FIG. 6

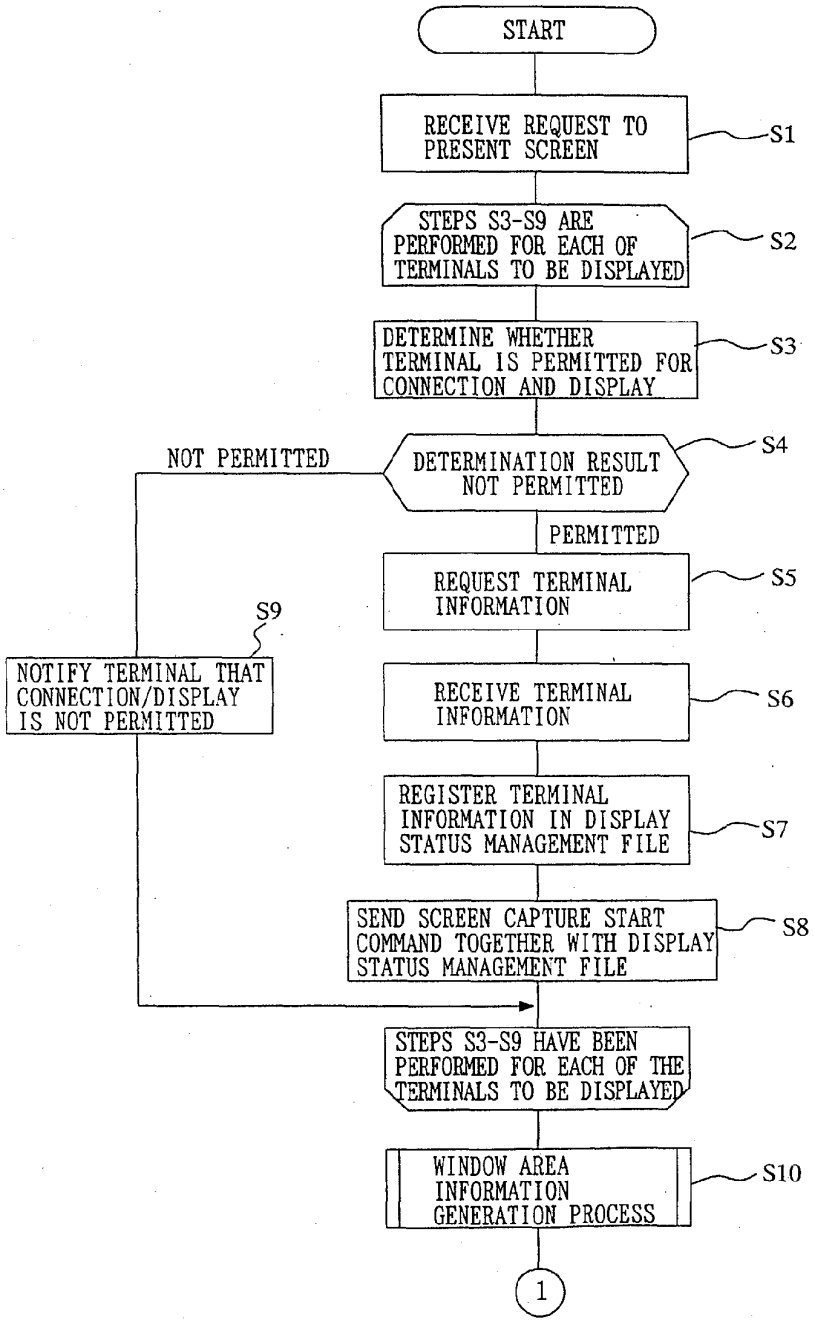

START
RECEIVE REQUEST TO PRESENT SCREEN
S1
STEPS S3-S9 ARE PERFORMED FOR EACH OF TERMINALS TO BE DISPLAYED
S2
DETERMINE WHETHER TERMINAL IS PERMITTED FOR CONNECTION AND DISPLAY
S3
NOT PERMITTED
DETERMINATION RESULT NOT PERMITTED
S4
PERMITTED
REQUEST TERMINAL INFORMATION
S5
S9
NOTIFY TERMINAL THAT CONNECTION/DISPLAY IS NOT PERMITTED
RECEIVE TERMINAL INFORMATION
S6
REGISTER TERMINAL INFORMATION IN DISPLAY STATUS MANAGEMENT FILE
S7
SEND SCREEN CAPTURE START COMMAND TOGETHER WITH DISPLAY STATUS MANAGEMENT FILE
S8
STEPS S3-S9 HAVE BEEN PERFORMED FOR EACH OF THE TERMINALS TO BE DISPLAYED
WINDOW AREA INFORMATION GENERATION PROCESS
S10
1

FIG. 7

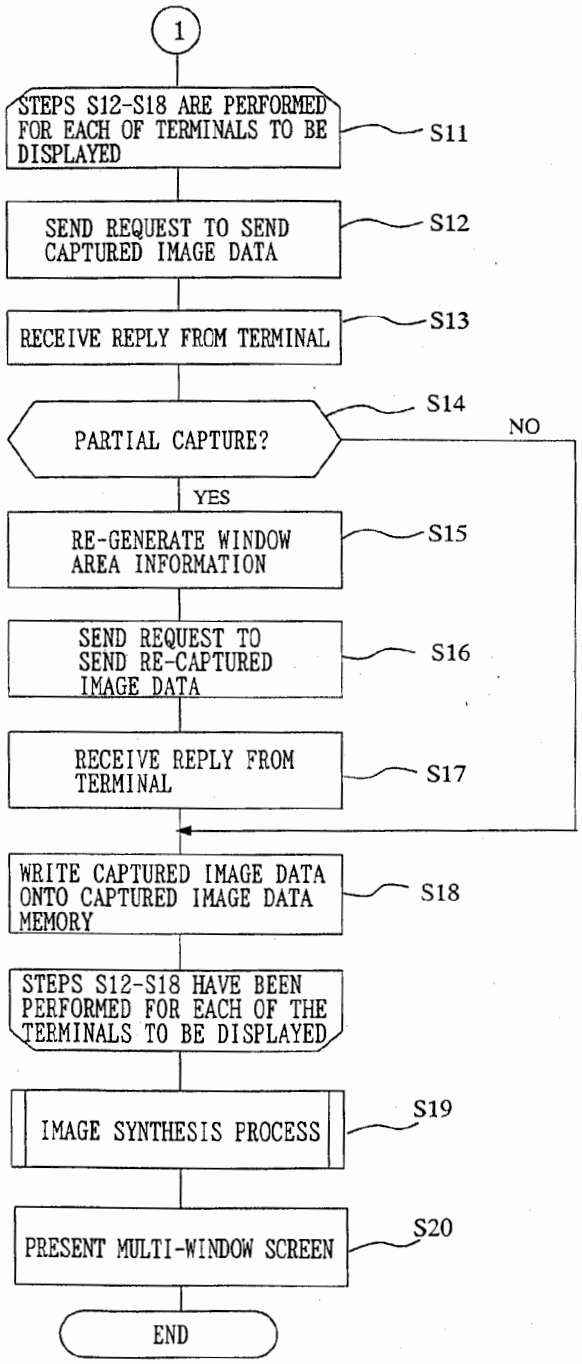

1
STEPS S12-S18 ARE PERFORMED FOR EACH OF TERMINALS TO BE DISPLAYED
S11
SEND REQUEST TO SEND CAPTURED IMAGE DATA
S12
RECEIVE REPLY FROM TERMINAL
S13
PARTIAL CAPTURE?
S14
NO
YES
RE-GENERATE WINDOW AREA INFORMATION
S15
SEND REQUEST TO SEND RE-CAPTURED IMAGE DATA
S16
RECEIVE REPLY FROM TERMINAL
S17
WRITE CAPTURED IMAGE DATA ONTO CAPTURED IMAGE DATA MEMORY
S18
STEPS S12-S18 HAVE BEEN PERFORMED FOR EACH OF THE TERMINALS TO BE DISPLAYED
IMAGE SYNTHESIS PROCESS
S19
PRESENT MULTI-WINDOW SCREEN
S20
END

FIG. 8

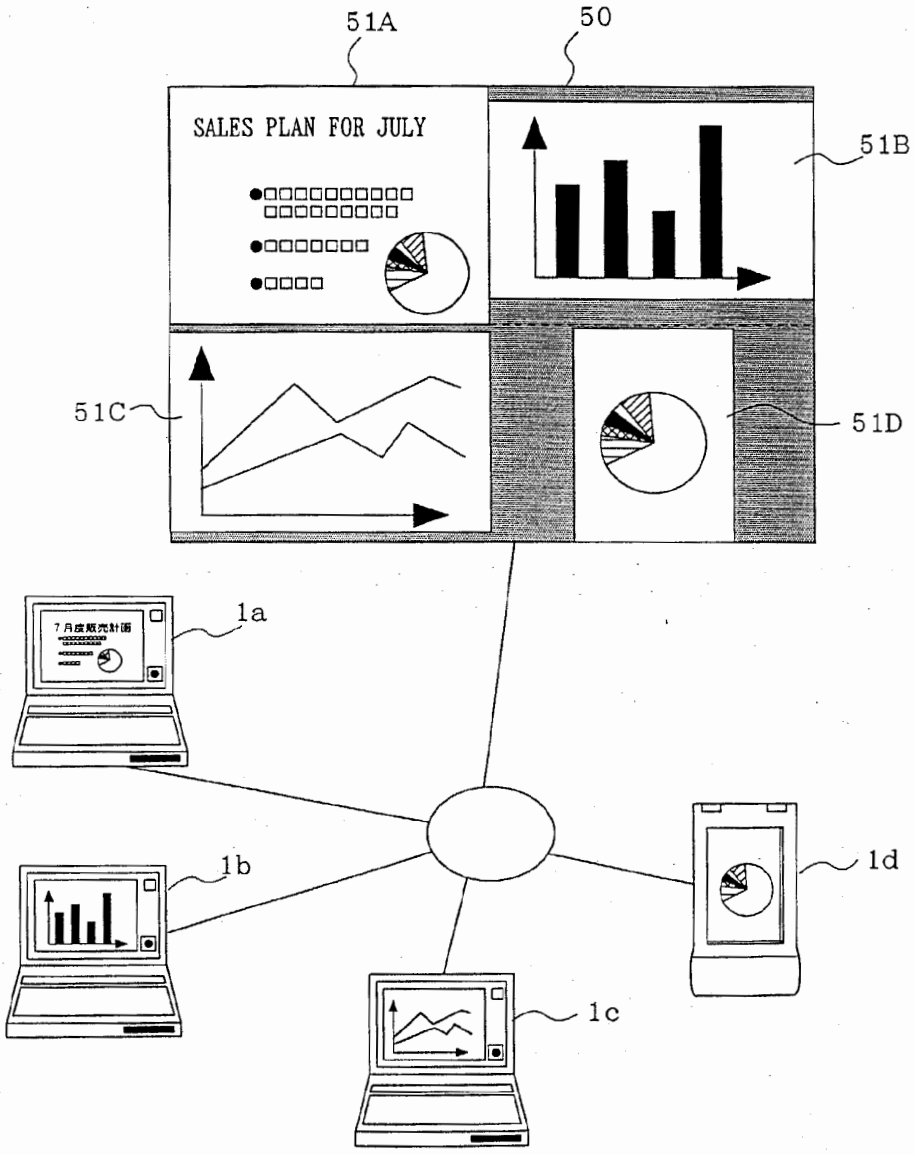


FIG. 9

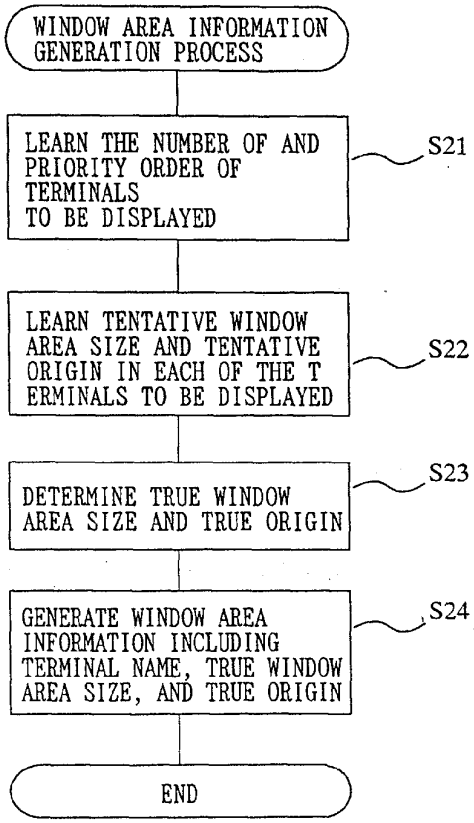

WINDOW AREA INFORMATION GENERATION PROCESS
LEARN THE NUMBER OF AND PRIORITY ORDER OF TERMINALS TO BE DISPLAYED
S21
LEARN TENTATIVE WINDOW AREA SIZE AND TENTATIVE ORIGIN IN EACH OF THE T ERMINALS TO BE DISPLAYED
S22
DETERMINE TRUE WINDOW AREA SIZE AND TRUE ORIGIN
S23
GENERATE WINDOW AREA INFORMATION INCLUDING TERMINAL NAME, TRUE WINDOW AREA SIZE, AND TRUE ORIGIN
S24
END

FIG. 10

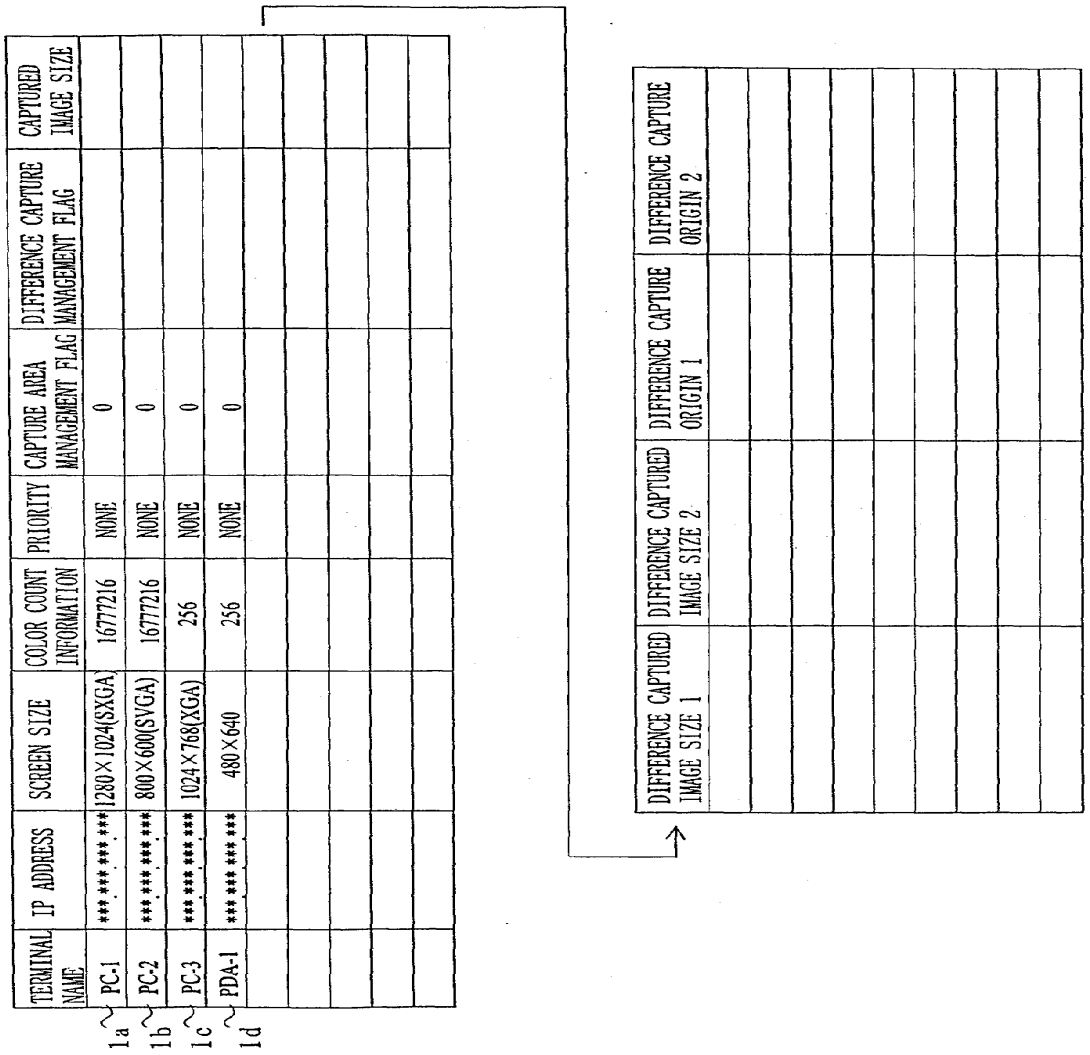

TERMINAL NAME
IP ADDRESS
SCREEN SIZE
COLOR COUNT INFORMATION
PRIORITY
CAPTURE AREA MANAGEMENT FLAG
DIFFERENCE CAPTURE MANAGEMENT FLAG
CAPTURED IMAGE SIZE
1a
PC-1
..***.***
1280×1024(SXGA)
16777216
NONE
0
1b
PC-2
..***.***
800×600(SVGA)
16777216
NONE
0
1c
PC-3
..***.***
1024×768(XGA)
256
NONE
0
1d
PDA-1
..***.***
480×640
256
NONE
0
DIFFERENCE CAPTURED IMAGE SIZE 1
DIFFERENCE CAPTURED IMAGE SIZE 2
DIFFERENCE CAPTURE ORIGIN 1
DIFFERENCE CAPTURE ORIGIN 2

FIG. 11A

NUMBER OF TERMINALS		FIRST	SECOND	THIRD	FOURTH
4	PRIORITY	NONE	NONE	NONE	NONE
		↓	↓	↓	↓
	TENTATIVE SIZE	640×512	640×512	640×512	640×512
	TENTATIVE ORIGIN	0, 0	640, 0	0, 512	640, 512

FIG. 11B

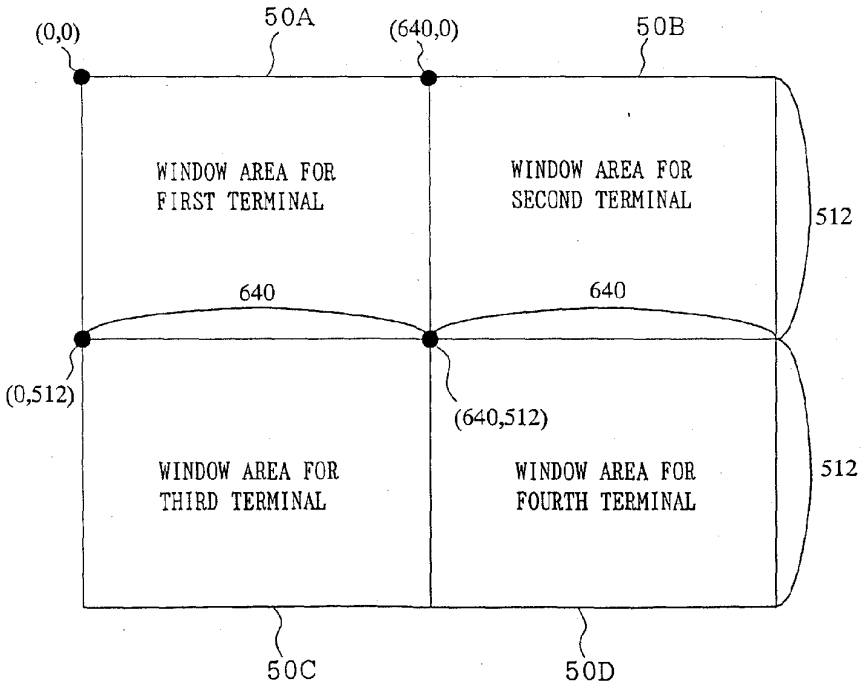


FIG. 12

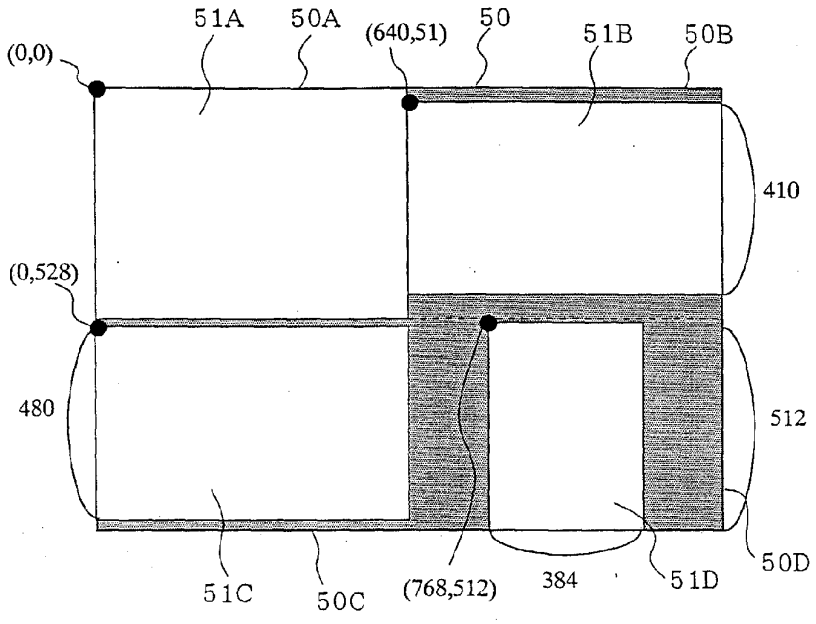


FIG. 13

TERMINAL NAME	PC-1	PC-2	PC-3	PDA-1
TRUE SIZE	640×512	640×410	640×480	384×512
TRUE ORIGIN	0,0	640,51	0,528	768,512

DATE AND TIME: MAY 21, 2002, 17:00:32

FIG. 14

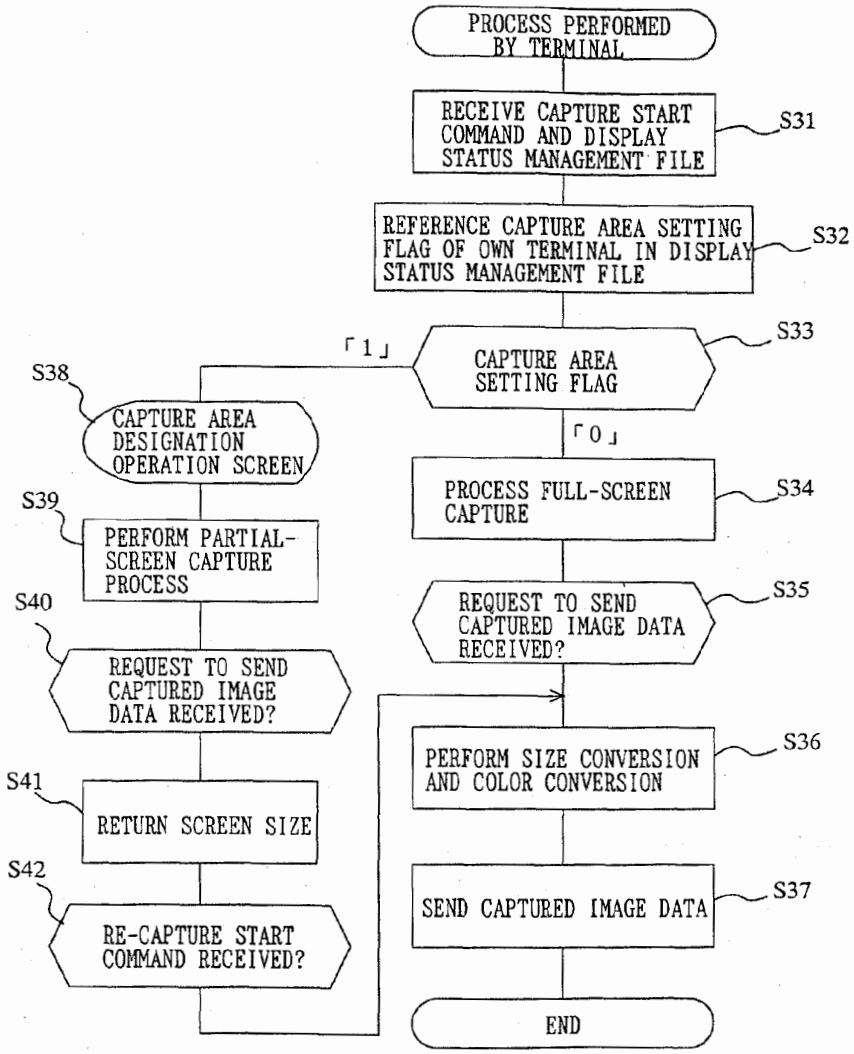

PROCESS PERFORMED BY TERMINAL
RECEIVE CAPTURE START COMMAND AND DISPLAY STATUS MANAGEMENT FILE
S31
REFERENCE CAPTURE AREA SETTING FLAG OF OWN TERMINAL IN DISPLAY STATUS MANAGEMENT FILE
S32
CAPTURE AREA SETTING FLAG
S33
「1」
「0」
S38
CAPTURE AREA DESIGNATION OPERATION SCREEN
PROCESS FULL-SCREEN CAPTURE
S34
S39
PERFORM PARTIAL-SCREEN CAPTURE PROCESS
REQUEST TO SEND CAPTURED IMAGE DATA RECEIVED?
S35
S40
REQUEST TO SEND CAPTURED IMAGE DATA RECEIVED?
PERFORM SIZE CONVERSION AND COLOR CONVERSION
S36
S41
RETURN SCREEN SIZE
S42
SEND CAPTURED IMAGE DATA
S37
RE-CAPTURE START COMMAND RECEIVED?
END

FIG. 15

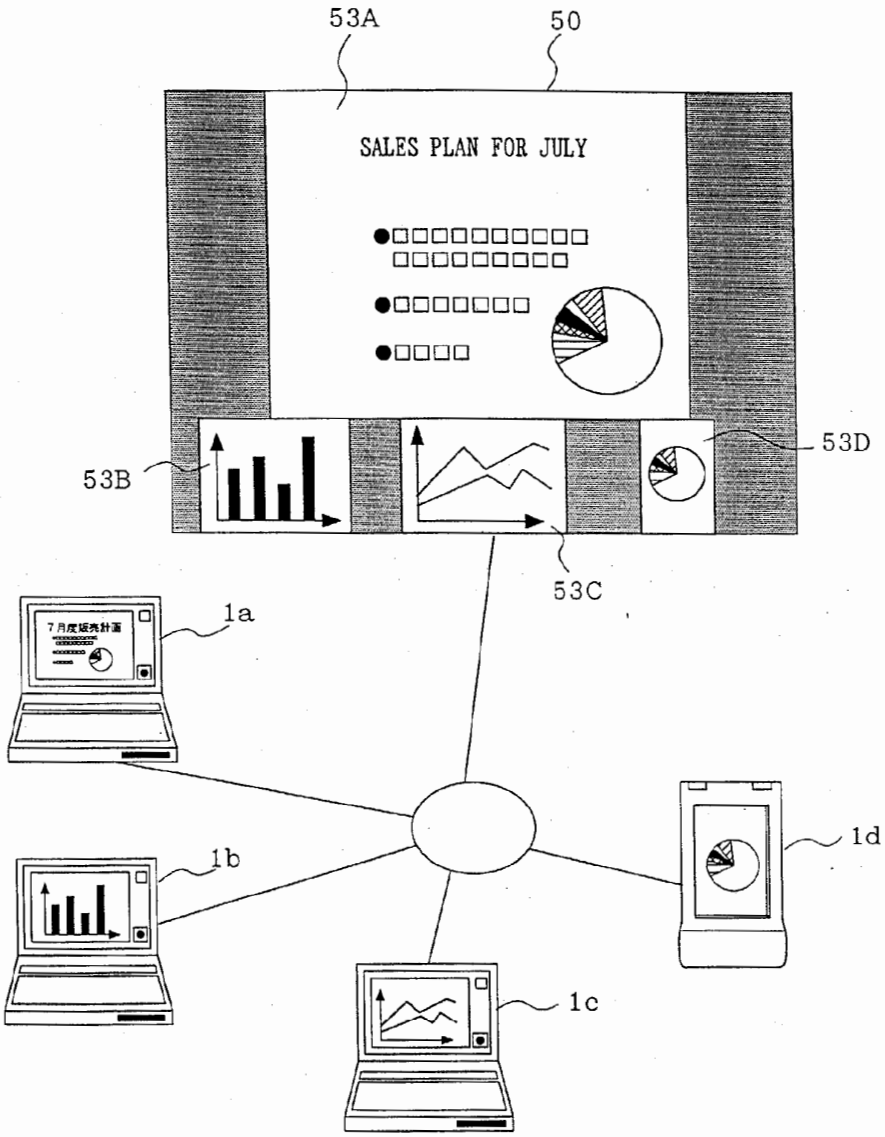


FIG. 16A

NUMBER OF TERMINALS		FIRST	SECOND	THIRD	FOURTH
4	PRIORITY	HIGH	NONE	NONE	NONE
		↓	↓	↓	↓
TENTATIVE SIZE		1280×768	427×256	427×256	426×256
TENTATIVE ORIGIN		0, 0	0,768	427,768	854,768

