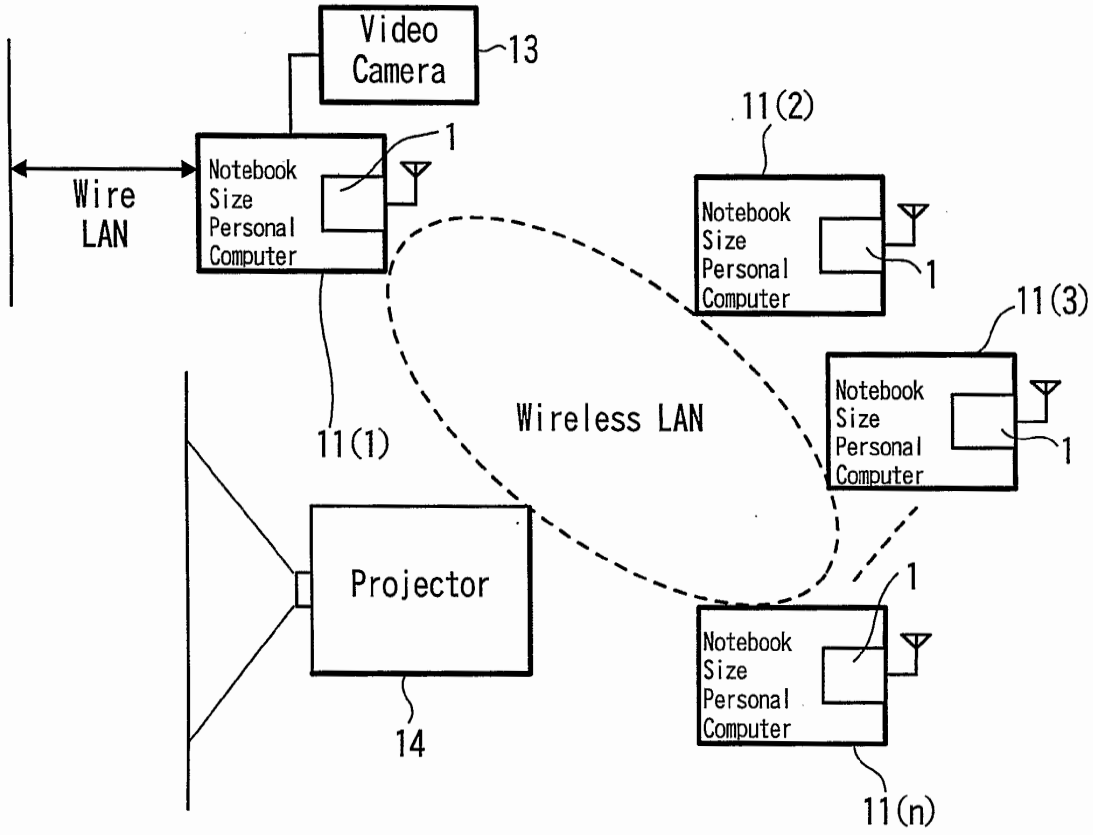

Video Camera
13
Wire LAN
Notebook Size Personal Computer
1
11(1)
11(2)
Notebook Size Personal Computer
1
11(3)
Notebook Size Personal Computer
1
Wireless LAN
Projector
14
Notebook Size Personal Computer
1
11(n)

FIG. 18

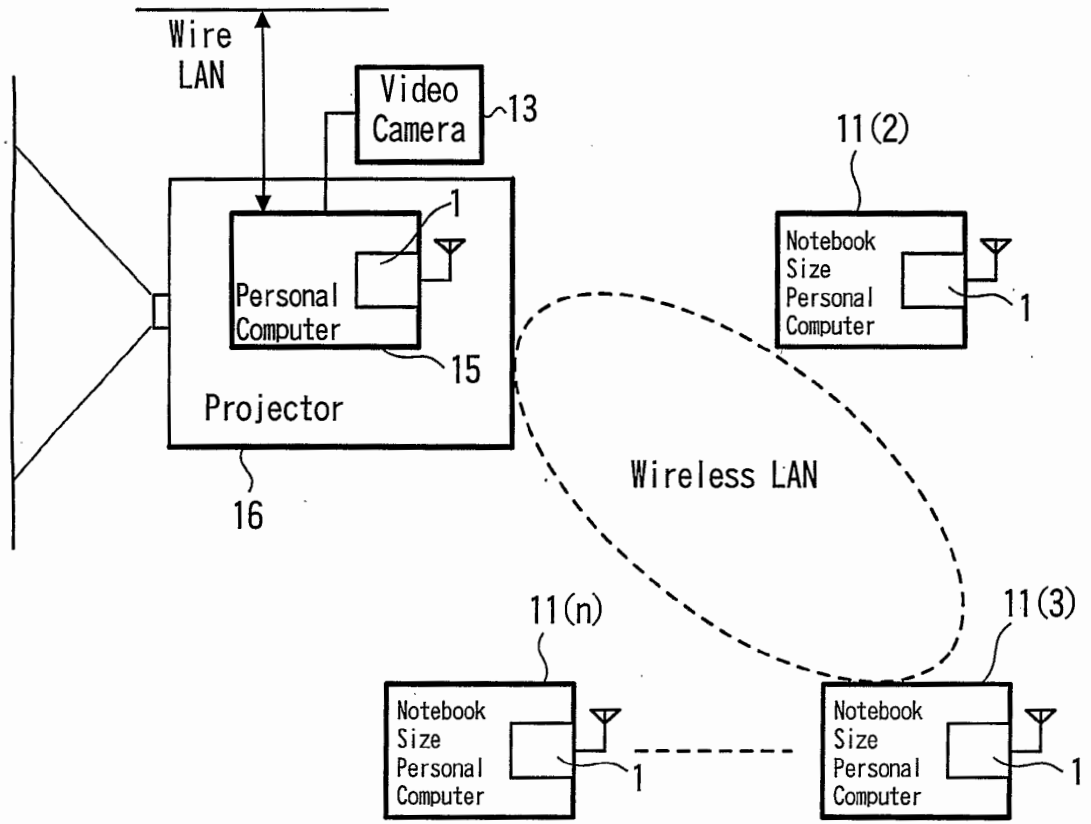
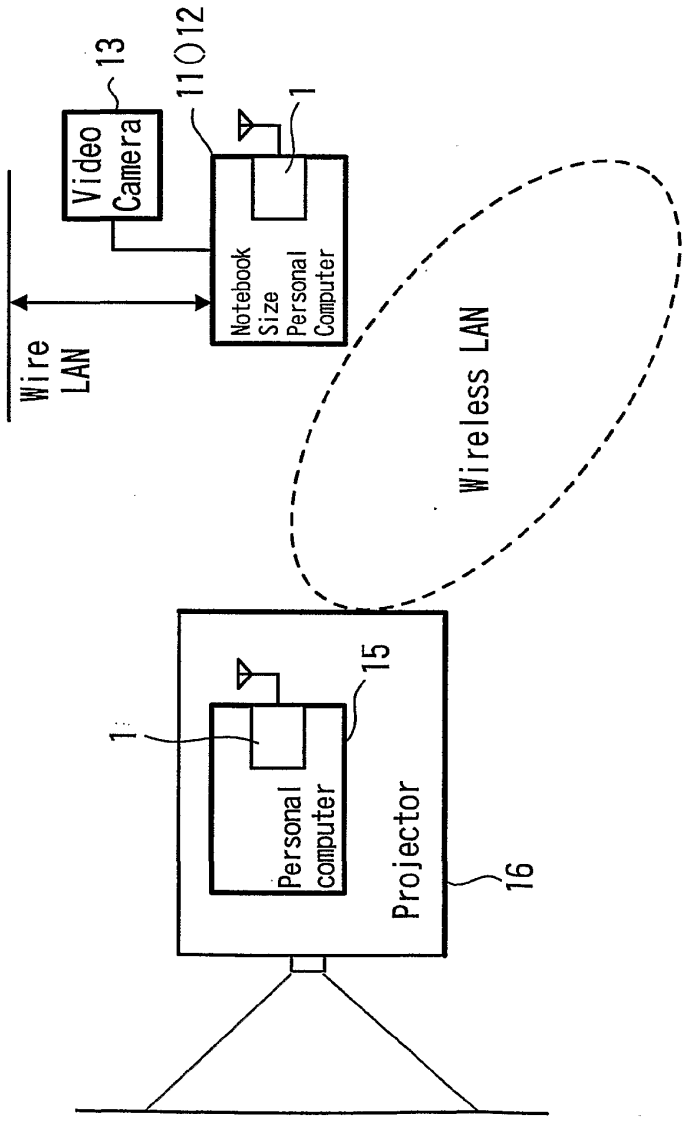

Wire
LAN
Video
Camera
13
1
Personal
Computer
15
Projector
16
11(2)
Notebook
Size
Personal
Computer
1
Wireless LAN
11(n)
Notebook
Size
Personal
Computer
1
11(3)
Notebook
Size
Personal
Computer
1

FIG. 19



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DESCRIPTION OF REFERENCE NUMERALS

1 ... network interface card

2 ... notebook size personal computer

2a ... PC card slot

3 ... PCMCIA interface

4 ... network interface

5 ... RF modulator

6 ... RF demodulator

7 ... antenna

8 ... CPU

9 ... flash ROM

10 ... RAM

11 (1) ... wireless LAN conference terminal device (host)

11 (2) to 11 (n) ... wireless LAN conference terminal devices (clients)

12, 14, 16 ... projectors

13 ... video camera

15 ... personal computer

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
22 November 2001 (22.11.2001)

PCT

(10) International Publication Number
WO 01/089156 A3

(51) International Patent Classification[7]: H04L 12/28, 29/06, 12/18

(21) International Application Number: PCT/JP01/04082

(22) International Filing Date: 16 May 2001 (16.05.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2000-143822 16 May 2000 (16.05.2000) JP

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(81) Designated States *(national)*: CA, CN, KR, US.

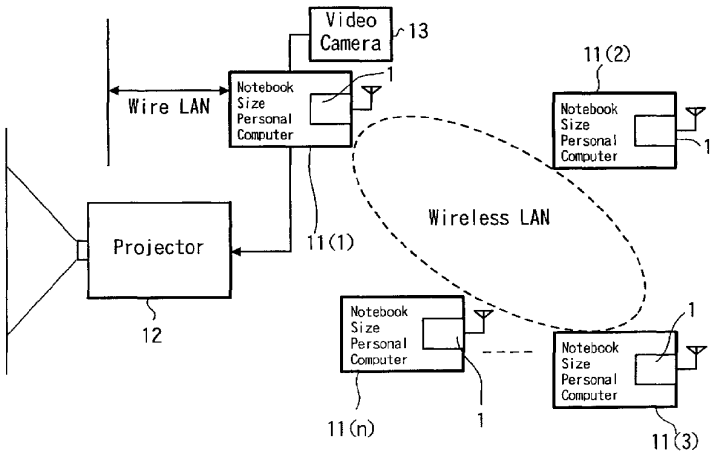
(84) Designated States *(regional)*: European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR).

Published:
— *with international search report*

(88) Date of publication of the international search report:
22 May 2003

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: CARD TYPE NETWORK INTERFACE, NETWORK CONFERENCE TERMINAL DEVICE AND SYSTEM



(57) Abstract: There are provided network conference terminal devices (11 (2) to 11 (n)) in which network interface cards (1) are attached to. The network interface card (1) includes a connecting means for connecting the information terminal device to a wireless LAN, a determining means for determining whether the information terminal device is served as a host or a client of the wireless LAN, a setting means for requesting the host to transmit setting information necessary for executing the network setting to connect the information terminal device to the wireless LAN based on the fact that the information terminal device is determined as the client and executing the network setting by using the setting information transmitted from the host and a processing means for transmitting a requested setting information to the client based on the fact that the information terminal device is determined as the host.

WO 01/089156 A3

INTERNATIONAL SEARCH REPORT

I onal Application No	PCT/JP 01/04082

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04L12/28 H04L29/06 H04L12/18

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 7 H04Q G06F H04L

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 practical, search terms used)

EPO-Internal, WPI Data, PAJ, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 998 094 A (NOKIA MOBILE PHONES LTD) 3 May 2000 (2000-05-03) abstract paragraphs '0003!,'0005!-'0007!,'0025!	1-32

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in 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 document 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
11 July 2002	29/07/2002

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Goller, W

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

tional Application No
PCT/JP 01/04082

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0998094 A	03-05-2000	FI 981052 A	13-11-1999
		EP 0998094 A2	03-05-2000
		JP 11355322 A	24-12-1999

Form PCT/ISA/210 (patent family annex) (July 1992)

EUROPEAN PATENT OFFICE

Patent Abstracts of Japan

PUBLICATION NUMBER : 2008090561
PUBLICATION DATE : 17-04-08

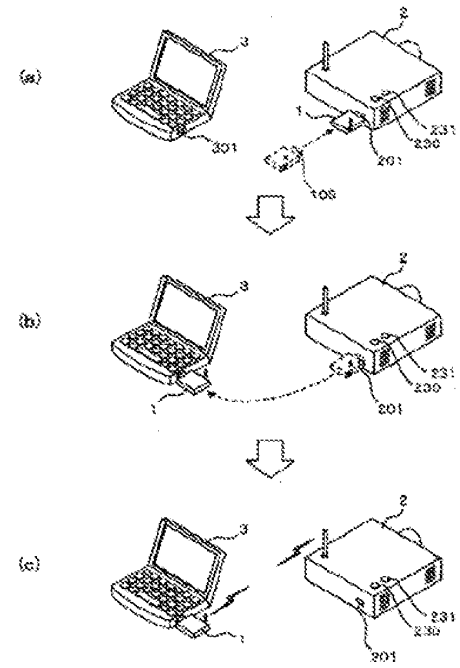
APPLICATION DATE : 29-09-06
APPLICATION NUMBER : 2006270125

APPLICANT : BROTHER IND LTD;

INVENTOR : AMANO KATSUHIRO;

INT.CL. : G06F 13/00 (2006.01), H04B 1/40 (2006.01), G09G 5/00 (2006.01), H04N 5/66 (2006.01), G09G 3/36 (2006.01), G09G 3/20 (2006.01), G03B 21/00 (2006.01)

TITLE : RADIO DEVICE, IMAGE PROJECTOR, AND IMAGE PROJECTION SYSTEM



ABSTRACT : PROBLEM TO BE SOLVED: To facilitate a communication connection operation between a computer system and an image projector.

SOLUTION: A USB device is configured by installing a radio communication part in a USB memory equipped with a USB connector, and configured to, when the USB connector is connected to an image projecting device, write the setting information of radio communication from an image projection device, and to, when the connector is connected to a computer device, read the setting information of radio communication written in the image projection device from the computer device.

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JP2008090561 A 20080417

SUBJECT OF THE INVENTION

Do easy a communication connection operation|work with computer apparatus and an image projection apparatus.
PROBLEM to be solved
It has a USB connector,
When the setting information of a wireless|radio communication can be written in from an image projection apparatus when a USB connector is connected to an image projection apparatus, and the said connector is connected to computer apparatus
It was set as the USB device which provided the radio communication part in the USB memory which made readable setting information of the wireless|radio communication written in from the image projection apparatus with computer apparatus.

DETAILED DESCRIPTION of the INVENTION

[0001] TECHNICAL FIELD
This invention relates to a radio|wireless device, an image projection apparatus, and an image projection system.
Specifically,
It has a radio|wireless part,
The image projection apparatus which projects the image according to the image data received in this radio|wireless part, and the computer apparatus which transmits image data by wireless|radio communication,
It is related with the image projection system provided with the radio|wireless device which functions as a radio|wireless part of this computer apparatus.

DESCRIPTION OF RELATED ART

[0002] Conventionally, image data is inputted from computer apparatus etc. and the said image is displayed on a liquid crystal display element,
image projection apparatuses, such as a projector which irradiates a light and carries out an expansion projection on a projection screen, are used widely.
Moreover, there also exists an image projection apparatus which projects the image based on image data using DMD(Digital Micromirror Device) element|device.

[0003] This image projection apparatus is variously used in the small-scale presentation in a meeting, the large-scale presentation which assembles many audiences and announces its result of research, etc.
Such a presentation transmits before a presenter the image data according to the image currently displayed on the display part of this computer apparatus which has arrange|positioned computer apparatus via a cable to an image projection apparatus from computer apparatus,
It is carried out when an image projection apparatus carries out the expansion projection of the image based on image data.

[0004] By the way, it is of connecting computer apparatus and an image projection apparatus with a cable as mentioned above necessary for in order to project an image by an image projection apparatus .
Therefore, preparation of a cable and the operation|work of a connection generate|occur|produce and it becomes complicated.
And it is necessary to prepare the cable according to the distance of the computer apparatus of a presenter, and an image projection apparatus.

[0005] Then, the image projection apparatus corresponding to the radio|wirelesses LAN(Local Area Network), such as IEEE802.11a/b/g, has been provided in recent years,

The convenience is improved by transmitting the image data from computer apparatus to an image projection apparatus by wireless|radio communication.

[0006] By the way, in order to wirelessly connect computer apparatus to the image projection apparatus of a wireless LAN response|compatibility, it is necessary to set a wireless|radio communication about each of computer apparatus and an image projection apparatus.
However, a certain amount of knowledge cannot be required for the setting of a wireless|radio communication, and it cannot set easily in many cases.
Then, what improves workability|operativity of the setting of this wireless|radio communication is proposed.

[0007] For example, in the patent document 1, setting information of a wireless|radio communication, such as WEP(Wired Equipment Privacy) key, is projected on a screen in an image projection apparatus,
While the user of computer apparatus looks at the setting information projected on the screen, the technique of establishing wireless connection with computer apparatus and an image projection apparatus is proposed by inputting into computer apparatus.

[0008] With moreover, the information storage medium equipped with the USB connector in the patent document 2
By reading the setting information of the wireless|radio communication set to computer apparatus via a USB connector, and connecting an information storage medium to an image projection apparatus via a USB connector after that
The technique which sets the setting information of the wireless|radio communication read in computer apparatus to an image projection apparatus is proposed.

[0009] Moreover, in the patent document 3, the USB memory which memorize|stored the driver program while memorize|storing the same information as the setting information of a wireless|radio communication in an image projection apparatus, and a wireless connection module are enclosed with an image projection apparatus, and are sold,
USB memory is connected to computer apparatus,
The setting information and the driver program of a wireless|radio communication are automatically accommodated in computer apparatus,
By connecting a wireless connection module after that, the technique of establishing wireless connection with an image projection apparatus and computer apparatus is proposed.
Unexamined-Japanese-Patent No. 2003-069923
Unexamined-Japanese-Patent No. 2005-202754
Unexamined-Japanese-Patent No. 2005-285091

DISCLOSURE OF THE INVENTION

PROBLEM TO BE SOLVED BY THE INVENTION

[0010] However,
With the technique of the patent document 1, setting information of the wireless|radio communication to the computer apparatus of the thing in an image projection apparatus which can grasp|ascertain the setting information of a wireless|radio communication visually must be performed manually, and a certain amount of knowledge and time are required for it.

[0011] Moreover, with the technique of the patent document 2, there exists an advantage by the point which does not need to input the setting information of a wireless|radio communication manually.
However,
The setting information of the wireless|radio communication set to computer apparatus is set to an image projection apparatus,
When the computer apparatus which outputs the image projected on an image projection apparatus at a meeting etc., for example had to be switched from this, the information storage medium provided with the USB connector was connected to the computer apparatus of a switching destination,

Then, it is necessary to connect with an image projection apparatus further,
An operation|work becomes complicated.
And the setting of encryption information, such as the WEP key, the setting as an access point, etc. must be beforehand performed to computer apparatus manually, and a certain amount of knowledge and time are required for it like the technique of description of the patent document 1.

[0012] Moreover, compared with the patent document 1 and the patent document 2, it is excellent in the point which can perform the setting of a wireless|radio communication to computer apparatus automatically with the technique of the patent document 3 by connecting to computer apparatus the USB memory which memorize|stored the same information as the setting information of a wireless|radio communication in an image projection apparatus.
However,
Since a wireless connection module for exclusive use is needed in addition to USB memory, there exists a problem a surface development cost and a manufacturing cost .
And the setting information of the wireless|radio communication in an image projection apparatus is fixing,
From this, once the setting information of a wireless|radio communication leaks, there exists a possibility that a wireless|radio communication with an image projection apparatus and computer apparatus may be monitored,
There exists a security top problem.
For example, when sharing an image projection apparatus by a plural group, also after the 1st group uses, the setting information of the wireless|radio communication remains in the computer apparatus of the 1st group,
Therefore
Even if the 2nd following group starts to use an image projection apparatus, it continues from the 1st group and a wireless|radio communication becomes possible,
There existed a security top problem.

MEANS TO SOLVE THE PROBLEM

[0013] Then, in order that this invention may solve this subject, invention of Claim 1 has a radio|wireless part,
It is a radio|wireless device which functions as a radio|wireless part of the computer apparatus which transmits the said image data to the image projection apparatus which projects the image according to the image data received in the said radio|wireless part by wireless|radio communication,
Comprising:
The connector which can connect any of the said image projection apparatus and the said computer apparatus,
When the setting information of the said wireless|radio communication can be written in from the said image projection apparatus when the said connector is connected to the said image projection apparatus, and the said connector is connected to the said computer apparatus
It is a readable radio|wireless setting information storage part by the said computer apparatus about the setting information of the said wireless|radio communication written in from the said image projection apparatus,
When the said connector was connected to the said computer apparatus, the radio communication part which communicates with the radio|wireless part of the said image projection apparatus by the setting based on the setting information of the said wireless|radio communication written in from the said image projection apparatus was provided.
It is characterized by the above-mentioned.

[0014] Moreover, invention of Claim 2 was equipped with the program storage part which stores the program as which the said computer apparatus is functioned as an image transmitting means to transmit image data to the said image projection apparatus via the said radio communication part in invention of Claim 1.
It is characterized by the above-mentioned.

[0015] Moreover, invention of Claim 3 is equipped with the image transmitting stop operation part which instruct|indicates the stop of transmitting operation|movement of the said image data to the said image projection apparatus in invention of Claim 2, and the said image transmitting means
When the said image transmitting stop operation part is operated, the request|requirement for projecting the said specific image is transmitted to the said image projection apparatus via the said radio communication part to the said image projection apparatus,

It is characterized by the above-mentioned.

[0016] Moreover, invention of Claim 4 is characterized by including the valid_time which functions the said radio communication part as the setting information of the said wireless|radio communication in the invention of any one of Claims 1-3.

[0017] Moreover, invention of Claim 5 provided a valid_time extension means to extend the said valid_time memorize|stored in the said radio|wireless setting information storage part, in invention of Claim 4.
It is characterized by the above-mentioned.

[0018] Moreover, invention of Claim 6 is, when it determines with the said valid_time having passed based on the time information to which the said image transmitting means is transmitted from the said image projection apparatus in invention of Claim 4 or Claim 5, and the said valid_time memorize|stored in the said radio|wireless setting information storage part,
The function of the said radio communication part is stopped,
It is characterized by the above-mentioned.

[0019] Moreover, invention of Claim 7 has a radio|wireless part,
The image projection apparatus which projects the image according to the image data received in the said radio|wireless part,
Computer apparatus which transmits the said image data to the said image projection apparatus,
The said image projection apparatus in the image projection system provided with the radio|wireless device which functions as a radio|wireless part of the said computer apparatus
WHEREIN:
The said image projection apparatus is a connection part which can connect the connector of the said radio|wireless device,
When the said radio|wireless device was connected to the said connection part, the control part which writes the setting information of the said wireless|radio communication in the radio|wireless setting information storage part of the said radio|wireless device was provided.
It is characterized by the above-mentioned.

[0020] Moreover, as for invention of Claim 8, in invention of Claim 7, the said control part carries out the predetermined period stop of operation|movement of the said radio|wireless part, when the said radio|wireless device is connected to the said connection part,
It is characterized by the above-mentioned.
Moreover -- setting invention of Claim 9 to invention of Claim 7 or Claim 8 -- as described in -- invention
WHEREIN:
The said control part is characterized by writing the setting information of the said wireless|radio communication in the radio|wireless setting information storage part of the said radio|wireless device, when the power supply of the said image projection apparatus is set to ON and the said radio|wireless device is connected to the said connection part.

[0021] Moreover -- setting invention of Claim 10 to invention of Claim 7 or Claim 8 -- as described in -- invention
WHEREIN:
Provide the write-in instruction|indication operation part which instruct|indicates write-in operation|movement of the setting information of the said wireless|radio communication with respect to the radio|wireless setting information storage part of the said radio|wireless device, and the said control part
When the said write-in instruction|indication operation part is operated, it is characterized by writing the setting information of the said wireless|radio communication in the said radio|wireless setting information storage part of the said radio|wireless device.

[0022] Moreover, invention of Claim 11 is, when it determines with the said control part not being the identification information of identification|isolation the identification information of the said radio|wireless device in the invention of any one of Claims 7-10,

It is characterized by not writing in setting information of the said wireless|radio communication to the setting information storage part of the said radio|wireless device.

[0023] Moreover, in the invention of any one of Claims 7-11, invention of Claim 12 to the setting information of the said wireless|radio communication
Before writing the setting information of the said wireless|radio communication in the radio|wireless setting information storage part of the said radio|wireless device including the encryption key in the said wireless|radio communication, the setting information production|generation part which produces|generates at least the above-mentioned encryption key among the setting information of the said wireless|radio communication was provided.
It is characterized by the above-mentioned.

[0024] Moreover, in invention of Claim 12, at least the above-mentioned encryption key is produced|generated among the setting information of the said wireless|radio communication, and the said setting information production|generation part updates invention of Claim 13, whenever the power supply of the said image projection apparatus is set to ON,
It is characterized by the above-mentioned.

[0025] Moreover, invention of Claim 14 is set to invention of Claim 12 or Claim 13.
The update instruction|indication operation part which instruct|indicates operation|movement which produces|generates and updates at least the above-mentioned encryption key among the setting information of the said wireless|radio communication is provided, and the said setting information production|generation part produces|generates and updates at least the above-mentioned encryption key among the setting information of the said wireless|radio communication, whenever the said update operation part is operated,
It is characterized by the above-mentioned.

[0026] Moreover, in the invention of any one of Claims 12-14, invention of Claim 15 produces|generates and updates at least the above-mentioned encryption key among the setting information of the said wireless|radio communication, when the period when communication with the said computer apparatus is not performed via the said radio|wireless part turns into more than predetermined period,
It is characterized by the above-mentioned.

[0027] Moreover, the said setting information production|generation part produces|generates the said active|validity period including the active|validity period when invention of Claim 16 functions the radio communication part in the said radio|wireless device as the setting information of the said wireless|radio communication in the invention of any one of Claims 12-15,
It is characterized by the above-mentioned.

[0028] Moreover, invention of Claim 17 has a radio|wireless part,
The image projection apparatus which projects the image according to the image data received in the said radio|wireless part,
Computer apparatus which transmits the said image data to the said image projection apparatus,
The image projection system provided with the radio|wireless device which functions as a radio|wireless part of the said computer apparatus
WHEREIN:
The said radio|wireless device is a connector which can connect any of the said image projection apparatus and the said computer apparatus,
When the setting information of the said wireless|radio communication can be written in from the said image projection apparatus when the said connector is connected to the said image projection apparatus, and the said connector is connected to the said computer apparatus
It is a readable radio|wireless setting information storage part by the said computer apparatus about the setting information of the said wireless|radio communication written in from the said image projection apparatus,

When the said connector was connected to the said computer apparatus, the radio communication part which communicates with the radio|wireless part of the said image projection apparatus by the setting based on the setting information of the said wireless|radio communication written in from the said image projection apparatus was provided.
It is characterized by the above-mentioned.

[0029] ADVANTAGE OF THE INVENTION
The radio|wireless device in invention of Claim 1, 17 has a radio|wireless part,
It functions as a radio|wireless part of the computer apparatus which transmits image data to the image projection apparatus which projects the image according to the image data received in a radio|wireless part by wireless|radio communication,
When a connector is connected with the connector which can connect any of an image projection apparatus and computer apparatus at an image projection apparatus
When the setting information of a wireless|radio communication can be written in from an image projection apparatus and a connector is connected to computer apparatus
When a connector is connected to computer apparatus with a readable radio|wireless setting information storage part with computer apparatus, the setting information of the wireless|radio communication written in from the image projection apparatus
The radio communication part which communicates with the radio|wireless part of an image projection apparatus by the setting based on the setting information of the wireless|radio communication written in from the image projection apparatus was provided,
Therefore
It is based on the setting information of the wireless|radio communication set by the image projection apparatus, Communication between an image projection apparatus and computer apparatus can be performed, and the high radio|wireless device or image projection system of a confidentiality can be provided.

[0030] Moreover, according to invention of Claim 2, the program storage part which stores the program as which computer apparatus is functioned as an image transmitting means to transmit image data to an image projection apparatus via a radio communication part was provided,
Therefore
Computer apparatus will function by reading and executing a program from this program storage part as an image transmitting means to transmit image data to an image projection apparatus via a radio communication part,
The wireless|radio communication setting using a radio|wireless device can be performed easily.

[0031] Moreover, according to invention of Claim 3, when the image transmitting stop operation part which instruct|indicates the stop of transmitting operation|movement of the image data to an image projection apparatus is operated, the request|requirement for projecting a specific image is transmitted to an image projection apparatus via a radio communication part to an image projection apparatus,
Therefore
It can replace with the image data transmitted from computer apparatus by operation of the user of computer apparatus, and a specific image can be projected from an image projection apparatus, and it becomes effective to show the image data transmitted from computer apparatus.

[0032] Moreover, according to invention of Claim 4, 16, since the valid_time which functions a radio communication part as the setting information of a wireless|radio communication is included, the valid_time of a wireless|radio communication with an image projection apparatus by a radio|wireless device can be set by an image projection apparatus.
Therefore,
For example, even if it is a case where an image projection apparatus is used by the meeting of a presentation etc. and unspecified large number of participant's computer apparatus is used
It can avoid being the computer apparatus which uses an image projection apparatus, and image data being accidentally transmitted before, from the computer apparatus which attached the radio|wireless device, and being transmitted from an image projection apparatus to it.

[0033] Moreover, according to invention of Claim 5, a valid_time extension means to extend the valid_time memorize|stored in the radio|wireless setting information storage part was provided,
Therefore
It continues, even if it is a case where the meeting of a presentation etc. extends,
The image data of computer apparatus can be projected from an image projection apparatus.

[0034] Moreover, according to invention of Claim 6, if an image transmitting means is memorize|stored in the time information transmitted from an image projection apparatus, and a radio|wireless setting information storage part and it determines with valid_time having passed based on valid_time, the function of a radio communication part will be stopped,
Therefore
The precision of an active|validity period can be improved.
That is, even if it is a case where the time information produced|generated with computer apparatus is erroneous, progress of valid_time is detectable with the time information of the image projection apparatus which produced|generated the active|validity period,
Therefore
Progress of valid_time is detectable with a sufficient precision.

[0035] Moreover, according to invention of Claim 7, it has a radio|wireless part,
The image projection apparatus in the image projection system provided with the image projection apparatus which projects the image according to the image data received in a radio|wireless part, the computer apparatus which transmits image data to an image projection apparatus, and the radio|wireless device which functions as a radio|wireless part of computer apparatus
WHEREIN:
The image projection apparatus was equipped with the connection part which can connect the connector of a radio|wireless device, and the control part which writes the setting information of a wireless|radio communication in the radio|wireless setting information storage part of a radio|wireless device when a radio|wireless device is connected to a connection part,
Therefore
The setting information of a wireless|radio communication is set with respect to a radio|wireless device by an image projection apparatus,
Based on this setting information, communication between an image projection apparatus and computer apparatus can be performed,
Therefore
The high image projection system of a confidentiality can be provided.

[0036] Moreover, according to invention of Claim 8, a control part carries out the predetermined period stop of operation|movement of a radio|wireless part, when a radio|wireless device is connected to a connection part,
Therefore
Image projection apparatus
WHEREIN:
While being able to avoid the communication with a radio|wireless device and a radio|wireless part which is not intended, power consumption can be reduced by stopping a radio|wireless part.

[0037] Moreover, when the power supply of an image projection apparatus is set according to invention of Claim 9 to ON as for a control part and the radio|wireless device is connected to the connection part
Since the setting information of a wireless|radio communication is written in the radio|wireless setting information storage part of a radio|wireless device
For example, only by using as the accommodation state of an image projection apparatus and a radio|wireless device, then the power supply ON of an image projection apparatus the state which connected the connector of the radio|wireless device to the image projection apparatus, the writing to a radio|wireless device is performed and it is excellent in the convenience.

[0038] Moreover, according to invention of Claim 10, provide the write-in instruction|indication operation part which instruct|indicates write-in operation|movement of the setting information of a wireless|radio communication with respect to the radio|wireless setting information storage part of a radio|wireless device, and a control part
Since the setting information of a wireless|radio communication is written in the radio|wireless setting information storage part of the said radio|wireless device when a write-in instruction|indication operation part is operated, the setting information of a wireless|radio communication is written in a radio|wireless device by the timing which a user wishes, and things are made.

[0039] Moreover, according to invention of Claim 11, since a control part will not write in the setting information of a wireless|radio communication to the setting information storage part of a radio|wireless device if it determines with the identification information of a radio|wireless device not being specific identification information, only a device for exclusive use can be used for it as a radio|wireless device.

[0040] Moreover, according to invention of Claim 12, the setting information of the wireless|radio communication was equipped with the setting information production|generation part which produces|generates an encryption key at least among the setting information of a wireless|radio communication before writing the setting information of a wireless|radio communication in the radio|wireless setting information storage part of a radio|wireless device including the encryption key in a wireless|radio communication,
Therefore
A possibility that the wireless|radio communication between computer apparatus and an image projection apparatus may be monitored can be reduced.

[0041] Moreover, according to invention of Claim 13, a setting information production|generation part produces|generates and updates an encryption key at least among the setting information of a wireless|radio communication, whenever the power supply of an image projection apparatus is set to ON,
Therefore
Even if it is a case where an encryption key is known temporarily, a possibility that the wireless|radio communication between computer apparatus and an image projection apparatus may be monitored after that can be reduced.
And since encryption keys differ, it can avoid being the computer apparatus which uses an image projection apparatus, and image data being accidentally transmitted before, from the computer apparatus which attached the radio|wireless device, and being transmitted from an image projection apparatus to it.

[0042] Moreover, according to invention of Claim 14, the update instruction|indication operation part which instruct|indicates operation|movement which produces|generates and updates at least the above-mentioned encryption key among the setting information of a wireless|radio communication is provided, and a setting information production|generation part produces|generates and updates an encryption key at least among the setting information of a wireless|radio communication, whenever the update operation part of an account is operated,
Therefore
Even if it is a case where an encryption key is known temporarily, a possibility that the wireless|radio communication between computer apparatus and an image projection apparatus may be monitored after that can be reduced.
And since encryption keys differ, it can avoid being the computer apparatus which uses an image projection apparatus, and image data being accidentally transmitted before, from the computer apparatus which attached the radio|wireless device, and being transmitted from an image projection apparatus to it.
Moreover, if the power supply of an image projection apparatus is turned OFF even when the power supply of an image projection apparatus is turned ON from OFF and it comprises so that an encryption key may be produced|generated and updated, starting of the lamp|ramp which is a light source will take time,
From this, there exists a case where he does not want to turn off the power supply of an image projection apparatus.
It is a case so that the image projection apparatus may be installed in a conference room and a meeting may continue.
Even if it is such a case, since the update instruction|indication operation part is provided, it is very convenient.

[0043] Moreover, according to invention of Claim 15, a setting information production|generation part produces|generates and updates an encryption key at least among the setting information of a wireless|radio communication, when the period when communication with computer apparatus is not performed via a radio|wireless part turns into more than predetermined period,

Therefore
When there is no communication with computer apparatus and an image projection apparatus more than predetermined period, it can determine with one presentation having been complete|finished, for example,
Therefore
An encryption key can be changed for every presentation.