FIG. 16B

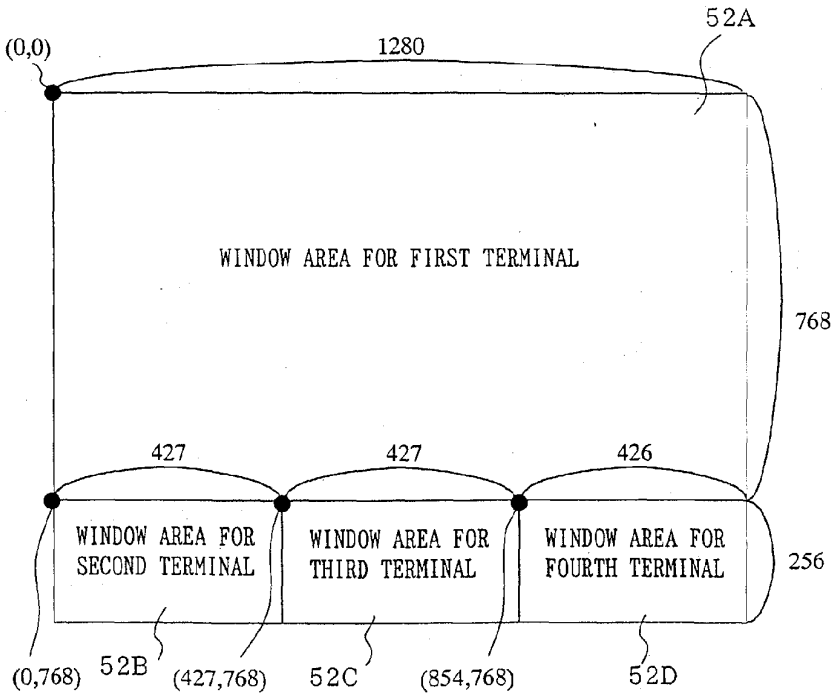


FIG. 17

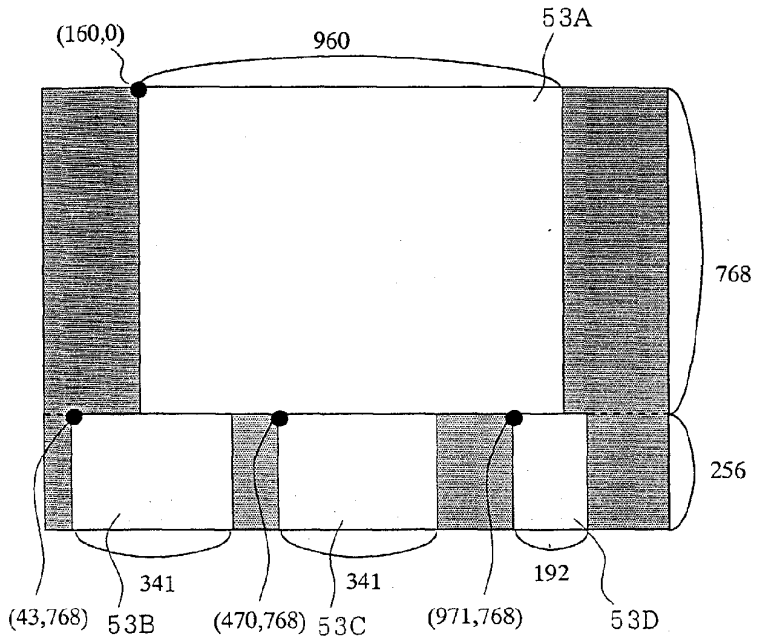


FIG. 18

TERMINAL NAME	PC-1	PC-2	PC-3	PDA-1
TRUE SIZE	960×768	341×256	341×256	192×256
TRUE ORIGIN	160,0	43,768	470,768	971,768

DATE AND TIME: MAY 21, 2002, 17:00:32

FIG. 19

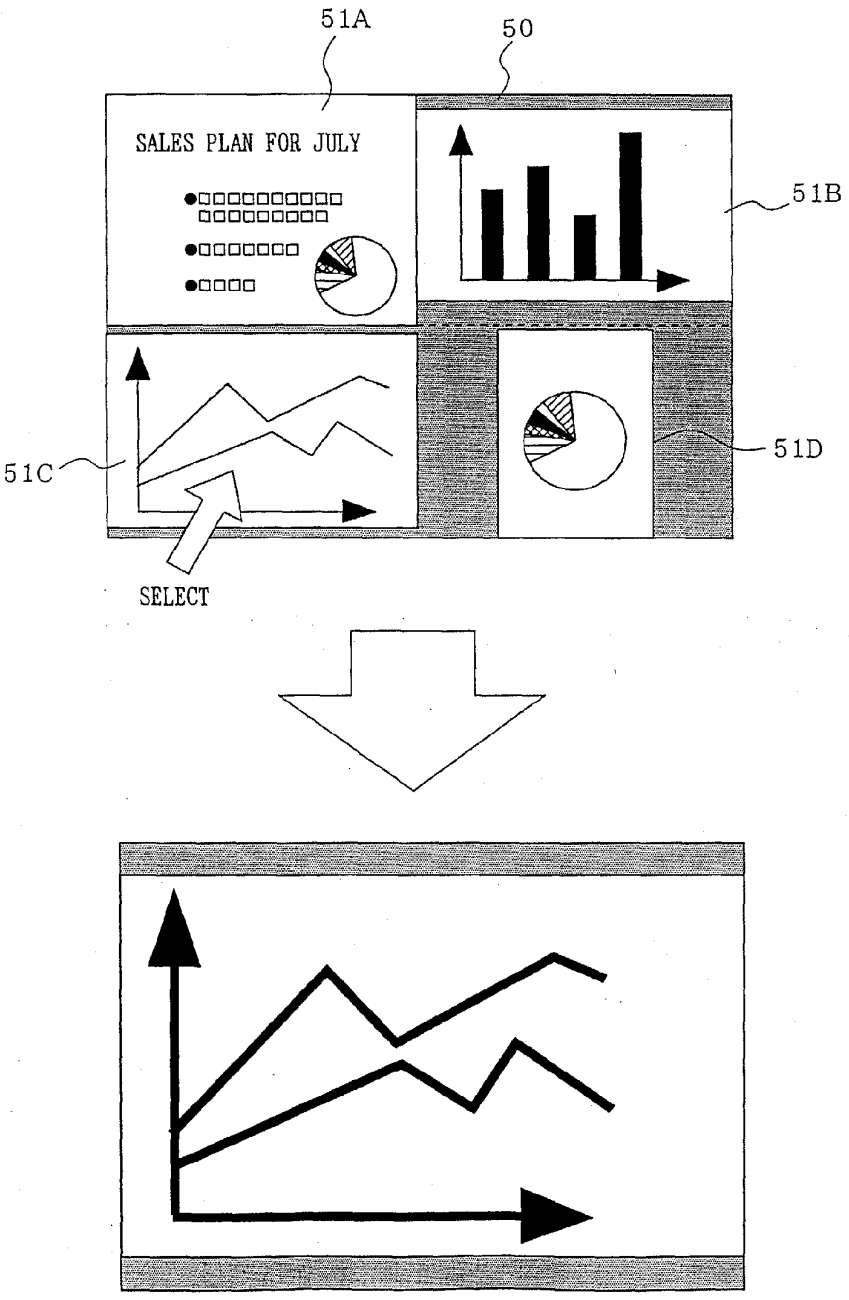


FIG. 20

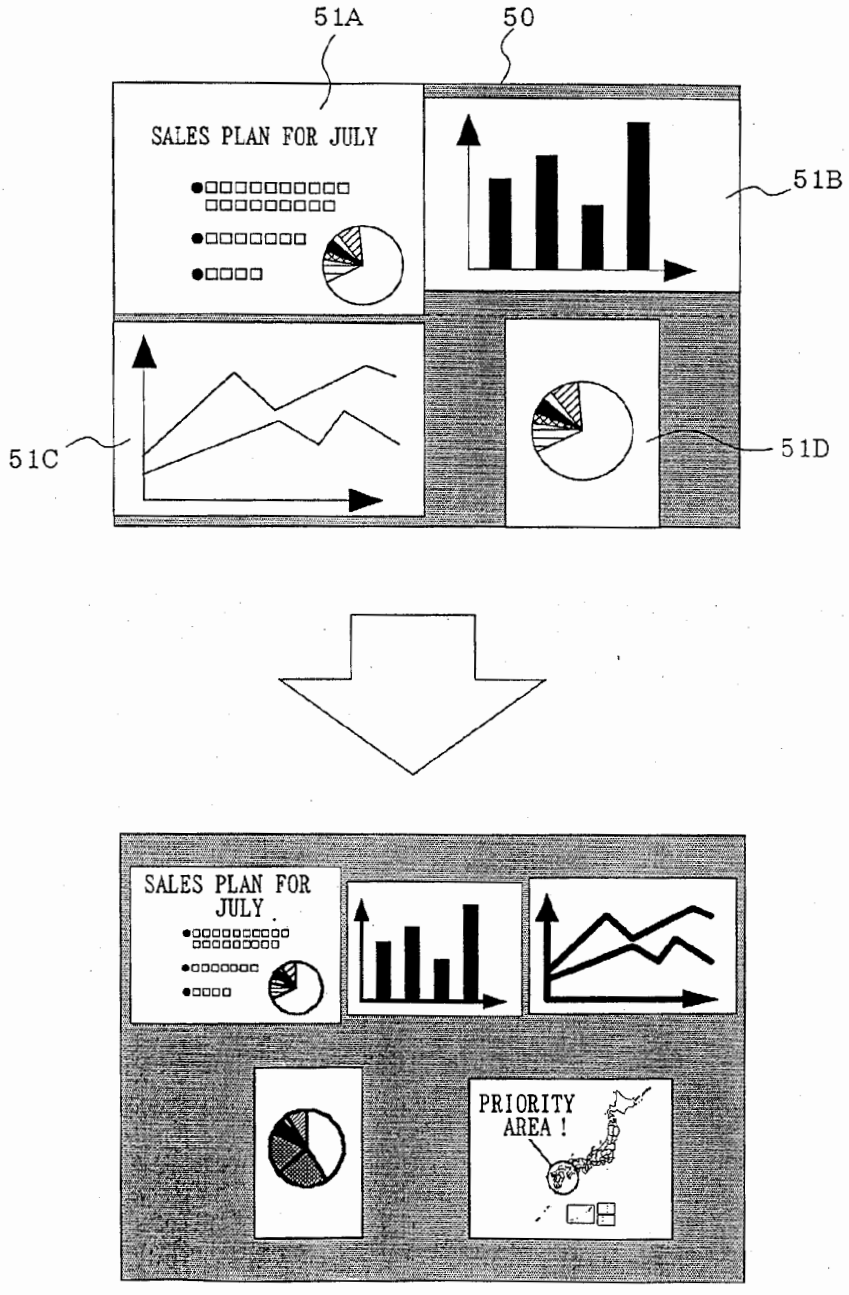

51A
50
SALES PLAN FOR JULY
51B
51C
51D
SALES PLAN FOR JULY
PRIORITY AREA !

FIG. 21

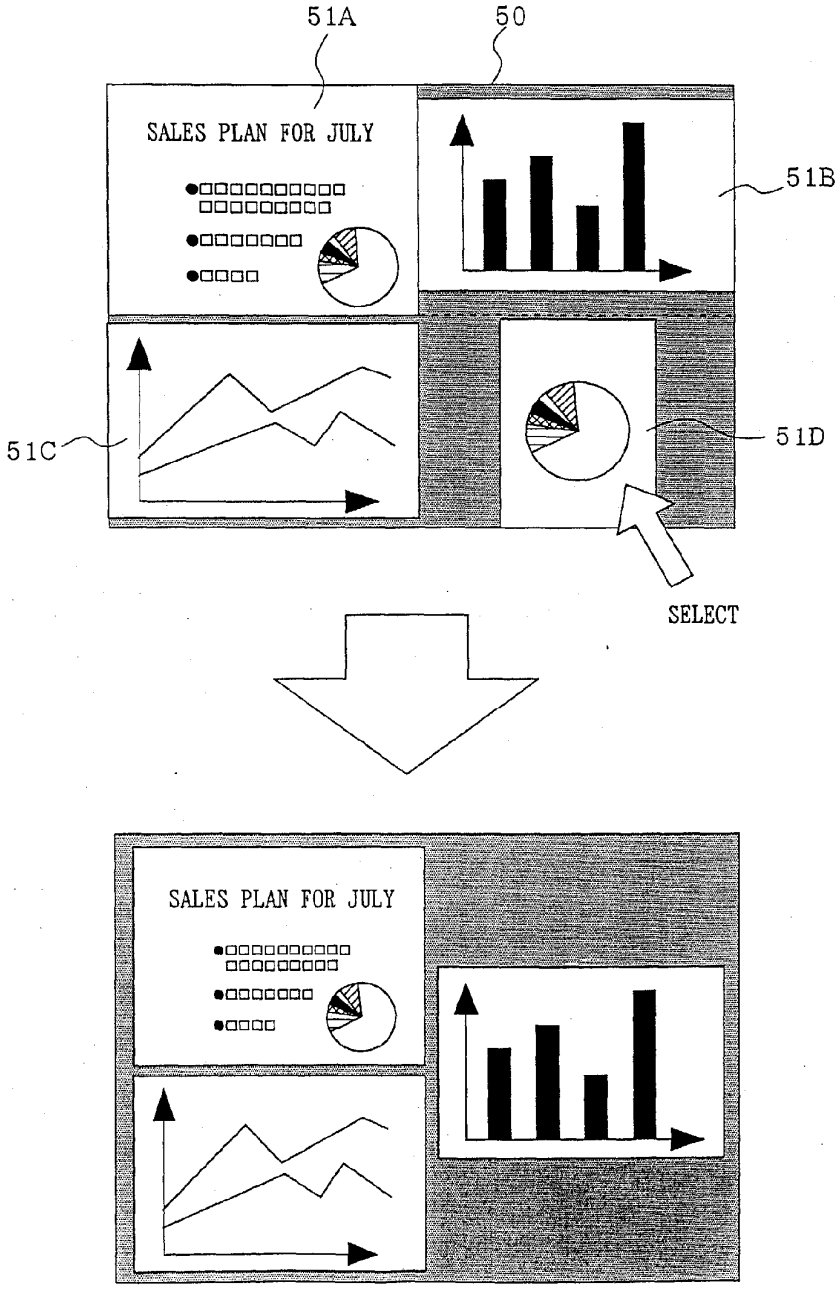

51A
50
SALES PLAN FOR JULY
51B
51C
51D
SELECT
SALES PLAN FOR JULY

FIG. 22

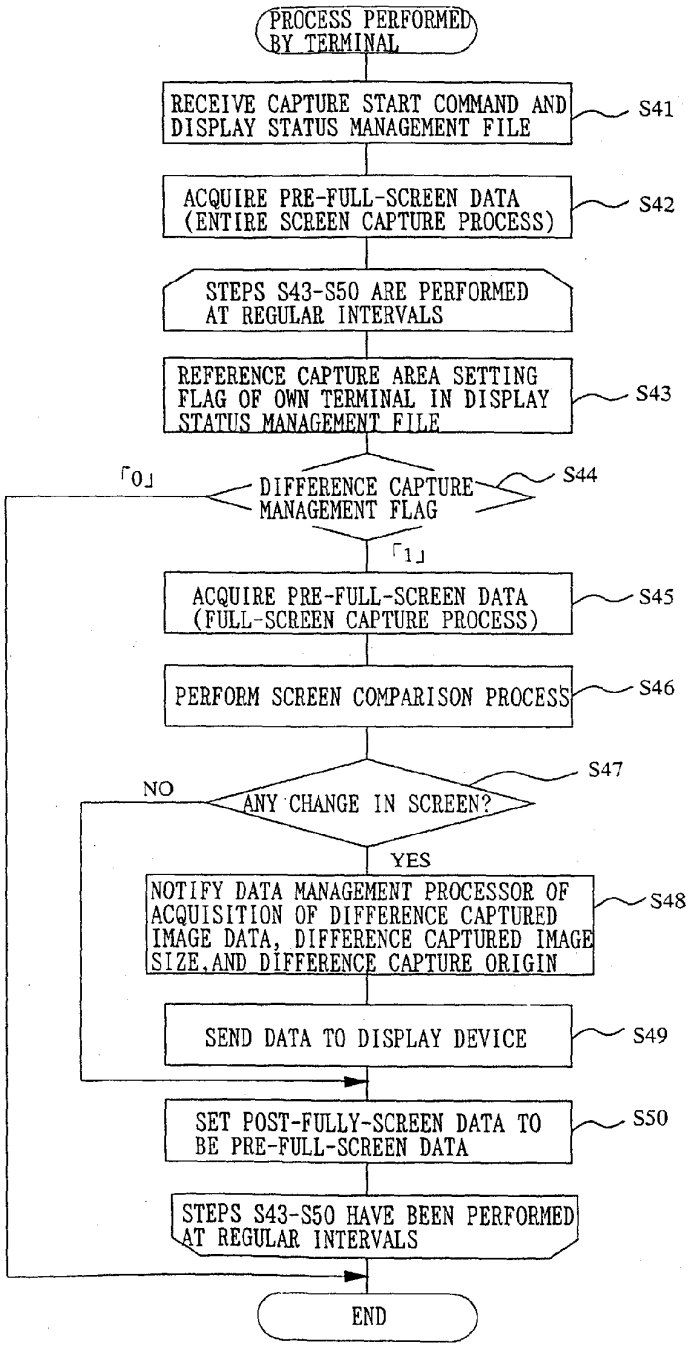

PROCESS PERFORMED BY TERMINAL
RECEIVE CAPTURE START COMMAND AND DISPLAY STATUS MANAGEMENT FILE
S41
ACQUIRE PRE-FULL-SCREEN DATA (ENTIRE SCREEN CAPTURE PROCESS)
S42
STEPS S43-S50 ARE PERFORMED AT REGULAR INTERVALS
REFERENCE CAPTURE AREA SETTING FLAG OF OWN TERMINAL IN DISPLAY STATUS MANAGEMENT FILE
S43
DIFFERENCE CAPTURE MANAGEMENT FLAG
S44
"0"
"1"
ACQUIRE PRE-FULL-SCREEN DATA (FULL-SCREEN CAPTURE PROCESS)
S45
PERFORM SCREEN COMPARISON PROCESS
S46
ANY CHANGE IN SCREEN?
S47
NO
YES
NOTIFY DATA MANAGEMENT PROCESSOR OF ACQUISITION OF DIFFERENCE CAPTURED IMAGE DATA, DIFFERENCE CAPTURED IMAGE SIZE, AND DIFFERENCE CAPTURE ORIGIN
S48
SEND DATA TO DISPLAY DEVICE
S49
SET POST-FULLY-SCREEN DATA TO BE PRE-FULL-SCREEN DATA
S50
STEPS S43-S50 HAVE BEEN PERFORMED AT REGULAR INTERVALS
END

FIG. 23

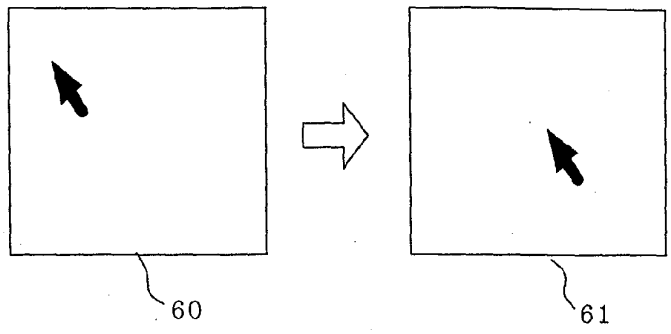


FIG. 24

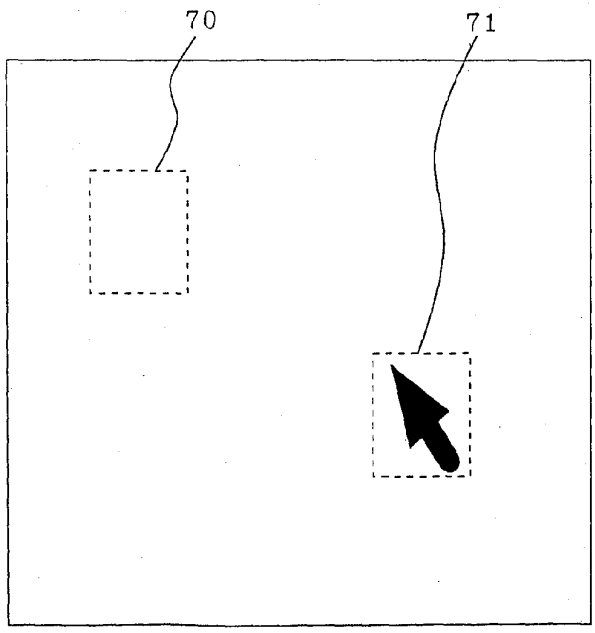


FIG. 25

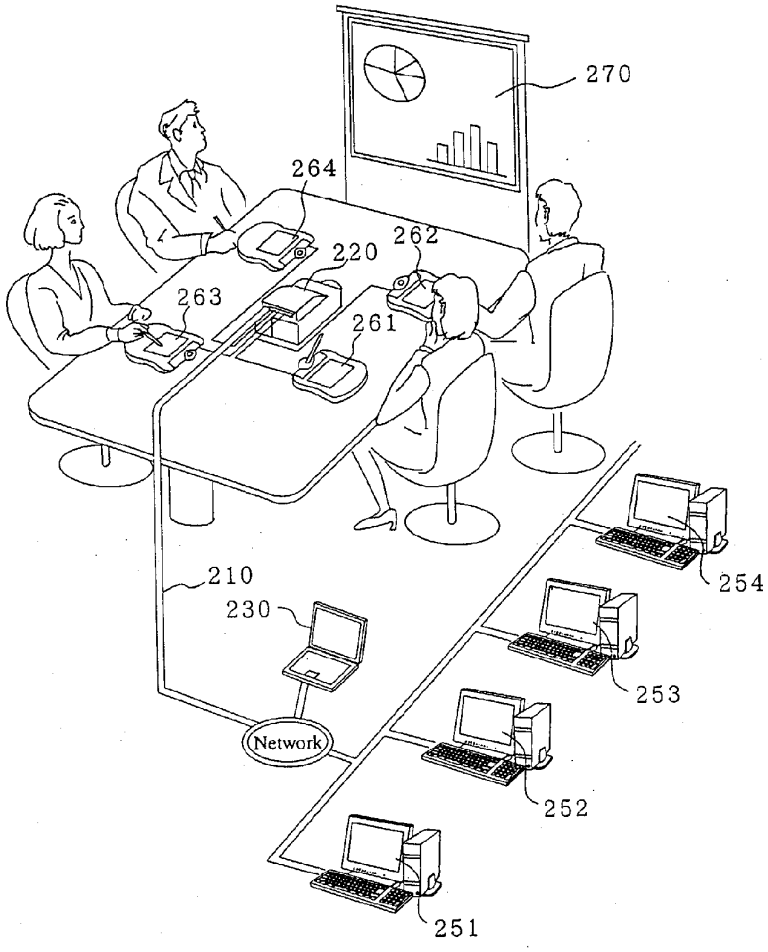


FIG. 26

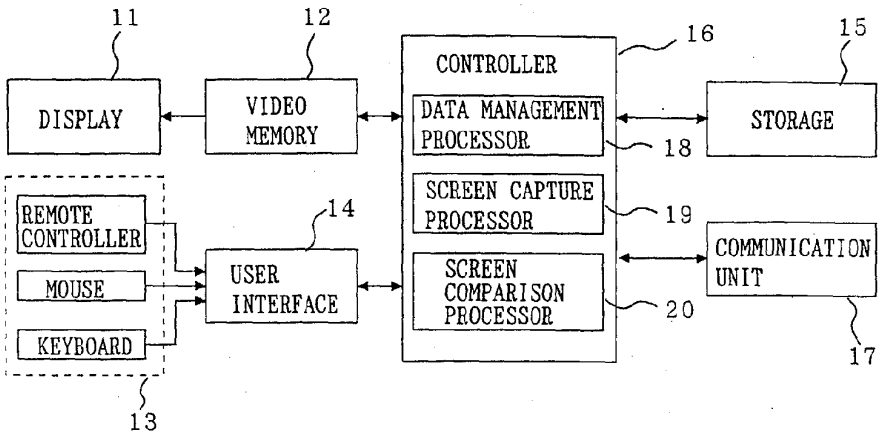

11
12
16
15
DISPLAY
VIDEO MEMORY
CONTROLLER
DATA MANAGEMENT PROCESSOR
18
STORAGE
SCREEN CAPTURE PROCESSOR
19
REMOTE CONTROLLER
14
MOUSE
USER INTERFACE
SCREEN COMPARISON PROCESSOR
20
COMMUNICATION UNIT
KEYBOARD
17
13

FIG. 27

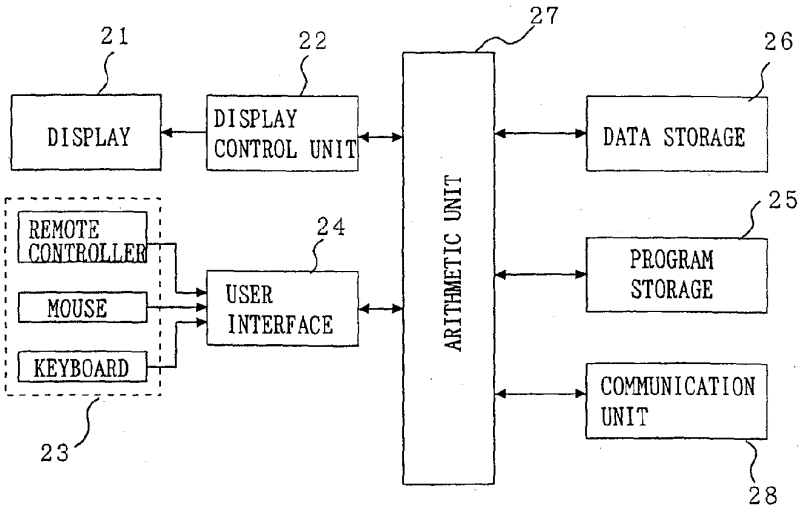
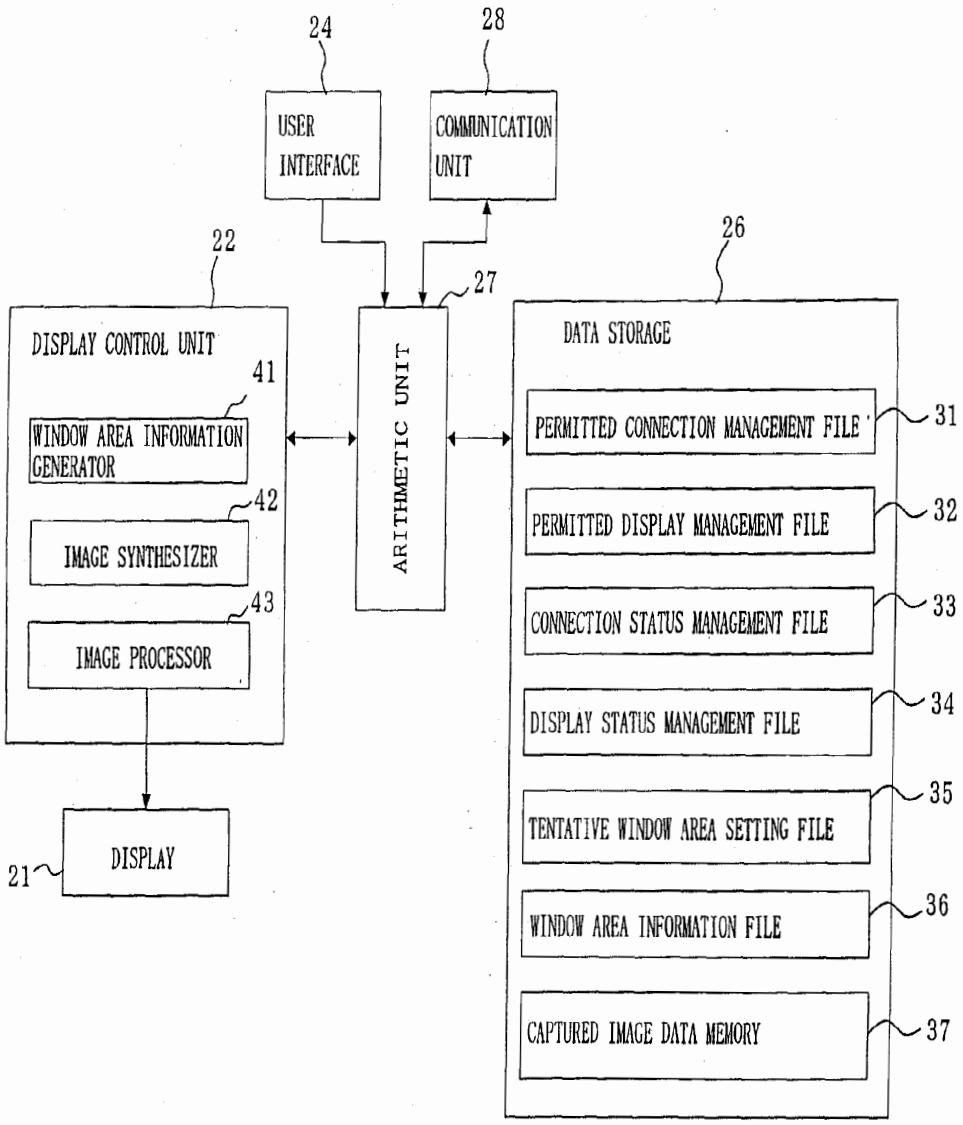

21
22
27
26
DISPLAY
DISPLAY CONTROL UNIT
ARITHMETIC UNIT
DATA STORAGE
25
REMOTE CONTROLLER
24
PROGRAM STORAGE
MOUSE
USER INTERFACE
KEYBOARD
COMMUNICATION UNIT
23
28

FIG. 28


24
28
USER INTERFACE
COMMUNICATION UNIT
22
26
27
DISPLAY CONTROL UNIT
41
WINDOW AREA INFORMATION GENERATOR
42
IMAGE SYNTHESIZER
43
IMAGE PROCESSOR
ARITHMETIC UNIT
DATA STORAGE
PERMITTED CONNECTION MANAGEMENT FILE
31
PERMITTED DISPLAY MANAGEMENT FILE
32
CONNECTION STATUS MANAGEMENT FILE
33
DISPLAY STATUS MANAGEMENT FILE
34
TENTATIVE WINDOW AREA SETTING FILE
35
WINDOW AREA INFORMATION FILE
36
CAPTURED IMAGE DATA MEMORY
37
21
DISPLAY

51

FIG. 29

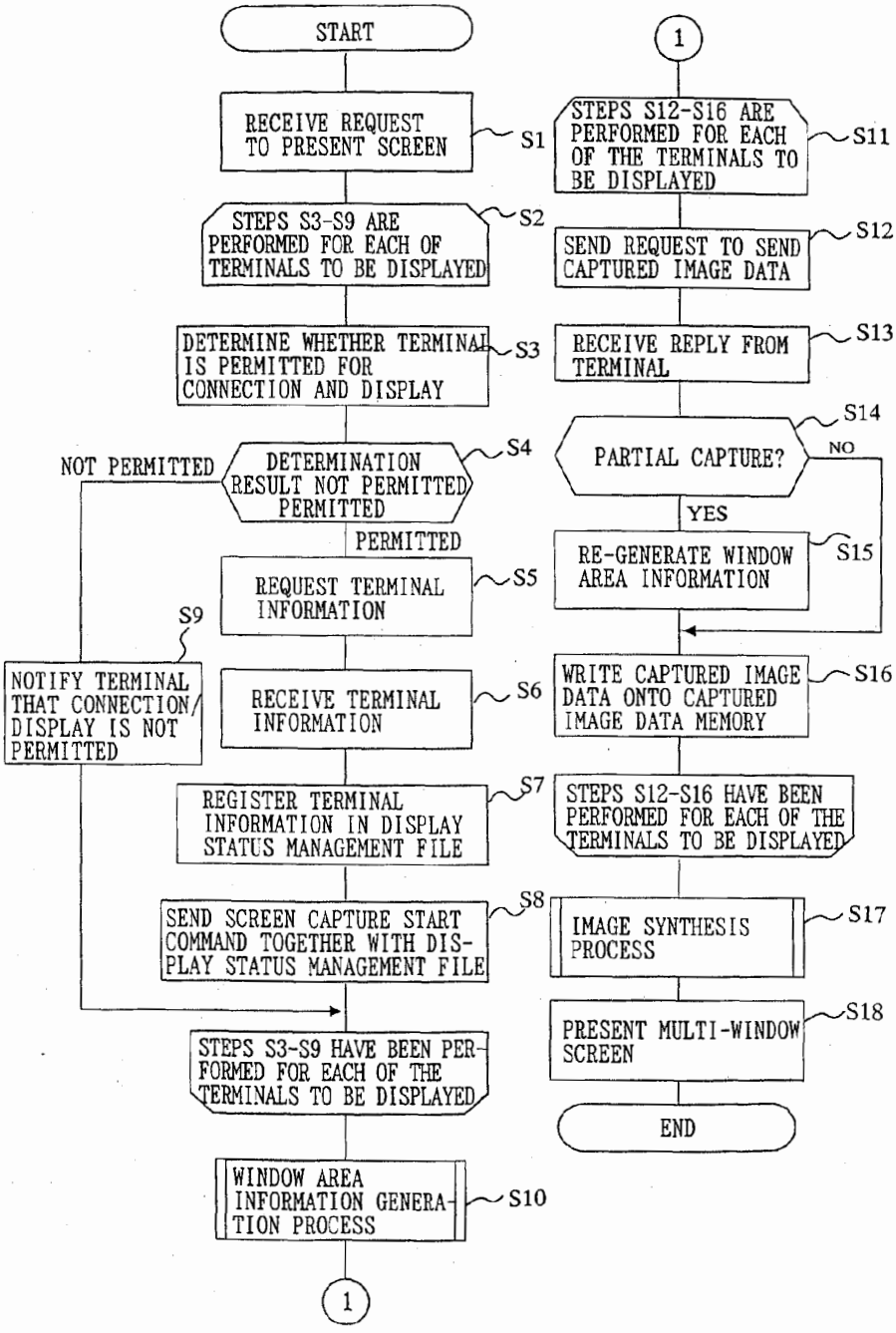
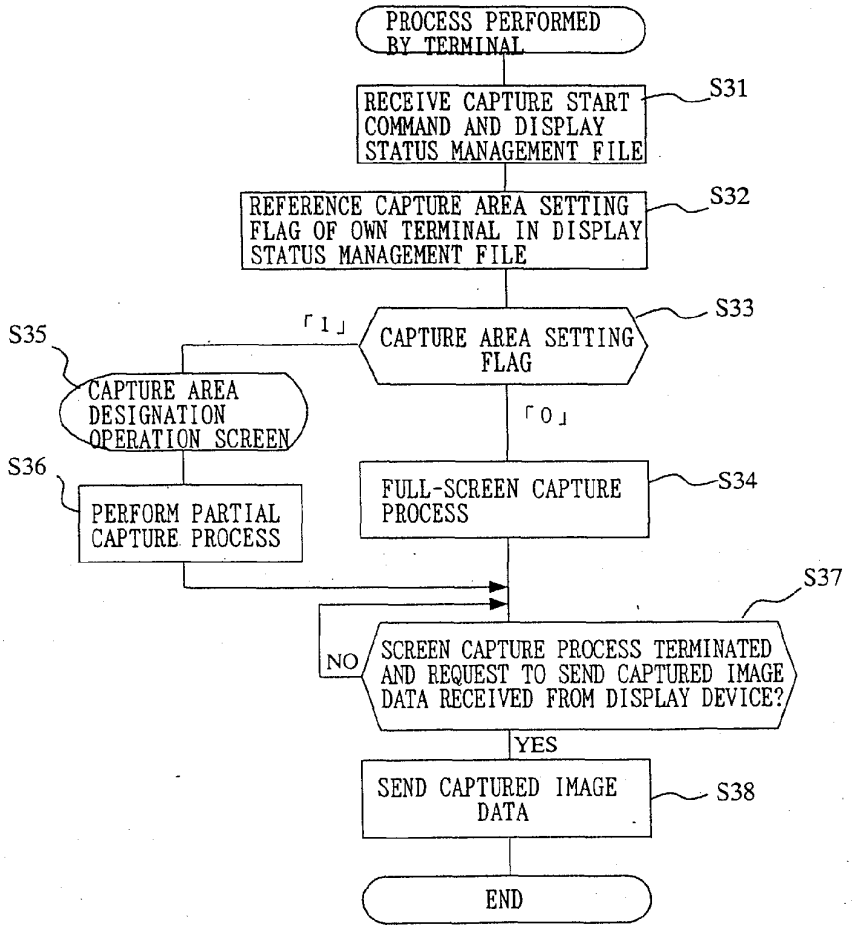

START
RECEIVE REQUEST TO PRESENT SCREEN
S1
STEPS S3-S9 ARE PERFORMED FOR EACH OF TERMINALS TO BE DISPLAYED
S2
DETERMINE WHETHER TERMINAL IS PERMITTED FOR CONNECTION AND DISPLAY
S3
DETERMINATION RESULT NOT PERMITTED PERMITTED
S4
NOT PERMITTED
PERMITTED
REQUEST TERMINAL INFORMATION
S5
RECEIVE TERMINAL INFORMATION
S6
REGISTER TERMINAL INFORMATION IN DISPLAY STATUS MANAGEMENT FILE
S7
SEND SCREEN CAPTURE START COMMAND TOGETHER WITH DISPLAY STATUS MANAGEMENT FILE
S8
NOTIFY TERMINAL THAT CONNECTION/DISPLAY IS NOT PERMITTED
S9
STEPS S3-S9 HAVE BEEN PERFORMED FOR EACH OF THE TERMINALS TO BE DISPLAYED
WINDOW AREA INFORMATION GENERATION PROCESS
S10
1
1
STEPS S12-S16 ARE PERFORMED FOR EACH OF THE TERMINALS TO BE DISPLAYED
S11
SEND REQUEST TO SEND CAPTURED IMAGE DATA
S12
RECEIVE REPLY FROM TERMINAL
S13
PARTIAL CAPTURE?
S14
NO
YES
RE-GENERATE WINDOW AREA INFORMATION
S15
WRITE CAPTURED IMAGE DATA ONTO CAPTURED IMAGE DATA MEMORY
S16
STEPS S12-S16 HAVE BEEN PERFORMED FOR EACH OF THE TERMINALS TO BE DISPLAYED
IMAGE SYNTHESIS PROCESS
S17
PRESENT MULTI-WINDOW SCREEN
S18
END

FIG. 30


PROCESS PERFORMED BY TERMINAL
RECEIVE CAPTURE START COMMAND AND DISPLAY STATUS MANAGEMENT FILE
S31
REFERENCE CAPTURE AREA SETTING FLAG OF OWN TERMINAL IN DISPLAY STATUS MANAGEMENT FILE
S32
CAPTURE AREA SETTING FLAG
S33
「1」
「0」
S35
CAPTURE AREA DESIGNATION OPERATION SCREEN
S36
PERFORM PARTIAL CAPTURE PROCESS
FULL-SCREEN CAPTURE PROCESS
S34
S37
NO
SCREEN CAPTURE PROCESS TERMINATED AND REQUEST TO SEND CAPTURED IMAGE DATA RECEIVED FROM DISPLAY DEVICE?
YES
SEND CAPTURED IMAGE DATA
S38
END

Espacenet

Bibliographic data: CN1476242 (A) — 2004-02-18

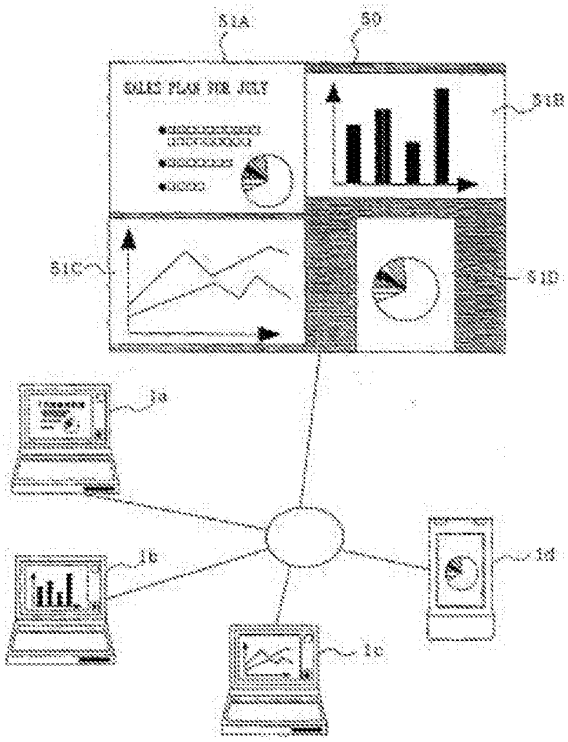
Display system, network answering display device, terminal apparatus and controlling program

Inventor(s):	KAN CHONO [JP]; NORIHIRO YOSHIKUNI [JP] ± (CHONO KAN, ; YOSHIKUNI NORIHIRO, ; CHONO KAN,YOSHIKUNI NORIHIRO)
Applicant(s):	SEIKO EPSON CORP [JP] ± (SEIKO EPSON CORP)
Classification:	**- international:** ***G09F9/00; G09G3/36; G09G5/00; H04N5/74; H04N7/14;*** (IPC1-7): G09F9/00; G09G3/36; H04N5/74 **- cooperative:** **G06F3/0481**; **G06F3/0484**; **G06F3/1454**; **G06Q10/10**; **H04N21/4312**; **H04N21/4314**; **H04N21/4402**; **H04N21/64792**; **H04N7/15**
Application number:	CN2003150183 20030718
Priority number(s):	JP20020214405 20020723 ; JP20020214406 20020723
Also published as:	CN1268122 (C) EP1385336 (A2) EP1385336 (A3) EP1385336 (B1) US2014115528 (A1) more

Abstract not available for CN1476242 (A)
Abstract of corresponding document: EP1385336 (A2)

A technique for presenting display screens of a plurality terminals (1a - 1d) connected to a network (3) on a multi-window screen of a display screen of a display device (2). A communication unit (28) receives image data captured and then sent by each terminal having a screen capture function. A display control unit (22) controls an image synthesizer (42) to synthesize the captured image data into single screen multi-window format data. A multi-window screen is thus presented.

FIG. 8



[19] 中华人民共和国国家知识产权局

[51] Int. Cl[7]
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[30] 优先权
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[71] 申请人 精工爱普生株式会社
地址 日本东京都
[72] 发明人 长野干 吉国典宏

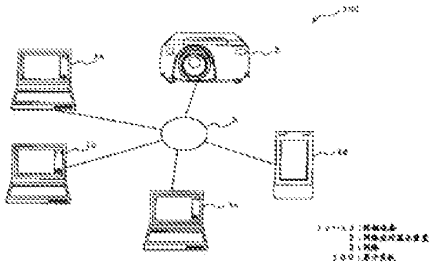
[74] 专利代理机构 北京市中咨律师事务所
代理人 陈海红 段承恩

权利要求书 6 页 说明书 51 页 附图 25 页

[54] 发明名称 显示系统、网络应对显示装置、终端设备和控制程序

[57] 摘要

涉及可以在显示装置的 1 个画面上多画面显示进行网络连接的多个终端设备的显示画面的技术。用通信部分 28 接收从具有画面俘获功能的各个终端设备发送来的俘获图像数据。 然后，在显示控制部分 22 中，借助于图像合成部分 42，借助于画面分割，把该各个俘获图像数据合成为 1 个画面的图像数据。 借助于此，就可以进行多画面显示。



ISSN1008-4274

1. 一种显示系统，其特征在于，具备：具有画面俘获功能，通过网络发送由该画面俘获功能取得的俘获图像数据的多个终端设备；和具有显示部分，并具有通过网络接收从上述终端设备发送来的上述俘获图像数据，借助于画面分割合成为 1 个画面的图像数据并在上述显示部分的显示画面上进行显示的多画面显示功能的网络应对显示装置，

作成为在上述终端设备侧进行作为用于向上述网络应对显示装置的上述显示画面上进行多画面显示所必须的处理的、用上述画面俘获功能取得的上述俘获图像数据的图像尺寸的尺寸变换处理，并在上述网络应对显示装置侧，从上述终端设备取得该尺寸变换后的俘获图像数据并进行上述合成。

2. 根据权利要求 1 所述的显示系统，其特征在于：上述网络应对显示装置，将上述显示部分的显示画面分割成要进行显示的终端设备的台数量，决定分配给要进行该显示的终端设备的分割画面的显示尺寸并发送给该终端设备，接收到该显示尺寸的终端设备，在进行上述尺寸变换处理时，把上述俘获图像数据的图像尺寸，尺寸变换成上述所接收到的上述显示尺寸。

3. 根据权利要求 1 或 2 所述的显示系统，其特征在于：上述终端设备，对用上述画面俘获功能取得的俘获图像数据，除了要进行上述尺寸变换处理之外，还要在进行向上述网络应对显示装置的上述显示部分的显示色数的色变换处理之后再将其向上述网络应对显示装置发送。

4. 根据权利要求 3 所述的显示系统，其特征在于：上述网络应对显示装置，在向上述终端设备发送显示尺寸时，也发送自身的上述显示部分的显示色数，上述终端设备，根据从上述网络应对显示装置接收到的上述显示色数，进行上述色变换处理。

5. 一种网络应对显示装置，是通过网络与分别具有画面俘获功能的多个终端设备连接的网络应对显示装置，其特征在于，具备：

显示部分，

可与上述各个终端设备之间进行双向通信的通信部分，

和显示控制部分，

在上述各个终端设备的每一个中，都用上述通信部分接收由上述画面俘获功能取得并已尺寸变换成规定的图像尺寸的俘获图像数据，上述显示控制部分，具有借助于画面分割把用上述通信部分接收到的上述各个俘获图像数据合成为 1 个画面的图像数据并使之在上述显示部分的显示画面上显示的多画面显示功能。

6. 根据权利要求 5 所述的网络应对显示装置，其特征在于：上述显示控制部分具有向当前的显示画面内嵌入新的画面以进行显示的嵌入功能。

7. 根据权利要求 5 所述的网络应对显示装置，其特征在于：借助于上述通信部分的双向通信，可从网络应对显示装置侧，也可从终端设备侧，进行在上述显示画面上显示俘获图像数据的终端设备的选择。

8. 根据权利要求 5 所述的网络应对显示装置，其特征在于：上述显示控制部分，具有从正在上述显示画面上显示的构成多画面的的多个分割画面中，放大显示规定的分割画面的放大显示功能。

9. 根据权利要求 5 所述的网络应对显示装置，其特征在于：上述显示控制部分，具有从正在上述显示画面上显示的构成多画面的多个分割画面中，把规定的分割画面切换成上述显示画面全体的显示的单画面切换功能。

10. 根据权利要求 5 所述的网络应对显示装置，其特征在于：上述显示控制部分，具有从正在上述显示画面上显示的构成多画面的的多个分割画面中，消去规定的分割画面的消去功能。

11. 根据权利要求 10 所述的网络应对显示装置，其特征在于：上述规定的分割画面，借助于上述通信部分的双向通信，可从网络应对显示装置侧，也可从终端设备侧进行选择。

12. 根据权利要求 5 所述的网络应对显示装置，其特征在于：从上述

终端设备接收到的上述俘获图像数据，是指定上述终端设备的显示画面的全部或一部分范围进行俘获而得到的图像数据。

13. 根据权利要求 5 所述的网络应对显示装置，其特征在于：从上述终端设备取得的俘获图像数据，是检测终端设备的显示画面上的变化，仅仅对画面上的变化部分进行俘获得到的图像数据。

14. 根据权利要求 5 所述的网络应对显示装置，其特征在于，具备：把上述显示部分的显示画面分割成要进行显示的终端设备台数量，决定要分配给该要进行显示的终端设备的分割画面的显示尺寸的显示尺寸决定部分，和用上述通信部分把用该显示尺寸决定部分决定的显示尺寸分别发送给相应的各个终端设备的控制部分，该控制部分用上述通信部分从发送了上述显示尺寸的各终端设备接收已尺寸变化成分配给该终端设备的分割画面的显示尺寸的俘获图像数据，把所接收到的各个俘获图像数据合成 1 个画面的图像数据在上述显示部分上进行显示那样地对上述显示控制部分进行控制。

15. 根据权利要求 14 所述的网络应对显示装置，其特征在于：使分配给要进行显示的终端设备的分割画面的纵横比，与该终端设备的显示部分的显示画面的纵横比相同。

16. 根据权利要求 5 所述的网络应对显示装置，其特征在于：上述控制部分对上述显示控制部分进行控制，使得在向终端设备发送显示尺寸时，也发送上述显示部分的显示色数，用上述通信部分，从发送了上述显示尺寸和上述显示色数的终端设备那里，接收已尺寸变换成分配给该终端设备的分割画面的显示尺寸，而且已变换成上述显示色数的俘获图像数据，并把所接收到的各个俘获图像数据合成 1 个画面的图像数据在上述显示部分上进行显示。

17. 一种终端设备，是通过网络连接在权利要求 5 到 16 中的任何一项所述的网络应对显示装置上的终端设备，其特征在于，具备：

显示部分；

与上述网络应对显示装置之间可进行双向通信的通信部分；

俘获在上述显示部分的显示画面上显示的内容的画面俘获处理部分;

把用上述画面俘获处理部分俘获到的俘获图像数据尺寸变换成规定的图像尺寸的图像变换部分;

和从上述通信部分把用该图像变换部分进行了尺寸变换后的俘获图像数据发送给上述网络应对显示装置的控制部分,

产生在要在上述网络应对显示装置的上述显示画面上显示的多画面中的 1 个分割画面上显示的俘获图像数据。

18. 根据权利要求 17 所述的终端设备,其特征在于:上述网络应对显示装置的上述显示画面,被分割成要进行显示的终端设备台数量,决定分配给要进行该显示的终端设备的分割画面的显示尺寸,上述图像变换部分,把用上述画面俘获处理部分取得的俘获图像数据尺寸变换成已分配给该终端设备的显示尺寸。

19. 根据权利要求 17 所述的终端设备,其特征在于:上述图像变换部分除了上述尺寸变换之外,还要对上述网络应对显示装置的上述显示部分的显示色数进行色变换,上述控制部分,从上述通信部分向上述网络应对显示装置发送已施行了上述尺寸变换处理和上述色变换处理的俘获图像数据。

20. 一种网络应对显示装置,是通过网络与分别具有画面俘获功能的多个终端设备连接的网络应对显示装置,其特征在于,具备:

显示部分,

可与上述各个终端设备进行双向通信的通信部分,

和显示控制部分,

上述显示控制部分,具有借助于画面分割,将在上述各个终端设备的每一者中通过上述画面俘获功能取得的,用上述通信部分接收到的各个俘获图像数据,合成为 1 个画面的图像数据并在上述显示部分的显示画面上显示的多画面显示功能。

21. 根据权利要求 20 所述的网络应对显示装置,其特征在于:上述显示控制部分,具有向当前的显示画面内嵌入新的画面以进行显示的嵌入

功能。

22. 根据权利要求 20 所述的网络应对显示装置，其特征在于：借助于上述通信部分的双向通信，可从网络应对显示装置侧，也可从终端设备侧进行在上述显示画面上显示俘获图像数据的终端设备的选择。

23. 根据权利要求 20 所述的网络应对显示装置，其特征在于：上述显示控制部分，具有从正在上述显示画面上显示的构成多画面的的多个分割画面中，放大显示规定的分割画面的放大显示功能。

24. 根据权利要求 20 所述的网络应对显示装置，其特征在于：上述显示控制部分，具有从正在上述显示画面上显示的构成多画面的的多个分割画面中，将规定的分割画面切换成上述显示画面全体的显示的单画面切换功能。

25. 根据权利要求 20 中的任何一项所述的网络应对显示装置，其特征在于：上述显示控制部分，具有从正在上述显示画面上显示的构成多画面的的多个分割画面中，消去规定的分割画面的消去功能。

26. 根据权利要求 25 所述的网络应对显示装置，其特征在于：上述规定的分割画面，借助于上述通信部分的双向通信，可从网络应对显示装置侧，也可从终端设备侧进行选择。

27. 根据权利要求 20 所述的网络应对显示装置，其特征在于：从上述终端设备取得的俘获图像数据，是指定上述终端设备的显示画面的全部或一部分范围进行俘获而得到的图像数据。

28. 根据权利要求 20 所述的网络应对显示装置，其特征在于：从上述终端设备取得的俘获图像数据，是检测终端设备的显示画面上的变化，仅仅对画面上的变化部分进行俘获而得到的图像数据。

29. 根据权利要求 20 所述的网络应对显示装置，其特征在于：上述显示控制部分，具备：把上述显示部分的显示画面分割成要进行显示的终端设备台数量，编制含有特定分配给该要进行显示的终端设备的分割画面的显示尺寸和该分割画面的显示位置信息的分割区域信息的分割区域信息编制部分，根据用该分割区域信息编制部分编制成的 分割区域信息把来自

终端设备的俘获图像数据合成为 1 个画面的图像数据，产生合成图像数据的图像合成部分，和对用该图像合成部分产生的上述图像合成数据进行处理产生显示图像数据并向上述显示部分输出的图像处理部分。

30. 根据权利要求 29 所述的网络应对显示装置，其特征在于：上述图像合成部分，在维持该图像尺寸的纵横比不变的状态下缩小或放大来自上述各个终端设备的俘获图像数据并进行合成。

显示系统、网络应对显示装置、终端设备和控制程序

技术领域

本发明涉及用来在显示装置的1个画面上多画面显示连接到网络上的多个终端设备的画面的技术。

背景技术

图25的构成图示出了现有的显示系统的一个例子。

在图25中，在网络210上，分别连接有作为网络应对显示装置的例如投影仪220、笔记本个人计算机230、台式个人计算机251、252、253、254，此外，在投影仪220上，直接连接有可直接向投影仪220输入图画等使之投影，或向正在投影的数据插入线图等的图形输入器261、262、263、264。另外，在笔记本个人计算机230和台式个人计算机251、252、253、254上已装进了画面俘获软件。

在像这样地构成的现有的显示系统中，采用用画面俘获软件俘获例如笔记本个人计算机230上的画面的内容，并通过网络210把所俘获的该俘获图像数据发送给投影仪220的办法，就可以用投影仪220投影正在笔记本个人计算机230上显示的画面。因此，采用用投影仪附属的遥控器等进行切换操作的办法，就可以把投影仪220的投影图像，从笔记本个人计算机230的画面切换成别的例如台式个人计算机251的画面的图像。

在上述现有的显示系统的情况下，如上所述，可以用投影仪220显示的图像，变成为已连接到投影仪220上的笔记本个人计算机230、台式个人计算机251、252、253、254中的任何一项的个人计算机的图像。为此，在要观看比较笔记本个人计算机230、台式个人计算机251、252、253、254的各个显示画面的内容以进行讨论的情况下等，就需要每次一个画面地进

行切换，出于这样的情况，近些年来，人们强烈要求一种可以用 1 个画面同时显示多个个人计算机的画面的功能。

此外，为了应对该要求，近些年来虽然一直在进行开发，但是现状是这样的功能尚不存在，此外，还存在着这样的情况：在要实现这样的显示系统时，如果或者因增加要用投影仪(网络应对显示装置)进行的处理量而对网络应对显示装置要求庞大的处理能力，或者招致网络的负荷的增加的话，那就成了问题。

发明内容

本发明就是有鉴于此而发明的，目的在于提供可在画面上多画面显示连接到网络上的多个终端设备的显示画面的网络应对显示装置和显示控制程序。

此外，目的还在于提供在不招致网络应对显示装置和网络负荷增大的情况下，可在显示画面上多画面显示连接到网络上的多个终端设备的显示画面的显示系统、网络应对显示装置、显示控制程序、网络应对投影仪、网络应对等离子体显示器、网络应对液晶监视器、终端设备和控制程序。

(1) 本发明的显示系统，是具备具有画面俘获功能，通过网络发送由画面俘获功能取得的俘获图像数据的多个终端设备；和具有具有显示部分，通过网络接收从终端设备发送来的俘获图像数据，借助于画面分割合成为 1 个画面的图像数据在显示部分的显示画面上进行显示的画面显示功能的网络应对显示装置，作成为使得在终端设备侧进行作为用来在网络应对显示装置的显示画面上进行多画面显示所必须的处理的、用画面俘获功能取得的俘获图像数据的图像尺寸的尺寸变换处理，在网络应对显示装置侧，作成为从终端设备取得该尺寸变换后的俘获图像数据并进行合成。

倘采用本发明，由于作成为使得在实现多画面显示功能时在终端设备一侧进行必要的尺寸变换处理，故可以得到可以在网络应对显示装置上多画面显示已连接到网络上的终端设备的显示画面，而不会招致网络应对显示装置和网络的负荷增大。

(2) 本发明的显示系统，在上述(1)中，网络应对显示装置，把显示部分的显示画面分割成要进行显示的终端设备的台数的量，决定要分配给要进行该显示的终端设备的分割画面的显示尺寸并发送给相应的终端设备，接收到该显示尺寸的终端设备，在进行尺寸变换处理时，把俘获图像数据的图像尺寸，尺寸变换成所接收到的显示尺寸。

倘采用本发明，则可以根据在网络应对显示装置一侧决定的显示尺寸在终端设备一侧进行尺寸变换处理。

(3) 本发明的显示系统，在上述(1)或(2)中，终端设备，对用画面俘获功能取得的俘获图像数据，除了要进行尺寸变换处理外，还要在进行了变换为网络应对显示装置的显示部分的显示色数的色变换处理之后向网络应对显示装置发送。

倘采用本发明，由于在终端设备一侧还进行了色变换处理之后把俘获图像数据发送给网络应对显示装置，故可以进一步减轻网络应对显示装置的负荷。

(4) 本发明的显示系统，在上述(3)中，网络应对显示装置，在向终端设备发送显示尺寸时，也发送自身的显示部分的显示色数，终端设备，根据从网络应对显示装置接收到的显示色数，进行色变换处理。

倘采用本发明，则可以根据网络应对显示装置所指定的、网络应对显示装置的显示部分的显示色数，在终端设备一侧，进行色变换处理。

(5) 本发明的显示系统，在上述(1)到(4)中的任何一项中，网络应对显示装置是投影仪。

倘采用本发明，则作为网络应对显示装置可以使用投影仪。

(6) 本发明的显示系统，在上述(1)到(4)中的任何一项中，网络应对显示装置是等离子体显示器。

倘采用本发明，则作为网络应对显示装置可以使用等离子体显示器。

(7) 本发明的显示系统，在上述(1)到(4)中的任何一项中，网络应对显示装置是液晶监视器。

倘采用本发明，则作为网络应对显示装置可以使用液晶监视器。

(8) 本发明的显示系统，在上述(1)到(4)中的任何一项中，网络应对显示装置是有机 EL 显示器。

倘采用本发明，则作为网络应对显示装置可以使用有机 EL 显示器。

(9) 本发明的显示系统，在上述(1)到(8)中的任何一项中，终端设备是个人计算机或 PDA。

倘采用本发明，则终端设备可以使用个人计算机或 PDA。

(10) 本发明的网络应对显示装置，是通过网络与分别具备画面俘获功能的多个终端设备进行连接的网络应对显示装置，具备显示部分、可与各个终端设备之间进行双向通信的通信部分、和显示控制部分，在各个终端设备的每一个设备中，都用通信部分接收用画面俘获功能取得并已尺寸变换成规定的图像尺寸的俘获图像数据，显示控制部分具有借助于画面分割把用通信部分接收到的各个俘获图像数据合成为 1 个画面的图像数据并使之在显示部分的显示画面上显示的多画面显示功能。

倘采用本发明，由于从终端设备一侧取得尺寸变换完毕的俘获图像数据并进行合成显示，故可以得到可以减轻因进行多画面显示而产生的负荷的网络应对显示装置。

(11) 本发明的网络应对显示装置，在上述(10)中，显示控制部分具有向当前的显示画面内嵌入新的画面以进行显示的嵌入功能。

倘采用本发明，则可以得到具有嵌入功能的网络应对显示装置。

(12) 本发明的网络应对显示装置，在上述(10)或(11)中，使用者可以从已连接到网络应对显示装置上的多个终端设备中任意选择在显示画面上显示俘获图像数据的终端设备。

倘采用本发明，则可以得到使用者可以从多个终端设备中，选择可以在网络应对显示装置上显示俘获图像数据的终端设备的网络应对显示装置。

(13) 本发明的网络应对显示装置，在上述(10)到(12)中的任何一项中，都可借助于通信部分的双向通信，从网络应对显示装置一侧，或从终端设备一侧，进行在显示画面上显示俘获图像数据的终端设备的选择。

倘采用本发明，则可以得到从网络应对显示装置一侧，或从终端设备一侧，都可以指定在网络应对显示装置上显示俘获图像数据的终端设备的网络应对显示装置。

(14) 本发明的网络应对显示装置，在上述(10)到(13)中的任何一项中，显示控制部分，具有从正在显示画面上显示的构成多画面的的多个分割画面中，放大显示规定的分割画面的功能。

倘采用本发明构，则可以得到具有放大显示规定的分割画面的放大显示功能的网络应对显示装置。

(15) 本发明的网络应对显示装置，在上述(10)到(13)中的任何一项中，显示控制部分，具有从正在显示画面上显示的构成多画面的的多个分割画面中，把规定的分割画面切换成显示画面全体的显示的单画面切换功能。

倘采用本发明，则可以得到把规定的分割画面切换成显示画面全体的显示的单画面切换功能的网络应对显示装置。

(16) 本发明的网络应对显示装置，在上述(10)到(13)中的任何一项中，显示控制部分，具有从正在显示画面上显示的构成多画面的的多个分割画面中，消去规定的分割画面的消去功能。

倘采用本发明，则可以得到具有消去规定的分割画面的的网络应对显示装置。

(17) 本发明的网络应对显示装置，在上述(14)到(16)中的任何一项中，规定的分割画面可根据使用者操作进行选择。

倘采用本发明，则可以得到使用者可以选择使之进行放大显示的分割画面、使之进行单画面显示的分割画面、和使之消去的分割画面的网络应对显示装置。

(18) 本发明的网络应对显示装置，在上述(17)中，规定的分割画面，借助于通信部分的双向通信，从网络应对显示装置一侧，或从终端设备一侧都可以进行选择。

倘采用本发明，则可以得到从网络应对显示装置一侧，或从终端设备一侧都可指定使之进行放大显示的分割画面、使之进行单画面显示的分割

画面、和使之消去的分割画面的网络应对显示装置。

(19) 本发明的网络应对显示装置，在上述(10)到(18)中的任何一项中，从终端设备接收到的俘获图像数据，是指定终端设备的显示画面的全部或一部分范围进行俘获而得到的图像数据。

倘采用本发明，则可以得到要在显示部分的显示画面上显示的俘获图像数据，是用全画面俘获得到的俘获图像数据、或部分俘获得到的俘获图像数据中的任何一方都可以显示的网络应对显示装置。

(20) 本发明的网络应对显示装置，在上述(10)到(18)中的任何一项中，从终端设备取得的俘获数据，是检测终端设备的显示画面上的变化，仅仅对画面上的变化部分进行俘获得到的图像数据。

倘采用本发明，由于仅仅对终端设备的显示画面上的变化部分进行俘获，故可以得到可以减轻对网络的负荷，并显示使之与已有的俘获数据进行合成后的图像数据的网络应对显示装置。

(21) 本发明的网络应对显示装置，在上述(10)到(20)中的任何一项中，具备：把显示部分的显示画面分割成要进行显示的终端设备台数量，决定要分配给该要进行显示的终端设备的分割画面的显示尺寸的显示尺寸决定部分，和用通信部分把用显示尺寸决定部分决定的显示尺寸分别发送给相应的各个终端设备的控制部分，控制部分使得用通信部分从发送显示尺寸的各终端设备接收已尺寸变化成分配给该终端设备的分割画面的显示尺寸的俘获图像数据，把所接收到的各个俘获图像数据合成 1 个画面的图像数据在显示部分上进行显示那样地对显示控制部分进行控制。

倘采用本发明，则可以把要在终端设备一侧进行尺寸变换处理时的显示尺寸，变成为用显示尺寸决定部分决定后的显示尺寸。

(22) 本发明的网络应对显示装置，在上述(21)中，使分配给要进行显示的终端设备的分割画面的纵横比，变成为与该终端设备的显示部分的显示画面的纵横比相同的纵横比。

倘采用本发明，则可以得到可以构成没有失调感的显示画面的网络应对显示装置。

(23) 本发明的网络应对显示装置，在上述(10)到(22)中的任何一项中，控制部分对控制显示控制部分进行控制，使得在向终端设备发送显示尺寸时，也发送显示部分的显示色数，用通信部分，从发送显示尺寸和显示色数的终端设备那里，接收已尺寸变换成分配给该终端设备的分割画面的显示尺寸，而且已变换成显示色数的俘获图像数据，并把所接收到的各个俘获图像数据合成1个画面的图像数据在显示部分上进行显示。

倘采用本发明，由于接收并合成显示在终端设备一侧除缩小变化之外还施行了色变换的俘获图像数据，故可以得到可以进一步减轻用来进行多画面显示的处理的负荷的网络应对显示装置。

(24) 本发明的网络应对显示装置，在上述(10)到(23)中的任何一项中，通信部分的通信协议是TCP/IP。

倘采用本发明，则作为通信部分的通信协议可以利用一般的TCP/IP。

(25) 本发明的网络应对显示装置，在上述(10)到(24)中的任何一项中，网络是LAN、无线LAN、近距离无线LAN中的任何一项。

倘采用本发明，则作为网络，可以利用LAN、无线LAN、近距离无线LAN。

(26) 本发明的网络应对投影仪，装载有在上述(10)到(25)中的任何一项的网络应对显示装置。

倘采用本发明，则可以得到具备上述效果的投影仪。

(27) 本发明的网络应对投影仪，在上述(26)中，显示部分是液晶光阀、LCOS光阀、DMD中的任何一项。

倘采用本发明，则在显示部分使用液晶光阀、LCOS光阀、DMD的投影仪中可以得到上述效果。

(28) 本发明的网络应对等离子体显示器，装载有上述(10)到(25)中的任何一项的网络应对显示装置，并把显示部分变成为等离子体显示面板。

倘采用本发明，则可以得到具备上述效果的等离子体显示器。

(29) 本发明的网络应对液晶监视器，装载有上述(10)到(25)中的任何一项的网络应对显示装置，并把显示部分变成为液晶面板。

倘采用本发明，则可以得到具备上述效果的液晶监视器。

(30) 本发明的网络应对有机 EL 显示器，装载有上述(10)到(25)中的任何一项的网络应对显示装置，并把显示部分变成为有机 EL 面板。

倘采用本发明，则可以得到具备上述效果的网络应对有机 EL 显示器。

(31) 本发明的显示控制程序，可以用 CPU 实现上述(10)到(25)中的任何一项的网络应对显示装置的显示控制部分。

倘采用本发明，则可以得到可把上述效果提供给显示装置的显示控制程序。

(32) 本发明的终端设备，是通过网络连接到上述(10)到(25)中的任何一项的网络应对显示装置上的终端设备，具备：显示部分；与网络应对显示装置之间可进行双向通信的通信部分；俘获在显示部分的显示画面上显示的内容的画面俘获处理部分；把用画面俘获处理部分俘获到的俘获图像数据尺寸变换成规定的图像尺寸的图像变换部分；从通信部分把用图像变换部分进行了尺寸变换后的俘获图像数据发送给网络应对显示装置的控制部分，产生可以在要在网络应对显示装置的显示画面上显示的多画面中的 1 个分割画面上显示的俘获图像数据。

倘采用本发明，则在产生要在网络应对显示装置的显示画面上显示的多画面中的 1 个分割画面上显示的俘获图像数据时，采用承担多画面显示所需要的处理的一部分，具体地说，承担尺寸变换处理的办法，就可以得到可以对网络应对显示装置的负荷减轻作出贡献的终端设备。

(33) 本发明的终端设备，在上述(32)中，网络应对显示装置的显示画面，被分割成要进行显示的终端设备台数的量，决定要分配给要进行该显示的终端设备的分割画面的显示尺寸，图像变换部分，把用画面俘获处理部分取得的俘获图像数据尺寸变换成已分配给该终端设备的显示尺寸。

倘采用本发明，则可以根据在网络应对显示装置一侧决定的显示尺寸进行尺寸变换处理。

(34) 本发明的终端设备，在上述(32)或(33)中，图像变换部分除尺寸变换之外，还要对网络应对显示装置的显示部分的显示色数进行色变换，控

制部分，从通信部分向网络应对显示装置发送已施行了尺寸变换处理和色变换处理的俘获图像数据。

倘采用本发明，由于除去尺寸变换处理之外还进行色变换处理，故可以对网络应对显示装置的进一步的负荷减轻作出贡献。

(35) 本发明的控制程序，可以用 CPU 实现上述(32)到(34)中的任何一项的终端设备的各个处理部分。

倘采用本发明，则可以得到可以把上述效果提供给终端设备的控制程序。

(36) 本发明的网络应对显示装置，是通过网络与分别具备画面俘获功能的多个终端设备进行连接的网络应对显示装置，具备显示部分、可与各个终端设备进行双向通信的通信部分和显示控制部分，显示控制部分，具有借助于画面分割，把在各个终端设备的每一者中借助于画面俘获功能取得，用通信部分接收到的各个俘获图像数据，合成为 1 个画面的图像数据在显示部分的显示画面上显示的多画面显示功能。

倘采用本发明，则可以得到在显示装置的画面上多画面显示已进行了网络连接的多个终端设备的显示画面的网络应对显示装置。

(37) 本发明的网络应对显示装置，在上述(36)中，显示控制部分，具有向当前的显示画面内嵌入新的画面以进行显示的嵌入功能。

倘采用本发明则可以得到具有嵌入功能的网络应对显示装置。

(38) 本发明的网络应对显示装置，在上述(36)或(37)中，使用者可以从已连接到网络应对显示装置上的多个终端设备中任意选择在显示画面上显示俘获图像数据的终端设备。

倘采用本发明，则可以得到使用者选择在网络应对显示装置上显示俘获图像数据的终端设备的网络应对显示装置。

(39) 本发明的网络应对显示装置，在上述(36)到(38)中的任何一项中，都可借助于通信部分的双向通信，从网络应对显示装置一侧，或从终端设备一侧进行在显示画面上显示俘获图像数据的终端设备的选择。

倘采用本发明，则可以得到从网络应对显示装置一侧，或从终端设备

一侧，都可以指定在网络应对显示装置上显示俘获图像数据的终端设备。

(40) 本发明的网络应对显示装置，在上述(36)到(39)中的任何一项中，显示控制部分，具有从正在显示画面上显示的构成多画面的的多个分割画面中，放大显示规定的分割画面的放大显示功能。

倘采用本发明构，则可以得到具有放大显示规定的分割画面的放大显示功能的网络应对显示装置。

(41) 本发明的网络应对显示装置，在上述(36)到(39)中的任何一项中，显示控制部分，具有从正在显示画面上显示的构成多画面的的多个分割画面中，把规定的分割画面切换成显示画面全体的显示的单画面切换功能。

倘采用本发明，则可以得到把规定的分割画面切换成显示画面全体的显示的单画面切换功能的网络应对显示装置。

(42) 本发明的网络应对显示装置，在上述(36)到(39)中的任何一项中，显示控制部分，具有从正在显示画面上显示的构成多画面的的多个分割画面中，消去规定的分割画面的消去功能。

倘采用本发明，则可以得到具有消去规定的分割画面的的消去功能网络应对显示装置。

(43) 本发明的网络应对显示装置，在上述(40)到(42)中的任何一项中，规定的分割画面可根据使用者操作进行选择。

倘采用本发明，则可以得到使用者可以选择使之进行放大显示的分割画面、使之进行单画面显示的分割画面、和使之消去的分割画面的网络应对显示装置。

(44) 本发明的网络应对显示装置，在上述(43)中，规定的分割画面，借助于通信部分的双向通信，从网络应对显示装置一侧，或从终端设备一侧都可以进行选择。

倘采用本发明，则可以得到从网络应对显示装置一侧，或从终端设备一侧都可指定使之进行放大显示的分割画面、使之进行单画面显示的分割画面、和使之消去的分割画面的网络应对显示装置。

(45) 本发明的网络应对显示装置，在上述(36)到(44)中的任何一项中，

从终端设备取得的俘获图像数据，是指定终端设备的显示画面的全部或一部分范围进行俘获而得到的图像数据。

倘采用本发明，则可以得到要在显示部分的显示画面上显示的俘获图像数据，是用全画面俘获得到的俘获图像数据、或部分俘获得到的俘获图像数据中的任何一方都可以显示的网络应对显示装置。