PREFERRED EMBODIMENT OF THE INVENTION

[0044] (Outline|summary of the image projection system S)
Hereafter, Embodiment of this invention is demonstrated, referring drawing.
FIG. 1 is a whole block diagram of the image projection system S in this embodiment,
FIG. 2 is a figure for demonstrating general|schematic operation|movement in the image projection system S in this embodiment,
FIG. 3 is an external view of a radio|wireless device.

[0045] As shown in FIG. 1, the image projection system S in this embodiment
The image projection apparatus 2 which projects the image according to the image data inputted from the outside on a screen,
Personal-computer 3 (It is hereafter set as "the computer apparatus 3") which transmits image data to the image projection apparatus 2, and the radio|wireless device 1 which is a USB dongle which functions as a radio|wireless part of the computer apparatus 3 are provided.
The computer apparatus 3 transmits image data to the image projection apparatus 2 via the radio|wireless device 1 by connecting below-mentioned USB connector 105 (referring FIG.3 and FIG.4) in the radio|wireless device 1.
The image projection apparatus 2 receives the image data transmitted by wireless|radio communication via the radio|wireless device 1 from the computer apparatus 3,
The image according to this image data is projected on a screen.

[0046] Here, the image projection apparatus 2 and the radio|wireless device 1 have the radio|wireless part each based on the wireless LAN specification so that the wireless|radio communication between the image projection apparatus 2 and the radio|wireless device 1 can satisfy|fill radio|wireless LAN(Local Area Network) specifications, such as IEEE802.11a/b/g.

[0047] It learns, if the setting for wirelessly|radio-communicating as mentioned above is not beforehand performed in wireless LAN, and it is..
There exists WEP(Wired Equipment Privacy) key which is SSID(Extended Service Set Identifier) and the encryption key which are network names as setting information (It is hereafter set as "radio|wireless setting information") of a wireless|radio communication which must be set,
If there is no knowledge to some extent, it cannot set but the operation|work is also complicated.

[0048] Then, in the image projection system S in this embodiment, the radio|wireless setting information storage part which memorize|stores radio|wireless setting information in the radio|wireless device 1 is provided,
It is supposed that this sets radio|wireless setting information automatically.
And he is trying to change an encryption key at a predetermined timing, and privacy is improved.

[0049] Here, the setting procedure of the wireless|radio communication in the image projection system S is demonstrated easily.
FIG. 2 is a figure for in this embodiment demonstrating the setting procedure of a wireless|radio communication.

[0050] USB connector 105 of the radio|wireless device 1 is connected to the USB interface 201 of the image projection apparatus 2 as shown in FIG. 2 (a).
The image projection apparatus 2 will write radio|wireless setting information required for communication by the radio|wireless part of the image projection apparatus 2 in the storage part of the radio|wireless device 1 via the USB interface 201, if it detects that the radio|wireless device 1 was connected via the USB interface 201.
At this time, a lamp|ramp 150 (refer FIG. 3) blink|flashes during the writing of the radio|wireless device 1,

Radio|wireless setting information is written in and it is notified that it is inside.

[0051] The timing which writes in the radio|wireless setting information used in the radio|wireless part of the image projection apparatus 2,
(a) When the radio|wireless device 1 is connected to the image projection apparatus 2,
(b) When the power supply of the image projection apparatus 2 was set to ON and the radio|wireless device 1 was connected to the image projection apparatus 2, the setting write-in button 230 (refer FIG.1 and FIG.2) as a write-in instruction|indication operation part provided in (c) image projection apparatus 2 may have been operated.

[0052] In addition, when the radio|wireless device 1 is not a specific device, the writing of radio|wireless setting information is not performed.
No matter the connected device may be what device, when this will be written in, it is for avoiding that operation|movement of the image projection system S becomes unstable by irregular goods (Copy goods etc.) of the crude radio|wireless device 1,
It enables it to use only a device for exclusive use as a radio|wireless device.
In whether the connected device is the radio|wireless device 1 for exclusive use, the image projection apparatus 2 is.
It can judge by detecting that the part which reads the identification information assign|provided to that device from a device, for example, shows a manufacturer among this identification information is specific information.

[0053] Completion|finish of the writing of the radio|wireless setting information to the radio|wireless device 1 will terminate flashing of a lamp|ramp 150 during writing,
Therefore
The radio|wireless device 1 is removed from the image projection apparatus 2 as shown in FIG.2(b),
it connects with the USB interface 301 of the computer apparatus 3 shortly.

[0054] The device-driver program (It abbreviates to a "device driver"hereafter) by which the computer apparatus 3 was stored in the radio|wireless device 1 when the radio|wireless device 1 was connected to the computer apparatus 3,
The radio|wireless setting application program (Hereafter, it abbreviates to a "radio|wireless setting application.") and the image transmission application program (Hereafter, it abbreviates to a "image transmission application.") are installed.
The control part of the computer apparatus 3 pick_out|removes radio|wireless setting information from the storage part of the radio|wireless device 1 by execution of a radio|wireless setting application,
This radio|wireless setting information is set to the radio communication part of the radio|wireless device 1 using a device driver.
Moreover, the control part of the computer apparatus 3 functions by execution of an image transmission application as an image transmitting means to transmit image data to the image projection apparatus 2 via a radio communication part.

[0055] The radio|wireless setting information of the image projection apparatus 2 and the radio|wireless device 1 can be set, and a wireless|radio communication is possible between the image projection apparatus 2 and the radio|wireless device 1 with the above.
Then, as shown in FIG.2(c), image data is transmitted to the image projection apparatus 2 by execution of the image transmission application of the computer apparatus 3 via the radio|wireless device 1 from the computer apparatus 3, and the image based on the image data is projected on a screen by the image projection apparatus 2.

[0056] Moreover, as shown in FIG. 3, the image transmission stopping switch 140 as an image transmitting stop operation part is provided in the radio|wireless device 1.
If this image transmission stopping switch 140 is operated, the image transmission application of the computer apparatus 3 will detect that operation,
Transmission of a display screen is stopped,
The request|requirement for projecting a specific image is transmitted to the image projection apparatus 2 via the radio|wireless device 1 from the image projection apparatus 2.
If this request|requirement is received, the image projection apparatus 2 will project a specific image.

This specific image is an image based on the image data memorize|stored in the image projection apparatus 2,
For example, it can be set as a black image, a scene camera, the image that projects "No Signal"etc.
Thereby, the user of the computer apparatus 3 can stop image transmission easily from the computer apparatus 3, and can avoid a complexity, such as switching the screen of the computer apparatus 3.

[0057] Moreover, the valid_time as which the radio|wireless part (the below-mentioned radio communication part 107) of the radio|wireless device 1 is functioned is contained in the radio|wireless setting information set to the radio|wireless device 1 by the image projection apparatus 2.
The image transmission application of the computer apparatus 3 restrict|limits the time which can perform the wireless|radio communication by the radio|wireless part of the radio|wireless device 1 by reading this valid_time.

[0058] Moreover, as shown in FIG. 3, the communication time extension button 141 as a valid_time extension means to extend this valid_time is provided in the radio|wireless device 1,
If this communication time extension button 141 is operated, the image transmission application of the computer apparatus 3 will detect that operation,
It changes so that the valid_time read from the radio|wireless device 1 may be extended.

[0059] The image transmission application of the computer apparatus 3 has the function to receive the time information transmitted from the image projection apparatus 2,
Based on this time information and the valid_time read from the radio|wireless device 1, it determines with valid_time having passed.
When it is judged that valid_time passed, the function of the radio communication part of the radio|wireless device 1 is stopped.

[0060] By the way, if the radio|wireless setting information which the image projection apparatus 2 writes in the radio|wireless device 1 is always constant, it is not preferable on security.
Moreover, there exists a possibility that the image data which is not intended from the computer apparatus 3 which has forgotten to remove the radio|wireless device 1 may be transmitted to the image projection apparatus 2.
Then, the image projection apparatus 2 updates an encryption key at least among radio|wireless setting information.

[0061] The timing in which the image projection apparatus 2 updates radio|wireless setting information,
(a) When power supply of image projection apparatus 2 is set to ON from OFF, or when update button 231 (refer FIG.1 and FIG.2) as update operation part provided in (b) image projection apparatus 2 is operated,
(c) The period when communication with the radio|wireless device 1 and the computer apparatus 3 is not performed may have become more than predetermined period.

[0062] (A structure of each apparatus, and description of operation|movement)
The image projection system S comprised as mentioned above is demonstrated still in detail about the structure and operation|movement.
Hereafter, each concrete structure and operation|movement of the radio|wireless device 1 in Embodiment of this invention, the image projection apparatus 2, and the computer apparatus 3 are demonstrated.

[0063] (radio|wireless device)
First, a structure and operation|movement of the radio|wireless device 1 are demonstrated.
FIG. 4 is a block diagram of the radio|wireless device 1,
FIG. 5 is a functional block diagram of the radio|wireless device 1,
FIG. 6 is a structure block diagram of a memory controller-function part.

[0064] As shown in FIG. 4, the radio|wireless device 1 is comprised from CPU(Central Processing Unit)101, RAM(Random Access Memory)102, ROM(Read Only Memory)103, flash memory 104, USB connector 105, the USB connection circuit 106, the radio communication part 107, the operation part 108, the alerting|reporting part 109, etc., It designs compactly portable.

[0065] CPU101 functions as a control part of the radio|wireless device 1 by reading and executing the control program stored in ROM103.
Moreover, the identification information (For example, MAC address) is stored in ROM103,
By control of CPU101, this identification information can be transmitted to the image projection apparatus 2 or the computer apparatus 3 via USB connector 105.

[0066] RAM102 is used by CPU101 as a working memory etc.
Moreover, flash memory 104 functions as a radio|wireless setting information storage part which stores radio|wireless setting information etc.

[0067] As shown in FIG. 9 to radio|wireless setting information, here Wireless LAN specification classification (band), A network mode, a network name (ESSID), a radio channel, a certification|authentication level, an encryption level, a data cipher system, an encryption key, an IP address, a sub-net mask, an address of DNS, valid_time, etc. are contained.
There exist an infrastructure mode which requires an access point, and an ad-hoc mode which does not require an access point in a network mode,
However,
Here, it sets to an ad-hoc mode so that a wireless|radio communication may be directly possible between the radio|wireless device 1 and an image projection apparatus.

[0068] USB connector 105 is a general purpose USB connector,
It is connectable with the USB connector of the image projection apparatus 2 and the computer apparatus 3.
When USB connector 105 is connected to the image projection apparatus 2 or the computer apparatus 3, CPU101 performs transmission and reception of data with these apparatuses via the USB connection circuit 106.
The USB connection circuit 106 is an interface circuit for transmitting/receiving data according to USB specification.

[0069] When this USB connector 105 is connected to the image projection apparatus 2, it is controlled by CPU101 to be able to write radio|wireless setting information in flash memory 104 from the image projection apparatus 2.
Moreover, when USB connector 105 is connected to the computer apparatus 3, it is controlled by CPU101 to be able to read out the radio|wireless setting information written in flash memory 104 with the computer apparatus 3.

[0070] The radio communication part 107 has an antenna 110, the RF section 111, and the baseband part 112,
Data can be transmitted/received based on a wireless LAN specification.
In addition, the RF section 111 and the baseband part 112 are comprised by WLAN(Wireless Local Area Network) chip|tip.

[0071] The radio communication part 107 communicates with the radio|wireless part of an image projection apparatus by the setting based on the radio|wireless setting information written in from the image projection apparatus 2, when USB connector 105 is connected to the computer apparatus 3.
Here, the radio|wireless setting information written in from the image projection apparatus 2 is first read into the computer apparatus 3,
The radio|wireless setting information read in this way is transmitted to the radio|wireless device 1 from the computer apparatus 3,
There exist a system it is made to make it wirelessly|radio-communicate the radio communication part 107 according to the radio|wireless setting information, a system with which CPU101 reads radio|wireless setting information from the image projection apparatus 2, and makes it wirelessly|radio-communicate the radio communication part 107 according to the radio|wireless setting information, etc.,
Here, the former system is held for an example and demonstrated.

[0072] The operation part 108 has the image transmission stopping switch 140, the communication time extension button 141, a silencing pushbutton 142 (refer FIG. 3), etc.,
If these buttons are operated, CPU101 will detect the operation and will perform the processing according to detected operation.

[0073] The image transmission stopping switch 140 is a slide switch (equivalent to an example of an image transmitting stop operation part) for instruct|indicating the stop of transmitting operation|movement of the image data to the image projection apparatus 2,
It is a changeover switch which switches image stop on-mode and image stop off-mode.
When this image transmission stopping switch 140 is operated to the image stop on-mode side in the state connected to the computer apparatus 3 via USB connector 105, CPU101 notifies information to that effect to computer apparatus.
CPU305 of the computer apparatus 3 will transmit the request|requirement for projecting a specific image (here black image surface image) to an image projection apparatus via the radio communication part 107 by execution of an image transmission application to the image projection apparatus 2, if the information is received.

[0074] In addition, when this image transmission stopping switch 140 is operated to the image stop on-mode side, in the state connected to the computer apparatus 3 via USB connector 105 CPU101
You may make it transmit the request|requirement for projecting a specific image to an image projection apparatus via the radio communication part 107 to the image projection apparatus 2, without transmitting the data inputted from the computer apparatus 3 to the image projection apparatus 1.

[0075] The communication time extension button 141 is an operation button (equivalent to an example of a valid_time extension means) for changing valid_time among the radio|wireless setting information memorize|stored in flash memory 104,
It is a switch of a pushbutton type|formula.
When this communication time extension button 141 is operated in the state connected to the computer apparatus 3 via USB connector 105 (pressing-down), CPU101 performs the processing which extends the valid_time for wirelessly|radio-communicating with the image projection apparatus 2.
CPU101 notifies this processing to the operating the communication time extension button 141 / to the image stop on-mode side computer apparatus 3,
It carries out by extending the valid_time which this computer apparatus 3 pick_out|removed from the radio|wireless device 1.
That is, in performing a wireless|radio communication with the image projection apparatus 2, the computer apparatus 3 reads the valid_time written in the flash memory 104 of the radio|wireless device 1, and memorize|stores it in the storage part of the computer apparatus 3.
It is determined whether the valid_time memorize|stored in this way passed.
Moreover, valid_time is extended by changing this memorize|stored valid_time.

[0076] In addition, valid_time is pick_out|removed among the radio|wireless setting information memorize|stored in flash memory 104 by CPU101,
The extended time (For example, 1 hour) is added to this valid_time,
You may be made to extend valid_time by overwriting the valid_time memorize|stored in flash memory 104.
In this case, whenever the control part 203 of the computer apparatus 3 determines whether valid_time passed, it reads valid_time from the radio|wireless device 1.

[0077] The alerting|reporting part 109 has a lamp|ramp 151, the alarm lamp|ramp 152 (refer FIG. 3), etc. during lamp|ramp LED150 and image transmission during writing,
CPU101 embraces a condition, and lights or blinks these lamp|ramps.
For example, radio|wireless setting information is written in flash memory 104, when it is inside, it writes in and inside lamp|ramp LED150 is blinked.
Moreover, while transmitting image data to the image projection apparatus 3 from the computer apparatus 3, a lamp|ramp 151 is blinked during image transmission.
In addition, these lamp|ramps are comprised by LED etc.

[0078] Here, the functional block diagram of the radio|wireless device 1 is shown in FIG. 5.
As shown in FIG. 5, the radio|wireless device 1 has the USB interface functional part 120, the memory controller-function part121, the USB hub functional part 122, and the wireless communication function part 123.

[0079] The USB interface functional part 120 respond|corresponds to USB connector 105 and the USB connection circuit 106 in FIG. 4,
Based on USB specification, data are transmitted/received between the image projection apparatus 2 or the computer apparatus 3.

[0080] The memory controller-function part 121 respond|corresponds to CPU101 and flash memory 104 in FIG. 4,
The removal recognition part 124 as which flash memory 104 is functioned as USB memory which memorize|stores radio|wireless setting information,
The CD-ROM recognition part 125 as which flash memory 104 is functioned as a CD-ROM for transmitting an image transmission program to the computer apparatus 3 is provided,
He is trying to make the image projection apparatus 2 and the computer apparatus 3 each recognize the radio|wireless device 1 as USB memory and a CD-ROM by the USB hub functional part 122.

[0081] The wireless communication function part 123 respond|corresponds to the radio communication part 107 in FIG. 4,
It is controlled by driver software installed in the computer apparatus 3 when USB connector 105 of the radio|wireless device 1 is connected to the computer apparatus 3.

[0082] As shown in FIG. 6, the memory controller-function part 121 has the removal recognition part 124 and the CD-ROM recognition part 125, and also
Several application programs 130, such as a radio|wireless setting application and an image transmission application, a device driver 131, the installer program 132, and the radio|wireless setting information 133 are memorize|stored in a physical memory part (a part of flash memory 104).
In addition, the flash memory 104 as a physical memory part may be comprised by one flash memory, or may be comprised by several flash memory.

[0083] An image transmission application controls the radio|wireless device 1 to the computer apparatus 3 by being installed in the computer apparatus 3,
It is made to function as an image transmitting means to transmit the image data from the computer apparatus 3 to the image projection apparatus 2.

[0084] Moreover, a device driver 131 performs the function which controls the radio communication part 107 of the radio|wireless device 1 to the computer apparatus 3 by being installed in the computer apparatus 3.

[0085] Moreover, a radio|wireless setting application makes the computer apparatus 3 perform the function which sets radio|wireless setting information etc. to the radio|wireless device 1 by being installed in the computer apparatus 3.

[0086] The installer program 132 installs the image transmission application 130 and a device driver 131 in the computer apparatus 3 by performing with the computer apparatus 3.

[0087] (image projection apparatus 2)
As shown in FIG. 7, the image projection apparatus 2 has a USB connector (it is equivalent to an example of a connection part),
The USB interface 201 which performs communication based on USB specification, and the operating panel 202 for performing various operation,
The control part 203 which controls the image projection apparatus 2 whole, and the non-volatile memory 204 for hold|maintaining information, such as radio|wireless setting information,
The timepiece circuit 205 which is a time measuring means, and the radio|wireless part 206 which performs the wireless|radio communication based on a wireless LAN specification,
The projection part 208 which projects the image based on the image data received via the video signal and the radio|wireless part206 which are inputted via the video-signal input circuit 207 which inputs a video signal, and the video-signal input circuit 207 from the exterior is provided,
These are incorporated in a housing.