(46) 本发明的网络应对显示装置，在上述(36)到(44)中的任何一项中，从终端设备取得的俘获数据，是检测终端设备的显示画面上的变化，仅仅对画面上的变化部分进行俘获得到的图像数据。

倘采用本发明，由于仅仅对终端设备的显示画面上的变化部分进行俘获，故可以得到可以减轻对网络的负荷，并显示使之与已有的俘获数据进行合成后的图像数据的网络应对显示装置。

(47) 本发明的网络应对显示装置，在上述(36)到(46)中的任何一项中，显示控制部分，具备：把上述显示部分的显示画面分割成要进行显示的终端设备台数量，编制含有特定要分配给要进行该显示的终端设备的分割画面的显示尺寸和该分割画面的显示位置信息的分割区域信息的分割区域信息编制部分，根据用该分割区域信息编制部分编制成的分割区域信息把来自终端设备的俘获图像数据合成为 1 个画面的图像数据，产生合成图像数据的图像合成部分，和对用该图像合成部分产生的图像合成数据进行处理产生显示图像数据向上述显示部分输出的图像处理部分。

(48) 本发明的网络应对显示装置，在上述(47)中，图像合成部分，在维持该图像尺寸的纵横比不变的状态下缩小或放大来自各个终端设备的俘获图像数据并进行合成。

倘采用本发明，则可以得到可以构成没有失调感的显示画面的网络应对显示装置。

(49) 本发明的网络应对显示装置，在上述(36)到(48)中的任何一项中，通信部分的通信协议是 TCP/IP。

倘采用本发明，则作为通信部分的通信协议可以利用一般的 TCP/IP。

(50) 本发明的网络应对显示装置，在上述(36)到(49)中的任何一项中，

网络是 LAN、无线 LAN、近距离无线 LAN 中的任何一项。

倘采用本发明，则作为网络，可以利用 LAN、无线 LAN、近距离无线 LAN。

(51) 本发明的网络应对投影仪，装载有在上述(36)到(50)中的任何一项的网络应对显示装置。

倘采用本发明，则可以得到具备上述效果的投影仪。

(52) 本发明的网络应对投影仪，在上述(51)中，显示部分是液晶光阀、LCOS 光阀、DMD 中的任何一项。

倘采用本发明，则在显示部分使用液晶光阀、LCOS 光阀、DMD 的投影仪中可以得到上述效果。

(53) 本发明的网络应对等离子体显示器，装载有上述(36)到(50)中的任何一项的网络应对显示装置，并把显示部分变成为等离子体面板。

倘采用本发明，则可以得到具备上述效果的等离子体显示器。

(54) 本发明的网络应对液晶监视器，装载有上述(36)到(50)中的任何一项的网络应对显示装置，并把显示部分变成为液晶面板。

倘采用本发明，则可以得到具备上述效果的液晶监视器。

(55) 本发明的网络应对有机 EL 显示器，装载有上述(36)到(50)中的任何一项的网络应对显示装置，并把显示部分变成为有机 EL 面板。

倘采用本发明，则可以得到具备上述效果的网络应对有机 EL 显示器。

(56) 本发明的显示控制程序，可以用 CPU 实现上述(36)到(50)中的任何一项的网络应对显示装置的显示控制部分。

倘采用本发明，则可以得到可把上述效果提供给显示装置的显示控制程序。

附图说明

图 1 示出了具备本发明的实施方案 1 的网络应对显示装置的显示系统的网络构成。

图 2 的框图示出了实施方案 1 的终端设备的构成。

图 3 的框图示出了实施方案 1 的网络应对显示装置的构成。

图 4 示出了实施方案 1 的网络应对显示装置的功能上的构成。

图 5 示出了用显示状况管理文件管理的终端设备信息的各个项目。

图 6 的流程图(1/2)示出了实施方案 1 的本实施方案的工作的流程。

图 7 的流程图(2/2)示出了实施方案 1 的本实施方案的工作的流程。

图 8 的模式图示出了在显示装置的显示画面上多画面显示终端设备 1a 到 1d 这 4 台的显示画面的状态。

图 9 的流程图示出了分割区域信息编制处理的流程。

图 10 示出了显示状况管理文件的具体的构成。

图 11(a)示出了存放在假分割区域设定文件中的表的具体的构成的一个例子，(b)示出了以(a)的表为基础的假分割区域。

图 12 是真分割区域尺寸和真原点的说明图。

图 13 示出了分割区域信息文件的一个例子。

图 14 的流程图示出了从实施方案 1 的显示装置那里接收到俘获开始指令和显示状况管理文件后的终端设备一侧的工作。

图 15 是用来说明放大显示功能的模式图。

图 16(a)示出了在变更了优先级别的情况下要参照的假分割区域设定表的一个例子，(b)示出了以(a)的表为基础的假分割区域。

图 17 示出了在变更了优先级别的情况下的真分割区域的一个例子。

图 18 示出了在变更了优先级别的情况下要编制的分割区域信息文件的一个例子。

图 19 是用来说明单画面显示功能的模式图。

图 20 是用来说明嵌入功能的模式图。

图 21 是用来说明画面消去功能的模式图。

图 22 的流程图示出了从显示装置那里接收到差分俘获开始指令和显示状况管理文件后的终端设备一侧的工作。

图 23 作为画面比较处理的一个例子，示出了使鼠标指点器工作时的例子。

图 24 是图 23 的画面比较处理的说明图。

图 25 的构成图示出了现有的显示系统的一个例子。

图 26 的框图示出了实施方案 2 的终端设备的构成。

图 27 的框图示出了实施方案 2 的网络应对显示装置的构成。

图 28 的框图示出了实施方案 2 的网络应对显示装置的功能上的构成。

图 29 的流程图示出了实施方案 2 的本实施方案的工作的流程。

图 30 的流程图示出了从实施方案 2 的显示装置那里接收到俘获开始指令和显示状况管理文件后的终端设备一侧的工作。

具体实施方式

实施方案 1

图 1 示出了具备本发明的实施方案 1 的网络应对显示装置的显示系统的网络构成。

该显示系统 100，具备：多个终端设备 1(在图 1 中，仅仅画出了 1a、1b、1c、1d 这么 4 台)，具有本身为本发明的主要功能的多画面显示功能的网络应对显示装置 2(在图中示出的是投影仪的例子)(以下，简称为显示装置 2)，多个终端设备 1 和显示装置 2 通过网络 3，用 TCP/IP 等的通信协议连接为可进行双向通信。对各个终端设备 1 都分别预先给予固有的名称(以下，叫做终端名)。另外，网络 3，可以利用 LAN、无线 LAN、近距离无线 LAN 的蓝牙(Bluetooth,美国 Bluetooth SIG Inc.公司的注册商标)等的各种网络。

该显示系统 100，是借助于画面分割使在显示装置 2 的显示画面上同时显示在多个终端设备 1 中分别正在显示着的画面成为可能的系统，是例如在会议或演讲等时用之有效的系统。以下，对终端设备 1、显示装置 2 各自的构成详细地进行说明。

图 2 的框图示出了终端设备的构成。

终端设备 1，例如，可用个人计算机或 PDA(个人数字助理)等构成，具备用来显示演讲用的资料等的各种信息的显示部分 11，存储在该显示部

分 11 上要显示的内容的视频存储器 12、例如由图形输入器、鼠标、操作键盘构成的输入部分 13，检测来自该输入部分 13 的操作输入向后述的控制部分 16 输出输入信息的使用者接口部分 14、存放用来进行本发明的处理的应用(控制)程序或各种数据的存储部分 15、控制部分(CPU)16 和通信部分 17。

已存放在存储部分 15 内的控制程序，是用来实现下述功能的程序：用来实现在显示装置 2 中的多画面功能的终端设备一侧控制功能；可以俘获显示部分 11 的画面的全部或一部分的画面俘获功能；把借助于画面俘获功能取得的俘获图像数据变换成显示装置 2 的显示部分 21 的形式的图像变换功能，和为实现检测显示部分 11 的画面上的变化，用该控制程序和 CPU 构成数据管理处理部分 18、画面俘获处理部分 19、图像变换部分 19A 和画面比较处理部分 20。

控制部分 16，通过使用者接口部分 14 或通信部分 17，接受连接请求、放大显示请求、单画面切换请求、消去请求等的各种请求，并进行与该请求内容对应的处理，同时由图像变换部分 19A 对使用画面俘获处理部分 19 取得的俘获图像数据进行变换，从通信部分 17 向显示装置 2 发送变换后的俘获图像数据的处理等。

通信部分 17，是进行与显示装置 2 之间的双向通信的部分，在这里，通信协议是 TCP/IP,具有进行该 TCP/IP 连接所需要的 ARP、ICMP、IP、TCP、UDP 等的协议处理功能。另外，该功能也可以用 OS 实现。

另外，在图像变换部分 19A 中进行的变换处理，是由显示装置 2 进行多画面显示时必要的处理，虽然要在以下详述，但是，具体地说是这样的处理：向已分配给该终端设备 1 的分割画面的显示尺寸变化的尺寸变换处理、向显示装置 2 的显示部分 21 的显示色数变换的色变换处理。如上所述，在终端设备 1 的情况下，被构成为使得在对于用画面俘获处理部分 19 取得的俘获图像数据进行了为在显示装置 2 上进行的多画面显示所需要的变换处理之后，再发送给显示装置 2。

图 3 的框图示出了显示装置的构成。

显示装置 2，具备如下构成部分：显示部分 21；具有本发明的单画面显示功能、放大显示功能、单画面切换功能、嵌入功能和消去功能，进行要在显示部分 21 上显示的显示画面的控制的显示控制部分 22；例如由遥控器、鼠标、操作键盘构成的输入部分 23；检测来自输入部分 23 的操作输入并把输入内容输出给后述的控制部分 27 的使用者接口部分 24；存放提供本发明的多画面显示功能的显示控制程序的程序存储部分 25；存储在执行该显示控制程序时所必须的各种文件或各种数据的数据存储部分 26；进行显示装置 2 全体的工作控制的控制部分(CPU)27；和进行与终端设备 1 之间的双向通信的通信部分 28。

通信部分 28，是进行与终端设备 1 之间的双向通信的部分，在这里，通信协议是 TCP/IP,具有进行该 TCP/IP 连接所需要的 ARPICMP、IP、TCP、UDP 等的协议处理功能。

另外，该显示装置 2，具体地说，除图 1 所例示的投影仪之外，例如，还可用等离子体显示器、液晶监视器等构成。图 3 仅仅示出了与本发明的宗旨有关的主要部分，至于在投影仪、等离子体显示器、液晶监视器中分别特有的其它的机构，虽然由于与本发明的宗旨没有关联性而被省略，但是，采用在已有的投影仪、等离子体显示器、液晶监视器分别具备图 3 所示的各个处理部分的办法，就可以实现网络应对投影仪、网络应对等离子体显示器、网络应对液晶监视器。此外，显示部分 21，是随着这些显示装置 2 的种类不同而不同的显示要素，具体地说，如果是投影仪，则将变成为液晶光阀、LCOS 光阀、DMD(数字微型反射镜器件，美国德州仪器公司的商标)，在该情况下，显示部分 21 的显示画面将变成为投影面。此外，如果是等离子体显示器，则显示部分 21 将变成为等离子体显示面板，如果是液晶监视器则将变成为液晶面板，而如果是有机 EL 显示器，则将变成为有机 EL 面板。

其次，参看图 4 对存放在数据存储部分内的各种文件等进行说明。

在数据存储部分 26 内，存放有显示部分规范管理文件 30、连接许可管理文件 31、显示许可管理文件 32、连接状况管理文件 33、显示状况管

理文件 34、假分割区域设定文件 35、分割区域信息文件 36，此外，还具备用来存储从各个终端设备 1 发送过来的俘获图像数据的俘获图像数据存储部分 37。

显示部分规范管理文件 30，是注册有表明显示部分 21 的显示画面的纵横的像素个数的画面尺寸、和表明显示部分 21 的显示色数的色数信息的文件。另外，在本例中，画面尺寸定为 1280 × 1024 (SXGA)，色数则定为是 1677 万 7216 色.

连接许可管理文件 31，是注册有允许进行连接的终端设备 1 的终端名的文件，显示许可管理文件 32，是注册有允许进行画面显示的终端设备 1 的终端名的文件。

连接状况管理文件 33，是注册当前正连接到显示装置 2 上的终端设备 1 的终端名的文件。

显示状况管理文件 34，是管理当前的显示部分 21 的显示状况的文件，以表格形式对与正在当前的显示部分 21 的显示画面上显示的俘获图像数据发送处的终端设备 1 有关的终端设备信息进行管理。该显示状况管理文件 34，每当变更显示部分 21 的显示画面时都要更新，例如，在从 4 分割画面变更为 3 分割画面的情况下，与被消去的分割画面对应的终端设备 1 的终端设备信息就从该表中消去，反之，当从 4 分割画面变更为 5 分割画面的情况下，就要重新注册与该追加的画面对应的终端设备 1 的终端设备信息。

图 5 示出了要用显示状况管理文件管理的终端设备信息的各个项目。

显示状况管理文件 34，由‘终端名’、‘IP 地址’、‘画面尺寸’、‘色数信息’、‘优先级别’、‘俘获范围管理标志’、‘差分俘获管理标志’、‘俘获图像尺寸’、‘ 差分俘获图像尺寸 1’、 差分俘获图像尺寸 2’、‘差分俘获原点 1’、‘差分俘获原点 2’ 这些项目构成。

‘终端名’是已预先赋予终端设备 1 的名字，‘画面尺寸’是显示部分 11 的显示画面的纵横像素个数，例如，如果是 SXGA 的终端设备，析像度则为 1280 × 1024，如果是 XGA 则为 1024 × 768。‘色数信息’是显示部分

11 的显示色数，例如为 256 色、1677 万 7216 色等。以上的‘终端名’、‘IP 地址’、‘画面尺寸’、‘色数信息’，是向该显示状况管理文件 34 进行注册时必须要存放的数据，其它的项目，则是可根据使用者操作等适宜设定(更新)的数据。

‘优先级别’，是左右要分配给用‘终端名’特定的终端设备 1 的分割画面的显示尺寸的大小的优先级别，可选用‘最高’、‘高’、‘无’等的值，将在以下详述，但是，在本例中，其构成为使得被分配为优先级别高的显示尺寸变大。‘俘获范围管理标志’是管理在用‘终端名’特定的终端设备 1 中的画面俘获究竟是全画面还是部分俘获的标志，通常示出的是表明全画面俘获的‘0’，在是部分俘获的情况下则被设定为‘1’。

‘差分俘获管理标志’是管理在用‘终端名’特定的终端设备 1 中的画面俘获究竟是通常的俘获还是仅仅画面上的变化部分的俘获(以后，叫做差分俘获)的标志，在是通常俘获的情况下，就表示‘0’，在是差分俘获的情况下就被设定为‘1’。

‘俘获图像尺寸’是在‘俘获范围管理标志’为‘1’的情况下，就是说在部分俘获的情况下的俘获图像数据的尺寸(纵横的像素个数)。

‘差分俘获图像尺寸 1’和‘差分俘获图像尺寸 2’，是‘差分俘获管理标志’为‘1’的情况下的、在差分俘获中取得的 2 个不同的范围的区域的尺寸。‘差分俘获图像原点 1’和‘差分俘获图像原点 2’，是在差分俘获中取得的 2 个不同的范围的区域的原点，用在‘俘获图像尺寸’中规定的区域内的绝对坐标表示。

假分割区域设定文件 35，为预先设定用来特定分配给各个终端设备 1 的假的分割区域的信息的文件，由为每一台终端设备准备好的多个表构成。该表的构成示于后述的图 11(a)、图 16(a)，对于其详细情况决定在以下的相应的地方进行说明。另外，对于分割区域信息文件 36，也在以下进行详述。

以上的各个文件 30、31、32、33、34、35、36，当用输入部分 23 进行规定的操作时，就会在显示部分 21 上显示文件的内容，可以自由地在显

示画面上进行确认和数据变更。

在这里，返回到图 4 的说明。

显示控制部分 22，具备作为显示尺寸决定部分的分割区域信息编制部分 41、图像合成部分 42 和图像处理部分 43，在控制部分 27 中根据通过来自使用者接口部分 24 或通信部分 28 接收到的来自使用者的连接请求、显示请求、嵌入显示请求、消去请求等的各种请求内容，边对各个处理部分 41、42、43 适宜存取数据存储部分 26 内的必要的文件边实施必要的处理，进行显示部分 21 的显示控制。显示控制部分 22，则可用提供已存放在程序存储部分 25 内的多画面功能的显示控制程序和控制部分(CPU)27 实现。

分割区域信息编制部分 41，在根据显示状况管理文件 34 把握显示对像的终端设备 1 的台数的同时，还取得显示对像的各个终端设备 1 中的每一者的优先级别和画面尺寸。然后，根据这些显示对像的终端设备 1 的台数、显示对像的各个终端设备 1 中的每一者的优先级别和画面尺寸，进行显示部分 21 的显示画面尺寸的分割，编制包括要分配给显示对像的各个终端设备 1 中的每一者的显示部分 21 上的分割画面的显示尺寸(以下，叫做分割区域尺寸)、和特定该分割画面的显示位置的信息(是对显示画面的分割画面的左上的绝对坐标，以下，叫做原点)在内的分割区域信息，进行作为分割区域信息文件 36 存放到数据存储部分 26 内的工作。

在分割区域信息编制部分 41 中编制成的分割区域信息文件 36 中，已分配给显示对像的各个终端设备 1 中的每一者的分割画面的分割区域尺寸，与已存放在显示部分规范管理文件 30 中的显示部分 21 的显示色数一起，借助于控制部分 27 从通信部分 28 发送给显示对像的各个终端设备 1 中的每一者，把从接收到这些数据的各个终端设备 1 返送回来的俘获图像数据，就是说，已根据所发送的分割区域尺寸和显示色数施行了前边所说的尺寸变换处理和色变换处理的俘获图像数据写入到俘获图像数据存储部分 37 内。另外，现在被叫做分割区域尺寸的信息，与在以下被叫做真分割区域尺寸的信息是相同的。

图像合成部分 42，根据分割区域信息编制部分 41 中编制成的分割区

域信息文件 36，对已存放在俘获图像数据存储部分 37 中的来自各个终端设备 1 的尺寸变换处理和色变换处理完毕的俘获图像数据进行合成，产生合成图像数据。

图像处理部分 43，是对用在图像合成部分 42 中产生的合成图像数据，或 OSD(on screen display，在画面上显示)功能等进行参照的数据存储部分 26 的显示状况管理文件 34 等的各种图像数据，进行扫描频率变换处理以产生显示图像数据，并向显示部分 21 输出的部分，例如可用扫描变换器构成。

以下，说明本实施方案的工作。图 6、图 7 的流程图示出了本实施方案的工作。

首先，在显示装置 2 一侧，作为用来进行多画面显示的准备阶段，用输入部分 23 进行规定的操作输入，当控制部分 27 通过使用者接口部分 24 检测到该操作输入后，就通过通信部分 28 和网络 3，与显示装置 2 的 IP 地址一起，同时通知终端名和 IP 地址的信息返送请求。该同时通知的终端名和 IP 地址的信息返送请求，被网络 3 上的各个终端设备 1 接收，各个终端设备 1 中的每一者，把自身的终端名和 IP 地址返送给显示装置 2。

显示装置 2，通过通信部分 28 接收来自各个终端设备 1 的返送信息(终端名和 IP 地址)，判定是否连接许可终端。具体地说，核查被返送的终端名是否与已注册在连接许可管理文件 31 中的终端名一致，如果一致，就判定为连接许可终端。

依次把来自已判定为连接许可终端的终端设备 1 的终端名和 IP 地址注册到连接状况管理文件 33 内。借助于该连接状况管理文件 33，在显示装置 2 一侧，就可以把握当前究竟已连接上多少台终端设备 1。此外，由于还作成为根据终端名判断连接许可和不许可，故结果就变成为例如即便是在借助于 DHCP，把 IP 地址提供给终端设备 1，在该要提供的 IP 地址在每一次连接时都不同的情况下等，也可以应对。

在以上的准备作业结束后，显示装置 2，就以各种请求等待的状态进行等待。现在，考虑在各个会议出席者所操作的各个终端设备 1 中，如图

所示，想要在显示装置 2 的显示画面 50 上多画面显示终端设备 1a 到 1d 这 4 台的显示画面的情况。在这里把每一个终端设备 1 的分辨率定为终端设备 1a 为 SXGA(1280×1024 像素)，终端设备 1b 为 SVGA(800×600 像素)，终端设备 1c 为 XGA(1024×768 像素)，终端设备 1d 为 480×640 像素的例子进行说明。

<多画面显示功能>

图 8 的模式图示出了在显示装置的显示画面上多画面显示终端设备 1a 到 1d 这 4 台的显示画面的状态。

首先，操作输入部分 23 的例如遥控器输入终端设备 1a 到 1d 的多画面显示的意图。这样一来，该输入信息，就是说包括终端设备 1a 到 1d 各自的识别信息在内的显示请求，就通过使用者接口部分 24 通知给控制部分 27(S1)。另外，在通知该显示请求时，虽然也可以指定优先级别或部分俘获或差分俘获，但是在这里假定未进行任何指定。

接收到显示请求的显示装置 2 的控制部分 27，对于显示对像的各个终端设备 1a 到 1d 中的每一者都要进行以下的步骤 S3 到 S9 的处理(S2)。就是说，根据由含于显示请求内的识别信息特定的终端名，参照连接许可管理文件 31、显示许可管理文件 32，分别判定究竟是连接许可终端，还是显示许可终端(S3)，在连接、显示都已许可的情况下(S4)，就通过通信部分 28 对该终端设备请求终端设备信息(终端名、IP 地址、画面尺寸、色数信息)(S5)。然后，接收对该请求进行应答返送回来的终端设备信息(S6)，并注册到显示状况管理文件 34 内(S7)。另外，在该显示请求时，在已进行了优先级别或部分俘获的指定、差分俘获的指定的情况下，在该步骤 S7 的注册时，也同样要注册‘优先级别’、‘俘获范围管理标志’、‘差分俘获管理标志’。

接着，对连接、显示都已许可的终端设备 1，与显示状况管理文件 34 一起，发送画面俘获开始指令(S8)。另外，对于未许可连接、显示的终端设备 1，就通过通信部分 28 通知该意思(S9)。

在这里，若设终端设备 1a 到 1d 全部都是连接、显示都已许可的终端

设备 1，则借助于步骤 S2 到步骤 S9 的处理，则结果就变成为把来自各个终端设备 1a 到 1d 的终端设备信息注册到显示状况管理文件 34 内，同时，对于各个终端设备 1a 到 1d，通过通信部分 28，与显示状况管理文件 34 一起发送画面俘获开始指令。

当以上的处理结束后，控制部分 27 就把区域分割请求通知给显示控制部分 22 的分割区域信息编制部分 41。借助于此，显示装置 2 就将进入分割区域信息编制处理(S10)。接收到画面俘获开始指令的终端设备 1 一侧的工作在后边讲述，以下，对用已接收到区域分割请求的分割区域信息编制部分 41 进行的分割区域信息编制处理，进行说明。

图 9 的流程图示出了分割区域信息编制处理的流程。在这里，设显示状况管理文件 34 是如图 10 那样地构成的文件，以下，具体地声明分割区域信息编制部分 41 的工作。另外，在图 10 中，设终端名 PC-1、PC-2、PC-3、PDA-1 分别与终端设备 1a、1b、1c、1d 对应。

分割区域信息编制部分 41，当从控制部分 27 接收到区域分割请求后，就参照显示状况管理文件 34 把握显示对像的终端设备 1 的台数(在这里为 4 台)，同时，取得各个终端设备 1a、1b、1c、1d 各自的优先级别(S21)。然后，根据这些终端设备 1 的台数，和各个终端设备 1a 到 1d 各自的优先级别，参照假分割区域设定文件 35，取得应分配给各个终端设备 1a、1b、1c、1d 每一者的假的分割区域的假的尺寸和假的原点(S22)。另外，至于要作成为‘假’的理由，是因为在这里要分配的分割区域，规定为在后边的步骤中，在对俘获图像数据进行尺寸变换时要进行变更的缘故，虽然这会在以下的说明弄得明白。

在这里，如图 10 所示，显示对像的终端设备台数为 4 台，由于在其全部中都没有优先级别设定，故在该情况下，在假分割区域设定文件 35 中要参照的相应的假分割区域设定表，例如，可像图 11(a)那样地构成。另外，在本例中，显示部分 21 的显示画面的画面尺寸定为 1280 × 1024(SXGA)，图 11(a)的假分割区域设定表，是该情况下的一个例子。此外，图 11(b)示出的是以(a)的假分割区域设定表为基础的假分割区域。

在这里，图 11(a)的所谓优先顺序，是根据显示状况管理文件 34 的‘优先级别’的项目决定顺序附加，从优先级别高的设备开始，依次定为第 1 台、第 2 台、第 3 台、第 4 台。然后对其每一者，把可以用在该下边的表中所示的‘假尺寸’、‘假原点’特定的区域作为假分割区域进行分配。在这里，在全部的显示对像的全部终端设备 1a、1b、1c、1d 中由于都是‘无’(参看图 10)，故实质上没有优先顺序。在像这样地没有优先级别的设定的情况下的分配顺序，虽然既可以定为预先决定好的规定的顺序，也可以定为要向显示状况管理文件 34 中注册的注册顺序等是任意的，但是，在本例中，定为对各个终端设备 1a、1b、1c、1d(以下决定适宜叫做终端名 PC-1、PC-2、PC-3、PDA-1)，分别按照顺序分配假分割区域 50A、50B、50C、50D，并在以下继续进行说明。

分割区域信息编制部分 41，还从显示状况管理文件 34(参看图 10)中取得各个 PC-1、PC-2、PC-3、PDA-1 每一者的画面尺寸，并根据这些所取得的信息决定要分配给每一者的真的分割区域尺寸和真的原点(S23)。

图 12 是真的分割区域的说明图。另外，在图 12 中，51A、51B、51C、51D，分别示出了分别分配给 PC-1、PC-2、PC-3、PDA-1 的真的分割区域。所谓真的分割区域，就是用来把在假的分割区域内应在该假的分割区域内显示的俘获图像数据，维持纵横比完全不变地进行尺寸变换，而且，使该变换后的图像，在假的分割区域 50A、50B、50C、50D 每一者的中心部分上显示的显示区域。在这里，若用 PC-2 的例子具体地对用来特定该真分割区域的真分割区域尺寸进行说明，则 PC-2 的画面尺寸为 1024×768 个像素(参看图 10)，是为了在已分配给该 PC-2 的 640×512 个像素的假分割区域 50B 内显示该尺寸的图像数据，维持原来的图像的纵横比(就是说相当于显示部分 11 的显示画面的纵横比)不变地进行缩小时的尺寸。此外，所谓真的原点，如图 12 所示，是用来使该尺寸的分割画面位于假分割区域 50B 的中心部分上的原点，是分割画面的左上的像素的坐标(对显示画面全体的绝对坐标)。

分割区域信息编制部分 41，对 PC-1、PC-2、PC-3、PDA-1 每一者决

定以上那样的真分割区域尺寸和真原点，编制成由终端名、分割区域、原点的项目构成的图 13 所示的那样的内容的分割区域信息后，作为分割区域信息文件 36 存储到数据存储部分 26 内(S24)。借助于此，分割区域信息编制处理结束。另外，在该分割区域信息文件 36 中，要附加上编制日时(2002 年 5 月 21 日，17:00:32)。

在这里返回图 6。

显示装置 2 的控制部分 27，当在分割区域信息编制部分 41 中进行的分割区域信息编制处理(S10)结束后，就对显示对像的各个终端设备 1a、1b、1c、1d，进行步骤 S12 到步骤 S14 的处理(S11)。就是说，发送俘获图像数据发送请求(S12)。采用在该俘获图像数据发送请求中，含有已存放在分割区域信息文件 36 内的、已分配给该请求的发送目的地的终端设备 1 的真的分割区域尺寸、和已存放在显示部分规范管理文件 30 内的该显示装置 2 的显示部分 21 的显示色数的办法进行发送。就是说，例如对于终端设备 1a(PC-1)来说，结果就变成为要发送含有真的分割区域尺寸 640×512(参看图 13)，和显示装置 2 的显示色数 1677 万 7216 色的俘获图像数据发送请求。

然而，在终端设备 1 一侧，在步骤 S8 中，在接收到从显示装置 2 发送出来的俘获开始请求后，就开始画面俘获，若在终端设备 1 中进行的画面俘获是全画面俘获，则对于该步骤 S12 的俘获图像数据发送请求，如后述那样，向显示装置 2 返送已根据含于该俘获图像数据发送请求中的真分割区域尺寸和显示色数施行了尺寸变换处理和色数变化处理后的俘获图像数据，若是部分俘获，则返送部分俘获图像的图像尺寸。

显示装置 2，接收来自终端设备 1 的返送信息(S13)，在返送内容是俘获图像数据时，就判断在终端设备 1 中进行的画面俘获是全画面俘获(S14)，把该接收到的俘获图像数据写入到俘获图像数据存储部分 37 内(S18)。

另一方面，在步骤 S13 中接收到的来自终端设备 1 的返送信息是图像尺寸时，就判断在该终端设备 1 中进行的画面俘获是部分俘获(S14)，用所接收到的图像尺寸更新显示状况管理文件 34 的 '俘获图像尺寸'，同时，根据所接收到的图像尺寸，用与上述同样的处理再次编制(S15)分割区域信

息(真分割区域尺寸和真的原点)以对分割区域信息文件 36 的相应的地方进行更新，发送包括再次编制成的真的分割区域尺寸和显示部分 21 的显示色数在内的再次俘获图像数据发送请求(S16)。该再次俘获图像数据发送请求如后所述被终端设备 1 接收，向显示装置 2 返送已根据含于再次俘获图像数据发送请求内的真的分割区域尺寸和显示装置 2 的显示色数施行了尺寸变换处理和色数变化处理后的俘获图像数据，显示装置 2 接收来自终端设备 1 的返送信息(S17)，写入到俘获图像数据存储部分 37 内(S18)。

分别对显示对像的各个终端设备 1a 到 1d 进行以上的处理，当来自显示对像的终端设备 1a、1b、1c、1d 的俘获图像数据完全齐备后，控制部分 27 就把图像合成指令通知给图像合成部分 42。借助于此，显示装置 2 就进入图像合成处理(S19)。

图像合成部分 42，在接受到图像合成指令后，就根据分割区域信息文件 36 的分割区域信息的真的原点特定合成部位，把已存放在俘获图像数据存储部分 37 内的尺寸变换处理完毕和色变换处理完毕的各个俘获图像数据的每一者，合成为 1 个画面的图像数据以产生合成图像数据，向图像处理部分 43 输出所产生的合成图像数据。

图像处理部分 43，把来自图像合成部分 42 的合成图像数据变换成显示部分 21 的扫描频率产生显示图像数据，向显示部分 21 输出。借助于此，如图 8 所示，就可以在显示画面 50 上显示在真的分割区域(以下，有时候叫做分割画面)51A、51B、51C、51D 上分别显示的每一个终端设备 1a、1b、1c、1d 的俘获图像数据(显示画面)的多画面(S20)。

其次，对已从显示装置 2 接收到俘获开始指令和显示状况管理文件 34 的终端设备 1 一侧的工作，进行说明。

图 14 的流程图示出了已从显示装置 2 接收到俘获开始指令和显示状况管理文件的终端设备一侧的工作。在这里，作为终端设备 1a(PC-1)的工作进行说明。

终端设备 1a 的控制部分 16，通过通信部分 17 接收从显示装置 2 发送来的俘获开始指令和显示状况管理文件 34(S31)，参照显示状况管理文件

34 的该终端设备 1a 的俘获范围指定标志(S32)。在这里，由于是 '0' (S33)，故判断为全画面俘获并对画面俘获处理部分 19 发出全画面俘获指令。接收到全画面俘获的指令的画面俘获处理部分 19，就以例如位映像等的形式把视频存储器 12 的内容(就是说，当前正在显示部分 11 的画面上显示着的内容)存放到存储部分 15 内(全画面俘获处理)(S34)。

然后，当从显示装置 2 接收到俘获图像数据发送请求后(S35)，就根据含于俘获图像数据发送请求中的真的分割区域尺寸，对在步骤 S34 的全画面俘获处理中取得的俘获图像数据，进行尺寸变换，同时根据俘获图像数据发送请求中所含的显示色数，进行色变换(S36)。在这里，由于终端设备 1a(PC-1)的画面尺寸为 1280 × 1024(参看图 10)，故要把该尺寸的俘获图像数据尺寸变换（缩小变换）成所分配的真的分割区域尺寸 640 × 512(参看图 13)。另外，显示色数由于是与显示装置 2 同样的 1677 万 7216 色，故虽然实际上不进行色变换，但是在比显示装置 2 的显示色数还多的情况下，结果就变成为与显示装置 2 的显示色数一致地进行减少色数变换。如上所述，通过通信部分 17 发送已进行了尺寸变换处理和色变换处理的俘获图像数据(S37)。

另一方面，在步骤 S33 中，在俘获范围管理标志为 '1' 的情况下，就判断为部分俘获在显示部分 11 上显示 '请指定俘获范围' 等的信息的俘获范围指定指示画面(S38)，同时，对画面俘获处理部分 19 发出部分俘获指示。然后，当由确认俘获范围指定指示画面后的使用者，通过输入部分 13 进行窗口的选择或把所希望的区域围起来的操作等后，画面俘获处理部分 19，就通过使用者接口部分 14 识别使用者操作，把与所指定的区域对应的视频存储器 12 上的图像数据及其图像尺寸存放到存储部分 15 内(部分俘获处理)(S39)。

然后，当从显示装置 2 接收到俘获图像数据发送请求后(S40)，就返送在步骤 S39 的部分俘获处理中取得的部分俘获图像的图像尺寸(S41)。该返送如上所述被显示装置 2 接收，借助于显示装置 2 根据在部分俘获中的图像尺寸再次编制真的分割区域尺寸，向终端设备 1a 发送包括该再次编制成

的真的分割区域尺寸和显示装置2的显示部分21的显示色数在内的再次俘获图像数据。终端设备1a接收这些数据，并根据含于再次俘获图像数据发送请求内的真的分割区域尺寸对在步骤S39中存放在存储部分15内的部分俘获图像数据进行尺寸变换，同时，根据含于俘获图像数据发送请求中的显示色数进行色变换(S36)，通过通信部分 17 发送像这样地进行了尺寸变换处理和色变换处理后的俘获图像数据(S37)。

在终端设备1a之外的终端设备1b、1c、1d中也同样地进行以上的处理。结果就变成为如上所述从各个终端设备1a、1b、1c、1d的每一者，向显示装置2，发送已尺寸变换成分配给每一者的真的分割区域尺寸，此外，还发送已色变换成显示装置2的显示部分21的显示色数的俘获图像数据。

然而，虽然从显示装置2向各个终端设备1发送来显示状况管理文件34，但是该显示状况管理文件34，如上所述，除去可在核查本终端设备1的俘获范围指定标志的设定状态时利用之外，还可以采用用输入部分 13 进行规定的操作的办法，在显示部分11上显示文件的内容。此外，对于连接许可管理文件 31、显示许可管理文件 32、连接状况管理文件 33，也可以从显示装置2适宜取得同样地在显示部分11上显示，借助于此，使用者就可以得知除去自身所操作的终端设备1之外还有哪一个终端设备正在进行显示，或给予自身的终端设备1的权限等。

<放大显示功能>

以下，对在当前正在显示的多个分割画面中放大显示任意的分割画面的放大显示功能进行说明。该放大显示功能，在上述的构成中，可以采用变更优先级别的办法进行应对。

图15是用来说明放大显示功能的模式图。在这里，示出的是采用提高终端设备1a的优先级别的办法进行放大显示的情况下的例子。

在该情况下，例如采用操作遥控器并指定终端设备1a的画面。该指定，在已把终端设备1分配给遥控器的情况下，可以采用按下其键的办法进行指定，此外，在未进行分配的情况下则可操作遥控器从在显示部分21上显示的菜单画面上进行选择，或者用遥控器使之在显示画面上显示光标，用

该光标指示终端设备 1a 的画面进行点击等的办法进行指定。

这样地指定的该指定信息，就是说，含有终端设备 1a 识别信息的放大显示请求，通过使用者接口部分 24 通知给控制部分 27，控制部分 27，根据含于放大显示请求内的识别信息特定终端设备 1a，把显示状况管理文件 34 的终端设备 1a(PC-1)的‘优先级别’的项目设定为‘高’，把区域分割请求通知给分割区域信息编制部分 41。

在分割区域信息编制部分 41 中，与上述同样地编制分割区域信息文件 36。在进行该编制时，要参照的假的分割区域设定表，例如像图 16(a) 那样地构成，图 16(b)示出了以该假的分割区域设定表为基础的假的分割区域。在这里，图 16(b)中的优先顺序，如上所述，根据显示状况管理文件 34 的‘优先级别’的项目决定顺序附加，在这里由于终端设备 1a 的优先级别为‘高’比别的终端设备 1b、1c、1d 都高，故分配优先顺序为第 1 号就是说图 16(b)的假的分割区域(第 1 台用的分割区域)52a。对于未设定优先级别的其它的终端设备终端设备 1b、1c、1d 的分割区域的分配，如上所述是任意的，在这里，给终端设备 1b、1c、1d 按照顺序分别分配假的分割区域 52B、52C、52D。然后，与上述同样地决定要分配给终端设备 1a、1b、1c、1d 的真的分割区域。

图 17 示出了该情况下的真的分割区域，分割区域 53A、53B、53C、53D 是分别分配给各个终端设备 1a、1b、1c、1d 的真的分割区域，这时的分割区域信息文件 36，构成为图 18 所示的那样的内容。

然后，进行与上述同样的工作，结果如图 15 所示，是在真的分割区域 53A、53B、53C、53D 上分别显示各个终端设备 1a、1b、1c、1d 的俘获图像数据(显示画面)，在显示画面 50 上显示在各个分割区域 53A、53B、53C、53D 中，被指定的分割画面 51A 被放大后的状态的多画面。

<单画面切换功能>

此外，如图 19 所示，还可以单画面显示多个分割画面中的任何一项。在该情况下，例如操作遥控器进行该意思的输入操作。把含有该输入信息，就是说含有与要进行单画面显示的分割画面 51C 对应的终端设备 1c 的识

别信息的单画面显示请求，通过使用者接口部分 24 通知给控制部分 27。控制部分 27 根据含于单画面显示请求中的识别信息特定终端设备 1c，把显示状况管理文件 34 的终端设备 1c(PC-3)的‘优先级别’的项目设定为‘最高’，把区域分割请求通知给分割区域信息编制部分 41。

接着，进行与上述同样的工作，其结果是如图 19 所示，从多画面变更为单画面。此外，例如，采用用遥控器进行规定的操作的办法，使‘优先级别’的项目返回到‘无’，借助于此，就变成为可以返回到原来的多画面的构成。

得益于这样的单画面切换功能，就可以确认因被缩小而看不见细节的分割画面的细节，此外，还可以借助于规定的操作返回到多画面，使用灵活性好。

<嵌入功能>

此外，如图 20 所示，也可以对当前正在显示着的多画面嵌入新的画面。该嵌入，相当于进行了多画面显示后的显示请求，可用与上述显示请求时同样的处理进行嵌入。

<消去功能>

此外，如图 21 所示，也可以在当前正在显示着的多个分割画面中消去任意的分割画面。在该情况下，要操作遥控器进行该意思的输入操作。通过使用者接口部分 24 把含有该输入信息，就是说把含有与要想消去的分割画面 51D 对应的终端设备 1d 的识别信息的消去请求通知给控制部分 27，控制部分 27 根据含于消去请求中的识别信息特定终端设备 1d，从显示状况管理文件 34 中消除该终端设备 1d 的终端设备信息，把区域分割请求通知给分割区域信息编制部分 41。之后的工作，与上述是同样的，借助于此，如图 21 所示，就可以消去指定的分割画面 50D，可以在消去后的台数量的多个分割画面上显示重新构成的多画面。另外，也可以采用单纯地仅仅消除消去指定的分割画面 51D 的构成。

如上所述，倘采用本实施方案，就可以得到具备借助于画面分割在显示装置 2 的显示画面上 1 个画面地显示正在已连接到网络 3 上的多个终端

设备 1 上显示着的画面的多画面显示功能的显示系统 100，而且，由于可以在终端设备 1 一侧进行在实现该多画面显示功能时所必要的处理，就是说上述的尺寸变换处理和色变换处理，故假定在显示装置 2 一侧对来自各个终端设备 1 的俘获图像数据中的每一者都进行同样的变换处理的情况下比较，可以显著地减轻显示装置 2 一侧的负荷。

此外，如上所述，由于作成为在终端设备 1 一侧进行了俘获图像数据的尺寸变换之后，再通过网络 3 发送给显示装置 2，故也可以减轻网络 3 的负荷。

此外，除去多画面显示功能之外，还具备放大显示功能、单画面切换功能、嵌入功能、消去功能，使用灵活性非常好。

此外，在各个终端设备 1 中取得的俘获图像数据，由于可维持其纵横比原状不变地在画面上的对应的分割画面上显示，故可以构成没有失调感的显示画面。

另外，也可以是这样的方法：在显示装置 2 主导下例如每 3 秒一次地不断更新显示画面而不是会议出席者(使用者)每当要观看显示时都通过输入部分输入显示请求。在该情况下，只要显示装置 2 的控制部分 27 管理时间，每当经过恒定的时间就与上述同样地进行之后的工作即可，因而总是可以得到最新的终端设备 1 的显示画面。

<差分俘获功能>

到现在为止说明的都是由全画面俘获(或部分俘获)进行的方法，以下，对检测终端设备的显示画面上的变化，发送用仅仅俘获变化部分的办法得到的图像数据的方法，进行说明。

首先，操作输入部分 23 的例如遥控器，输入想要进行对终端设备 1a 到 1d 的差分俘获的意图。就是说，把显示状况管理文件 34 的差分俘获管理标志设定为 '1'。

已把差分俘获管理标志设定为 '1' 的第 1 次，如通常那样，进行上述步骤 S1 到 S20 的处理，进行多画面显示。

在多画面显示完成后，显示装置 2，就从控制部分 27 到通信部分 28，

通过网络 3 对差分俘获管理标志设定为‘1’的终端设备 1，与显示状况管理文件 34 一起，发送差分俘获开始指令。

其次，对从显示装置 2 接收到差分俘获开始指令和显示状况管理文件的终端设备 1 一侧的工作，进行说明。

图 22 的流程图示出了从显示装置 2 接收到差分俘获开始指令和显示状况管理文件的终端设备 1 一侧的工作。在这里。作为终端设备 1a(PC-1)的工作进行说明。

终端设备 1a 的数据管理处理部分 18，通过通信部分 17 接收从显示装置 2 发送来的差分俘获开始指令和显示状况管理文件 34(S41)。接受到它们后就执行以后的全画面俘获处理。就是说，画面俘获处理部分 19 把视频存储器 12 的内容存放到存储部分 15 内(S42)。把在这里得到的图像数据叫做前全画面数据。

画面比较处理部分 20，每隔恒定的时间(例如每 0.5 秒 1 次等，设定是任意的)就参照数据管理处理部分 18 所接收到的显示状况管理文件 34 的差分俘获管理标志(S43)，如果差分俘获管理标志是‘1’(S44)，就进行以后的差分俘获工作。

此外，例如如果使用者要停止差分俘获工作那样地进行指示，则只要用变更显示状况管理文件 34 的方法把差分俘获管理标志改写成‘0’即可。采用画面比较处理部分 20 参照该标志的办法，判断俘获工作停止。

执行全画面俘获处理,画面俘获处理部分 19 把视频存储器 12 的内容存放到存储部分 15 内(S45)。把在这里得到的图像数据，叫做后全画面数据。其次，运算部分 16 的画面比较处理部分 20 进行前全画面数据和后全画面数据的比较(S46)。

作为画面比较处理的一个例子，用使鼠标光标动作时的例子(图 23)进行说明。在该图中，在前全画面数据 60 和后全画面数据 61 中鼠标光标的位置已发生变化。就是说，如图 24 所示， 2 个区域(70、71)被识别为已发生了变化的区域。画面比较处理部分 20 虽然对之进行检测，但是，在这里在可以判断为有了画面的变化的情况下(S47)，画面比较处理部分 20 就取

得有了变化的区域的图像数据、图像数据的尺寸(纵×横像素)、用图像数据的原点坐标(显示状况管理文件 34 的‘俘获图像尺寸’规定的区域内的绝对坐标)。

在本例的情况下，就区域 70 来说，可以取得该区域 70 部分的俘获图像数据(以下，叫做差分俘获图像数据 1)、差分俘获图像尺寸 1、差分俘获原点 1，就区域 71 来说，可以取得该区域 71 部分的俘获图像数据(以下，叫做差分俘获图像数据 2)、差分俘获图像尺寸 2、差分俘获原点 2，在把这些信息存放到存储部分 15 内的同时，把已取得差分俘获图像数据等的信息通知给数据管理处理部分 18(S48)。另外，差分俘获图像尺寸 1、差分俘获图像尺寸 2、差分俘获原点 1，差分俘获原点 2，要写入到显示状况管理文件 34 的相应的部分内。

网络管理部分 18，通过通信部分 17 和网络 3，把这些数据发送往显示装置 2(S49)。另外，在该差分俘获功能的情况下，与上述全画面俘获(或部分俘获)的方法不同，不是每次都从显示装置 2 一侧接收 发送请求，而是用画面比较处理部分 20 检测到画面上的变换的情况下，这种变动成为要因而进行发送工作。

为了进行下一次的画面比较处理，要把后全画面数据变成为前全画面数据(S50)。

其次，对从终端设备 1a 接受到差分俘获图像数据 1、差分俘获图像数据 2 和显示状况管理文件 34 的显示装置 2 一侧的工作，进行说明。

当显示装置 2 用通信部分 28 从终端设备 1a 那里接收到差分俘获图像数据 1、差分俘获图像数据 2 和显示状况管理文件 34 后，控制部分 27 就把图像合成指令通知给图像合成部分 42。借助于此，显示装置 2 进入由差分俘获功能进行的图像合成处理。

图像合成部分 42，当接收到图像合成指令后，就根据相当于当前正在显示部分 21 上显示的图像的分离区域信息文件 36，在从终端设备 1a 接收到的显示状况管理文件 34(差分俘获图像尺寸 1、差分俘获图像尺寸 2、差分俘获原点 1，差分俘获原点 2)，改写已存放到俘获图像数据存储部分 37

内的俘获图像数据中，相当于差分俘获图像数据 1、差分俘获图像数据 2 的部分。之后的工作与上述的步骤 19、步骤 20 是同样的。

该方法，由于要用网络 3 发送的图像数据的量比上述的全画面俘获(或部分俘获)的方法少，故可以减轻施加给网络的负荷。另外总能得到最新的终端设备 1 的显示图像。

另外，在上述的说明中，在进行差分检测时，虽然设想为用已导入到终端设备 1 内的专用的程序进行俘获并进行处理，但是在可以直接检测视频存储器的内容差分的那样的驱动器，可以在 OS 上利用进行处理的情况下，也可以利用这种方式。

另外，上述图像数据，也可以采用用压缩图像形式(例如，JPEG 形式等)在终端设备 1 和显示装置 2 之间进行发送接收的办法，来减小施加给网络的负荷。

另外，在上述中，虽然一直以采用操作显示装置 2 一侧的输入部分 23 的办法进行显示请求或单画面显示请求等的各种请求的情况，就是说，以在显示装置 2 一侧主导下决定显示画面的构成的情况为例进行的说明，但是，从各个终端设备 1 一侧决定也是可能的。在该情况下，会议出席者(使用者)，从自身所操作的终端设备 1 操作输入部分 13 输入该意图。该输入信息，通过使用者接口部分 14 通知给控制部分 16，该控制部分 16，对显示装置 2，通过通信部分 17 和网络 3 发送与含有本终端设备 1 的终端名和 IP 地址的上述输入信息对应的请求。该请求通过网络 3 被显示装置 2 的通信部分 28 接收，通知给控制部分 27。之后的工作，与上述是同样的，如上所述。从各个终端设备 1 一侧决定各种请求也是可能的。

另外，采用在上述各种请求中含有指定是全画面俘获还是部分俘获的信息的办法，从各个终端设备 1 一侧决定俘获范围的指定也是可能的。

此外，优先级别，如上所述，既可以借助于使用者操作适宜指定，也可以对预定要连接到显示装置 2 上的多个终端设备 1 预先给定优先级别。在预先给定优先级别的情况下，要作成为这样的构成：在把终端设备信息注册到显示状况管理文件 34 内时，自动地把已给予该终端设备 1 的优先级

别设定到显示状况管理文件 34 的优先级别的项目内。

另外，在本实施方案中，虽然说明的是根据假分割区域设定文件 35 决定假分割区域，但是也可以作成为每次根据计算决定。

此外，在部分俘获的情况下，虽然例示的是从终端设备 1 向显示装置 2 返送图像尺寸，根据返送回来的图像尺寸在显示装置 2 一侧进行真的分割区域的再次编制的情况，但是也可以作成为在终端设备 1 一侧进行该再次编制处理。

实施方案 2

图 1 示出了具备本发明的实施方案 1 的网络应对显示装置的显示系统的网络构成。

该显示系统 100，具备：多个终端设备 1(在图 1 中，仅仅画出了 1a、1b、1c、1d 这么 4 台)，具有本身为本发明的主要功能的多画面显示功能的网络应对显示装置 2(在图中示出的是投影仪的例子)(以下，简称为显示装置 2)，多个终端设备 1 和显示装置 2 通过网络 3，用 TCP/IP 等的通信协议连接为可进行双向通信。对各个终端设备 1 都分别预先给予固有的名称(以下，叫做终端名)。另外，网络 3，可以利用 LAN、无线 LAN、近距离无线 LAN 的蓝牙(Bluetooth,美国 Bluetooth SIG Inc.公司的注册商标)等的各种网络。

该显示系统 100，是借助于画面分割使在显示装置 2 的显示画面上同时显示在多个终端设备 1 中分别正在显示着的画面成为可能的系统，是例如在会议或演讲等时用之有效的系统。以下，对终端设备 1、显示装置 2 各自的构成详细地进行说明。

图 26 的框图示出了终端设备的构成。

终端设备 1，例如，可用个人计算机或 PDA(个人数字助理)等构成，具备用来显示演讲用的资料等的各种信息的显示部分 11，存储在该显示部分 11 上显示的内容的视频存储器 12、例如由图形输入器、鼠标、操作键盘构成的输入部分 13，检测来自该输入部分 13 的操作输入向后述的运算部分 16 输出输入信息的使用者接口部分 14、存放用来进行本发明的处理

的应用(控制)程序或各种数据的存储部分 15、运算部分(CPU)16 和通信部分 17。

已存放在存储部分 15 内的控制程序，是用来实现在显示装置 2 中实现的多画面功能的终端设备一侧控制功能；可以俘获显示部分 11 的画面的全部或一部分的画面俘获功能；和检测显示部分 11 的画面上的变化的功能，故可用应用程序和 CPU 构成数据管理处理部分 18、画面俘获处理部分 19 和画面比较处理部分 20。

数据管理处理部分 18，通过通信部分 17 或使用者接口部分 14，接受连接请求、显示请求、放大显示请求、单画面切换请求、消去请求等的各种请求，并进行与该请求内容对应的处理，同时，通过通信部分 17 进行把用画面俘获处理部分 19 取得的俘获图像数据发送给显示装置 2 的处理等。

通信部分 17，是进行与显示装置 2 之间的双向通信的部分，在这里，通信协议是 TCP/IP,具有进行该 TCP/IP 连接所需要的 ARP、ICMP、IP、ARP、TCP、UDP 等的协议处理功能。另外，该功能也可以用 OS 实现。

图 27 的框图示出了显示装置的构成。

显示装置 2，具备如下构成部分：显示部分 21、具有本发明的多画面显示功能、放大显示功能、单画面显示功能、嵌入功能和消去功能，进行要在显示部分 21 上显示的显示画面的控制的显示控制部分 22；例如由遥控器、鼠标、操作键盘构成的输入部分 23；检测来自输入部分 23 的操作输入并把输入内容输出给后述的运算部分 27 的使用者接口部分 24；存放提供本发明的多画面显示功能的显示控制程序的程序存储部分 25；存储在执行该显示控制程序时所必须的各种文件或各种数据的数据存储部分 26；进行显示装置 2 全体的工作控制的运算部分(CPU)27；进行与终端设备 1 之间的双向通信的通信部分 28。

通信部分 28，是进行与终端设备 1 之间的双向通信的部分，在这里，通信协议是 TCP/IP,具有进行该 TCP/IP 连接所需要的 ARP、ICMP、IP、ARP、TCP、UDP 等的协议处理功能。

在这里，该显示装置 2，除图 1 所例示的投影仪之外，例如，还可用

等离子体显示器、液晶监视器等构成。显示部分 21，是随着这些显示装置 2 的种类不同而不同的显示要素，具体地说，如果是投影仪，则将变成为液晶光阀、LCOS 光阀、DMD(数字微型反射镜器件，美国德州仪器公司的商标)，在该情况下，显示部分 21 的显示画面将变成为投影面。此外，如果是等离子体显示器，则显示部分 21 将变成为等离子体显示面板，如果是液晶监视器则将变成为液晶面板，而如果是有机 EL 显示器，则将变成为有机 EL 面板。

其次，参看图 28 对存放在数据存储部分内的各种文件等进行说明。

在数据存储部分 26 内，存放有连接许可管理文件 31、显示许可管理文件 32、连接状况管理文件 33、显示状况管理文件 34、假分割区域设定文件 35、分割区域信息文件 36，此外，还具备用来存储从各个终端设备 1 发送过来的俘获图像数据的俘获图像数据存储部分 37。

连接许可管理文件 31，是注册有允许进行连接的终端设备 1 的终端名的文件，显示许可管理文件 32，是注册有允许进行画面显示的终端设备 1 的终端名的文件。

连接状况管理文件 33，是注册当前已连接到显示装置 2 上的终端设备 1 的终端名的文件。

显示状况管理文件 34，是管理当前的显示部分 21 的显示状况的文件，以表格形式对与正在当前的显示部分 21 的显示画面上显示的俘获图像数据发送处的终端设备 1 有关的终端设备信息进行管理。该显示状况管理文件 34，每当变更显示部分 21 的显示画面时都要更新，例如，在从 4 分割画面变更为 3 分割画面的情况下，与被消去的分割画面对应的终端设备 1 的终端设备信息就从该表中消去，反之，当从 4 分割画面变更为 5 分割画面的情况下，就要新注册与该追加的画面对应的终端设备 1 的终端设备信息。

图 5 示出了要用显示状况管理文件管理的终端设备信息的各个项目。

显示状况管理文件 34，由‘终端名’、‘IP 地址’、‘画面尺寸’、‘色数信息’、‘优先级别’、‘俘获范围管理标志’、‘差分俘获管理标志’、‘俘获

图像尺寸’、‘差分俘获图像尺寸 1’、差分俘获图像尺寸 2’、‘差分俘获原点 1’、‘差分俘获原点 2’这些项目构成。

‘终端名’是已预先赋予终端设备 1 的名字，‘画面尺寸’是显示部分 11 的显示画面的纵横像素个数，例如，如果分辨率是 SXGA 的终端设备，则为 1280×1024，如果是 XGA 则为 1024×768。‘色数信息’是显示部分 11 的显示色数，例如为 256 色、1677 万 7216 色等。以上的‘终端名’、‘IP 地址’、‘画面尺寸’、‘色数信息’，是向该显示状况管理文件 34 进行注册时必须要存放的数据，其它的项目，则是可根据使用者操作等适宜设定(更新)的数据。

‘优先级别’，是左右要分配给可用‘终端名’特定的终端设备 1 的显示尺寸的大小的优先级别，可选用‘最高’、‘高’、‘无’等的值，将在以下详述，但是，在本例中，其构成为使得被分配为优先级别高的显示尺寸变大。‘俘获范围管理标志’是管理在可用‘终端名’特定的终端设备 1 中的画面俘获究竟是全画面还是部分俘获的标志，通常示出的是表明全画面俘获的‘0’，在是部分俘获的情况下则被设定为‘1’。

‘差分俘获管理标志’是管理在可用‘终端名’特定的终端设备 1 中的画面俘获究竟是通常的俘获还是仅仅画面上的变化部分的俘获(以后，叫做差分俘获)的标志，在是通常俘获的情况下，就表示‘0’，在是差分俘获的情况下就被设定为‘1’。

‘俘获图像尺寸’是在‘俘获范围管理标志’为‘1’的情况下，就是说在部分俘获的情况下的俘获图像数据的尺寸(纵横的像素个数)。

‘差分俘获图像尺寸 1’和‘差分俘获图像尺寸 2’，是‘差分俘获管理标志’为‘1’的情况下的、在差分俘获中取得的 2 个不同的范围的区域的尺寸。‘差分俘获原点 1’和‘差分俘获原点 2’，是在差分俘获中取得的 2 个不同的范围的区域的原点，用在‘俘获图像尺寸’中规定的区域内的绝对坐标表示。

假分割区域设定文件 35，是预先设定用来特定分配给各个终端设备 1 的假的分割区域的信息的文件，由为每一台终端设备准备好的多个表构成。

该表的构成示于后述的图 11(a)、图 16(a)，对于其详细情况在以下的相应的地方进行说明。另外，对于分割区域信息文件 36，也在以下进行详述。

以上的各个文件 31、32、33、34、35、36，当用输入部分 23 进行规定的操作时，就会在显示部分 21 上显示文件的内容，可以自由地在显示画面上进行确认和数据变更。

在这里，返回到图 28 的说明。

显示控制部分 22，具备分割区域信息编制部分 41、图像合成部分 42 和图像处理部分 43，在运算部分 27 中根据通过来自使用者接口部分 24 或通信部分 28 接收到的来自使用者的连接请求、显示请求、嵌入显示请求、消去请求等的各种请求内容，边对各个部分 41、42、43 适宜存取数据存储部分 26 内的必要的文件边实施必要的处理，进行显示部分 21 的显示控制。显示控制部分 22，则可用提供已存放在程序存储部分 25 内的多画面功能的显示控制程序和运算部分(CPU)27 实现。

分割区域信息编制部分 41，在根据显示状况管理文件 43 把握显示对像的终端设备 1 的台数的同时，还取得显示对像的各个终端设备 1 中的每一者的优先级别和画面尺寸。然后，根据这些显示对像的终端设备 1 的台数、显示对像的各个终端设备 1 中的每一者的优先级别和画面尺寸，进行显示部分 21 的显示画面尺寸的分割，编制包括要分配给显示对像的各个终端设备 1 中的每一者的显示部分 21 上的分割画面的显示尺寸(以下，叫做分割区域尺寸)、和特定该分割画面的显示位置的信息(是对显示画面的分割画面的左上的绝对坐标，以下，叫做原点)在内的分割区域信息，进行作为分割区域信息文件 36 存放到数据存储部分 26 内的工作。

图像合成部分 42，对已存放在俘获图像数据存储部分 37 中的俘获图像数据，进行缩小、放大、色变换等的处理，根据在分割区域信息编制部分 41 中编制成的分割区域信息文件 36，产生合成图像数据。

图像处理部分 43，是对用在图像合成部分 42 中产生的合成图像数据，或 OSD(on screen display，在屏幕上显示)功能等进行参照的数据存储部分 26 的显示状况管理文件 34 等的各种图像数据，进行扫描频率变换处理以

产生显示图像数据，并向显示部分 21 输出的部分，例如可用扫描转换器构成。

以下，说明本实施方案的工作。图 29 的流程图示出了本实施方案的工作。

首先，在显示装置 2 一侧，作为用来进行多画面显示的准备阶段，用输入部分 23 进行规定的操作输入，当运算部分 27 通过使用者接口部分 24 检测该操作输入后，就通过通信部分 28 和网络 3，与显示装置 2 的 IP 地址一起，同时通知终端名和 IP 地址的信息返送请求。该同时通知的终端名和 IP 地址的信息返送请求，被网络 3 上的各个终端设备 1 接收，各个终端设备 1 中的每一者，把自身的终端名和 IP 地址返送给显示装置 2。

显示装置 2，通过通信部分 28 接收来自各个终端设备 1 的返送信息(终端名和 IP 地址)，判定是否连接许可终端。具体地说，核查被返送的终端名是否与已注册在连接许可管理文件 31 中的终端名一致，如果一致，就判定为连接许可终端。

依次把来自已判定为连接许可终端的终端设备 1 的终端名和 IP 地址注册到连接状况管理文件 33 内。借助于该连接状况管理文件 33，在显示装置 2 一侧，就可以把握当前究竟已连接上多少台终端设备 1。此外，由于还作成为根据终端名判断连接许可和不许可，故结果就变成为例如即便是在借助于 DHCP，把 IP 地址提供给终端设备 1，在该要提供的 IP 地址在每一次连接时都不同的情况下等，也可以应对。

以上的准备作业在已结束后，显示装置 2，就以各种请求等待的状态进行待机。现在，考虑在各个会议出席者所操作的各个终端设备 1 中，如下图所示，想要在显示装置 2 的显示画面 50 上多画面显示终端设备 1a 到 1d 这 4 台的显示画面的情况。在这里把每一个终端设备 1 的分辨率定为设终端设备 1a 为 SXGA(1280 × 1024 像素)，终端设备 1b 为 SVGA(800 × 600 像素)，终端设备 1c 为 XGA(1024 × 768 像素)，终端设备 1d 为 480 × 640 像素的例子进行说明。

<多画面显示功能>

图 8 的模式图示出了在显示装置的画面上多画面显示终端设备 1a 到 1d 这 4 台的显示画面的状态。

首先，操作输入部分 23 的例如遥控器输入终端设备 1a 到 1d 的多画面显示的意图。这样一来，该输入信息，就是说包括终端设备 1a 到 1d 各自的识别信息在内的显示请求，就通过使用者接口部分 24 通知给控制部分 27(S1)。另外，在通知该显示请求时，虽然也可以指定优先级别或部分俘获或差分俘获，但是在这里假定未进行任何指定。

接收到显示请求的显示装置 2 的运算部分 27，对于显示对像的各个终端设备 1a 到 1d 中的每一者都要进行以下的步骤 S3 到 S9 的处理(S2)。就是说，根据由含于显示请求内的识别信息特定的终端名，参照连接许可管理文件 31、显示许可管理文件 32，分别判定究竟是连接许可终端，还是显示许可终端(S3)，在连接、显示都已许可的情况下(S4)，就通过通信部分 28 对该终端设备请求终端设备信息(终端名、IP 地址、画面尺寸、色数信息)(S5)。然后，接收对该请求进行应答返送回来的终端设备信息(S6)，并注册到显示状况管理文件 34 内(S7)。另外，在该显示请求时，在已进行了优先级别或部分俘获的指定、差分俘获的指定的情况下，在该步骤 S7 的注册时，也同样要注册‘优先级别’、‘俘获范围管理标志’、‘差分俘获管理标志’。

接着，对连接、显示都已许可的终端设备 1，与显示状况管理文件 34 一起，发送画面俘获开始指令(S8)。另外，对于未许可连接、显示的终端设备 1，就通过通信部分 28 通知该意思（S9）。

在这里，若设终端设备 1a 到 1d 全部都是连接、显示都已许可的终端设备 1，则借助于步骤 S2 到步骤 S9 的处理，则结果就变成为把来自各个终端设备 1a 到 1d 的终端设备信息注册到显示状况管理文件 34 内，同时，对于各个终端设备 1a 到 1d，通过通信部分 28，与显示状况管理文件 34 一起发送画面俘获开始指令。

当以上的处理结束后，运算部分 27 就把区域分割请求通知给显示控制部分 22 的分割区域信息编制部分 41。借助于此，显示装置 2 就将进入分

割区域信息编制处理(S10)。接收到画面俘获开始指令的终端设备 1 一侧的工作在后边讲述，以下，对用已接收到区域分割请求的分割区域信息编制部分 41 进行的分割区域信息编制处理，进行说明。

图 9 的流程图示出了分割区域信息编制处理的流程。在这里，设显示状况管理文件 34 是如图 10 那样地构成的文件，以下，具体地说明分割区域信息编制部分 41 的工作。另外，在图 10 中，设终端名 PC-1、PC-2、PC-3、PDA-1 分别与终端设备 1a、1b、1c、1d 对应。

分割区域信息编制部分 41，当从控制部分 27 接收到区域分割请求后，就参照显示状况管理文件 34 把握显示对像的终端设备 1 的台数(在这里为 4 台)，同时，取得各个终端设备 1a、1b、1c、1d 各自的优先级别(S21)。然后，根据这些终端设备 1 的台数，和各个终端设备 1a 到 1d 各自的优先级别，参照假分割区域设定文件 35，取得应分配给各个终端设备 1a、1b、1c、1d 每一者的假的分割区域的假的尺寸和假的原点(S22)。另外，至于要作成为‘假’的理由，是因为在这里要分配的分割区域，规定为在后边的步骤中，在对俘获图像数据进行尺寸变换时要进行变更的缘故，虽然这会在以下的说明弄得明白。

在这里，如图 10 所示，显示对像的终端设备台数为 4 台，由于在其全部中都没有优先级别设定，故在该情况下，在假分割区域设定文件 35 中要参照的相应的假分割区域设定表，例如，可像图 11(a)那样地构成。另外，在本例中，显示部分 21 的显示画面的画面尺寸定为 1280×1024(SXGA)，图 11(a)的假分割区域设定表，是该情况下的一个例子。此外，图 11(b)示出的是以(a)的假分割区域设定表为基础的假分割区域。

在这里，图 11(a)的所谓优先顺序，是根据显示状况管理文件 34 的‘优先级别’的项目决定顺序附加，从优先级别高的设备开始，依次定为第 1 台、第 2 台、第 3 台、第 4 台。然后对其每一者，把可以用在其下边的表中所示的‘假尺寸’、‘假原点’特定的区域作为假分割区域进行分配。在这里，在全部的显示对像的全部终端设备 1a、1b、1c、1d 中由于都是‘无’(参看图 10)，故实质上没有优先顺序。在像这样地没有优先级别的设定的

情况下的分配顺序，虽然既可以定为预先决定好的规定的顺序，也可以定为要向显示状况管理文件 34 中注册的注册顺序等是任意的，但是，在本例中，定为对各个终端设备 1a、1b、1c、1d(以下决定适宜叫做终端名 PC-1、PC-2、PC-3、PDA-1)，分别按照顺序分配假分割区域 50A、50B、50C、50D，并在以下继续进行说明。

分割区域信息编制部分 41，还从显示状况管理文件 34(参看图 10)中取得各个 PC-1、PC-2、PC-3、PDA-1 每一者的画面尺寸，并根据这些所取得的信息决定要分配给每一者的真的分割区域尺寸和真的原点(S23)。

图 12 是真的分割区域的说明图。另外，在图 12 中，51A、51B、51C、51D，分别示出了分别分配给 PC-1、PC-2、PC-3、PDA-1 的真的分割区域。所谓真的分割区域，就是用来把在假的分割区域内应在该假的分割区域内显示的俘获图像数据，维持纵横比完全不变地进行尺寸变换，而且，使该变换后的图像，在假的分割区域 50A、50B、50C、50D 每一者的中心部分上显示的显示区域。在这里，若用 PC-2 的例子具体地对用来特定该真分割区域的真分割区域尺寸进行说明，则 PC-2 的画面尺寸为 1024×768 个像素(参看图 10)，是为了在已分配给该 PC-2 的 640×512 个像素的假分割区域 50B 内显示该尺寸的图像数据，维持原来的图像的纵横比不变地进行缩小时的尺寸。此外，所谓真的原点，如图 12 所示，是用来使该尺寸的分割画面位于假分割区域 50B 的中心部分上的原点，是分割画面的左上的像素的坐标(对显示画面全体的绝对坐标)。