[0088] The USB connector of the radio|wireless device 1 is connectable with the USB connector of the USB interface 201.
The control part 203 detects whether USB connector 105 of the radio|wireless device 1 is connected to the USB interface 201,
When connecting, data with the radio|wireless device 1 are transmitted/received.

[0089] The operating panel 202 is provided in the location which a user can operate in a projection apparatus, i.e., the proper place of the outer wall surface of a housing,
When a user operates this operating panel 202, the control part 203 performs control according to that content of operation.
The setting write-in button 230 (equivalent to an example of a write-in instruction|indication operation part), the update button 231 (equivalent to an example of an update operation part), etc. which were mentioned above are arrange|positioned at the operating panel 202.

[0090] The control part 203 incorporates CPU, ROM, RAM, etc.,
CPU functions as a control part by reading and executing the program beforehand stored in ROM.
In addition, RAM is used as a working memory etc.

[0091] The non-volatile memory 204 is comprised from flash memory (flash memory) etc., and hold|maintains the radio|wireless setting information produced|generated by the control part 203, for example.

[0092] The radio|wireless part 206 is equipped with the radio-control part 211 which performs the processing which makes the radio signal transmitted/received by the radio|wireless circuit 210 comprised from RF (radio|wireless) unit which transmits/receives a radio signal via an antenna and an antenna, and the radio|wireless circuit 210 the radio signal according to a wireless LAN specification.
In addition, the radio-control part 211 here is comprised from a microcomputer.

[0093] The video-signal input circuit 207 is a thing of the sake when inputting video signals, such as composite video-signal (For example, NTSC video signal) and the component video signal (For example, RGB code), via a cable from the exterior.

[0094] The projection part 208 is equipped with the lamp|ramp drive circuit 220, the light source 221, the illumination optical system 222, transmissive-liquid-crystal panel 223 (It is hereafter referred to as "LCD223"), the imaging optical system 224, the image-processing circuit 225, the LCD drive circuit 226, and the focus adjustment circuit 227.

[0095] It is comprised from a lamp|ramp etc., a lighting drive is carried out based on the signal output from the lamp|ramp drive circuit 220 controlled by the control part 203, and the light source 221 light-emits.
The light light-emitted with the light source 221 is irradiated to LCD223 by the illumination optical system 222 as an illumination light.

[0096] The image-processing circuit 225 processes addition, a change, etc. of a signal based on control by control unit U with respect to the image data which received by the video signal or the radio|wireless part 206 inputted into the video-signal input circuit 207.
The image signal which was processed in this way and produced|generated is inputted into the LCD drive circuit 226.

[0097] LCD223 is driven by the LCD drive circuit 226, and displays imaging|video on the display surface.
The imaging|video displayed in this way is radiate|emitted from LCD223 as a light by the illumination light from the illumination optical system 222.
Then, this emitted light passes along the imaging optical system 224 and the opening for a projection of a housing, and is projected on a screen (plane of incidence).
Thus, the image displayed on LCD223 becomes a structure projected on a screen.
In addition, a focus adjustment mechanism can adjust the focus of the image projected on a screen.

[0098] Here, the setting of the radio|wireless information in the image projection apparatus 2 is concretely demonstrated with reference to the flowchart of FIG. 8, FIG. 10 and FIG. 11.
FIG. 8 is a flowchart of a setting processing of the radio|wireless information in the image projection apparatus 2,
FIG. 9 is a figure which shows an example of radio|wireless setting information,
FIG. 10 is a flowchart of the valid_time embedding|flush-mounting processing in the image projection apparatus 2,
FIG. 11 is a flowchart of the encryption key automatic-updating processing in the image projection apparatus 2.

[0099] First, with reference to FIG. 8, an example of fundamental operation|movement of the radio|wireless information setting in the image projection apparatus 2 is demonstrated.

[0100] As shown in FIG. 8, the control part 203 of the image projection apparatus 2 detects whether whether the power supply of the image projection apparatus 2 was turned on, whether the setting write-in button's 230 having been turned on (pressing-down), and the radio|wireless device 1 were inserted (step S100).
In this processing, if either of the insertion of ON of a power supply, ON of the setting write-in button 230, and the radio|wireless device 1 is detected (step S100: YES), the control part 203 will be transferred to the processing of step S101.

[0101] In step S101, the control part 203 operate|moves the function of the radio|wireless part 206,
Transmission and reception of the radio signal in the radio|wireless part 206 is started (step S101), and a processing is transferred to step S102.

[0102] In step S102, the control part 203 determines whether the USB device is inserted in the USB interface 201 (step S102).
In this processing, if it determines with the USB device being inserted (step S102: YES), the control part 203 will acquire the identification information of a USB device (step S103).
Here, as identification information, the MAC address allocated to the USB device is mentioned as an example, and is demonstrated.

[0103] Next, the control part 203 determines whether the identification information of the USB device inserted is the identification information which the radio|wireless device 1 holds (step S104).
Here, as for the MAC address which is identification information, 24 bits of high-orders become bender|vendor ID,
24 bits of low order becomes a serial number allocated for every bender|vendor.
The MAC address of a USB device of the control part 203 is predetermined bender|vendor ID,
And by determining whether it is a predetermined serial number, it is determined whether the MAC address of a USB device is a MAC address of the radio|wireless device 1.

[0104] In this processing, if it determines with the inserted USB device being the radio|wireless device 1 (step S104: YES), the control part 203 will stop the function of the radio|wireless part 206,
Transmission and reception of the radio signal in the radio|wireless part 206 is stopped (step S105).

[0105] Then, the control part 203 acquires the information of the present time from the timepiece circuit 205 (step S106), and reads connectable time from the non-volatile memory 204 further (step S107).
At this time, the control part 203 calculates valid_time based on connectable time and the present time.
For example, connectable time is 2 hours,
Valid_time will be set to PM4:30 supposing the present time is PM 2:30.
Moreover, a date is also included in valid_time.

[0106] Subsequently, the control part 203 produces|generates the encryption key used in radio|wireless part 206 grade|etc., (step S108), and transfers a processing to step S109.
Thus, the control part 203 functions as a setting information production|generation part which produces|generates an encryption key at least among radio|wireless setting information, before writing radio|wireless setting information in the flash memory 104 of the radio|wireless device 1.
In addition, just before writing radio|wireless setting information in the radio|wireless device 1, it is made to perform a production|generation of an encryption key,

However,
An encryption key can be produced|generated whenever the power supply of an image projection apparatus is set to ON.
Moreover, whenever the setting write-in button 230 is operated, you may be made to produce|generate an encryption key.

[0107] In step S109, the control part 203 reads radio|wireless setting information from the non-volatile memory 204. As shown in FIG. 9, the radio|wireless setting information read here has a network mode, a network name (except for an encryption key and valid_time), etc.
In addition, it becomes radio|wireless setting information for the valid_time produced|generated at the encryption key and step S107 which were produced|generated at the information read in this way and step S108 to write in the radio|wireless device 1.
However, regarding an IP address, an IP address which is different in the image projection apparatus 2 is set.

[0108] Next, the control part 203 performs a write request to the radio|wireless device 1, in order to start a write-in processing of the radio|wireless setting information to the radio|wireless device 1.
When this request|requirement is received by the radio|wireless device 1, CPU101 of the radio|wireless device 1 makes a lamp|ramp 150 light during writing (step S110).

[0109] Then, the control part 203 writes radio|wireless setting information in the flash memory 104 of the radio|wireless device 1.
Moreover, a lamp|ramp 150 is blinked during writing (step S110).
(Step S111)

The control part 203 transfers a processing to step S113, after waiting (step S112) and this writing are complete|finished until writing is complete|finished (step S112: YES).

[0110] In step S113, as for the control part 203, the radio|wireless device 1 determines whether the radio|wireless device 1 was extracted from the USB interface 201 (step S114).
In this processing, if it determines with the radio|wireless device 1 having been extracted (step S114: YES), the control part 203 will restart the function of the radio|wireless part 206,
Transmission and reception of the radio signal in the radio|wireless part 206 is enabled (step S115), and a processing is transferred to step S115.

[0111] In step S102, if it determines with the USB device not being inserted in the USB interface 201 (step S102: NO), a processing will be transferred to step S116.

[0112] Moreover, in step S104, if it determines with the inserted USB device not being the radio|wireless device 1 (step S104: NO), the control part 203 will transfer a processing to step S116.
In addition, if it determines with the identification information not being specific identification information even if a USB device is a device which has a radio|wireless part, it will determine with it not being the radio|wireless device 1,
It is made not to write in radio|wireless setting information.

[0113] In step S116, the control part 203 judges whether a power supply is OFF.
When it determines the control part 203 with a power supply being OFF, while complete|finishing (step S116:YES) and this processing, when it determines with a power supply not being OFF, it will perform a repetition processing from (step S116:NO) and step S100.

[0114] As mentioned above, if the radio|wireless device 1 is connected to USB connector 104, he is trying for the control part 203 of the image projection apparatus 2 in this embodiment to write the radio|wireless setting information for wirelessly|radio-communicating with the image projection apparatus 2 in this radio|wireless device 1.
Moreover, after the radio|wireless device 1 is connected to USB connector 104, he is trying for predetermined period to stop operation|movement of the radio|wireless part 206.

[0115] By the way, in the above-mentioned Embodiment, we decided to write in the radio|wireless device 1 by using an encryption key and valid_time as separate information,
However,
You may make it embed valid_time to an encryption key.

[0116] In this case, as shown in FIG. 10, the control part 203 produces|generates a random variable first (step S120). Then, the control part 203 acquires the information of connectable time among the radio|wireless setting information memorize|stored in the non-volatile memory 204,
It is based with the connectable time acquired in this way and the information of the present time obtained from the timepiece circuit205, and valid_time is calculated (step S121).

[0117] Subsequently, it is determined whether the mode of the encryption key of the radio|wireless setting information memorize|stored in the non-volatile memory 204 is 64 bits, and whether the control part 203 is 128 bits (step S122).
In this processing, if it determines with the mode of an encryption key being 128 bits (step S122: YES), the control part 203 will make the restriction|limiting of an encryption key the hexadecimal number of 13 characters or 26 digits (step S123).
On the other hand, if it determines with the mode of an encryption key being 64 bits, the control part 203 will make the restriction|limiting of an encryption key the hexadecimal number of five characters or 10 digits (step S124).

[0118] Then, based on the random variable (random value) produced|generated at step S120, and the valid_time calculated at step S121, the control part 203 produces|generates an encryption key.
This encryption key is produced|generated on the conditions restrict|limited by the processing of step S123, or the processing of step S124.
For example, in the case of 128 bits, seven characters are comprised by a random variable in the first half among 13 characters,
Six characters are comprised at a date in the second half.
Thus, the image transmission application of the computer apparatus 3 can set valid_time by an encryption key by comprising.
Moreover, CPU305 of the computer apparatus 3 can detect valid_time by execution of an image transmission application based on an encryption key.

[0119] By the way, when the encryption key produced|generated by the image projection apparatus 2 was continued, are kept as the same encryption key and an encryption key is known temporarily,
There exists a possibility that the wireless|radio communication between computer apparatus and an image projection apparatus may be monitored after that.
In the above-mentioned, whenever it writes radio|wireless setting information in the radio|wireless device 1, the privacy of a wireless|radio communication is improved by updating an encryption key.

[0120] However, when switching the display image of several computer apparatus 3 and projecting a display image from the image projection apparatus 2, several radio|wireless devices 1 for respectively connecting to several computer apparatus 3 are needed.
However,
When an encryption key is changed for every radio|wireless device, there exists a problem of communication becoming impossible to the newest with an image projection apparatus only as for the radio|wireless device 1 linked to the image projection apparatus 2.
Moreover, whenever the radio|wireless device 1 is connected, an encryption key must be changed and a load|burden arises in a processing.

[0121] Then, when satisfy|filling a predetermined condition, he is trying to update an encryption key in the image projection apparatus 2 of this embodiment.
Thus, an example of the method of updating an encryption key is demonstrated with reference to drawing.
FIG. 11 is a flowchart of an encryption key automatic-updating processing.

[0122] As shown in FIG. 11, if an encryption key automatic-updating processing is started, the control part 203 will initialize elapsed time first (step S130).

[0123] Then, the control part 203 detects whether the radio|wireless device 1 was extracted from the USB interface 201 (step S131).
In this processing, if it determines with the radio|wireless device 1 having been extracted from the USB interface 201 (step S131: YES), the control part 203 will start count-up of elapsed time (step S132),
A processing is transferred to step S133.

[0124] The elapsed time currently counted up was acquired in step S133,
Then, it is determined whether the control part 203 is a state (in process of wireless connection) in which the radio|wireless part206 of the image projection apparatus 2 is wirelessly|radio-communicating (step S134).

[0125] In this processing, if it determines with it being a state in which the radio|wireless part 206 is not wirelessly|radio-communicating (step S134: NO), the control part 203 will determine whether elapsed time exceeded the connection permitted time (step S135).
On the other hand, if it determines with it being the state in which the radio|wireless part 206 is wirelessly|radio-communicating (step S134: YES), the control part 203 will reset elapsed time (step S137),
A processing is transferred to step S131.

[0126] In step S135, if it determines with elapsed time having exceeded the connection permitted time (step S135: YES), the control part 203 will update an encryption key and will complete|finish an encryption key automatic-updating processing.
On the other hand, if it determines with elapsed time not exceeding over a connection permitted time (step S135: NO), the control part 203 will transfer a processing to step S131.

[0127] Thus, when the period when communication with the computer apparatus 3 is not performed via the radio|wireless part206 becomes (For example, 2 hours or more) more than predetermined period, the control part 203 of the image projection apparatus 2 of this embodiment produces|generates an encryption key at least among radio|wireless setting information, and he is trying to update it.
Thereby, a load|burden of an encryption key generation processing can be reduced.
Moreover, a radio|wireless setting can be performed to several radio|wireless devices 1.
In addition, it is necessary to make it the control part 203 allocate a different IP address for every radio|wireless device regarding an IP address.

[0128] Moreover, in addition to updating an encryption key automatically, it replaces with, and a manual operation may be made to perform.
That is, the image projection apparatus 2 is equipped with the update button 231 which instruct|indicates operation|movement which produces|generates and updates an encryption key at least among radio|wireless setting information,
Whenever the update button 231 is operated, an encryption key is produced|generated at least among radio|wireless setting information, and you may make it update.
The power supply of the image projection apparatus 2 is turned ON,
When a user and a utilization group take the place, high security can be ensured by updating an encryption key.

[0129] (computer apparatus 3)
Next, the computer apparatus 3 is demonstrated with reference to drawing.
FIG. 12 is a block diagram of the computer apparatus 3 in this embodiment.

[0130] As shown in FIG. 12, the computer apparatus 3
USB connector 301, the USB bus controller 302, and LCD303 that are display parts,
The graphics controller 304 which performs the processing for making it display on LDC303, CPU305 which perform control of the computer-apparatus 3 whole, and memory 306 which stores a program and various parameters,
The 1st bus|bath 307 that connects these is provided.

[0131] Furthermore, the computer apparatus 3 is with the LAN interface 310 corresponding to 10 BASE-T or 100 BASE-TX, a mouse|mouth 311, a keyboard 312, the CD/DVD drive 313, the floppy disk (trademark) disk drive 314, and a hard disk 315,
The 2nd bus|bath 316 that connects these is provided.
And the bus controller 308 which controls exchange of the data of the 1st bus|bath 307 and the 2nd bus|bath 316 is provided.

[0132] With USB connector 301 and the USB bus controller 302, the transmission and reception of data based on a USB device and USB specifications, such as the radio|wireless device 1 and an external keyboard, is processed.

[0133] Moreover, the operating-system (OS) program and the application program for presentations are stored in memory 306,
If the power supply of the computer apparatus 3 is turned on, first CPU305 by reading and executing OS program from memory 306
It enables it to perform fundamental functions of computer apparatus, such as memory managements regarding an input-output of a mouse|mouth 311 or a keyboard 312, such as a function, memory 306, and a hard disk 315.

[0134] And in the state in which this OS program was executed by CPU305, computer programs, such as an application program for presentations, are read from memory 306, and are executed.
In addition, like the after-mentioned, when a device driver and the application program for image transmission are installed, and these are also performed by CPU305, various control is performed.

[0135] An example of fundamental operation|movement of the radio|wireless information setting in the computer apparatus 3 comprised as mentioned above is demonstrated.
FIG. 13 is a flowchart which shows operation|movement of the radio|wireless information setting in the computer apparatus 3,
It is controlled by CPU305 which is a control part of the computer apparatus 3.

[0136] As shown in FIG. 13, CPU305 of the computer apparatus 3 determines whether the radio|wireless device 1 is connected (step S200).
Determination of whether the radio|wireless device 1 is connected determines whether the USB device was connected to USB connector 301,
Furthermore, when a USB device is connected, this USB device determines by whether it has specific identification information.

[0137] In this processing, if it determines with the radio|wireless device 1 having been inserted (step S200: YES), CPU305 will start the processing of auto run|orchid operation|movement (step S201).
This auto run|orchid operation processing is a processing of S220-S227 in FIG. 14, and is mentioned later.

[0138] Completion|finish of auto run|orchid operation processing will determine whether the image transmission application has started CPU305 normally (step S202).
In this processing, if it determines with the image transmission application having started normally (step S202: YES), a processing will be transferred to step S203.
Hereafter, operation|movement from step S203 to S216 is performed by functioning as an image transmitting means etc., when CPU305 operate|moves according to an image transmission application.

[0139] In step S203, CPU305 performs the lighting request|requirement of a lamp|ramp 151 during image transmission of the radio|wireless device 1 via USB connector 301.
If this lighting request|requirement is received, CPU101 of the radio|wireless device 1 will light a lamp|ramp 151 during image transmission.