分割区域信息编制部分 41，对 PC-1、PC-2、PC-3、PDA-1 每一者决定上述那样的真分割区域和真原点，编制成由终端名、分割区域、原点的项目构成的图 13 所示的那样的内容的分割区域信息后，作为分割区域信息文件 36 存储到数据存储部分 26 内(S24)。借助于此，分割区域信息编制处理结束。另外，在该分割区域信息文件 36 中，要附加上编制日时(2002 年 5 月 21 日，17：00；32)。

在这里返回图 29。

显示装置 2 的运算部分 27，当在分割区域信息编制部分 41 中进行的

分割区域信息编制处理(S10)结束后，就对显示对像的各个终端设备 1a、1b、1c、1d，进行步骤 S12 到步骤 S14 的处理(S11)。就是说，发送俘获图像数据发送请求(S12)。另外，在各个终端设备 1a、1b、1c、1d 中，在接收到借助于步骤 S8 的处理从显示装置 2 一侧发送过来的俘获开始指令后，如后所述开始画面俘获处理，借助于该画面俘获处理取得的俘获图像数据和图像尺寸(在部分俘获的情况下)，对步骤 S11 的俘获图像数据发送请求进行应答并返送到显示装置 2。

显示装置 2，接收来自终端设备 1 的返送信息(S13)，在返送内容是俘获图像数据时，就判断在终端设备 1 中进行的画面俘获是全画面俘获(S14)，把该接收到的俘获图像数据写入到俘获图像数据存储部分 37 内(S16)。

另一方面，在步骤 S13 中接收到的来自终端设备 1 的返送信息是俘获图像数据和图像尺寸时，就判断在该终端设备 1 中进行的画面俘获是部分俘获(S14)，用所接收到的图像尺寸更新显示状况管理文件 34 的‘俘获图像尺寸’，同时，根据所接收到的图像尺寸，用与上述同样的处理再次编制分割区域信息(S15) 。然后，将与图像尺寸同时接收到的俘获图像数据写入俘获图像数据存储部 37 中(S16)。

分别对显示对像的各个终端设备 1a 到 1d 进行以上的处理，当来自显示对像的终端设备 1a、1b、1c、1d 的俘获图像数据完全齐备后，运算部分 27 就把图像合成指令通知给图像合成部分 42。借助于此，显示装置 2 就进入图像合成处理(S17)。

图像合成部分 42，在接受到图像合成指令后，就根据分割区域信息文件 36 的分割区域信息和显示状况管理文件的‘色数信息’，对已存放在俘获图像数据存储部分 37 内的各个俘获图像数据的每一者，进行尺寸变换和色变换，合成为 1 个画面的图像数据以产生合成图像数据，向图像处理部分 43 输出所产生的合成图像数据。

图像处理部分 43，把来自图像合成部分 42 的合成图像数据变换成显示部分 21 的扫描频率产生显示图像数据，向显示部分 21 输出。借助于此，如图 8 所示，就可以在显示画面 50 上多画面显示在真的分割区域(以下，

有时候叫做分割画面)51A、51B、51C、51D 上分别显示每一个终端设备 1a、1b、1c、1d 的俘获图像数据(显示画面) (S18)。

其次，对已从显示装置 2 接收到俘获开始指令和显示状况管理文件 34 的终端设备 1 一侧的工作，进行说明。

图 30 的流程图示出了已从显示装置接收到俘获开始指令和显示状况管理文件的终端设备一侧的工作。在这里，作为终端设备 1a(PC-1)的工作进行说明。

终端设备 1a 的数据管理处理部分 18，通过通信部分 17 接收从显示装置 2 发送来的俘获开始指令和显示状况管理文件 34(S31)，参照显示状况管理文件 34 的该终端设备 1a 的俘获范围指定标志(S32)。在这里，由于是 '0' (S33)，故判断为全画面俘获并对画面俘获处理部分 19 发出全画面俘获指令。接收到全画面俘获的指令的画面俘获处理部分 19，就以例如位映像等的形式把视频存储器 12 的内容(就是说，当前正在显示部分 11 的画面上显示着的内容)存放到存储部分 15 内(全画面俘获处理)(S34)，把画面俘获已经结束的情况通知给数据管理处理部分 18。

另一方面，在俘获范围管理标志为 '1' 时，就判断为部分俘获，在显示部分 11 上显示 '请指定俘获范围' 等的信息的俘获范围指定指示画面(S35)，同时，对画面俘获处理部分 19 发出部分俘获指示。当由确认俘获范围指定指示画面后的使用者，通过输入部分 13 进行窗口的选择或把所希望的区域围起来的操作等后，画面俘获处理部分 19，就通过使用者接口部分 14 识别使用者操作，把与所指定的区域对应的视频存储器 12 上的图像数据及其图像尺寸存放到存储部分 15 内(部分俘获处理)(S36)，把画面俘获已经结束的情况通知给数据管理处理部分 18。

如上所述，在终端设备 1a 一侧，在接收到俘获开始指令后，就进行画面俘获处理。这期间，在显示装置 2 一侧，如上所述正在进行分割区域信息编制处理，因此，终端设备 1a，当在画面俘获处理部分 19 中进行的画面俘获处理结束，而且接收到来自显示装置 2 的俘获图像数据发送请求后(S37)，就通过通信部分 17 发送俘获图像数据和图像尺寸(在部分俘获的情

况下)(S38)。

在终端设备 1a 之外的终端设备 1b、1c、1d 中也同样地进行以上的处理。结果就变成为如上所述从各个终端设备 1a、1b、1c、1d，向显示装置 2，发送俘获图像数据和图像尺寸(在部分俘获的情况下)。

然而，虽然从显示装置 2 向各个终端设备 1 发送来显示状况管理文件 34，但是该显示状况管理文件 34，如上所述，除去可在核查该终端设备 1 的俘获范围指定标志的设定状态时利用之外，还可以采用用输入部分 13 进行规定的操作的办法，在显示部分 11 上显示文件的内容。此外，对于连接许可管理文件 31、显示许可管理文件 32、连接状况管理文件 33，也可以从显示装置 2 适宜取得并同样地在显示部分 11 上显示，借助于此，使用者就可以得知除去自身所操作的终端设备 1 之外还有哪一个终端设备正在进行显示，或给予自身的终端设备 1 的权限等。

<放大显示功能>

以下，对在当前正在显示的多个分割画面中放大显示任意的分割画面的放大显示功能进行说明。该放大显示功能，在上述的构成中，可以采用变更优先级别的办法进行应对。

图 15 是用来说明放大显示功能的模式图。在这里，示出的是采用提高终端设备 1a 的优先级别的办法进行放大显示的情况下的例子。

在该情况下，采用例如操作遥控器的办法指定终端设备 1a 的画面。该指定，在已把终端设备 1 分配给遥控器的情况下，可以采用按下其键的办法进行指定，此外，在未进行分配的情况下则可操作遥控器从在显示部分 21 上显示的菜单画面上进行选择，或者用遥控器使之在显示画面上显示光标，用该光标指示终端设备 1a 的画面进行点击等的办法进行指定。

像这样地指定的该指定信息，就是说，含有终端设备 1a 识别信息的放大显示请求，通过使用者接口部分 24 通知给运算部分 27，运算部分 27，根据含于放大显示请求内的识别信息特定终端设备 1a，把显示状况管理文件 34 的终端设备 1a(PC-1)的‘优先级别’的项目设定为‘高’，把区域分割请求通知给分割区域信息编制部分 41。

在分割区域信息编制部分 41 中，与上述同样地编制分割区域信息文件 36。在进行该编制时，要参照假的分割区域设定表，例如像图 16(a) 那样地构成，图 16(b)示出了以该假的分割区域设定表为基础的假的分割区域。在这里，图 16(b)中的优先顺序，如上所述，根据显示状况管理文件 34 的‘优先级别’的项目决定顺序附加，在这里由于终端设备 1a 的优先级别为‘高’比别的终端设备 1b、1c、1d 都高，故分配优先顺序为第 1 号就是说图 16(b)的假的分割区域(第 1 台用的分割区域)52a。对于未设定优先级别的其它的终端设备 1b、1c、1d 的分割区域的分配，如上所述是任意的，在这里，给终端设备 1b、1c、1d 按照顺序分别分配假的分割区域 52B、52C、52D。然后，与上述同样地决定要分配给各终端设备 1a、1b、1c、1d 的真的分割区域。

图 17 示出了该情况下的真的分割区域，分割区域 53A、53B、53C、53D 是分别分配给各个终端设备 1a、1b、1c、1d 的真的分割区域，这时的分割区域信息文件 36，构成为图 17 所示的那样的内容。

然后，进行与上述同样的工作，结果是如图 15 所示在真的分割区域 53A、53B、53C、53D 上分别显示各个终端设备 1a、1b、1c、1d 的俘获图像数据(显示画面)，在显示画面 50 上显示在各个分割画面 53A、53B、53C、53D 中，被指定的分割画面 51A 被放大后的状态的多画面。

<单画面切换功能>

此外，如图 19 所示，还可以单画面显示多个分割画面中的任何一项。在该情况下，例如操作遥控器进行该意思的输入操作。把含有该输入信息，就是说含有与要进行单画面显示的分割画面 51C 对应的终端设备 1c 的识别信息的单画面显示请求，通过使用者接口部分 24 通知给运算部分 27。运算部分 27 根据含于单画面显示请求中的识别信息特定终端设备 1c，把显示状况管理文件 34 的终端设备 1c(PC-3)的‘优先级别’的项目设定为‘最高’，把区域分割请求通知给分割区域信息编制部分 41。

接着，进行与上述同样的工作，其结果是如图 19 所示，从多画面变更为单画面。此外，例如，采用用遥控器进行规定的操作的办法，使‘优先

级别”的项目返回到‘无’，借助于此，就变成为可以返回到原来的多画面的构成。

得益于这样的单画面切换功能，就可以确认图被缩小而看不见细节的分割画面的细节，此外，还可以借助于规定的操作返回到多画面，使用灵活性好。

<放入功能>

此外，如图 20 所示，也可以对当前正在显示着的多画面放入新的画面。该放入，相当于进行了多画面显示后的显示请求，可用与上述显示请求时同样的处理进行放入。

<消去功能>

此外，如图 21 所示，也可以在当前正在显示着的多个分割画面中消去任意的分割画面。在该情况下，要操作遥控器进行该意思的输入操作。通过使用者接口部分 24 把含有该输入信息，就是说把含有与要想消去的分割画面 SID 对应的终端设备 Id 的识别信息的消去请求通知给运算部分 27，运算部分 27 根据令于消去请求中的识别信息特定终端设备 Id，从显示状况管理文件 34 中消除该终端设备 Id 的终端设备信息，把区域分割请求通知给分割区域信息编制部分 41。之后的工作，与上述是同样的，借助于此，如图 21 所示，就可以消去指定的分割画面 SID，在可以在消去后的合数量的多个分割画面上显示重新构成的多画面。另外，也可以采用单独地仅仅消除消去指定的分割画面 SID 的构成。

如上所述，倘采用本实施方案，就可以得到具备借助于画面分割在显示画面上 1 个画面地显示已连接到网络 3 上的多个终端设备 1 上显示着的画面的多画面形式功能的显示装置 2。

此外，还可以得到除去多画面显示功能之外，还具备放大显示功能、单画面切换功能、放入功能、消去功能的高功能的显示装置 2。

此外，在构成多画面时，由于作成为使得可维持伴随图像数据纵横比原状不变地进行尺寸变换后进行合成，故可以得到可以构成没有失调感的显示画面的显示装置 2。

另外，也可以是这样的方法：在显示装置 2 主导下例如每 3 秒一次地不断更新显示画面而不是会议出席者(使用者)每当要观看显示时都通过输入部分 23 输入显示请求。在该情况下，只要显示装置 2 的运算部分 27 管理时间，每当经过恒定的时间就与上述同样地进行之后的工作即可，因而总是可以得到最新的终端设备 1 的显示画面。

<差分俘获功能>

到现在为止说明的都是由全画面俘获(或部分俘获)进行的方法，以下，对检测终端设备的显示画面上的变化，发送用仅仅俘获变化部分的办法得到的图像数据的方法，进行说明。

首先，操作输入部分 23 的例如遥控器，输入想要进行对终端设备 1a 到 1d 的差分俘获的意图。就是说，把显示状况管理文件 34 的差分俘获管理标志设定为 '1'。

已把差分俘获管理标志设定为 '1' 的第 1 次，如通常那样，进行上述步骤 S1 到 S18 的处理，进行多画面显示。

在多画面显示完成后，显示装置 2，就从运算部分 27 通过通信部分 28、网络 3 对差分俘获管理标志设定为 '1' 的终端设备 1，与显示状况管理文件 34 一起，发送差分俘获开始指令。

其次，对从显示装置 2 接收到差分俘获开始指令和显示状况管理文件的终端设备 1 一侧的工作，进行说明。

图 22 的流程图示出了从显示装置 2 接收到差分俘获开始指令和显示状况管理文件的终端设备 1 一侧的工作。在这里。作为终端设备 1a(PC-1)的工作进行说明。

终端设备 1a 的数据管理处理部分 18，通过通信部分 17 接收从显示装置 2 发送来的差分俘获开始指令和显示状况管理文件 34(S41)。接受到它们后就执行以后的全画面俘获。就是说，画面俘获处理部分 19 把视频存储器 12 的内容存放到存储部分 15 内(S42)。把在这里得到的图像数据叫做前全画面数据。

画面比较处理部分 20，每隔恒定的时间(例如每 0.5 秒 1 次等，设定是

任意的)就参照数据管理处理部分 18 所接收到的显示状况管理文件 34 的差分俘获管理标志(S43)，如果差分俘获管理标志是 '1' (S44)，就进行以后的差分俘获。

此外，例如如果使用者要停止差分俘获工作那样地进行指示，则只要用变更显示状况管理文件 34 的方法把差分俘获管理标志改写成 '0' 即可。采用画面比较处理部分 20 参照该标志的办法，判断俘获工作停止。

执行全画面俘获处理,画面俘获处理部分 19 把视频存储器 12 的内存放到存储部分 15 内(S45)。把在这里得到的图像数据，叫做后全画面数据。其次，运算部分 16 的画面比较处理部分 20 进行前全画面数据和后全画面数据的比较(S46)。

作为该画面比较处理的一个例子，用使鼠标光标工作时的例子(图 23)进行说明。在该图中，在前全画面数据 60 和后全画面数据 61 中鼠标光标的位置已发生变化。就是说，如图 24 所示， 2 个区域(70、71)被识别为已发生了变化的区域。画面比较处理部分 20 虽然对之进行检测，但是，在这里在可以判断为有了画面的变化的情况下(S47)，画面比较处理部分 20 就取得有了变化的区域的图像数据、图像数据的尺寸(纵×横像素)、用图像数据的原点坐标(显示状况管理文件 34 的 '俘获图像尺寸' 规定的区域内的绝对坐标)。

在本例的情况下，就区域 70 来说，可以取得该区域 70 的俘获图像数据(以下，叫做差分俘获图像数据 1)、差分俘获图像尺寸 1、差分俘获原点 1，就区域 71 来说，可以取得该区域 71 的俘获图像数据(以下，叫做差分俘获图像数据 2)、差分俘获图像尺寸 2、差分俘获原点 2，在把这些信息存放到存储部分 15 内的同时，把已取得差分俘获图像数据等的信息通知给数据管理处理部分 18(S48)。另外，差分俘获图像尺寸 1、差分俘获图像尺寸 2、差分俘获原点 1，差分俘获原点 2，要写入到显示状况管理文件 34 的相应的部分内。

网络管理部分 18，通过通信部分 17 和网络 3，把这些数据发送往显示装置 2(S49)。另外，在该差分俘获功能的情况下，与上述全画面俘获(或部

分俘获)的方法不同，在不是每次都从显示装置 2 一侧接收发送请求，而是用画面比较处理部分 20 检测到画面上的变换的情况下，这种变动成为要因而进行发送工作。

为了进行下一次的画面比较处理，要把后全画面数据变成为前全画面数据(S50)。

其次，对从终端设备 1a 接受到差分俘获图像数据 1、差分俘获图像数据 2 和显示状况管理文件 34 的显示装置 2 一侧的工作，进行说明。

当显示装置 2 用通信部分 28 从终端设备 1a 那里接收到差分俘获图像数据 1、差分俘获图像数据 2 和显示状况管理文件 34 后，运算部分 27 就把图像合成指令通知给图像合成部分 42。借助于此，显示装置 2 进入由差分俘获功能进行的图像合成处理。

图像合成部分 42，当接收到图像合成指令后，就根据相当于当前正在显示部分 21 上显示的图像的分离区域信息文件 36，在从终端设备 1a 接收到的显示状况管理文件 34(差分俘获图像尺寸 1、差分俘获图像尺寸 2、差分俘获原点 1，差分俘获原点 2)，改写已存放到俘获图像数据存储部分 37 内的俘获图像数据中，相当于差分俘获图像数据 1、差分俘获图像数据 2 的部分。之后的工作与上述的步骤 17、步骤 18 是同样的。

该方法，由于要用网络 3 发送的图像数据的量比上述的全画面俘获(或部分俘获)的方法少，故可以减轻施加给网络的负荷。此外，还总是可以得到最新的终端设备 1 的显示画面。

另外，在上述的说明中，在进行差分检测时，虽然设想为用已导入到终端设备 1 内的专用的程序进行俘获并进行处理，但是可以直接检测视频存储器的内容的差分那样的驱动器可以在 OS 上利用进行处理的情况下，也可以利用这种方式。

另外，上述图像数据，也可以采用用压缩图像形式(例如，JPEG 形式等)在终端设备 1 和显示装置 2 之间进行发送接收的办法，来减小施加给网络的负荷。

另外，在上述中，虽然一直以采用操作显示装置 2 一侧的输入部分 23

的办法进行显示请求或单画面显示请求等的各种请求的情况，就是说，以在显示装置 2 一侧主导下决定显示画面的构成的情况为例进行的说明，但是，从各个终端设备 1 一侧决定也是可能的。在该情况下，会议出席者(使用者)，从自身所操作的终端设备 1 操作输入部分 13 输入该意图。该输入信息，通过使用者接口部分 14 通知给数据管理处理部分 18，该数据管理处理部分 18，对显示装置 2，通过通信部分 17 和网络 3 发送与含有本终端设备 1 的终端名和 IP 地址的上述输入信息对应的请求。该请求通过网络 3 被显示装置 2 的通信部分 28 接收，通知给运算部分 27。之后的工作，与上述是同样的，这样，从各个终端设备 1 一侧决定各种请求也是可能的。

另外，采用在上述各种请求中含有指定是全画面俘获还是部分俘获的信息的办法，从各个终端设备 1 一侧指定俘获范围也是可能的。

此外，优先级别，如上所述，既可以借助于使用者操作适宜指定，也可以对预定要连接到显示装置 2 上的多个终端设备 1 预先给定优先级别。在预先给定优先级别的情况下，要作成为这样的构成：在把终端设备信息注册到显示状况管理文件 34 内时，自动地把已给予该终端设备 1 的优先级别自动设定到显示状况管理文件 34 的优先级别的项目内。

另外，在本实施方案中，虽然说明的是根据假分割区域设定文件 35 决定假分割区域，但是也可以作成为每次根据计算决定。

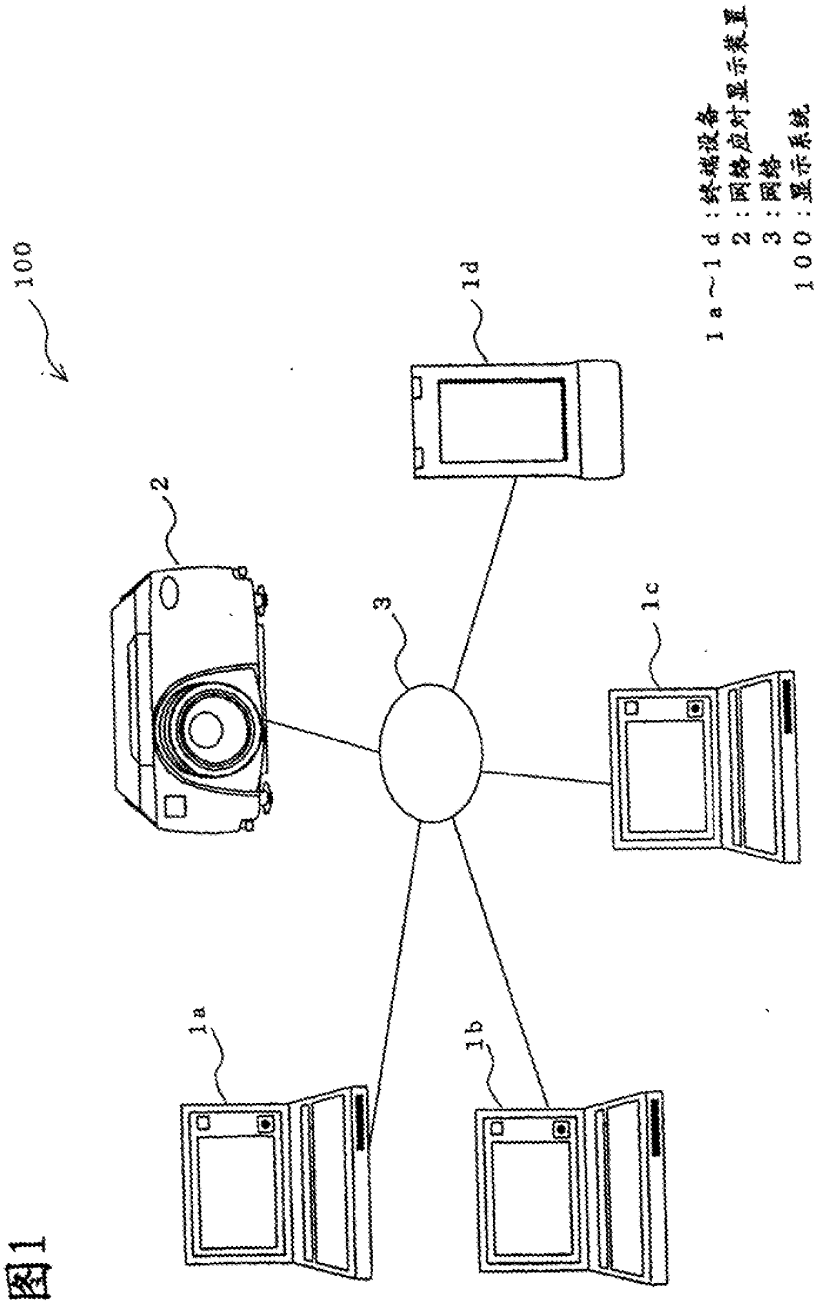


图1

图2

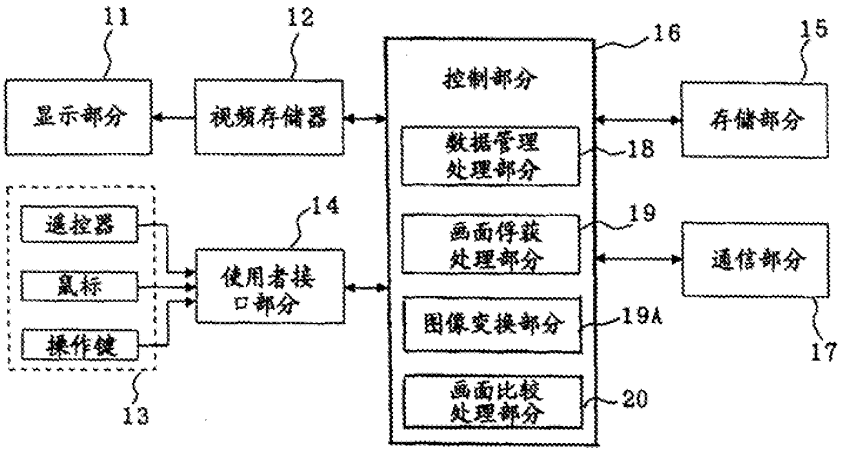
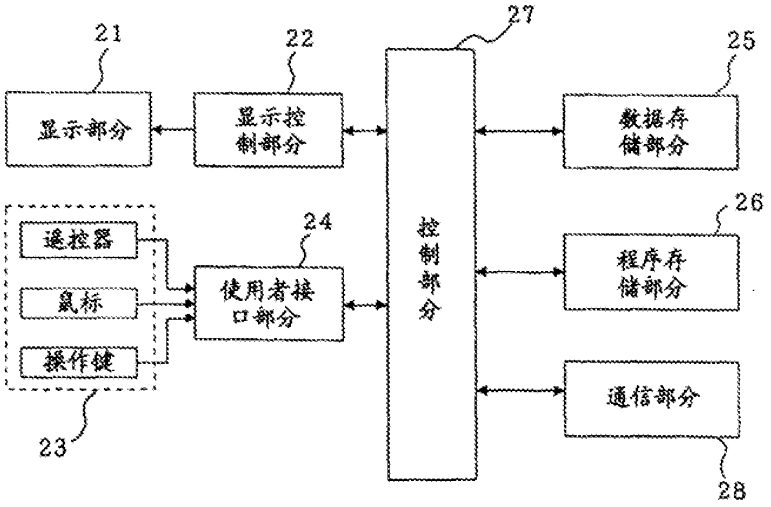

11
12
16
15
显示部分
视频存储器
控制部分
存储部分
数据管理
处理部分
18
遥控器
14
19
鼠标
使用者接
口部分
画面俘获
处理部分
通信部分
图像变换部分
19A
操作键
17
画面比较
处理部分
20
13

图3


21
22
27
25
显示部分
显示控
制部分
数据存
储部分
遥控器
24
26
鼠标
使用者接
口部分
控
制
部
分
程序存
储部分
操作键
通信部分
23
28

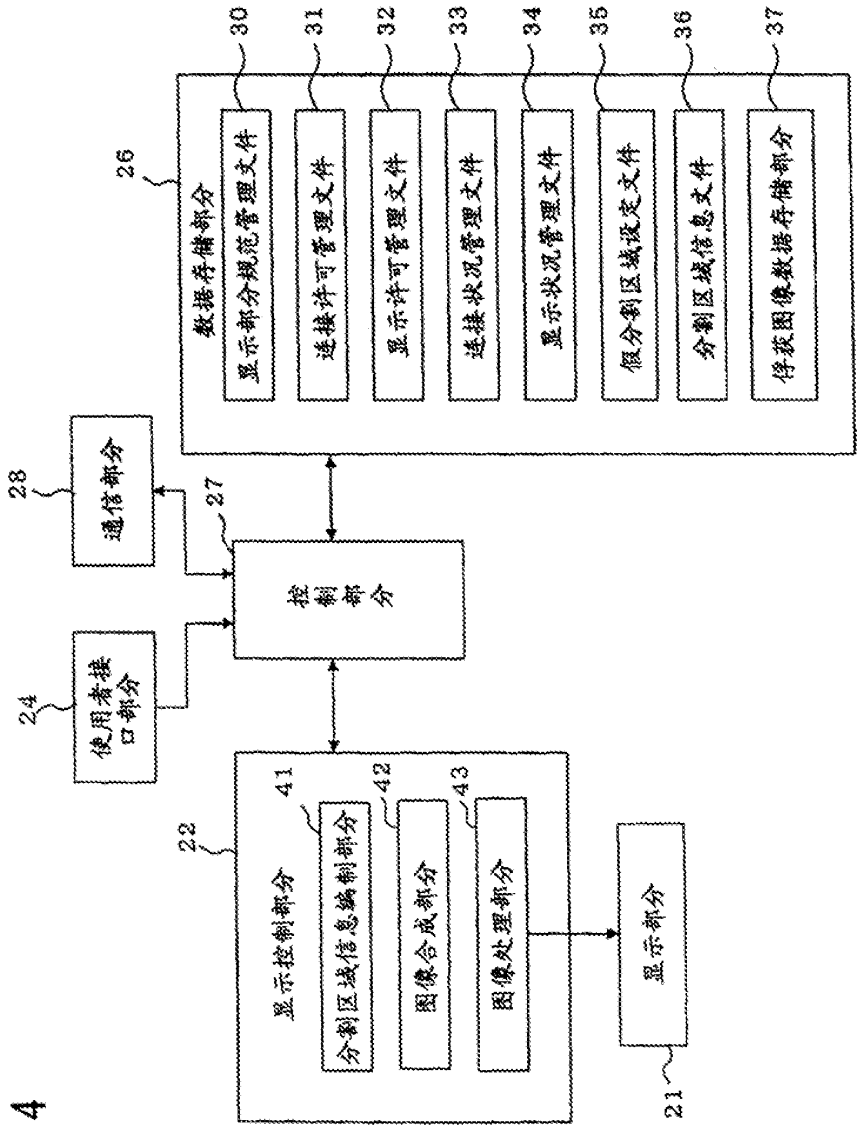

26
数据存储部分
30
显示部分规范管理文件
31
连接许可管理文件
32
显示许可管理文件
33
连接状况管理文件
34
显示状况管理文件
35
假分割区域设定文件
36
分割区域信息文件
37
停获图像数据存储部分
28
通信部分
27
控制部分
24
使用者接口部分
22
显示控制部分
41
分割区域信息编制部分
42
图像合成部分
43
图像处理部分
21
显示部分

图4

图5

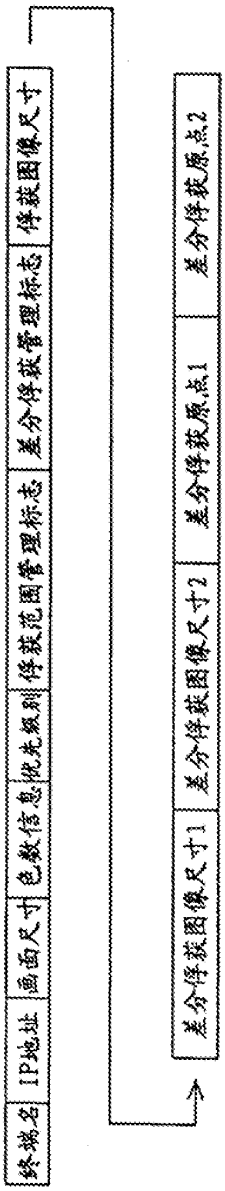

终端名
IP地址
画面尺寸
色数信息
优先级别
俘获范围管理标志
差分俘获管理标志
俘获图像尺寸
差分俘获图像尺寸1
差分俘获图像尺寸2
差分俘获原点1
差分俘获原点2

图6

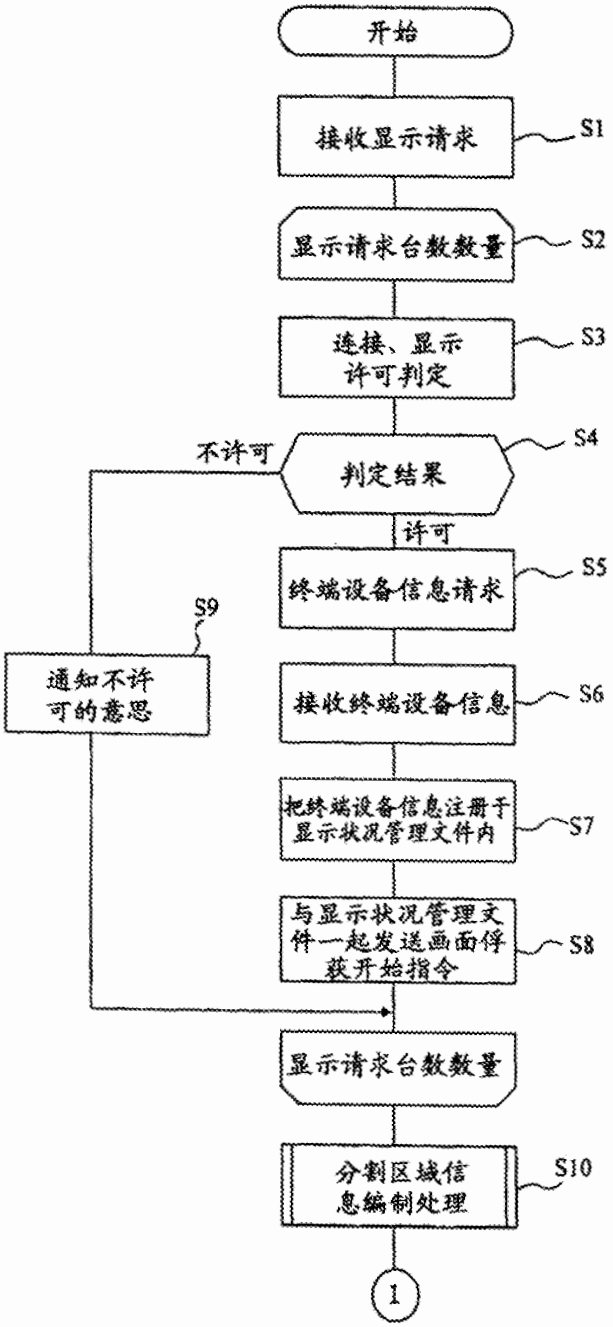

开始
接收显示请求
S1
显示请求台数数量
S2
连接、显示许可判定
S3
判定结果
S4
不许可
许可
终端设备信息请求
S5
接收终端设备信息
S6
把终端设备信息注册于显示状况管理文件内
S7
与显示状况管理文件一起发送画面停获开始指令
S8
显示请求台数数量
分割区域信息编制处理
S10
1
通知不许可的意思
S9