[0140] Next, CPU305 starts transmission for the image data according to Screen (It is hereafter set as a "display screen") currently displayed on LCD303 which is a display part of the computer apparatus 3 to the image projection apparatus 2.
In this processing, CPU305 transmits the data of a display image to the radio|wireless device 1 via USB connector 301, It is transmitted to the image projection apparatus 2 by wireless|radio communication from this radio|wireless device 1, If the image projection apparatus 2 receives the display-image data transmitted in this way,
The image based on this display-image data is projected on a screen.

[0141] In the state which has transmitted the data of a display image, CPU305 determines whether the image transmission stopping switch 140 of the radio|wireless device 1 was turned ON (step S205).
Here, CPU101 of the radio|wireless device 1 will notify information to that effect to the computer apparatus 3 via USB connector 105, If it detects that the image transmission stopping switch 140 was operated to the image stop on-mode side (switch ON).
When the notification of this information is received, CPU305 determines with switch-on of the image transmission stopping switch 140 of the radio|wireless device 1 having been carried out.

[0142] When the image transmission stopping switch 140 of the radio|wireless device 1 determines with having operated to Switch ON (step S205: YES), in step S205 CPU305
A lamp|ramp 151 is made to light-extinguish during image transmission of a radio|wireless device (step S209), and a processing is transferred to step S210.
During image transmission of a radio|wireless device, like the time of lighting, light extinction of a lamp|ramp 151 is performed, when CPU305 performs the light-extinction request|requirement of a lamp|ramp 151 during image transmission of the radio|wireless device 1 via USB connector 301.
On the other hand, if it determines with the image transmission stopping switch 140 of the radio|wireless device 1 not being operated to Switch ON (step S205: NO), CPU305 will transfer a processing to step S206.

[0143] In step S210, CPU305 transmits the black image surface display instruction command which is a specific image via the radio|wireless device 1 to the image projection apparatus 2 to the image projection apparatus 2,
A processing is transferred to step S211.

[0144] Here, it was presupposed to transmission of the black image surface display instruction command that CPU305 is controlled,
However,
CPU101 of the radio|wireless device 1 may be made to transmit a black image surface display instruction command, when the image transmission stopping switch 140 is operated to Switch ON.
In this case
In step S211, CPU305 determines whether the image transmission stopping switch 140 of the radio|wireless device 1 was operated to the image stop off-mode side (OFF).
Here, CPU101 of the radio|wireless device 1 will notify information to that effect to the computer apparatus 3 via USB connector 105, If it detects that the image transmission stopping switch 140 was operated to Switch OFF.
When the notification of this information is received, CPU305 determines with the image transmission stopping switch 140 of the radio|wireless device 1 having been operated to Switch OFF.

[0145] In this processing, If it determines with the image transmission stopping switch 140 of the radio|wireless device 1 having been operated to Switch OFF (step S211: YES), CPU305 will transfer a processing to step S206.

[0146] In step S206, CPU305 request|requires time information (information of the present time) with respect to the image projection apparatus 2,
The time information transmitted from the image projection apparatus 2 with respect to this request|requirement is acquired,
A processing is transferred to step S207.

[0147] In step S207, CPU305 determines whether valid_time passed or not.

Determination of whether valid_time passed is performed based on the time information acquired from the image projection apparatus 2, and the radio|wireless setting information read from the radio|wireless device 1.
That is, it is determined whether it is time late|slower than the valid_time contained in the radio|wireless setting information with which the present time acquired from the image projection apparatus 2 read determination of whether valid_time passed from the radio|wireless device 1.

[0148] In this processing, CPU305 displays on LCD303 that a timeout message determines with valid_time having passed (step S212), and wireless connection with the image projection apparatus 2 is cut|disconnected (step S213). (step S207: YES)
A cutting|disconnection of wireless connection with the image projection apparatus 2 transmits the request|requirement of a cutting|disconnection of CPU305 of wireless connection with the image projection apparatus 2 with respect to the radio|wireless device 1,
It is carried out when the radio|wireless device 1 accepts this request|requirement.
After complete|finishing a cutting|disconnection of wireless connection, CPU305 complete|finishes execution of an image transmission application (step S214).

[0149] Moreover, if it determines with CPU305 having cut the predetermined time (For example, 5 minutes) till valid_time even if it is a case where valid_time has not passed, the display to the effect of valid_time approaching LCD303 so that valid_time may be extended before valid_time passes will be performed.
The information to the effect of replacing with the display to this LCD303, or valid_time pressing for both CPU305 is transmitted to the image projection apparatus 2 via the radio|wireless device 1,
You may be made to carry out the - p- pause|pose of the information to the effect of valid_time being near at hand to the image projected from the image projection apparatus 2.

[0150] Moreover, in step S207, it is determined whether the radio|wireless device 1 was extracted from the computer apparatus 3 CPU305 as determining with valid_time not having passed (step S208). (step S207: NO)
In this processing, CPU305 displays on LCD303 that an error message determines with the radio|wireless device 1 having been extracted from the computer apparatus 3 (step S215), and execution of an image transmission application is complete|finished (step S216). (step S208: YES)
On the other hand, if it determines with the radio|wireless device 1 not being extracted from the computer apparatus 3 (step S208: YES), CPU305 will transfer a processing to step S205.

[0151] In step S202, after the processing of step S214 and the processing of step S216 are complete|finished while the image transmission application is not operate|moving normally (step S202: NO) or, CPU305 complete|finishes this main processing.

[0152] Next, the auto run|orchid operation processing in step S201 is demonstrated with reference to FIG. 14.
FIG. 14 is a flowchart of the auto run|orchid processing in computer apparatus.
In this auto run|orchid operation|movement, when the radio|wireless device 1 is connected, CPU305 recognizes the radio|wireless device 1 as a CD-ROM by the function of the CD-ROM recognition part 125 of this radio|wireless device 1,
It operate|moves by reading the information of the radio|wireless device 1 automatically.

[0153] As shown in FIG. 14, CPU305 determines whether the device driver 131 is installed in the self-computer apparatus 3 (step S220).
When it determines with the device driver 131 not being installed in this processing (step S220: YES), CPU305
The device driver 131 for radio communication part 107 control memorize|stored in the flash memory 104 of the radio|wireless device 1 is read via USB connector 301,
The installation processing of this device driver 131 is performed with respect to the self-computer apparatus 3 (step S221).

[0154] When the processing of step S221 is complete|finished, or when it determines with the device driver being installed in step S220 (step S220: YES), CPU305 starts a radio|wireless setting application,

The radio|wireless setting information currently hold|maintained at the radio|wireless device 1 is read via USB connector 301 (step S223).

[0155] Next, CPU305 sets the network of WLAN (wireless LAN) (step S224).
This network setting is performed with respect to the radio|wireless device 1.
That is, CPU305 transmits radio|wireless setting information to the radio|wireless device 1 via USB connector 301,
The radio|wireless device 1 sets the network of WLAN according to this radio|wireless setting information.
The setting of IP networks, such as the IP address for performing LAN communication, a sub-net mask, the IP address of DNS, and the setting of information required for wireless|radio communications, such as a network name and an encryption key, are one of the settings of the network of WLAN.

[0156] After the processing of step S224 is complete|finished, CPU305 will determine whether network connection is set as the image projection appsratus 2, if it paraphrases whether the wireless|radio communication with the image projection apparatus 2 is connected via the radio|wireless device 1 (step S225).
In this processing, if it determines with network connection with the image projection apparatus 2 being performed (step S225: YES), CPU305 will start and perform an image transmission application (step S226).
On the other hand, if it determines with network connection with the image projection apparatus 2 not being performed (step S225: NO), CPU305 will perform an error message display processing (step S227).
This error message display processing is performed when CPU305 displays an error message on LCD303.

[0157] Completion|finish of the processing of step S226 or the processing of step S227 will complete|finish this auto run|orchid operation processing.

[0158] In addition, CPU305 of the computer apparatus 3 is made to perform power-supply control of the radio|wireless device 1.
That is, the radio|wireless device 1 has the memory controller-function part 121 and the wireless communication function part 123 as mentioned above,
It can each be made to carry out ON, OFF control of these power supplies separately.
Thus, it can turn on and off separately with the memory controller-function part 121 and the wireless communication function part 123,
Therefore
Reliable wireless connection operation|movement can be performed within the range of the electric power restricted as a USB device.
For example, in S223, the power supply to the memory controller-function part 121 is turned ON from step S220,
The power supply to the wireless communication function part 123 is turned OFF.
Moreover, in S227, the power supply to the memory controller-function part 121 is turned OFF from step S224,
The power supply to the wireless communication function part 123 is turned ON.
Moreover, in copying the image transmission application stored in the storage part of the radio|wireless device 1 to the hard disk 315 of the computer apparatus 1, it turns ON the power supply to the memory controller-function part 121,
The power supply to the wireless communication function part 123 is turned OFF.

[0159] In the image projection system S of this embodiment, the radio|wireless device 1 has the radio|wireless part 206 as mentioned above,
It functions as a radio|wireless part of the computer apparatus 3 which transmits image data to the image projection apparatus 2 which projects the image according to the image data received in the radio|wireless part 206 by wireless|radio communication.
When USB connector 105 is connected with USB connector 105 which can connect with this radio|wireless device 1 any of the image projection apparatus 2 and the computer apparatus 3 at the image projection apparatus 2
When radio|wireless setting information (setting information of a wireless|radio communication) can be written in from the image projection apparatus 2 and USB connector 105 is connected to the computer apparatus 3
When USB connector 105 is connected to the readable flash memory 104 and the computer apparatus 3 with the computer apparatus 3, the radio|wireless setting information written in from the image projection apparatus 2

The radio communication part 107 which communicates with the radio|wireless part 206 of the image projection apparatus 2 by the setting based on the radio|wireless setting information written in from the image projection apparatus 2 was provided,
Therefore
it is based on the radio|wireless setting information set by the image projection apparatus 2,
Communication between the image projection apparatus 2 and the computer apparatus 3 can be performed, and the high radio|wireless device 1 of a confidentiality or the image projection system S can be provided.

[0160] In the above, some of Embodiment of this invention were demonstrated in detail based on drawing,
However,
These are illustrations,
It is possible to implement this invention with other forms which performed a various deformation|transformation and improvement based on an expert's knowledge.

[0161] For example, the communication based on USB specification demonstrated between the radio|wireless device 1, the image projection apparatus 2, and the computer apparatus 3,
However,
It is not restricted to this,
You may be made to communicate by other telecommunications standards.

BRIEF DESCRIPTION OF THE DRAWINGS

[0162]
FIG. 1: It is a whole block diagram of the image projection system in this embodiment.

FIG. 2: It is a figure for demonstrating general|schematic operation|movement in the image projection system in this embodiment.

FIG. 3: It is an external view of the radio|wireless device in this embodiment.

FIG. 4: It is a block diagram of the radio|wireless device in this embodiment.

FIG. 5: It is a functional block diagram of the radio|wireless device in this embodiment.

FIG. 6: It is a block diagram of the memory controller-function part of FIG. 5.

FIG. 7: It is a block diagram of the image projection apparatus in this embodiment.

FIG. 8: It is a flowchart for the operation|movement description of the image projection apparatus in this embodiment.

FIG. 9: It is a figure which shows the example of the radio|wireless setting information in this embodiment.

FIG. 10: It is a flowchart for the operation|movement description of the image projection apparatus in this embodiment.

FIG. 11: It is a flowchart for the operation|movement description of the image projection apparatus in this embodiment.

FIG. 12: It is a block diagram of the computer apparatus in this embodiment.

FIG. 13: It is a flowchart for the operation|movement description of the computer apparatus in this embodiment.

FIG. 14: It is a flowchart for the operation|movement description of the computer apparatus in this embodiment.

DESCRIPTION OF SYMBOLS

[0163] 1 Radio|wireless device
2 Image projection apparatus
3 Computer apparatus 3
101 CPU (control part) of radio|wireless device
104 Flash memory (storage part)
203 Control part of image projection apparatus
305 CPU (control part) of computer apparatus

[Claims]

1. It has a radio|wireless part,
It is a radio|wireless device which functions as a radio|wireless part of the computer apparatus which transmits the said image data to the image projection apparatus which projects the image according to the image data received in the said radio|wireless part by wireless|radio communication,
Comprising:
The connector which can connect any of the said image projection apparatus and the said computer apparatus,
When the setting information of the said wireless|radio communication can be written in from the said image projection apparatus when the said connector is connected to the said image projection apparatus, and the said connector is connected to the said computer apparatus
It is a readable radio|wireless setting information storage part by the said computer apparatus about the setting information of the said wireless|radio communication written in from the said image projection apparatus,
When the said connector was connected to the said computer apparatus, the radio communication part which communicates with the radio|wireless part of the said image projection apparatus by the setting based on the setting information of the said wireless|radio communication written in from the said image projection apparatus was provided.
The radio|wireless device characterized by the above-mentioned.

2. The program storage part which stores the program as which the said computer apparatus is functioned as an image transmitting means to transmit image data to the said image projection apparatus via the said radio communication part was provided.
The radio|wireless device of Claim 1 characterized by the above-mentioned.

3. The image transmitting stop operation part which instruct|indicates the stop of transmitting operation|movement of the said image data to the said image projection apparatus is provided,
The said image transmitting means transmits the request|requirement for projecting a specific image to the said image projection apparatus via the said radio communication part to the said image projection apparatus, when the said image transmitting stop operation part is operated,
The radio|wireless device of Claim 2 characterized by the above-mentioned.

4. The valid_time as which the said radio communication part is functioned is included in the setting information of the said wireless|radio communication,
The radio|wireless device of any one of the Claims 1-3 characterized by the above-mentioned.

5. A valid_time extension means to extend the said valid_time memorize|stored in the said radio|wireless setting information storage part was provided.
The radio|wireless device of Claim 4 characterized by the above-mentioned.

6. The said image transmitting means,
If it determines with the said valid_time having passed based on the time information transmitted from the said image projection apparatus, and the said valid_time memorize|stored in the said radio|wireless setting information storage part,
The function of the said radio communication part is stopped,
The radio|wireless device of Claim 4 or Claim 5 characterized by the above-mentioned.

7. It has a radio|wireless part,
The image projection apparatus which projects the image according to the image data received in the said radio|wireless part,
Computer apparatus which transmits the said image data to the said image projection apparatus,
The said image projection apparatus in the image projection system provided with the radio|wireless device which functions as a radio|wireless part of the said computer apparatus
WHEREIN:
The said image projection apparatus,
The connection part which can connect the connector of the said radio|wireless device,
When the said radio|wireless device was connected to the said connection part, the control part which writes the setting information of the said wireless|radio communication in the radio|wireless setting information storage part of the said radio|wireless device was provided.
The image projection apparatus characterized by the above-mentioned.

8. The said control part,
When the said radio|wireless device is connected to the said connection part, the predetermined period stop of operation|movement of the said radio|wireless part is carried out,
The image projection apparatus of Claim 7 characterized by the above-mentioned.

9. The said control part,
When the power supply of the said image projection apparatus is set to ON and the said radio|wireless device is connected to the said connection part, the setting information of the said wireless|radio communication is written in the radio|wireless setting information storage part of the said radio|wireless device.
The image projection apparatus of Claim 7 or Claim 8 characterized by the above-mentioned.

10. The write-in instruction|indication operation part which instruct|indicates write-in operation|movement of the setting information of the said wireless|radio communication with respect to the radio|wireless setting information storage part of the said radio|wireless device is provided,
The said control part,
When the said write-in instruction|indication operation part is operated, the setting information of the said wireless|radio communication is written in the said radio|wireless setting information storage part of the said radio|wireless device.
The image projection apparatus of Claim 7 or Claim 8 characterized by the above-mentioned.

11. The said control part,
If it determines with the identification information of the said radio|wireless device not being specific identification information,
Setting information of the said wireless|radio communication is not written in to the setting information storage part of the said radio|wireless device.
The image projection apparatus of any one of the Claims 7-10 characterized by the above-mentioned.

12. The encryption key in the said wireless|radio communication is included in the setting information of the said wireless|radio communication,
Before writing the setting information of the said wireless|radio communication in the radio|wireless setting information storage part of the said radio|wireless device, the setting information production|generation part which produces|generates at least the above-mentioned encryption key among the setting information of the said wireless|radio communication was provided.
The image projection apparatus of any one of the Claims 7-11 characterized by the above-mentioned.

13. The said setting information production|generation part,
Whenever the power supply of the said image projection apparatus is set to ON, at least the above-mentioned encryption key is produced|generated and updated among the setting information of the said wireless|radio communication,

The image projection apparatus of Claim 12 characterized by the above-mentioned.

14. The update instruction|indication operation part which instruct|indicates operation|movement which produces|generates and updates at least the above-mentioned encryption key among the setting information of the said wireless|radio communication is provided,
The said setting information production|generation part,
Whenever the said update operation part is operated, at least the above-mentioned encryption key is produced|generated and updated among the setting information of the said wireless|radio communication,
The image projection apparatus of Claim 12 or Claim 13 characterized by the above-mentioned.

15. The said setting information production|generation part,
When the period when communication with the said computer apparatus is not performed via the said radio|wireless part turns into more than predetermined period, at least the above-mentioned encryption key is produced|generated and updated among the setting information of the said wireless|radio communication,
The image projection apparatus of any one of the Claims 12-14 characterized by the above-mentioned.

16. The active|validity period as which the radio communication part in the said radio|wireless device is functioned is included in the setting information of the said wireless|radio communication,
The said setting information production|generation part produces|generates the said active|validity period,
The image projection apparatus of any one of the Claims 12-15 characterized by the above-mentioned.

17. It has a radio|wireless part,
The image projection apparatus which projects the image according to the image data received in the said radio|wireless part,
Computer apparatus which transmits the said image data to the said image projection apparatus,
The image projection system provided with the radio|wireless device which functions as a radio|wireless part of the said computer apparatus
WHEREIN:
The said radio|wireless device,
The connector which can connect any of the said image projection apparatus and the said computer apparatus,
When the setting information of the said wireless|radio communication can be written in from the said image projection apparatus when the said connector is connected to the said image projection apparatus, and the said connector is connected to the said computer apparatus
It is a readable radio|wireless setting information storage part by the said computer apparatus about the setting information of the said wireless|radio communication written in from the said image projection apparatus,
When the said connector was connected to the said computer apparatus, the radio communication part which communicates with the radio|wireless part of the said image projection apparatus by the setting based on the setting information of the said wireless|radio communication written in from the said image projection apparatus was provided.
The image projection system characterized by the above-mentioned.

(19)日本国特許庁(JP)　(12)公開特許公報(A)　(11)特許出願公開番号
特開2008-90561
(P2008-90561A)
(43)公開日　平成20年4月17日(2008.4.17)

(51)Int.Cl.		F I			テーマコード（参考）
G06F 13/00	(2006.01)	G06F	13/00	353V	2K103
H04B 1/40	(2006.01)	G06F	13/00	510A	5B089
G09G 5/00	(2006.01)	H04B	1/40		5C006
H04N 5/66	(2006.01)	G09G	5/00	555D	5C058
G09G 3/36	(2006.01)	H04N	5/66	Z	5C080

審査請求 未請求　請求項の数 17　ＯＬ　（全 28 頁）　最終頁に続く

(21)出願番号　特願2006-270125 (P2006-270125)
(22)出願日　平成18年9月29日 (2006.9.29)

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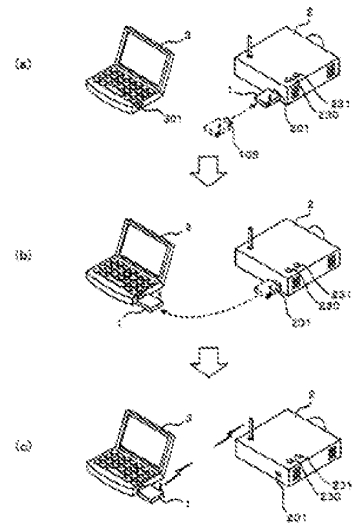
Ｆターム(参考)　2K103 CA72 CA73
5B089 HB18 MB02
5C006 AA28 AF51 AF67 AF68 EC11
FA47
5C058 AA18 BA35 BB25
5C080 AA10 CC06 DD13 DD26 DD30
JJ02 JJ06 JJ07

最終頁に続く

(54)【発明の名称】無線デバイス、画像投影装置及び画像投影システム

(57)【要約】
【課題】コンピュータ装置と画像投影装置との通信接続作業を容易にすること。
【解決手段】ＵＳＢコネクタを有しており、画像投影装置にＵＳＢコネクタを接続したときに画像投影装置から無線通信の設定情報を書き込み可能であり、かつコンピュータ装置に前記コネクタを接続したときに、画像投影装置から書き込まれた無線通信の設定情報をコンピュータ装置により読み出し可能としたＵＳＢメモリに無線通信部を設けたＵＳＢデバイスとした。
【選択図】図２



【特許請求の範囲】
【請求項1】
無線部を有し、前記無線部で受信される画像データに応じた画像を投影する画像投影装置に、前記画像データを無線通信により送信するコンピュータ装置の無線部として機能する無線デバイスであって、
前記画像投影装置及び前記コンピュータ装置のいずれにも接続可能なコネクタと、
前記画像投影装置に前記コネクタを接続したときに、前記画像投影装置から前記無線通信の設定情報を書き込み可能であり、かつ前記コンピュータ装置に前記コネクタを接続したときに、前記画像投影装置から書き込まれた前記無線通信の設定情報を前記コンピュータ装置により読み出し可能な無線設定情報記憶部と、
前記コンピュータ装置に前記コネクタを接続したときに、前記画像投影装置から書き込まれた前記無線通信の設定情報に基づいた設定により前記画像投影装置の無線部と通信を行う無線通信部と、
を備えたことを特徴とする無線デバイス。
【請求項2】
前記画像投影装置に画像データを前記無線通信部を介して送信する画像送信手段として前記コンピュータ装置を機能させるプログラムを格納するプログラム格納部を備えたことを特徴とする請求項１に記載の無線デバイス。
【請求項3】
前記画像投影装置への前記画像データの送信動作の停止を指示する画像送信停止操作部を備え、
前記画像送信手段は、前記画像送信停止操作部が操作されたとき、前記画像投影装置に特定画像を投影させるための要求を前記無線通信部を介して前記画像投影装置へ送信することを特徴とする請求項２に記載の無線デバイス。
【請求項4】
前記無線通信の設定情報には、前記無線通信部を機能させる有効時間を含むことを特徴とする請求項１～３のいずれか１項に記載の無線デバイス。
【請求項5】
前記無線設定情報記憶部に記憶された前記有効時間を延長する有効時間延長手段を設けたことを特徴とする請求項４に記載の無線デバイス。
【請求項6】
前記画像送信手段は、
前記画像投影装置から送信される時間情報と前記無線設定情報記憶部に記憶された前記有効時間とに基づき、前記有効時間が経過したと判定すると、前記無線通信部の機能を停止することを特徴とする請求項４又は請求項５に記載の無線デバイス。
【請求項7】
無線部を有し、前記無線部で受信される画像データに応じた画像を投影する画像投影装置と、前記画像投影装置に前記画像データを送信するコンピュータ装置と、前記コンピュータ装置の無線部として機能する無線デバイスとを備えた画像投影システムにおける前記画像投影装置において、
前記画像投影装置は、
前記無線デバイスのコネクタを接続可能な接続部と、
前記無線デバイスが前記接続部に接続されたとき、前記無線通信の設定情報を前記無線デバイスの無線設定情報記憶部に書き込む制御部と、
を備えたことを特徴とする画像投影装置。
【請求項8】
前記制御部は、
前記無線デバイスが前記接続部に接続されたとき、前記無線部の動作を所定期間停止する

ことを特徴とする請求項７に記載の画像投影装置。
【請求項9】
前記制御部は、
当該画像投影装置の電源がＯＮとなったときに、前記無線デバイスが前記接続部に接続されているときは、前記無線通信の設定情報を前記無線デバイスの無線設定情報記憶部に書き込む
ことを特徴とする請求項７又は請求項８に記載の画像投影装置。
【請求項10】
前記無線デバイスの無線設定情報記憶部に対して前記無線通信の設定情報の書き込み動作を指示する書き込み指示操作部を備え、
前記制御部は、
前記書き込み指示操作部が操作されたとき、前記無線通信の設定情報を前記無線デバイスの前記無線設定情報記憶部に書き込む
ことを特徴とする請求項７又は請求項８に記載の画像投影装置。
【請求項11】
前記制御部は、
前記無線デバイスの識別情報が特定の識別情報でないと判定すると、前記無線デバイスの設定情報記憶部へ前記無線通信の設定情報の書き込みを行わない
ことを特徴とする請求項７～１０のいずれか１項に記載の画像投影装置。
【請求項12】
前記無線通信の設定情報には、前記無線通信における暗号キーを含み、
前記無線通信の設定情報を前記無線デバイスの無線設定情報記憶部に書き込む前に、前記無線通信の設定情報のうち少なくとも前記暗号キーを生成する設定情報生成部を備えた
ことを特徴とする請求項７～１１のいずれか１項に記載の画像投影装置。
【請求項13】
前記設定情報生成部は、
当該画像投影装置の電源がＯＮとなる毎に、前記無線通信の設定情報のうち少なくとも前記暗号キーを生成して更新する
ことを特徴とする請求項１２に記載の画像投影装置。
【請求項14】
前記無線通信の設定情報のうち少なくとも前記暗号キーを生成して更新する動作を指示する更新指示操作部を備え、
前記設定情報生成部は、
前記更新操作部が操作される毎に、前記無線通信の設定情報のうち少なくとも前記暗号キーを生成して更新する
ことを特徴とする請求項１２又は請求項１３に記載の画像投影装置。
【請求項15】
前記設定情報生成部は、
前記無線部を介して前記コンピュータ装置との通信が行われない期間が所定期間以上となったとき、前記無線通信の設定情報のうち少なくとも前記暗号キーを生成して更新する
ことを特徴とする請求項１２～１４のいずれか１項に記載の画像投影装置。
【請求項16】
前記無線通信の設定情報には、前記無線デバイスにおける無線通信部を機能させる有効期間を含み、
前記設定情報生成部は、前記有効期間を生成する
ことを特徴とする請求項１２～１５のいずれか１項に記載の画像投影装置。
【請求項17】
無線部を有し、前記無線部で受信される画像データに応じた画像を投影する画像投影装置と、前記画像投影装置に前記画像データを送信するコンピュータ装置と、前記コンピュータ装置の無線部として機能する無線デバイスとを備えた画像投影システムにおいて、

前記無線デバイスは、
前記画像投影装置及び前記コンピュータ装置のいずれにも接続可能なコネクタと、
前記画像投影装置に前記コネクタを接続したときに、前記画像投影装置から前記無線通信の設定情報を書き込み可能であり、かつ前記コンピュータ装置に前記コネクタを接続したときに、前記画像投影装置から書き込まれた前記無線通信の設定情報を前記コンピュータ装置により読み出し可能な無線設定情報記憶部と、
前記コンピュータ装置に前記コネクタを接続したときに、前記画像投影装置から書き込まれた前記無線通信の設定情報に基づいた設定により前記画像投影装置の無線部と通信を行う無線通信部と、
【発明の詳細な説明】"とする画像投影システム。
【技術分野】
【0001】
本発明は、無線デバイス、画像投影装置及び画像投影システムに関し、特に、無線部を有し、この無線部で受信される画像データに応じた画像を投影する画像投影装置と、画像データを無線通信により送信するコンピュータ装置と、このコンピュータ装置の無線部として機能する無線デバイスとを備えた画像投影システムに関する。
【背景技術】
【0002】
従来より、コンピュータ装置等から画像データを入力して液晶表示素子に当該画像を表示し、光を照射して投影スクリーン上に拡大投影するプロジェクタなどの画像投影装置が広く使用されている。また、ＤＭＤ（Ｄｉｇｉｔａｌ　Ｍｉｃｒｏｍｉｒｒｏｒ　Ｄｅｖｉｃｅ）素子を用いて画像データに基づいた画像を投影する画像投影装置もある。
【0003】
この画像投影装置は、会議における小規模のプレゼンテーションや、多数の聴衆を集めて自分の研究成果を発表する大規模のプレゼンテーション等において、多様に使用されている。このようなプレゼンテーションは、プレゼンテーターの手前にコンピュータ装置を配置し、このコンピュータ装置の表示部に表示している画像に応じた画像データを、コンピュータ装置からケーブルを介して画像投影装置へ送信し、画像投影装置が画像データに基づいた画像を拡大投射することによって行われる。
【0004】
ところで、画像投影装置で画像を投影するためには、上述のようにコンピュータ装置と画像投影装置とをケーブルによって接続する必要となる。そのため、ケーブルの準備や接続の作業が発生し煩雑になる。しかも、プレゼンテーターのコンピュータ装置と画像投影装置との距離に応じたケーブルを用意する必要がある。
【0005】
そこで、近年、ＩＥＥＥ８０２．１１ａ／ｂ／ｇなどの無線ＬＡＮ（Ｌｏｃａｌ　Ａｒｅａ　Ｎｅｔｗｏｒｋ）に対応した画像投影装置が提供されてきており、コンピュータ装置から画像投影装置への画像データの送信を無線通信によって行うことによって、利便性を向上させている。
【0006】
ところで、コンピュータ装置を無線ＬＡＮ対応の画像投影装置に無線接続するためには、コンピュータ装置と画像投影装置のそれぞれについて無線通信の設定を行う必要がある。しかし、無線通信の設定にはある程度の知識を要し、容易に設定することができない場合も多い。そこで、この無線通信の設定の作業性を向上させるものが提案されている。
【0007】
例えば、特許文献１では、画像投影装置において、ＷＥＰ（Ｗｉｒｅｄ　Ｅｑｕｉｐｍｅｎｔ　Ｐｒｉｖａｃｙ）キーなどの無線通信の設定情報をスクリーンに投影し、コンピュータ装置の利用者がスクリーンに投影された設定情報を見ながら、コンピュータ装置へ入力することによって、コンピュータ装置と画像投影装置との無線接続を確立する技術が提案されている。

【0008】
また、特許文献２では、ＵＳＢコネクタを備えた情報記憶媒体によって、コンピュータ装置に設定されている無線通信の設定情報をＵＳＢコネクタを介して読み取り、その後、情報記憶媒体をＵＳＢコネクタを介して画像投影装置に接続することにより、コンピュータ装置から読み取った無線通信の設定情報を画像投影装置に設定する技術が提案されている。
【0009】
また、特許文献３では、画像投影装置における無線通信の設定情報と同一の情報を記憶すると共にドライバプログラムを記憶したＵＳＢメモリと、無線接続モジュールとを画像投影装置と同梱して販売し、コンピュータ装置にＵＳＢメモリを接続して、無線通信の設定情報とドライバプログラムとをコンピュータ装置に自動的に収納し、その後無線接続モジュールを接続することによって、画像投影装置とコンピュータ装置との無線接続を確立する技術が提案されている。
【特許文献1】特開２００３－０６９９２３号公報
【特許文献2】特開２００５－２０２７５４号公報
【特許文献3】特開２００５－２８５０９１号公報
【発明の開示】
【発明が解決しようとする課題】
【0010】
しかしながら、特許文献１に記載の技術では、画像投影装置における無線通信の設定情報を視覚的に把握することができるものの、コンピュータ装置への無線通信の設定情報は手動で行わなければならず、ある程度の知識と時間が必要である。
【0011】
また、特許文献２に記載の技術では、無線通信の設定情報を手動で入力する必要がない点で利点があるが、コンピュータ装置に設定されている無線通信の設定情報を画像投影装置に設定することになることから、例えば、会議などで画像投影装置に投影させる画像を出力するコンピュータ装置を切り替えなければならないときには、切り替え先のコンピュータ装置にＵＳＢコネクタを備えた情報記憶媒体を接続した後、更に、画像投影装置に接続する必要があり、作業が煩雑となる。しかも、コンピュータ装置に、予めＷＥＰキーなどの暗号情報の設定やアクセスポイントとしての設定などを手動で行わなければならず、特許文献１の記載の技術と同様に、ある程度の知識と時間が必要である。
【0012】
また、特許文献３に記載の技術では、画像投影装置における無線通信の設定情報と同一の情報を記憶したＵＳＢメモリをコンピュータ装置に接続することにより、コンピュータ装置に無線通信の設定を自動で行うことができる点で特許文献１及び特許文献２に比べて優れているが、ＵＳＢメモリ以外に、専用の無線接続モジュールが必要となるため開発コスト及び製造コストの面で問題がある。しかも、画像投影装置における無線通信の設定情報は、固定であることから、一旦無線通信の設定情報が漏洩してしまうと、画像投影装置とコンピュータ装置との無線通信を傍受されてしまう恐れがあり、セキュリティ上問題がある。例えば、画像投影装置を複数グループで共用する場合など、第１のグループが使ったあとでも無線通信の設定情報は第１のグループのコンピュータ装置に残っているので、次の第２のグループが画像投影装置を使用開始しても、第１のグループから継続して無線通信が可能となり、セキュリティ上問題があった。
【課題を解決するための手段】
【0013】
そこで、本発明はかかる課題を解決するために、請求項１に記載の発明は、無線部を有し、前記無線部で受信される画像データに応じた画像を投影する画像投影装置に、前記画像データを無線通信により送信するコンピュータ装置の無線部として機能する無線デバイスであって、前記画像投影装置及び前記コンピュータ装置のいずれにも接続可能なコネクタと、前記画像投影装置に前記コネクタを接続したときに、前記画像投影装置から前記無

線通信の設定情報を書き込み可能であり、かつ前記コンピュータ装置に前記コネクタを接続したときに、前記画像投影装置から書き込まれた前記無線通信の設定情報を前記コンピュータ装置により読み出し可能な無線設定情報記憶部と、前記コンピュータ装置に前記コネクタを接続したときに、前記画像投影装置から書き込まれた前記無線通信の設定情報に基づいた設定により前記画像投影装置の無線部と通信を行う無線通信部とを備えたことを特徴とする。

【0014】

また、請求項２に記載の発明は、請求項１に記載の発明において、前記画像投影装置に画像データを前記無線通信部を介して送信する画像送信手段として前記コンピューク装置を機能させるプログラムを格納するプログラム格納部を備えたことを特徴とする。

【0015】

また、請求項３に記載の発明は、請求項２に記載の発明において、前記画像投影装置への前記画像データの送信動作の停止を指示する画像送信停止操作部を備え、前記画像送信手段は、前記画像送信停止操作部が操作されたとき、前記画像投影装置に前記特定画像を投影させるための要求を前記無線通信部を介して前記画像投影装置へ送信することを特徴とする。

【0016】

また、請求項４に記載の発明は、請求項１～３のいずれか１項に記載の発明において、前記無線通信の設定情報には、前記無線通信部を機能させる有効時間を含むことを特徴とする。

【0017】

また、請求項５に記載の発明は、請求項４に記載の発明において、前記無線設定情報記憶部に記憶された前記有効時間を延長する有効時間延長手段を設けたことを特徴とする。

【0018】

また、請求項６に記載の発明は、請求項４又は請求項５に記載の発明において、前記画像送信手段は、前記画像投影装置から送信される時間情報と前記無線設定情報記憶部に記憶された前記有効時間とに基づき、前記有効時間が経過したと判定すると、前記無線通信部の機能を停止することを特徴とする。

【0019】

また、請求項７に記載の発明は、無線部を有し、前記無線部で受信される画像データに応じた画像を投影する画像投影装置と、前記画像投影装置に前記画像データを送信するコンピュータ装置と、前記コンピュータ装置の無線部として機能する無線デバイスとを備えた画像投影システムにおける前記画像投影装置において、前記画像投影装置は、前記無線デバイスのコネクタを接続可能な接続部と、前記無線デバイスが前記接続部に接続されたとき、前記無線通信の設定情報を前記無線デバイスの無線設定情報記憶部に書き込む制御部とを備えたことを特徴とする。

【0020】

また、請求項８に記載の発明は、請求項７に記載の発明において、前記制御部は、前記無線デバイスが前記接続部に接続されたとき、前記無線部の動作を所定期間停止することを特徴とする