图7

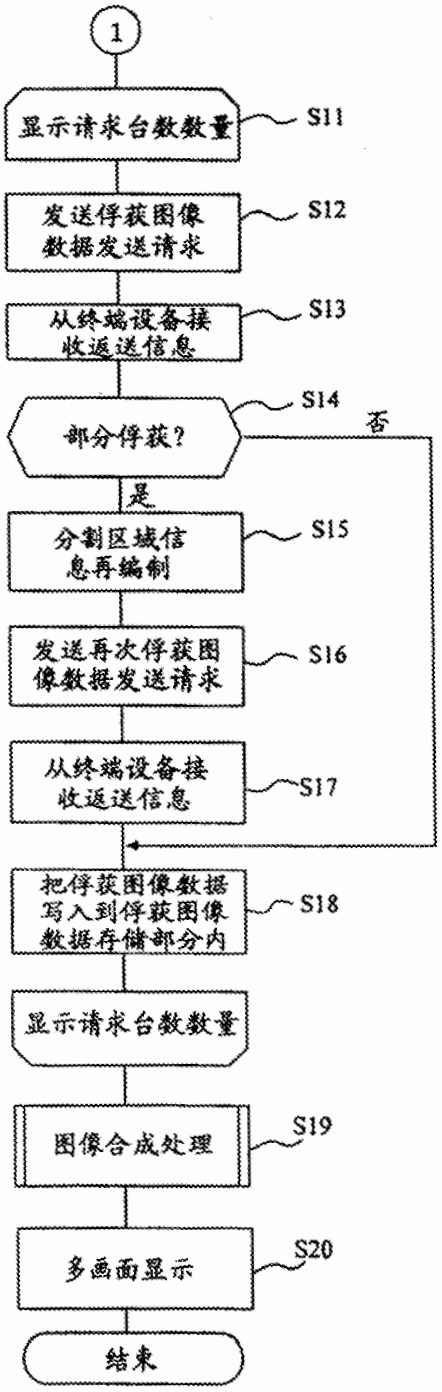

1
显示请求台数数量
S11
发送俘获图像数据发送请求
S12
从终端设备接收返送信息
S13
部分俘获?
S14
否
是
分割区域信息再编制
S15
发送再次俘获图像数据发送请求
S16
从终端设备接收返送信息
S17
把俘获图像数据写入到俘获图像数据存储部分内
S18
显示请求台数数量
图像合成处理
S19
多画面显示
S20
结束

图8

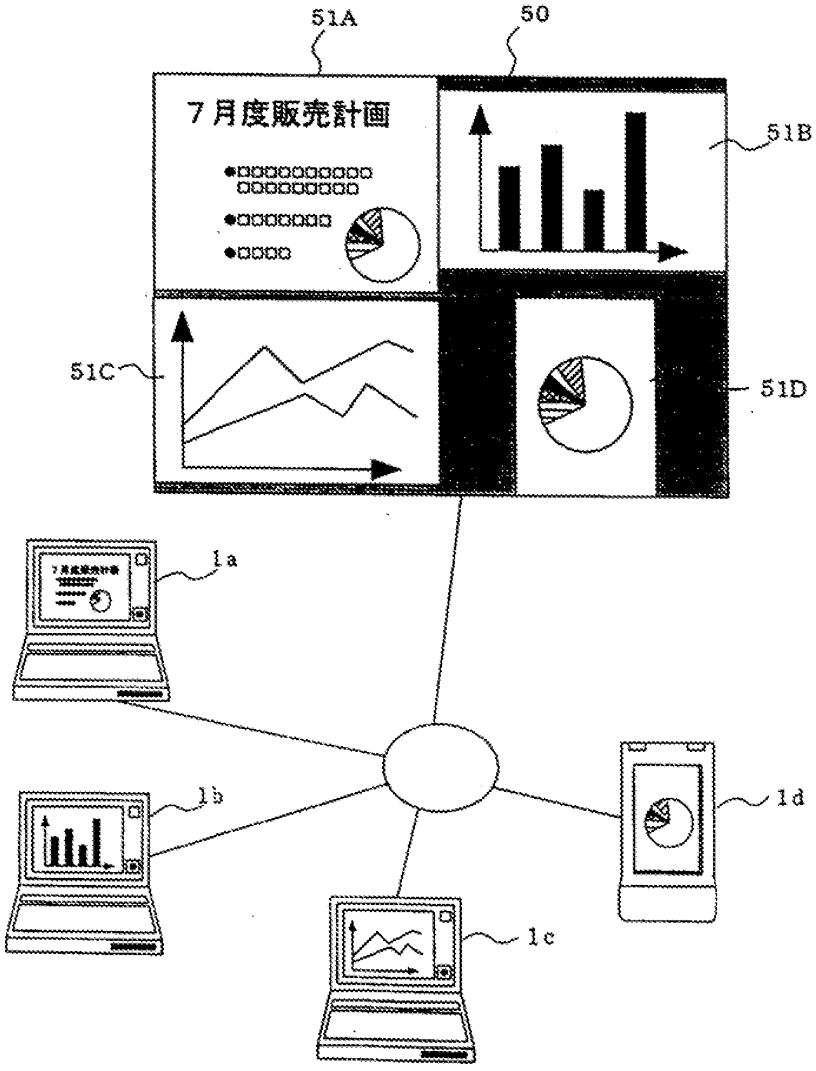


图9

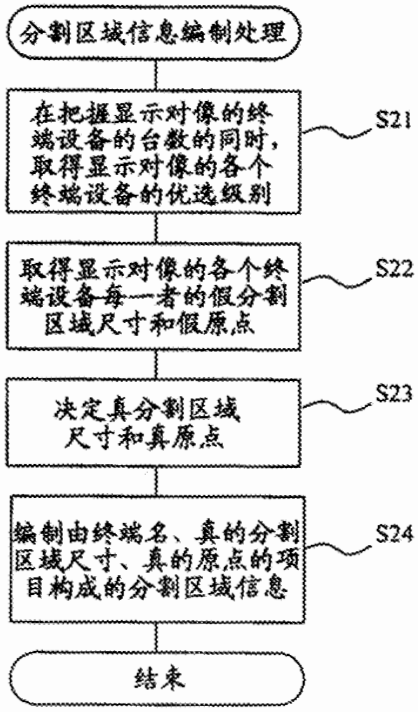
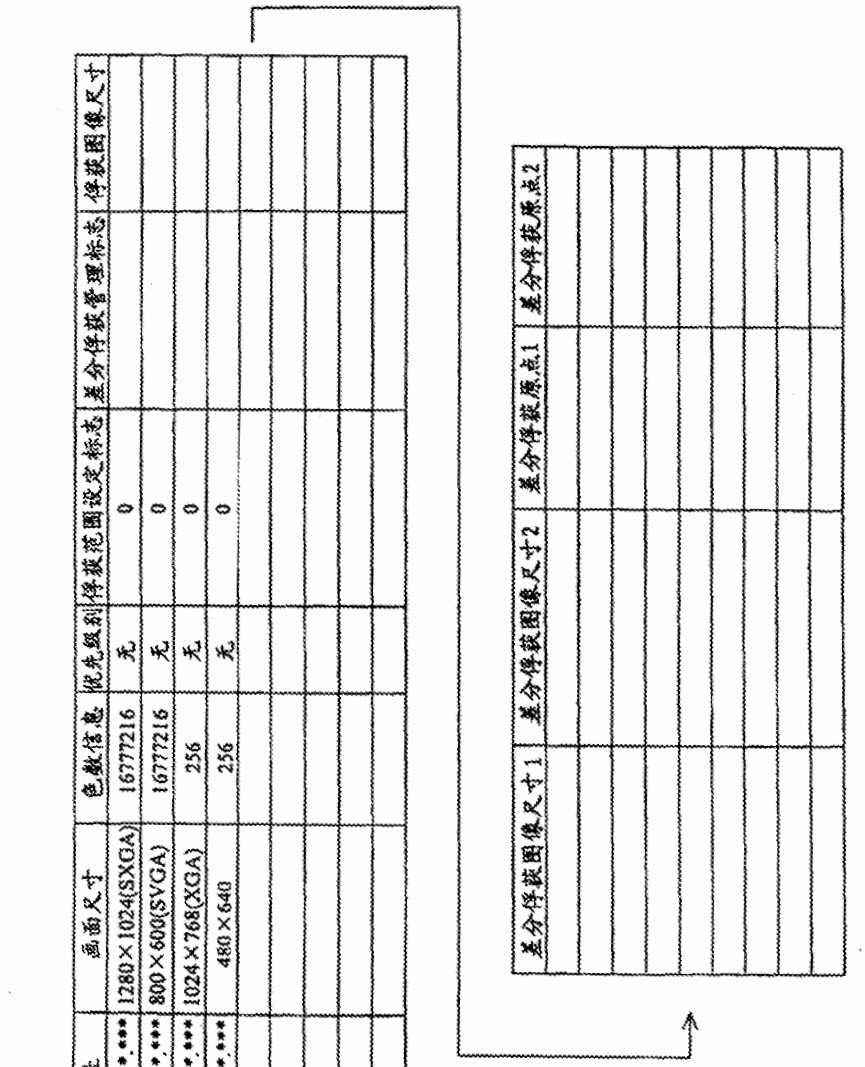

分割区域信息编制处理
在把握显示对像的终端设备的台数的同时，取得显示对像的各个终端设备的优选级别
S21
取得显示对像的各个终端设备每一者的假分割区域尺寸和假原点
S22
决定真分割区域尺寸和真原点
S23
编制由终端名、真的分割区域尺寸、真的原点的项目构成的分割区域信息
S24
结束

图10



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图11

(a)

台数		第1台	第2台	第3台	第4台
4	优先顺序	无	无	无	无
		↓	↓	↓	↓
	假尺寸	640×512	640×512	640×512	640×512
	假原点	0, 0	640, 0	0, 512	640, 512

(b)

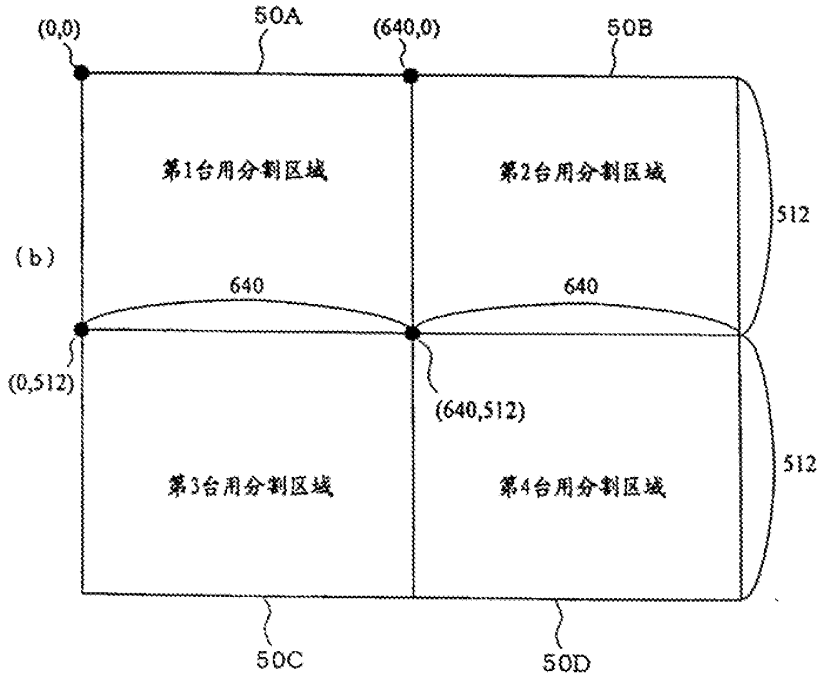


图12

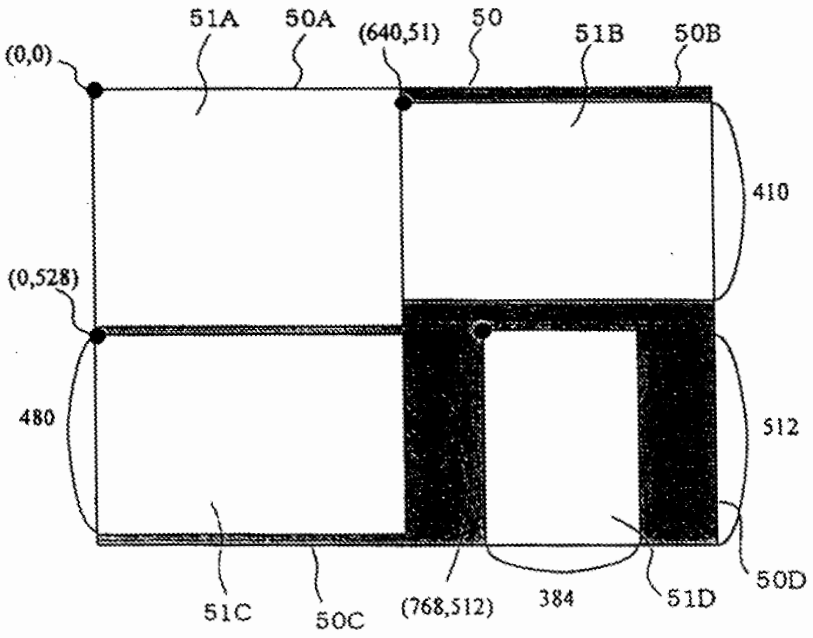


图13

终端名	PC-1	PC-2	PC-3	PDA-1
真尺寸	640×512	640×410	640×480	384×512
真原点	0,0	640,51	0,528	768,512

日期时间：2002年5月21日 17：00：32

图14

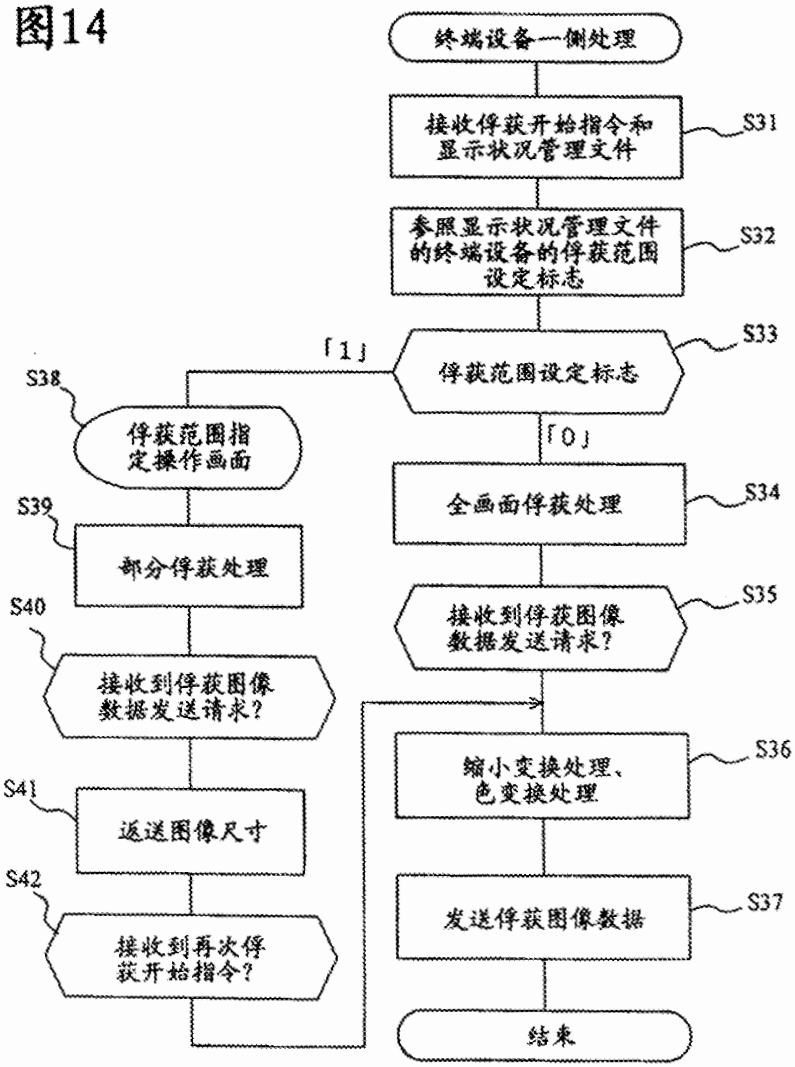

终端设备一侧处理
接收俘获开始指令和显示状况管理文件
S31
参照显示状况管理文件的终端设备的俘获范围设定标志
S32
俘获范围设定标志
S33
「1」
「0」
S38
俘获范围指定操作画面
全画面俘获处理
S34
S39
部分俘获处理
接收到俘获图像数据发送请求?
S35
S40
接收到俘获图像数据发送请求?
缩小变换处理、色变换处理
S36
S41
返送图像尺寸
发送俘获图像数据
S37
S42
接收到再次俘获开始指令?
结束

图15

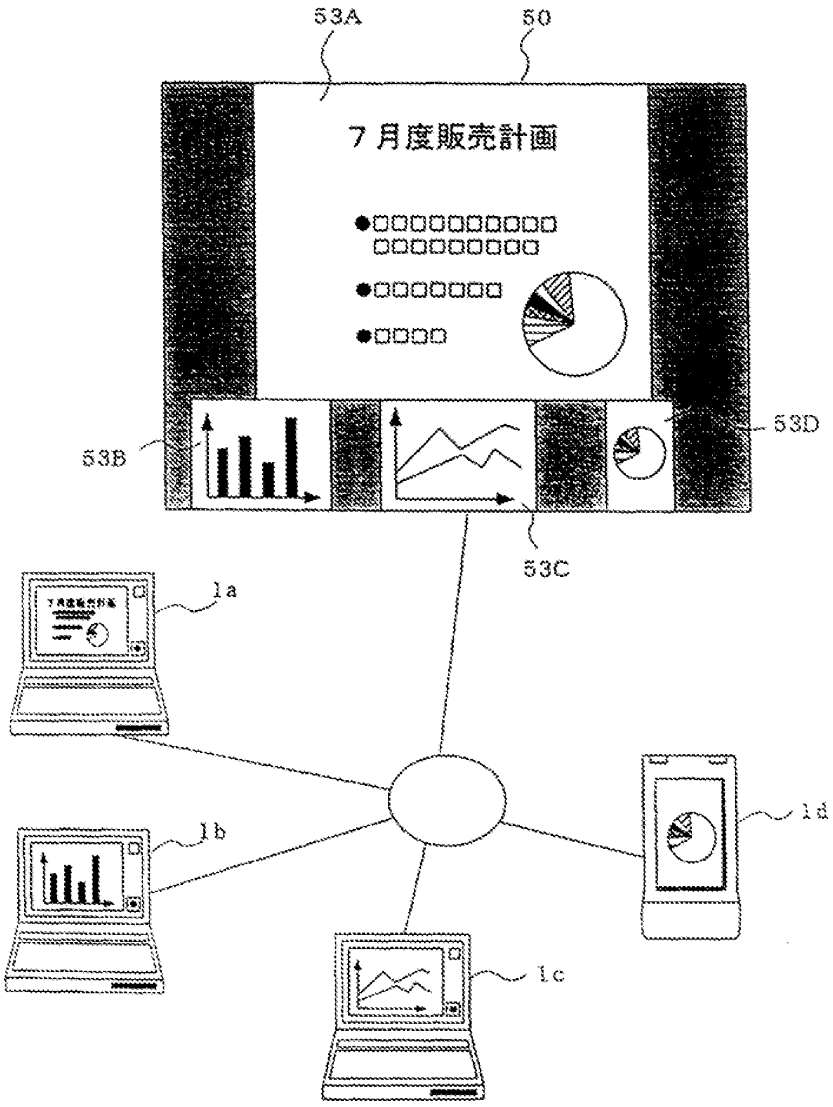


图16

(a)

台数		第1台	第2台	第3台	第4台
4	优先顺序	高	无	无	无
	假尺寸	1280×768	427×256	427×256	426×256
	假原点	0, 0	0,768	427,768	854,768

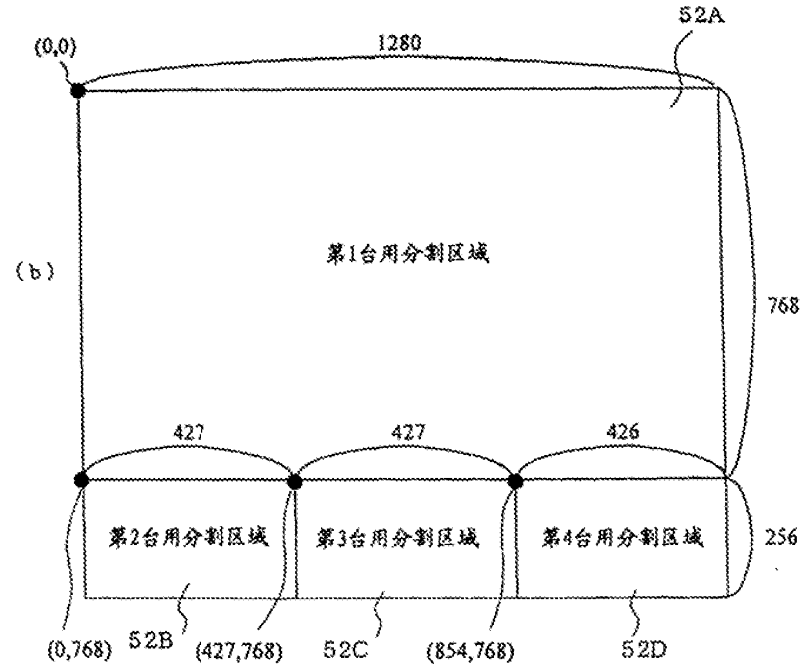


图17

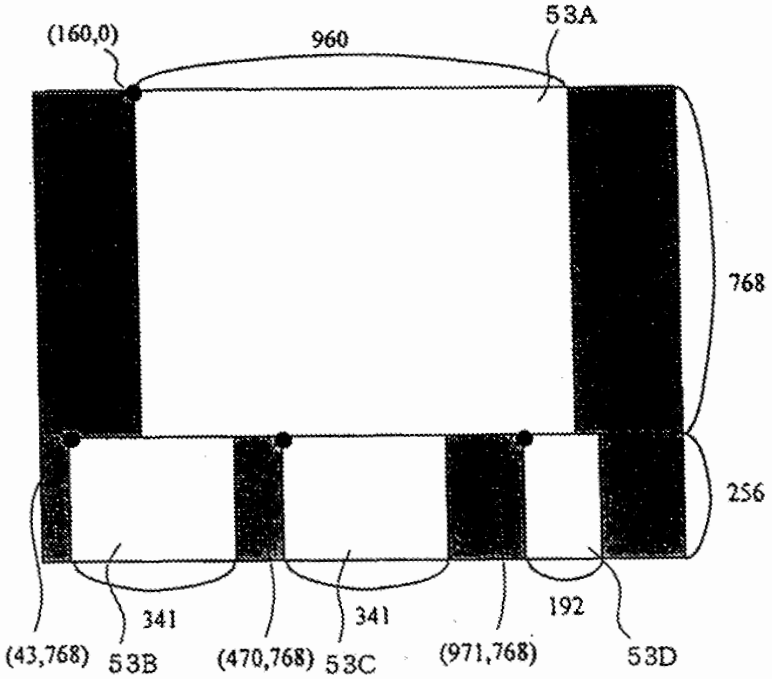


图18

终端名	PC-1	PC-2	PC-3	PDA-1
真尺寸	960×768	341×256	341×256	192×256
真原点	160,0	43,768	470,768	971,768

日期时间：２００２年5月２１日１７：００：３２

图19

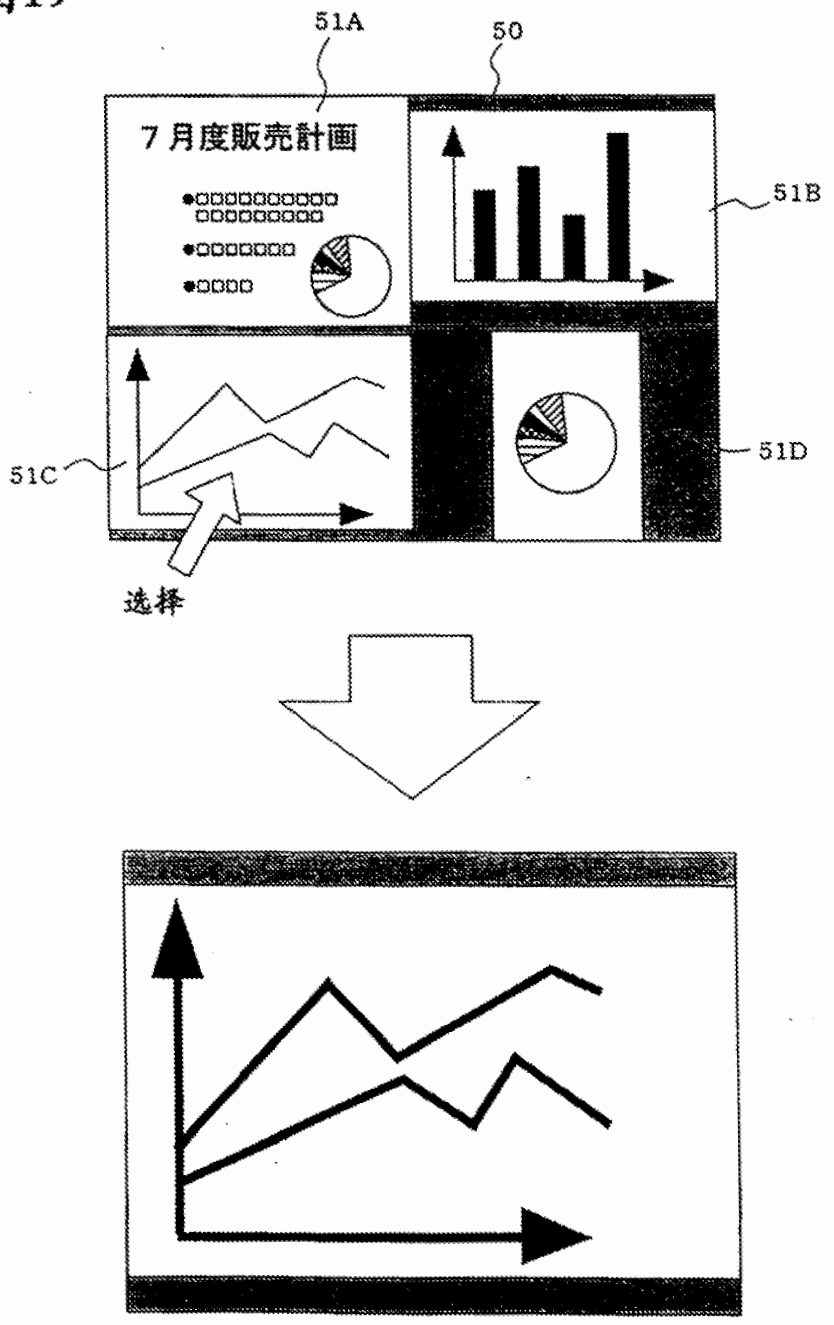


图20

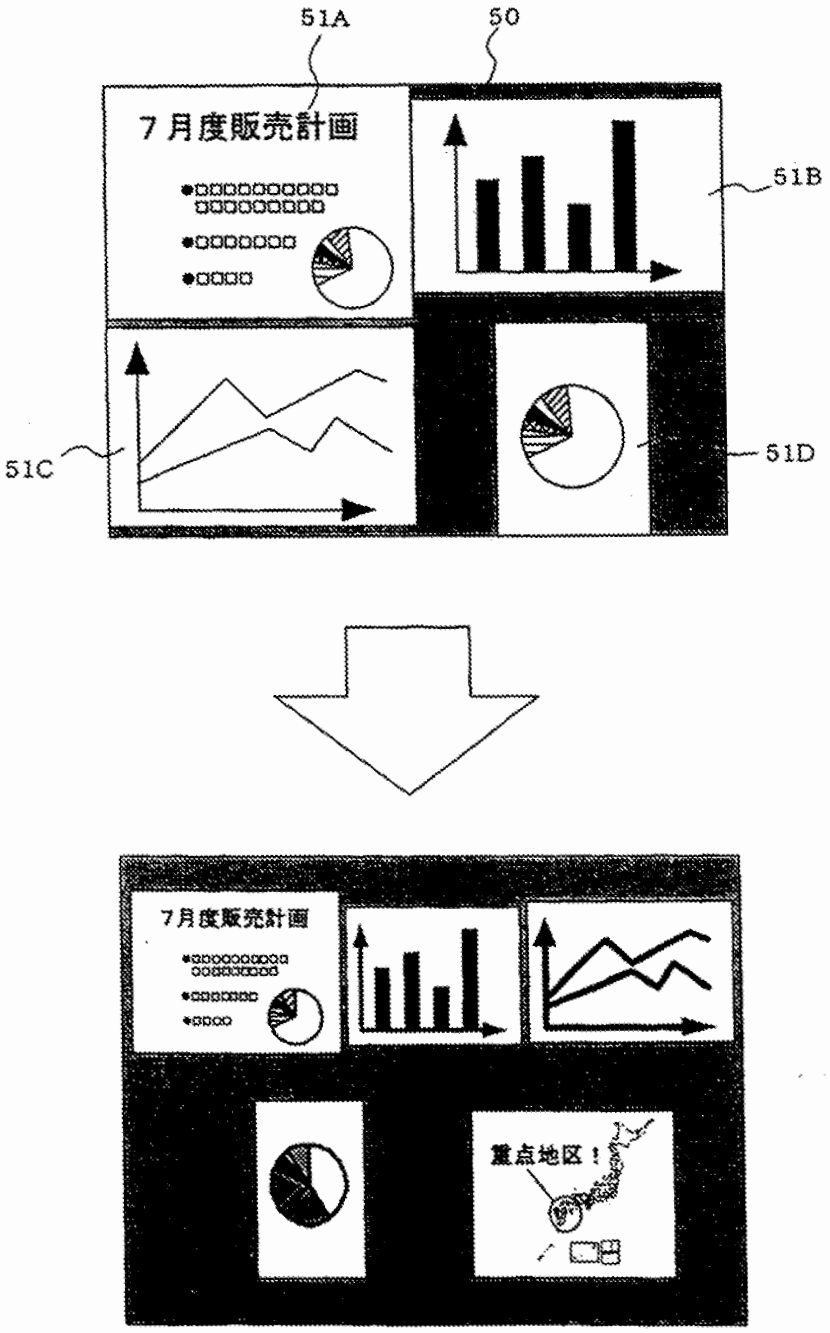


图21

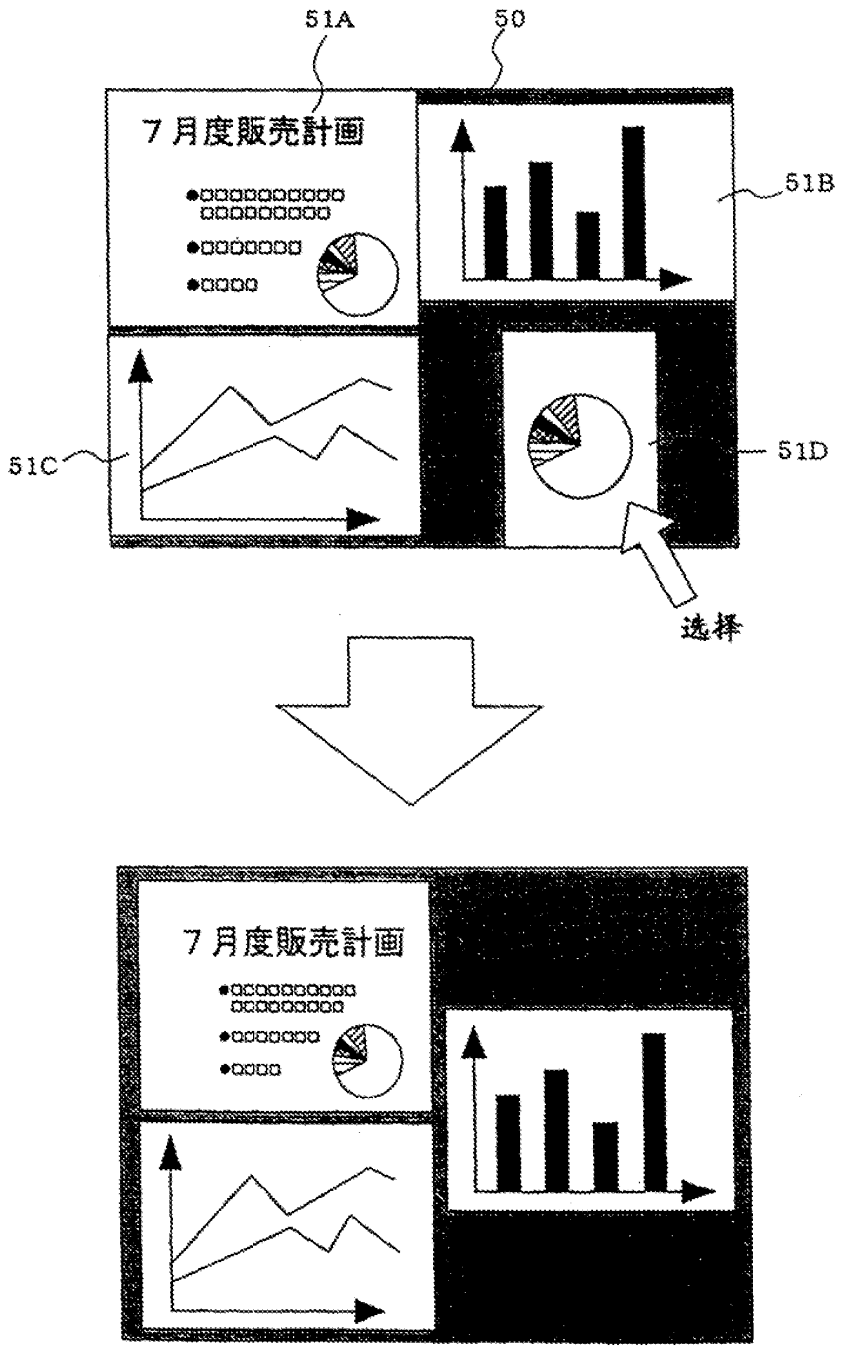


图22

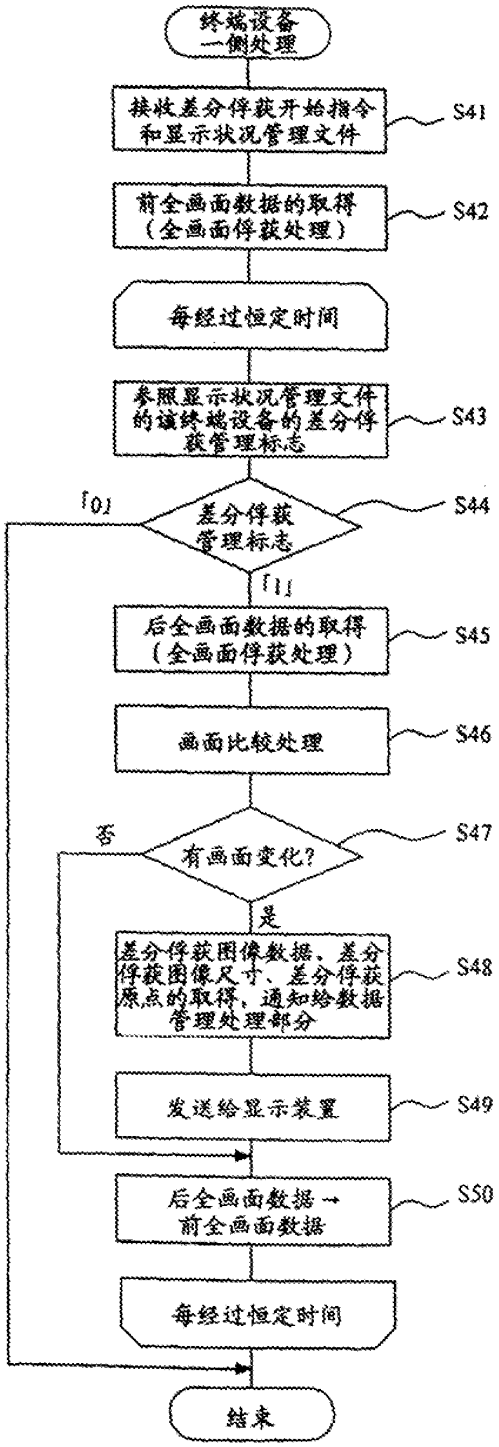

终端设备
一侧处理
接收差分停获开始指令
和显示状况管理文件
S41
前全画面数据的取得
（全画面停获处理）
S42
每经过恒定时间
参照显示状况管理文件
的该终端设备的差分停
获管理标志
S43
「0」
差分停获
管理标志
S44
「1」
后全画面数据的取得
（全画面停获处理）
S45
画面比较处理
S46
否
有画面变化?
S47
是
差分停获图像数据、差分
停获图像尺寸、差分停获
原点的取得，通知给数据
管理处理部分
S48
发送给显示装置
S49
后全画面数据→
前全画面数据
S50
每经过恒定时间
结束