また、請求項９に記載の発明は、請求項７又は請求項８に記載の発明において、に記載の発明において、前記制御部は、当該画像投影装置の電源がＯＮとなったときに、前記無線デバイスが前記接続部に接続されているときは、前記無線通信の設定情報を前記無線デバイスの無線設定情報記憶部に書き込むことを特徴とする。

【0021】

また、請求項１０に記載の発明は、請求項７又は請求項８に記載の発明において、に記載の発明において、前記無線デバイスの無線設定情報記憶部に対して前記無線通信の設定情報の書き込み動作を指示する書き込み指示操作部を備え、前記制御部は、前記書き込み指示操作部が操作されたとき、前記無線通信の設定情報を前記無線デバイスの前記無線設定情報記憶部に書き込むことを特徴とする。

【0022】
　また、請求項１１に記載の発明は、請求項７～１０のいずれか１項に記載の発明において、前記制御部は、前記無線デバイスの識別情報が特定の識別情報でないと判定すると、前記無線デバイスの設定情報記憶部へ前記無線通信の設定情報の書き込みを行わないことを特徴とする。
【0023】
　また、請求項１２に記載の発明は、請求項７～１１のいずれか１項に記載の発明において、前記無線通信の設定情報には、前記無線通信における暗号キーを含み、前記無線通信の設定情報を前記無線デバイスの無線設定情報記憶部に書き込む前に、前記無線通信の設定情報のうち少なくとも前記暗号キーを生成する設定情報生成部を備えたことを特徴とする。
【0024】
　また、請求項１３に記載の発明は、請求項１２に記載の発明において、前記設定情報生成部は、当該画像投影装置の電源がＯＮとなる毎に、前記無線通信の設定情報のうち少なくとも前記暗号キーを生成して更新することを特徴とする。
【0025】
　また、請求項１４に記載の発明は、請求項１２又は請求項１３に記載の発明において、前記無線通信の設定情報のうち少なくとも前記暗号キーを生成して更新する動作を指示する更新指示操作部を備え、前記設定情報生成部は、前記更新操作部が操作される毎に、前記無線通信の設定情報のうち少なくとも前記暗号キーを生成して更新することを特徴とする。
【0026】
　また、請求項１５に記載の発明は、請求項１２～１４のいずれか１項に記載の発明において、前記無線部を介して前記コンピュータ装置との通信が行われない期間が所定期間以上となったとき、前記無線通信の設定情報のうち少なくとも前記暗号キーを生成して更新することを特徴とする。
【0027】
　また、請求項１６に記載の発明は、請求項１２～１５のいずれか１項に記載の発明において、前記無線通信の設定情報には、前記無線デバイスにおける無線通信部を機能させる有効期間を含み、前記設定情報生成部は、前記有効期間を生成することを特徴とする。
【0028】
　また、請求項１７に記載の発明は、無線部を有し、前記無線部で受信される画像データに応じた画像を投影する画像投影装置と、前記画像投影装置に前記画像データを送信するコンピュータ装置と、前記コンピュータ装置の無線部として機能する無線デバイスとを備えた画像投影システムにおいて、前記無線デバイスは、前記画像投影装置及び前記コンピュータ装置のいずれにも接続可能なコネクタと、前記画像投影装置に前記コネクタを接続したときに、前記画像投影装置から前記無線通信の設定情報を書き込み可能であり、かつ前記コンピュータ装置に前記コネクタを接続したときに、前記画像投影装置から書き込まれた前記無線通信の設定情報を前記コンピュータ装置により読み出し可能な無線設定情報記憶部と、前記コンピュータ装置に前記コネクタを接続したときに、前記画像投影装置から書き込まれた前記無線通信の設定情報に基づいた設定により前記画像投影装置の無線部と通信を行う無線通信部とを備えたことを特徴とする。
【発明の効果】
【0029】
　請求項１，１７に記載の発明における無線デバイスは、無線部を有し、無線部で受信される画像データに応じた画像を投影する画像投影装置に、画像データを無線通信により送信するコンピュータ装置の無線部として機能するものであり、画像投影装置及びコンピュータ装置のいずれにも接続可能なコネクタと、画像投影装置にコネクタを接続したときに、画像投影装置から無線通信の設定情報を書き込み可能であり、かつコンピュータ装置にコネクタを接続したときに、画像投影装置から書き込まれた無線通信の設定情報をコンピ

ュータ装置により読み出し可能な無線設定情報記憶部と、コンピュータ装置にコネクタを接続したときに、画像投影装置から書き込まれた無線通信の設定情報に基づいた設定により画像投影装置の無線部と通信を行う無線通信部とを備えたので、画像投影装置によって設定された無線通信の設定情報に基いて、画像投影装置とコンピュータ装置との間の通信を行うことができ、機密性の高い無線デバイス或いは画像投影システムを提供することが可能となる。

【0030】

また、請求項２に記載の発明によれば、画像投影装置に画像データを無線通信部を介して送信する画像送信手段としてコンピュータ装置を機能させるプログラムを格納するプログラム格納部を備えたので、コンピュータ装置は、このプログラム格納部からプログラムを読み出して実行することにより、画像投影装置に画像データを無線通信部を介して送信する画像送信手段として機能することになり、無線デバイスを用いての無線通信設定を容易に行うことができる。

【0031】

また、請求項３に記載の発明によれば、画像投影装置への画像データの送信動作の停止を指示する画像送信停止操作部が操作されたとき、画像投影装置に特定画像を投影させるための要求を無線通信部を介して画像投影装置へ送信するので、コンピュータ装置のユーザの操作によって、コンピュータ装置から送信する画像データに代えて特定の画像を画像投影装置から投影させることができ、コンピュータ装置から送信される画像データを見せたくないときに有効となる。

【0032】

また、請求項４，１６に記載の発明によれば、無線通信の設定情報には、無線通信部を機能させる有効時間を含むので、画像投影装置によって無線デバイスによる画像投影装置との無線通信の有効時間を設定することができる。従って、例えば、プレゼンテーションなどの会議に画像投影装置を使用され、不特定多数の参加者のコンピュータ装置が用いられる場合であっても、以前に画像投影装置を使用したコンピュータ装置であって無線デバイスを取り付けたコンピュータ装置から誤って画像データが送信され、画像投影装置から送信されることを回避することができる。

【0033】

また、請求項５に記載の発明によれば、無線設定情報記憶部に記憶された有効時間を延長する有効時間延長手段を設けたので、プレゼンテーションなどの会議が延びた場合であっても、継続して、コンピュータ装置の画像データを画像投影装置から投影することができる。

【0034】

また、請求項６に記載の発明によれば、画像送信手段は、画像投影装置から送信される時間情報と無線設定情報記憶部に記憶され有効時間とに基づき、有効時間が経過したと判定すると、無線通信部の機能を停止するので、有効期間の精度を向上させることができる。すなわち、コンピュータ装置で生成する時間情報が誤っている場合であっても、有効期間を生成した画像投影装置の時間情報により有効時間の経過を検出することができるので、有効時間の経過を精度よく検出することができる。

【0035】

また、請求項７に記載の発明によれば、無線部を有し、無線部で受信される画像データに応じた画像を投影する画像投影装置と、画像投影装置に画像データを送信するコンピュータ装置と、コンピュータ装置の無線部として機能する無線デバイスとを備えた画像投影システムにおける画像投影装置において、画像投影装置は、無線デバイスのコネクタを接続可能な接続部と、無線デバイスが接続部に接続されたとき、無線通信の設定情報を無線デバイスの無線設定情報記憶部に書き込む制御部とを備えたので、画像投影装置によって無線デバイスに対して無線通信の設定情報を設定し、この設定情報に基いて画像投影装置とコンピュータ装置との間の通信を行うことができるので、機密性の高い画像投影システムを提供することが可能となる。

【0036】
　また、請求項８に記載の発明によれば、制御部は、無線デバイスが接続部に接続されたとき、無線部の動作を所定期間停止するので、画像投影装置において、無線デバイスと無線部との意図しない通信を回避することができるとともに、無線部を停止することにより消費電力を低減することができる。
【0037】
　また、請求項９に記載の発明によれば、制御部は、画像投影装置の電源がＯＮとなったときに、無線デバイスが接続部に接続されているときは、無線通信の設定情報を無線デバイスの無線設定情報記憶部に書き込むので、例えば、無線デバイスのコネクタを画像投影装置に接続した状態を、画像投影装置及び無線デバイスの収納状態とすれば、画像投影装置の電源ＯＮにするだけで、無線デバイスへの書き込みが行われ、利便性に優れる。
【0038】
　また、請求項１０に記載の発明によれば、無線デバイスの無線設定情報記憶部に対して無線通信の設定情報の書き込み動作を指示する書き込み指示操作部を備え、制御部は、書き込み指示操作部が操作されたとき、無線通信の設定情報を前記無線デバイスの無線設定情報記憶部に書き込むので、ユーザの希望するタイミングにより無線デバイスへ無線通信の設定情報を書き込みことが可能となる。
【0039】
　また、請求項１１に記載の発明によれば、制御部は、無線デバイスの識別情報が特定の識別情報でないと判定すると、無線デバイスの設定情報記憶部へ無線通信の設定情報の書き込みを行わないので、専用のデバイスのみを無線デバイスとして用いることができる。
【0040】
　また、請求項１２に記載の発明によれば、無線通信の設定情報には、無線通信における暗号キーを含み、無線通信の設定情報を無線デバイスの無線設定情報記憶部に書き込む前に、無線通信の設定情報のうち少なくとも暗号キーを生成する設定情報生成部を備えたので、コンピュータ装置と画像投影装置との間の無線通信を傍受されてしまう恐れを低減することができる。
【0041】
　また、請求項１３に記載の発明によれば、設定情報生成部は、画像投影装置の電源がＯＮとなる毎に、無線通信の設定情報のうち少なくとも暗号キーを生成して更新するので、仮に暗号キーが知られた場合であっても、その後にコンピュータ装置と画像投影装置との間の無線通信を傍受されてしまう恐れを低減することができる。しかも、暗号キーが異なることになるため、以前に画像投影装置を使用したコンピュータ装置であって無線デバイスを取り付けたコンピュータ装置から誤って画像データが送信され、画像投影装置から送信されることを回避することができる。
【0042】
　また、請求項１４に記載の発明によれば、無線通信の設定情報のうち少なくとも前記暗号キーを生成して更新する動作を指示する更新指示操作部を備え、設定情報生成部は、記更新操作部が操作される毎に、無線通信の設定情報のうち少なくとも暗号キーを生成して更新するので、仮に暗号キーが知られた場合であっても、その後にコンピュータ装置と画像投影装置との間の無線通信を傍受されてしまう恐れを低減することができる。しかも、暗号キーが異なることになるため、以前に画像投影装置を使用したコンピュータ装置であって無線デバイスを取り付けたコンピュータ装置から誤って画像データが送信され、画像投影装置から送信されることを回避することができる。また、画像投影装置の電源をＯＦＦからＯＮにしたときに暗号キーを生成して更新するように構成した場合でも、画像投影装置の電源をＯＦＦにすると、光源であるランプの起動に時間がかかることから、画像投影装置の電源をＯＦＦしたくない場合がある。会議室に画像投影装置を設置しており、会議が連続するような場合である。このような場合であっても、更新指示操作部を設けているため極めて便利である。
【0043】

また、請求項１５に記載の発明によれば、設定情報生成部は、無線部を介してコンピュータ装置との通信が行われない期間が所定期間以上となったとき、無線通信の設定情報のうち少なくとも暗号キーを生成して更新するので、所定期間以上コンピュータ装置と画像投影装置との通信がないときには、例えば、一つのプレゼンテーションが終了したと判定することができるので、プレゼンテーションごとに暗号キーを変更することができる。

【発明を実施するための最良の形態】

【0044】

（画像投影システムＳの概要）

以下、本発明の実施の形態について、図面を参照しながら説明する。図１は本実施形態における画像投影システムＳの全体構成図、図２は本実施形態における画像投影システムＳにおける概略動作を説明するための図、図３は無線デバイスの外観図である。

【0045】

図１に示すように、本実施形態における画像投影システムＳは、外部から入力される画像データに応じた画像をスクリーンに投影する画像投影装置２と、画像投影装置２へ画像データを送信するパーソナルコンピュータ３（以下、「コンピュータ装置３」とする。）と、コンピュータ装置３の無線部として機能するＵＳＢドングルである無線デバイス１とを備えている。コンピュータ装置３は、無線デバイス１における後述のＵＳＢコネクタ１０５（図３及び図４参照）を接続することによって、無線デバイス１を介して画像投影装置２に画像データを送信する。画像投影装置２は、コンピュータ装置３から無線デバイス１を介して無線通信により送信される画像データを受信して、この画像データに応じた画像をスクリーンに投影する。

【0046】

ここで、画像投影装置２と無線デバイス１との間の無線通信は、ＩＥＥＥ８０２．１１ａ／ｂ／ｇなどの無線ＬＡＮ（Local Area Network）規格を満たすことができるように、画像投影装置２及び無線デバイス１は、それぞれ無線ＬＡＮ規格に準拠した無線部を有している。

【0047】

無線ＬＡＮにおいては、上述のように無線通信を行うための設定を予め行わなければならい、設定しなければならない無線通信の設定情報（以下、「無線設定情報」とする。）としては、ネットワーク名であるＳＳＩＤ（Extended Service Set Identifier）や暗号キーであるＷＥＰ（Wired Equipment Privacy）キーなどがあり、ある程度知識がなければ設定することができず、その作業も煩雑である。

【0048】

そこで、本実施形態における画像投影システムＳにおいては、無線デバイス１に無線設定情報を記憶させる無線設定情報記憶部を設けており、これにより無線設定情報の設定を自動的に行うこととしている。しかも、所定のタイミングで暗号キーを変更するようにしており、秘匿性を向上させている。

【0049】

ここで、画像投影システムＳにおける無線通信の設定手順を簡単に説明する。図２は、本実施形態における無線通信の設定手順を説明するための図である。

【0050】

図２（ａ）に示すように、無線デバイス１のＵＳＢコネクタ１０５を画像投影装置２のＵＳＢインターフェイス２０１に接続する。画像投影装置２は、無線デバイス１がＵＳＢインターフェイス２０１を介して接続されたことを検出すると、画像投影装置２の無線部による通信に必要な無線設定情報をＵＳＢインターフェイス２０１を介して無線デバイス１の記憶部に書き込む。このとき、無線デバイス１の書き込み中ランプ１５０（図３参照）が点滅し、無線設定情報を書き込み中であることが知らせられる。

【0051】

画像投影装置２の無線部で用いる無線設定情報を書き込むタイミングは、（ａ）無線デバイス１が画像投影装置２に接続されたとき、（ｂ）画像投影装置２の電源がＯＮになっ

たときに無線デバイス１が画像投影装置２に接続されているとき、或いは（ｃ）画像投影装置２に設けられた書き込み指示操作部としての設定書込ボタン２３０(図１及び図２参照)が操作されたとき、などがある。

【0052】

なお、無線デバイス１が特定のデバイスでないときには、無線設定情報の書き込みは行われない。これは、接続されたデバイスがどのようなデバイスであっても書き込むことにすると、粗悪な無線デバイス１の不正規品（コピー品など）によって画像投影システムＳの動作が不安定となることを回避するためであり、専用のデバイスのみを無線デバイスとして用いることができるようにしている。接続されたデバイスが、専用の無線デバイス１であるか否かは、画像投影装置２が、そのデバイスに付与されている識別情報をデバイスから読み込み、例えば、この識別情報のうちメーカを示す部分が特定の情報であることを検出することによって判断することができる。

【0053】

無線デバイス１への無線設定情報の書き込みが終了すると、書き込み中ランプ１５０の点滅が終了するので、図２（ｂ）に示すように、無線デバイス１を画像投影装置２から取り外して、今度はコンピュータ装置３のＵＳＢインターフェイス３０１に接続する。

【0054】

コンピュータ装置３に無線デバイス１が接続されると、コンピュータ装置３は無線デバイス１に格納されたデバイスドライバプログラム（以下、「デバイスドライバ」と略す）、無線設定アプリケーションプログラム（以下、「無線設定アプリケーション」と略す）及び画像転送アプリケーションプログラム（以下、「画像転送アプリケーション」と略す）をインストールする。コンピュータ装置３の制御部は、無線設定アプリケーションの実行により、無線デバイス１の記憶部から無線設定情報を取り出し、この無線設定情報をデバイスドライバを用いて無線デバイス１の無線通信部に設定する。また、コンピュータ装置３の制御部は、画像転送アプリケーションの実行により、画像投影装置２に画像データを無線通信部を介して送信する画像送信手段として機能する。

【0055】

以上により、画像投影装置２及び無線デバイス１の無線設定情報を合わせることができ、画像投影装置２と無線デバイス１との間で無線通信が可能となる。その後、図２（ｃ）に示すように、コンピュータ装置３の画像転送アプリケーションの実行によりコンピュータ装置３から無線デバイス１を介して、画像投影装置２へ画像データが送信され、画像投影装置２ではその画像データに基づいた画像をスクリーンに投影する。

【0056】

また、無線デバイス１には、図３に示すように、画像送信停止操作部としての画像転送停止スイッチ１４０が設けられている。この画像転送停止スイッチ１４０が操作されると、コンピュータ装置３の画像転送アプリケーションがその操作を検出して、表示画面の転送を停止し、画像投影装置２から特定画像を投影させるための要求を無線デバイス１を介して画像投影装置２へ送信する。この要求を受信すると、画像投影装置２は、特定画像を投影する。この特定画像は、画像投影装置２に記憶させた画像データに基づく画像であり、例えば、黒画像、風景画像、「No Signal」を投影する画像などとすることができる。これにより、コンピュータ装置３のユーザは、コンピュータ装置３から画像転送を容易に停止することができ、コンピュータ装置３の画面を切り替える等の煩雑さを回避することができる。

【0057】

また、画像投影装置２によって無線デバイス１に設定される無線設定情報には、無線デバイス１の無線部（後述の無線通信部１０７）を機能させる有効時間が含まれる。コンピュータ装置３の画像転送アプリケーションは、この有効時間を読み取ることにより、無線デバイス１の無線部による無線通信を行うことができる時間を制限する。

【0058】

また、無線デバイス１には、図３に示すように、この有効時間を延長する有効時間延長

手段としての通信時間延長ボタン１４１が設けられており、この通信時間延長ボタン１４１が操作されると、コンピュータ装置３の画像転送アプリケーションがその操作を検出し、無線デバイス１から読み出していた有効時間を延長するように変更する。

【0059】

コンピュータ装置３の画像転送アプリケーションは、画像投影装置２から送信される時刻情報を受信する機能を有しており、この時間情報と無線デバイス１から読み出した有効時間とに基づき、有効時間が経過したと判定する。有効時間が経過したと判断した場合には、無線デバイス１の無線通信部の機能を停止する。

【0060】

ところで、画像投影装置２が無線デバイス１に書き込む無線設定情報が常に一定では、セキュリティ上好ましくない。また、無線デバイス１を外し忘れたコンピュータ装置３から意図しない画像データが画像投影装置２に送信されてしまう恐れがある。そこで、画像投影装置２は無線設定情報のうち少なくとも暗号キーを更新する。

【0061】

画像投影装置２が無線設定情報を更新するタイミングは、（ａ）画像投影装置２の電源がＯＦＦからＯＮになったとき、或いは（ｂ）画像投影装置２に設けられた更新操作部としての更新ボタン２３１(図１及び図２参照)が操作されたとき、（ｃ）無線デバイス１とコンピュータ装置３との通信が行われない期間が所定期間以上になったとき、などがある。

【0062】

（各装置の構成及び動作の説明）

以上のように構成される画像投影システムＳについて、その構成及び動作について更に詳細に説明する。以下、本発明の実施の形態における無線デバイス１、画像投影装置２及びコンピュータ装置３のそれぞれの具体的構成及び動作を説明する。

【0063】

（無線デバイスについて）

まず、無線デバイス１の構成及び動作について説明する。図４は無線デバイス１のブロック図、図５は無線デバイス１の機能ブロック図、図６はメモリコントローラ機能部の構ブロック図である。

【0064】

無線デバイス１は、図４に示すように、ＣＰＵ（Central Processing Unit）１０１、ＲＡＭ(Random Access Memory)１０２、ＲＯＭ(Read Only Memory)１０３、フラッシュメモリ１０４、ＵＳＢコネクタ１０５、ＵＳＢ接続回路１０６、無線通信部１０７、操作部１０８、報知部１０９などから構成されており、持ち運び可能にコンパクトに設計されている。

【0065】

ＣＰＵ１０１は、ＲＯＭ１０３に格納された制御プログラムを読み出して実行することによって、無線デバイス１の制御部として機能する。また、ＲＯＭ１０３には、識別情報（例えば、ＭＡＣアドレス）が格納されており、ＣＰＵ１０１の制御により、ＵＳＢコネクタ１０５を介して、画像投影装置２やコンピュータ装置３へこの識別情報を送信することができる。

【0066】

ＲＡＭ１０２は、ＣＰＵ１０１によってワーキングメモリなどとして使用される。また、フラッシュメモリ１０４は、無線設定情報などを格納する無線設定情報記憶部等として機能する。

【0067】

ここで、無線設定情報には、図９に示すように、無線ＬＡＮ規格種別（バンド）、ネットワークモード、ネットワーク名（ＥＳＳＩＤ）、無線チャンネル、認証レベル、暗号化レベル、データ暗号化方式、暗号キー、ＩＰアドレス、サブネットマスク、ＤＮＳのアドレス、有効時間などが含まれる。ネットワークモードには、アクセスポイントを必要とす

るインフラストラクチャーモードとアクセスポイントを必要としないアドホックモードがあるが、ここでは、無線デバイス１と画像投影装置間で直接無線通信ができるようにアドホックモードに設定される。

【0068】

ＵＳＢコネクタ１０５は、汎用のＵＳＢコネクタであり、画像投影装置２及びコンピュータ装置３のＵＳＢコネクタに接続することができる。ＵＳＢコネクタ１０５を画像投影装置２又はコンピュータ装置３に接続したときに、ＣＰＵ１０１は、これらの装置とのデータの送受信をＵＳＢ接続回路１０６を介して行う。ＵＳＢ接続回路１０６は、ＵＳＢ規格に準じてデータの送受信を行うためのインターフェイス回路である。

【0069】

このＵＳＢコネクタ１０５が画像投影装置２に接続されたとき、フラッシュメモリ１０４に画像投影装置２から無線設定情報を書き込み可能となるように、ＣＰＵ１０１によって制御される。また、ＵＳＢコネクタ１０５がコンピュータ装置３に接続されたとき、フラッシュメモリ１０４に書き込まれた無線設定情報をコンピュータ装置３により読み出し可能となるように、ＣＰＵ１０１により制御される。

【0070】

無線通信部１０７は、アンテナ１１０と、ＲＦ部１１１と、ベースバンド部１１２とを有しており、無線ＬＡＮ規格に基づいてデータの送受信を行うことができる。なお、ＲＦ部１１１とベースバンド部１１２とはＷＬＡＮ（Wireless Local Area Network）チップにより構成される。

【0071】

無線通信部１０７は、コンピュータ装置３にＵＳＢコネクタ１０５を接続したときに、画像投影装置２から書き込まれた無線設定情報に基づいた設定により画像投影装置の無線部と通信を行う。ここで、画像投影装置２から書き込まれた無線設定情報はまずコンピュータ装置３に読み込まれ、このように読み込んだ無線設定情報をコンピュータ装置３から無線デバイス１へ送信して、無線通信部１０７をその無線設定情報に従って無線通信を行わせるようにする方式や、ＣＰＵ１０１が画像投影装置２から無線設定情報を読み込んで無線通信部１０７をその無線設定情報に従って無線通信を行わせる方式などがあり、ここでは、前者の方式を例に挙げて説明する。

【0072】

操作部１０８は、画像転送停止スイッチ１４０、通信時間延長ボタン１４１やリセットボタン１４２（図３参照）などを有しており、これらのボタンが操作されると、ＣＰＵ１０１がその操作を検出し、検出した操作に応じた処理を行う。

【0073】

画像転送停止スイッチ１４０は、画像投影装置２への画像データの送信動作の停止を指示するためのスライドスイッチ（画像送信停止操作部の一例に相当）であり、画像停止ＯＮモードと、画像停止ＯＦＦモードとを切り替える切替スイッチである。コンピュータ装置３にＵＳＢコネクタ１０５を介して接続されている状態で、この画像転送停止スイッチ１４０が画像停止ＯＮモード側へ操作されたとき、ＣＰＵ１０１は、その旨の情報をコンピュータ装置に通知する。コンピュータ装置３のＣＰＵ３０５は、その情報を受信すると、画像転送アプリケーションの実行により、画像投影装置に特定画像（ここでは、黒画画像）を投影させるための要求を無線通信部１０７を介して画像投影装置２へ送信する。

【0074】

なお、コンピュータ装置３にＵＳＢコネクタ１０５を介して接続されている状態で、この画像転送停止スイッチ１４０が画像停止ＯＮモード側へ操作されたとき、ＣＰＵ１０１は、コンピュータ装置３から入力されるデータを画像投影装置１へ送信せずに、画像投影装置に特定画像を投影させるための要求を無線通信部１０７を介して画像投影装置２へ送信するようにしてもよい。

【0075】

通信時間延長ボタン１４１は、フラッシュメモリ１０４に記憶された無線設定情報のう

ち有効時間を変更するための操作ボタン（有効時間延長手段の一例に相当）であり、押しボタン式のスイッチである。コンピュータ装置３にＵＳＢコネクタ１０５を介して接続されている状態で、この通信時間延長ボタン１４１が操作（押下）されたとき、ＣＰＵ１０１は、画像投影装置２と無線通信するための有効時間を延長する処理を行う。この処理は、ＣＰＵ１０１が、通信時間延長ボタン１４１が画像停止ＯＮモード側へ操作されたことコンピュータ装置３へ通知し、このコンピュータ装置３が無線デバイス１から取り出した有効時間を延長することによって行う。つまり、コンピュータ装置３は、画像投影装置２との無線通信を行うに当たり、無線デバイス１のフラッシュメモリ１０４に書き込まれた有効時間を読み出しておき、コンピュータ装置３の記憶部に記憶しておく。このように記憶した有効時間を経過したか否かを判定する。また、この記憶した有効時間を変更することによって有効時間を延長する。

【0076】

なお、ＣＰＵ１０１によってフラッシュメモリ１０４に記憶した無線設定情報のうち有効時間を取り出し、この有効時間に延長時間（例えば、１時間）を加算し、フラッシュメモリ１０４に記憶した有効時間を上書きすることによって有効時間の延長を行うようにしてもよい。この場合、コンピュータ装置３の制御部２０３は、有効時間が経過したかの判定を行う毎に、無線デバイス１から有効時間を読み出すことになる。

【0077】

報知部１０９は、書き込み中ランプＬＥＤ１５０、画像転送中ランプ１５１、アラームランプ１５２（図３参照）などを有しており、ＣＰＵ１０１は、状況に応じてこれらのランプを点灯或いは点滅させる。例えば、無線設定情報がフラッシュメモリ１０４に書き込まれ中であるときには書き込み中ランプＬＥＤ１５０を点滅させる。また、コンピュータ装置３から画像投影装置３へ画像データを送信中であるときには画像転送中ランプ１５１を点滅させる。なお、これらのランプは、ＬＥＤなどによって構成される。

【0078】

ここで、図５に無線デバイス１の機能ブロック図を示す。図５に示すように、無線デバイス１は、ＵＳＢインターフェイス機能部１２０と、メモリコントローラ機能部１２１と、ＵＳＢハブ機能部１２２と、無線通信機能部１２３とを有している。

【0079】

ＵＳＢインターフェイス機能部１２０は、図４におけるＵＳＢコネクタ１０５及びＵＳＢ接続回路１０６に対応し、画像投影装置２やコンピュータ装置３との間でＵＳＢ規格に基づいてデータの送受信を行う。

【0080】

メモリコントローラ機能部１２１は、図４におけるＣＰＵ１０１及びフラッシュメモリ１０４に対応し、フラッシュメモリ１０４を、無線設定情報を記憶するＵＳＢメモリとしての機能させるリムーバル認識部１２４と、フラッシュメモリ１０４を、画像転送プログラムをコンピュータ装置３へ転送するためのＣＤ－ＲＯＭとしての機能させるＣＤ－ＲＯＭ認識部１２５とを備えており、ＵＳＢハブ機能部１２２によって無線デバイス１を画像投影装置２やコンピュータ装置３にＵＳＢメモリ及びＣＤ－ＲＯＭとしてそれぞれ認識させるようにしている。

【0081】

無線通信機能部１２３は、図４における無線通信部１０７に対応し、無線デバイス１のＵＳＢコネクタ１０５をコンピュータ装置３に接続したときに、コンピュータ装置３にインストールされたドライバソフトによって制御される。

【0082】

メモリコントローラ機能部１２１は、図６に示すように、リムーバル認識部１２４及びＣＤ－ＲＯＭ認識部１２５を有する他、物理メモリ部（フラッシュメモリ１０４の一部）には、無線設定アプリケーションや画像転送アプリケーションなどの複数のアプリケーションプログラム１３０と、デバイスドライバ１３１と、インストーラプログラム１３２と、無線設定情報１３３とが記憶される。なお、物理メモリ部としてのフラッシュメモリ１

０４は、一つのフラッシュメモリで構成しても複数のフラッシュメモリで構成してもよい。

【0083】

画像転送アプリケーションは、コンピュータ装置３にインストールされることにより、コンピュータ装置３に、無線デバイス１を制御して、コンピュータ装置３からの画像データを画像投影装置２へ送信する画像送信手段として機能させるものである。

【0084】

また、デバイスドライバ１３１は、コンピュータ装置３にインストールされることにより、コンピュータ装置３に、無線デバイス１の無線通信部１０７を制御する機能を実行させるものである。

【0085】

また、無線設定アプリケーションは、コンピュータ装置３にインストールされることにより、コンピュータ装置３に、無線デバイス１に無線設定情報などを設定する機能を実行させるものである。

【0086】

インストーラプログラム１３２は、コンピュータ装置３によって実行されることにより、画像転送アプリケーション１３０やデバイスドライバ１３１をコンピュータ装置３にインストールするものである。

【0087】

（画像投影装置２について）

画像投影装置２は、図7に示すように、ＵＳＢコネクタ（接続部の一例に相当する）を有し、ＵＳＢ規格に基づく通信を行うＵＳＢインターフェイス２０１と、各種操作を行うための操作パネル２０２と、画像投影装置２全体を制御する制御部２０３と、無線設定情報などの情報を保持するための不揮発性メモリ２０４と、計時手段である時計回路２０５と、無線ＬＡＮ規格に準拠した無線通信を行う無線部２０６と、外部から映像信号を入力する映像信号入力回路２０７と、映像信号入力回路２０７を介して入力される映像信号や無線部２０６を介して受信される画像データに基づいた画像を投影する投影部２０８とを備えており、これらはハウジングに内蔵される。

【0088】

ＵＳＢインターフェイス２０１のＵＳＢコネクタには、無線デバイス１のＵＳＢコネクタを接続することができる。制御部２０３は、無線デバイス１のＵＳＢコネクタ１０５がＵＳＢインターフェイス２０１に接続されているか否かを検出し、接続されている場合には、無線デバイス１とのデータの送受信を行う。

【0089】

操作パネル２０２は、投影装置において使用者が操作可能な箇所、すなわちハウジングの外壁面の適所に設けられており、使用者がこの操作パネル２０２を操作することによって、その操作内容に応じた制御を制御部２０３が実行する。操作パネル２０２には、上述した設定書込ボタン２３０（書き込み指示操作部の一例に相当）や更新ボタン２３１（更新操作部の一例に相当）などが配置されている。

【0090】

制御部２０３は、ＣＰＵ，ＲＯＭ，ＲＡＭなどを内蔵しており、ＣＰＵがＲＯＭに予め格納されたプログラムを読み出して実行することによって制御部として機能する。なお、ＲＡＭはワーキングメモリなどとして用いられる。

【0091】

不揮発性メモリ２０４は、例えば、フラッシュメモリ（flash memory）などから構成され、制御部２０３によって生成される無線設定情報などを保持する。

【0092】

無線部２０６は、アンテナとアンテナを介して無線信号を送受信するＲＦ（無線）ユニットなどから構成される無線回路２１０と、無線回路２１０により送受信する無線信号を無線ＬＡＮ規格に準じた無線信号とする処理を行う無線制御部２１１とを備えている。な

お、ここでの無線制御部２１１は、マイクロコンピュータから構成される。

【0093】

映像信号入力回路２０７は、コンポジット映像信号（例えばＮＴＳＣ映像信号）やコンポーネント映像信号（例えばＲＧＢ信号）などの映像信号を外部からケーブルを介して入力するときのためのものである。

【0094】

投影部２０８は、ランプ駆動回路２２０と、光源２２１と、照明光学系２２２と、透過型液晶パネル２２３（以下、「ＬＣＤ２２３」とする。）と、結像光学系２２４と、画像処理回路２２５と、ＬＣＤ駆動回路２２６と、ピント調整回路２２７とを備えている。

【0095】

光源２２１は、ランプなどから構成され、制御部２０３によって制御されたランプ駆動回路２２０から出力される信号に基づいて、点灯駆動されて発光する。光源２２１で発光された光は、照明光学系２２２によって、照明光としてＬＣＤ２２３に照射される。

【0096】

画像処理回路２２５は、制御ユニットＵによる制御に基づいて、映像信号入力回路２０７に入力された映像信号或いは無線部２０６により受信した画像データに対し、信号の付加や変更などの加工を行う。このように加工されて生成された画像信号は、ＬＣＤ駆動回路２２６に入力される。

【0097】

ＬＣＤ２２３は、ＬＣＤ駆動回路２２６によって駆動され、その表示面に映像を表示する。このように表示された映像は、照明光学系２２２からの照明光によって、光としてＬＣＤ２２３から出射される。続いて、この出射光は、結像光学系２２４及びハウジングの投影用開口部を通って、スクリーン（投射面）に投影される。このように、ＬＣＤ２２３に表示される画像がスクリーンに投影される構成となっている。なお、ピント調整機構によって、スクリーンに投影する画像のピントを調整することができる。

【0098】

ここで、画像投影装置２における無線情報の設定について、図８、図１０及び図１１のフローチャートを参照して具体的に説明する。図８は画像投影装置２における無線情報の設定処理のフローチャート、図９は無線設定情報の一例を示す図、図１０は画像投影装置２における有効時間埋め込み処理のフローチャート、図１１は画像投影装置２における暗号キー自動更新処理のフローチャートである。

【0099】

まず、図８を参照して、画像投影装置２における無線情報設定の基本的な動作の一例について説明する。

【0100】

図８に示すように、画像投影装置２の制御部２０３は、画像投影装置２の電源がＯＮされたか否か、設定書込ボタン２３０がＯＮ（押下）されたか否か、及び無線デバイス１が挿入されたか否かを検出する（ステップＳ１００）。この処理において、電源のＯＮ、設定書込ボタン２３０のＯＮ及び無線デバイス１の挿入のいずれかを検出すると（ステップＳ１００：ＹＥＳ）、制御部２０３は、ステップＳ１０１の処理に移行する。

【0101】

ステップＳ１０１において、制御部２０３は、無線部２０６の機能を動作させ、無線部２０６での無線信号の送受信を開始して（ステップＳ１０１）、処理をステップＳ１０２に移行する。

【0102】

ステップＳ１０２において、制御部２０３は、ＵＳＢインターフェイス２０１にＵＳＢデバイスが挿入されているか否かを判定する（ステップＳ１０２）。この処理において、ＵＳＢデバイスが挿入されていると判定すると（ステップＳ１０２：ＹＥＳ）、制御部２０３は、ＵＳＢデバイスの識別情報を取得する（ステップＳ１０３）。ここでは、識別情報として、ＵＳＢデバイスに割り当てられたＭＡＣアドレスを例に挙げて説明する。