图23

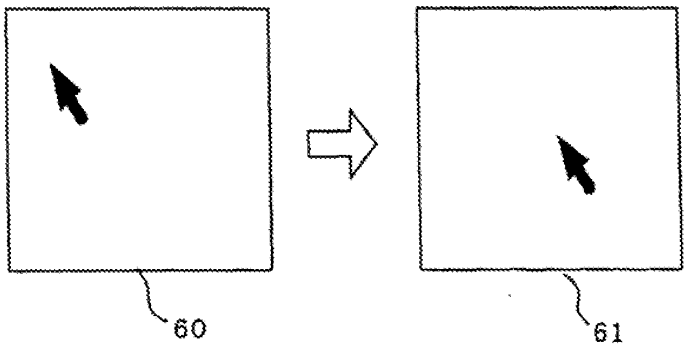


图24

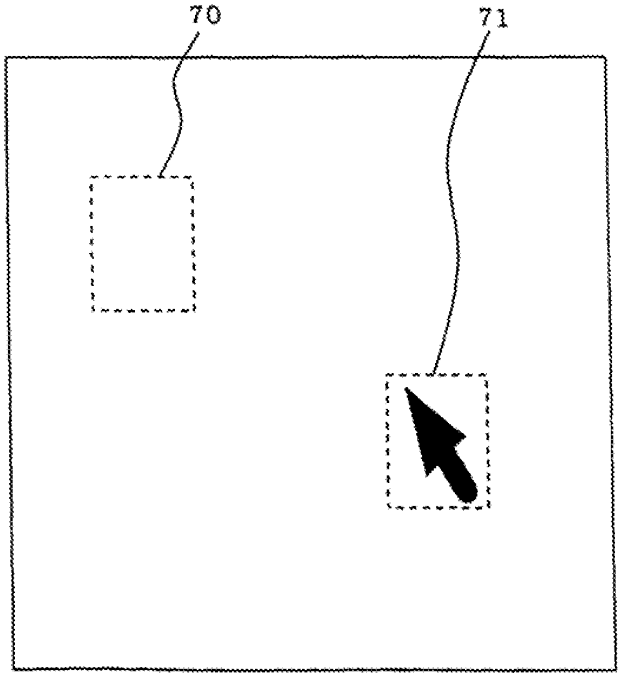


图25

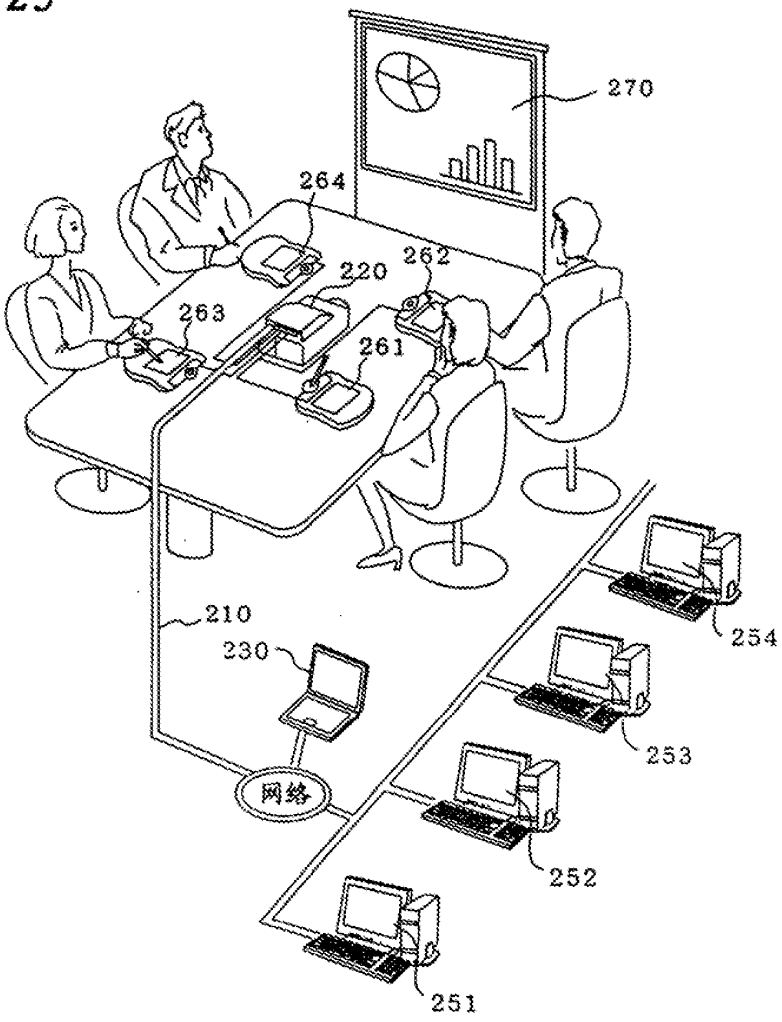


图26

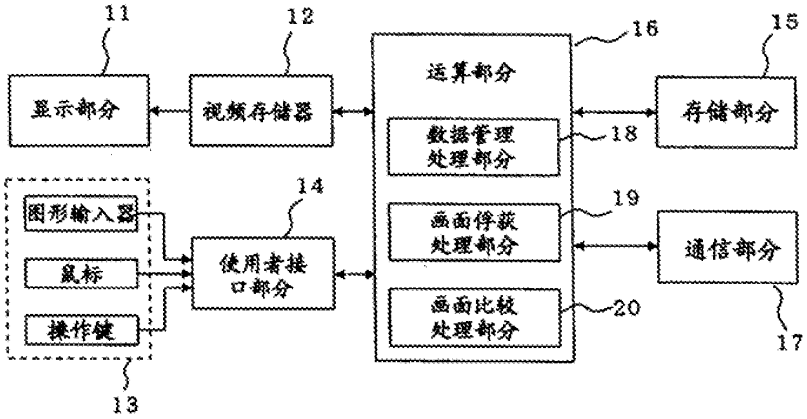
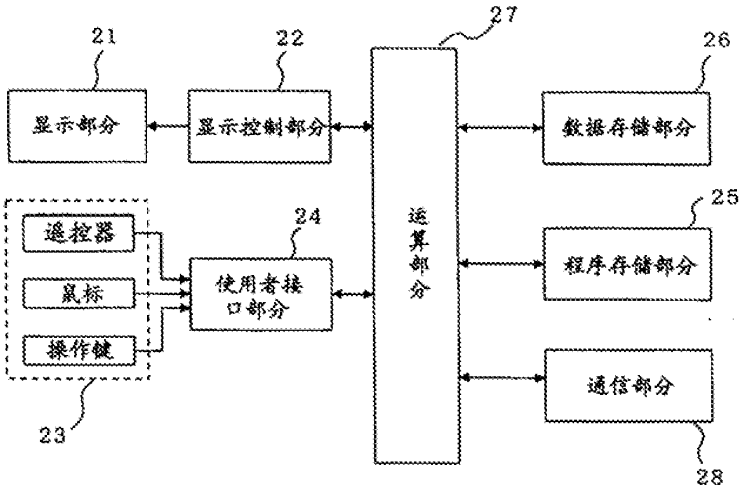

11
12
16
15
显示部分
视频存储器
运算部分
存储部分
数据管理处理部分
18
14
19
图形输入器
鼠标
操作键
使用者接口部分
画面存获处理部分
通信部分
画面比较处理部分
20
17
13

图27


21
22
27
26
显示部分
显示控制部分
数据存储部分
遥控器
24
25
鼠标
使用者接口部分
运算部分
程序存储部分
操作键
通信部分
23
28

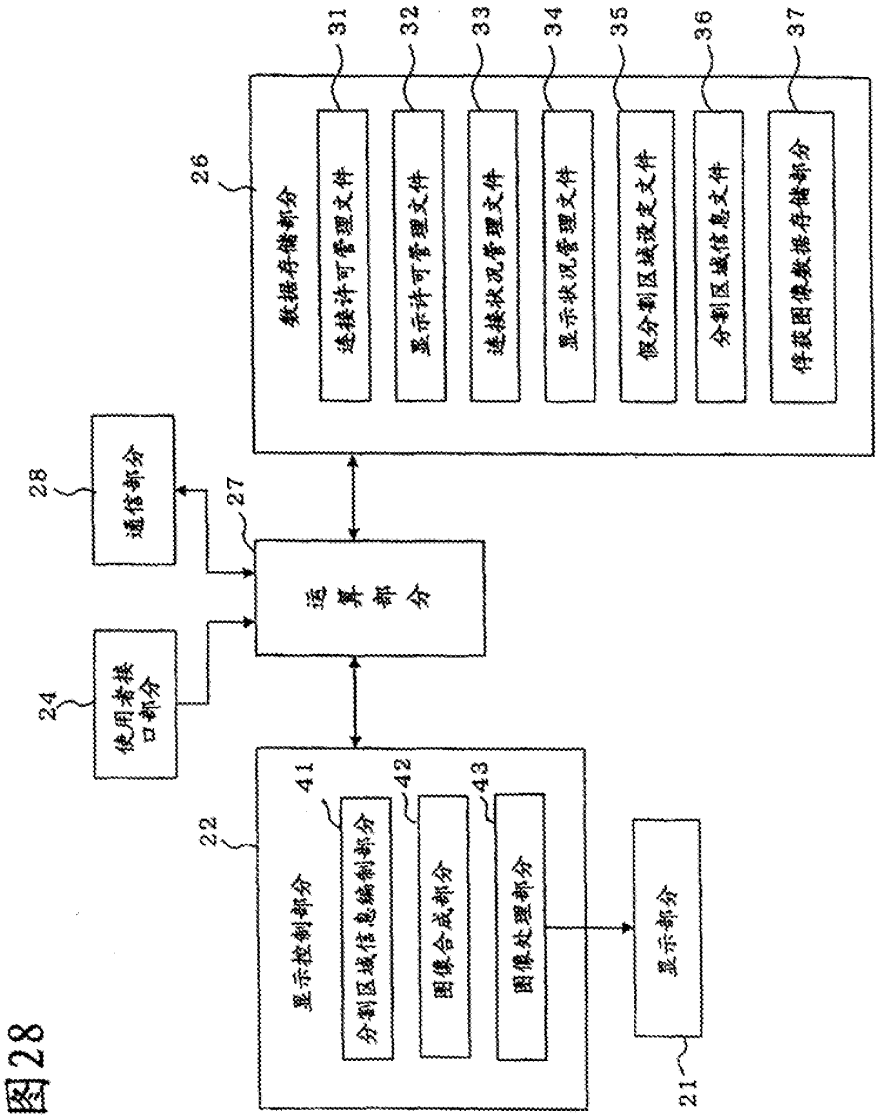

26
数据存储部分
31
连接许可管理文件
32
显示许可管理文件
33
连接状况管理文件
34
显示状况管理文件
35
假分割区域定义文件
36
分割区域信息文件
37
待获图像数据存储部分
28
通信部分
27
运算部分
24
使用者接口部分
22
显示控制部分
41
分割区域信息编制部分
42
图像合成部分
43
图像处理部分
21
显示部分

图28

图29

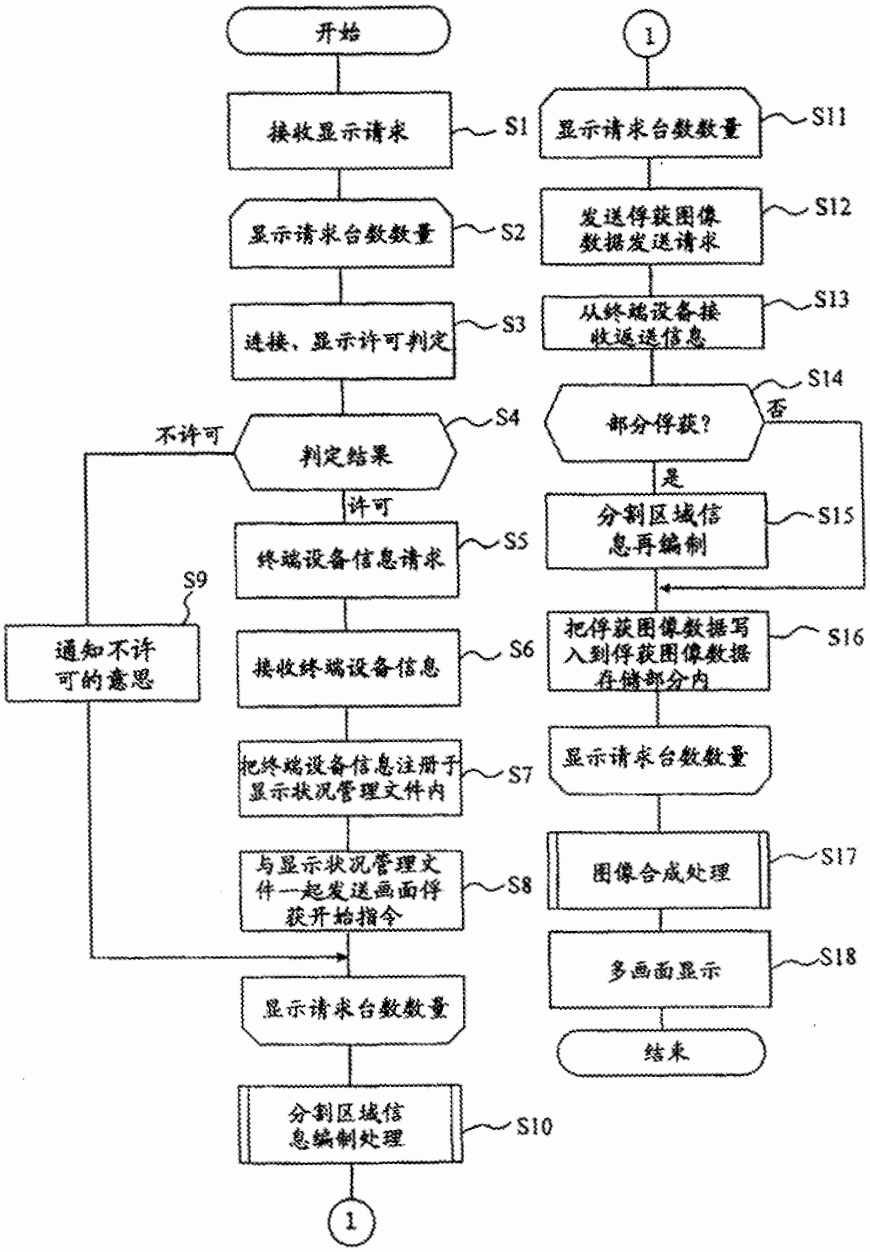
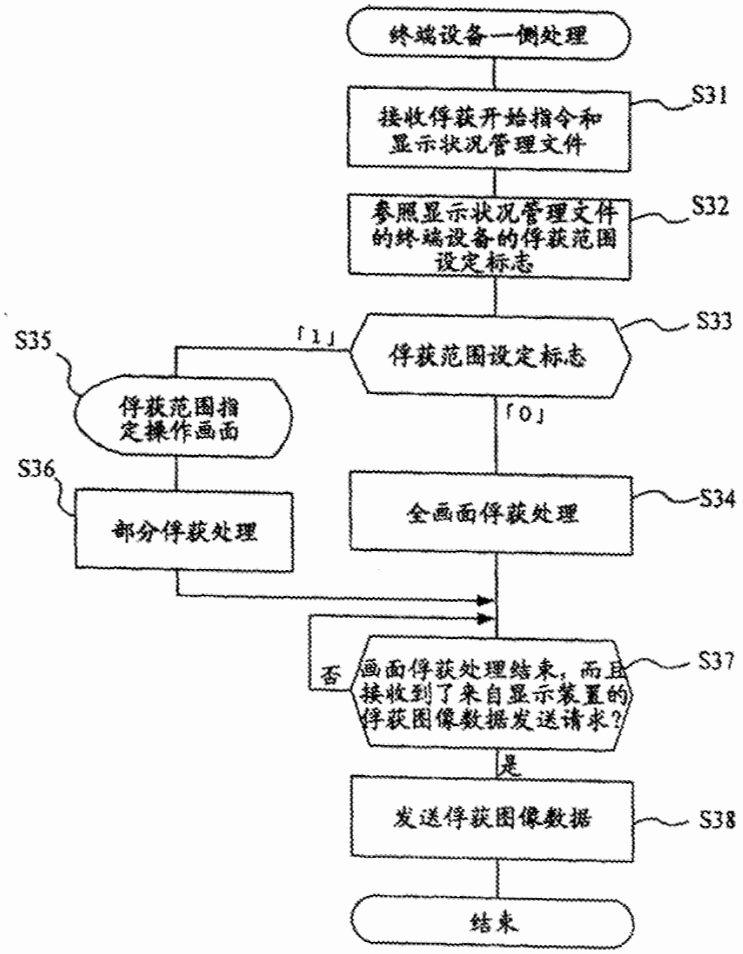

开始
接收显示请求
S1
显示请求台数数量
S2
连接、显示许可判定
S3
判定结果
S4
不许可
许可
终端设备信息请求
S5
接收终端设备信息
S6
把终端设备信息注册于显示状况管理文件内
S7
与显示状况管理文件一起发送画面俘获开始指令
S8
通知不许可的意思
S9
显示请求台数数量
分割区域信息编制处理
S10
1
1
显示请求台数数量
S11
发送俘获图像数据发送请求
S12
从终端设备接收返送信息
S13
部分俘获?
S14
否
是
分割区域信息再编制
S15
把俘获图像数据写入到俘获图像数据存储部分内
S16
显示请求台数数量
图像合成处理
S17
多画面显示
S18
结束

图30


终端设备一侧处理
S31
接收俘获开始指令和显示状况管理文件
S32
参照显示状况管理文件的终端设备的俘获范围设定标志
S33
俘获范围设定标志
「1」
S35
俘获范围指定操作画面
S36
部分俘获处理
「0」
S34
全画面俘获处理
否
S37
画面俘获处理结束，而且接收到了来自显示装置的俘获图像数据发送请求？
是
S38
发送俘获图像数据
结束

Espacenet

Bibliographic data: CN1550996 (A) — 2004-12-01

Image-display system and method, image-display program, projector and projector-control method, and projector-control program

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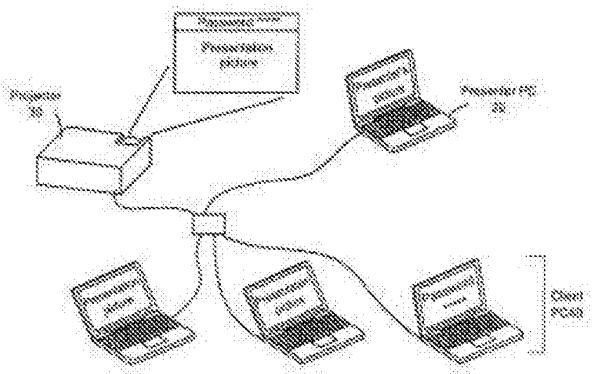
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With a conventional image-display system, a presenter sometimes has difficulty in providing every viewer with an easy-to-see picture. When projecting an image transmitted from a computer operated by the presenter and enabling the viewer to watch the image projected by the projector, the projector receives image data transmitted through two-way



communication from the computer operated by the presenter, projects an image represented by the received image data and transmits the received image data to a client computer operated by the viewer through the two-way communication, and the client computer receives the image data transmitted through the two-way communication and displays the image represented by the received image data on its display.

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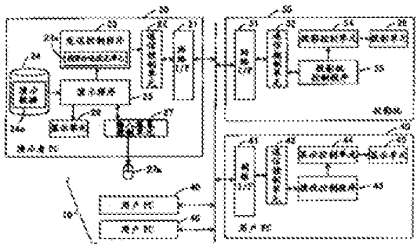
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[57] 摘要

在以往的图像显示系统中，有时难以提供所有的视听者易于观看的画面，本发明在于当用投影机投影从演示者操作的计算机发送的图像的同时使得视听者能够视认该投影机的投影图像时，在上述投影机中通过双向通信接收上述演示者操作的计算机发送的图像数据，投影该接收的图像数据表示的图像的同时对于视听者操作的用户计算机通过双向通信发送该接收的图像数据，在上述用户计算机中通过双向通信接收上述发送的图像数据，在画面上显示该接收的图像数据表示的图像。



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1. 一种图像显示系统，该图像显示系统用投影机投影从演示者操作的计算机发送的图像的同时使得视听者能够视认该投影机的投影图像，其特征在于：

上述投影机具备

与外部计算机进行双向通信的投影机通信控制单元；

经过该投影机通信控制单元接收上述演示者操作的计算机发送的图像数据的投影机图像数据接收单元；

投影该接收的图像数据表示的图像的投影单元；

经过上述投影机通信控制单元把上述接收的图像数据发送到视听者操作的用户计算机的图像数据发送单元，

上述用户计算机具备

与上述投影机进行双向通信的用户通信控制单元；

经过该用户通信控制单元取得上述发送来的图像数据的用户图像数据接收单元；

在画面上显示该接收的图像数据表示的图像的显示单元。

2. 根据权利要求 1 所述的图像显示系统，其特征在于：

上述投影机通信控制单元与上述演示者操作的计算机进行双向通信，接收该计算机发送的表示能否分送上述图像数据的数据，当接收了表示允许分送上述图像数据的数据时，上述图像数据发送单元把该图像数据发送给上述用户计算机。

3. 根据权利要求 2 所述的图像显示系统，其特征在于：

上述图像数据接收单元通过上述用户通信控制单元进行对于上述投影机的连接请求，当接收了表示允许分送上述图像数据的数据时，上述图像数据发送单元通过上述投影机通信控制单元对于上述连接请求进行连接允许，发送上述图像数据。

4. 根据权利要求 3 所述的图像显示系统，其特征在于：

上述图像数据接收单元具备接受只有上述投影机的投影图像的视听者

能够视认的口令的输入的口令输入单元，

当上述连接请求时发送该接受的口令，上述图像数据发送单元具备接收该发送来的口令并且判别是否是正确口令的口令判别单元，当判别为是正确的口令时发送上述图像数据。

5. 根据权利要求 1－4 的任一项所述的图像显示系统，其特征在于：

上述图像数据发送单元原样地把上述接收的图像数据发送给上述用户计算机，上述显示单元根据与上述投影单元相同的算法展开图像数据，在画面上显示图像。

6. 一种投影机，该投影机投影从演示者操作的计算机发送的图像的同时使得视听者能够视认该投影图像，其特征在于：

具备

与外部计算机进行双向通信的投影机通信控制单元；

通过该投影机通信控制单元接收上述演示者操作的计算机发送的图像数据的投影机图像数据接收单元；

投影该接收的图像数据表示的图像的投影单元；

通过上述投影机通信控制单元把上述接收的图像数据发送给视听者操作的用户计算机的图像数据发送单元。

7. 一种图像显示方法，该图像显示方法用投影机投影从演示者操作的计算机发送的图像的同时使得视听者能够视认该投影机的投影图像，其特征在于：

在上述投影机中通过双向通信接收上述演示者操作的计算机发送的图像数据，投影该接收的图像数据表示的图像的同时对于视听者操作的用户计算机通过双向通信发送该接收的图像数据，

在上述用户计算机中通过双向通信接收上述发送来的图像数据，在画面上显示该接收的图像数据表示的图像。

8. 一种投影机控制方法，该投影机控制方法投影从演示者操作的计算机发送的图像的同时使得视听者能够视认该投影图像，其特征在于：

通过双向通信接收上述演示者操作的计算机发送的图像数据，投影该

接收的图像数据表示的图像的同时对于视听者操作的用户计算机通过双向通信发送该接收的图像数据。

9. 一种图像显示程序，该图像显示程序用投影机投影从演示者操作的计算机发送的图像的同时使得视听者能够视认该投影机的投影图像，其特征在于：

使上述投影机实现

与外部计算机进行双向通信的投影机通信控制功能；

通过该投影机通信控制功能接收上述演示者操作的计算机发送的图像数据的投影机图像数据接收功能；

投影该接收的图像数据表示的图像的投影功能；

通过上述投影机通信控制功能向视听者操作的用户计算机发送上述接收的图像数据的图像数据发送功能，

使上述用户计算机实现

与上述投影机进行双向通信的用户通信控制功能；

通过该用户通信控制功能取得上述发送来的图像数据的用户图像数据接收功能；

在画面上显示该接收的图像数据表示的图像的显示功能。

10. 一种投影机控制程序，该投影机控制程序投影从演示者操作的计算机发送的图像的同时使得视听者能够视认该投影图像，其特征在于：

使投影机的控制计算机实现

与外部计算机进行双向通信的投影机通信控制功能；

通过该投影机通信控制功能接收上述演示者操作的计算机发送的图像数据的投影机图像数据接收功能；

投影该接收的图像数据表示的图像的投影功能；

通过上述投影机通信控制功能向视听者操作的用户计算机发送上述接收的图像数据的图像数据发送功能。

图像显示系统、方法、程序，投影机及其控制方法、程序

技术领域

本发明涉及图像显示系统，投影机，图像显示方法，投影机控制方法，图像显示程序以及投影机控制程序。

背景技术

以往，在这种图像显示系统中，经过网络把演示者操作的计算机连接到投影机上，向投影机发送显示该计算机的画面的图像数据，投影机把该画面投影到屏幕上。（例如，参照特开 2001－14135 号公报。）

在上述以往的图像显示系统中，有时难以向所有的视听者提供易于观看的画面。即，在很大的演示会场中位于远离屏幕位置的视听者大多难以观看到屏幕，特别是在文字或者图面小的情况下将产生视听者不能够专注于演示等的不理想状况。

发明内容

本发明是鉴于上述课题而产生的，目的在于提供能够向视听者提供易于观看的画面的图像显示系统，投影机，图像显示方法，投影机控制方法，图像显示程序以及投影机控制程序。

为了达到上述目的，在本发明中，向视听者操作的用户计算机发送演示者操作的计算机发送的图像数据。由于该图像数据是显示投影机的投影图像的数据，因此通过由用户计算机显示该图像数据表示的图像，视听者能够在手头的用户计算机的画面上视认投影图像。从而，即使在由于远离投影机的投影屏幕，或者投影会场大的原因等视听者难以视认投影图像的场所，视听者也能够在手头可靠地视听图像。

这里，演示者操作的计算机只要能够发送显示投影图像的图像数据即可，而最好是演示者进行演示时使用的计算机。在该意义下最好是发送用于显示包括演示者的操作（鼠标指示器的操作等）的计算机画面的图像数据。作为图像数据的形式并没有特别限定，能够采用影像信号或者 RGB 信号，MPEG 等的压缩数据等各种形态。

在投影机通信控制装置以及用户通信控制装置中，只要能够连接成可以把上述演示者操作的计算机以及视听者能够操作的用户计算机进行双向通信，则就不限定通信线路或者协议、标准等。例如，既可以是有线网、无线网的任一种，也能够采用 TCP、UDP 等各种协议，即使是以太网（以太网是富士施乐有限公司的注册商标）的各标准或者 IEEE1394，USB 等各种标准也能够实现。

在投影装置中，只要能够投影图像数据表示的图像即可，只要能够把图像数据表示的图像显示在屏幕上即可。从而，当图像数据压缩了等时，进行展开，显示图像。虽然图像数据发送装置对于用户计算机传送上述接收的图像数据，但是如果在从图像数据进行用于显示图像的图像处理（例如展开等）以后传送图像数据，则由于图像数据的容量增大，在展开等处理方面增加负担，因此在传送之前需要花费时间。

从而，在图像数据发送装置中最好是直接传送上述接收的图像数据。另外，通过从投影机向用户计算机传送该图像数据，图像数据对于多台用户计算机的传送不需要涉及上述演示者操作的计算机，通信控制的负荷仅是投影机单体。由于在演示者操作的计算机中演示者在进行各种说明时执行种种操作等，因此通过抑制多余的负荷，即使是低规格的计算机也能够舒适地进行演示。

在用户计算机的显示装置中，只要能够在画面上显示从投影机接收的图像数据表示的图像即可，如果在投影机中实施上述的图像处理或者展开等，则最好是用相同的算法实施图像处理或者展开等。其结果，能够在用户计算机的画面上显示与投影机的投影图像相同的图像。另外，在用户计算机中如果在硬盘或者 RAM 等中存储图像数据，则视听者既能够在任意

的阶段重新观看演示的图像，也能够在演示的行进速度不能够继续下去时暂时停止，然后在任意的阶段再次开始图像行进，能够提供更便利的功能。

如以上那样，在本发明中通过投影机对于用户计算机传送显示投影图像的投影图像数据，能够在用户计算机中视认图像，而根据演示的内容或者演示者的意图有时希望禁止用户计算机中的视认。这种情况下作为理想的结构例，能够采用从演示者操作的计算机发送表示是否分送上述图像数据的数据，在投影机的图像数据发送装置中根据表示该能否分送的数据决定是否发送上述图像的结构。能够采用在可以分送时，对于向投影机进行了连接请求的所有的用户计算机进行连接允许，发送图像数据的结构。

即，通过采用从演示者操作的计算机取得表示能否分送的数据的结构，能够根据演示者的意图决定允许或者不允许分送。另外，由于根据表示能否分送的数据决定允许或者不允许图像数据分送，因此能够仅根据该数据决定是否对于多台用户计算机进行分送，不需要控制对于多台用户计算机的每一台的允许以及不允许，能够通过非常简单的处理控制能否分送。

这种能否分送的控制在演示会场内的图像数据分送中特别方便。即，在演示会场中由于通常大多数视听者实际上视听图像，因此考虑对于各用户计算机的分送允许以及不允许毕竟大多是无意义的。从而，通过采用在演示者一侧具有分送允许以及不允许的主动权的结构，在大多数情况下能否分送的控制是非常充分的。

另外，用于发送表示能否分送的数据的结构可以采用各种形态，还可以构成为如果演示者预先注册能否分送，则对于来自投影机的查询，从演示者操作的计算机自动地发送表示能否分送的数据。除此以外，还能够采用当有来自投影机的能否分送的查询时在演示者操作的计算机的画面上显示查询能否分送的上托菜单等各种结构。

进而，作为控制能否分送的结构例，能够采用由用户计算机利用所输入的口令的结构。即，由用户图像数据接收装置接受只有上述投影机的投影图像的视听者能够视认的口令的输入，在从用户计算机对于投影机进行连接请求时发送口令。而且，如果接收由投影机一侧的图像数据发送装置

发送来的口令，由口令判别单元判别为是正确的口令，则能够仅对于输入了正确口令的用户计算机发送图像数据。

这种情况下，能够对于多台用户计算机的每一台决定是否分送图像数据。另外，由于这里的口令是只有投影机的投影图像的视听者能够视认的口令，因此能够把分送目标限定于只是投影机的投影图像的视听者操作的用户计算机。作为只有投影机的投影图像的视听者能够视认的口令能够采用各种口令，例如，能够采用在投影机的投影图像内预先记述口令的结构。如果依据该结构，则能够构成为使得仅对于处在演示者进行演示的会场内的视听者操作的用户计算机分送图像数据。除此以外，还能够采用仅对于在演示会场内正在入场的视听者分发记载了口令的入场券等各种结构。

这里，在上述的图像显示系统中，当然通过在投影机以及用户计算机中按照时间序列实施预定过程的方法也能够起到作用。从而，作为图像显示方法构成本发明，作为投影机控制方法也构成本发明。另外，既有这种图像显示系统单独存在的情况，也有在组装到某设备中的状态下利用的情况等，作为本发明的思想并不限定于这些，还包括各种形态。从而，无论是软件还是硬件等，都能够进行适当的变更。

作为本发明的思想的具体化例子，在构成图像显示系统或者投影机的控制软件的情况下，当然存在实现这种功能的程序。这是通过在投影机以及用户计算机中执行并且实现上述功能的图像显示程序以及投影机的程序。

附图说明

图 1 是本发明的图像显示系统的结构图。

图 2 是示出发送控制程序的处理的流程图。

图 3 是示出投影机控制程序的处理的流程图。

图 4 是示出接收控制程序的处理的流程图。

图 5 是示出其它实施例中的工作例的概略图。

具体实施方式

这里，按照以下的顺序说明本发明实施形态。

（1）图像显示系统的结构：

（2）演示者 PC 中的处理：

（3）投影机中的处理：

（4）用户 PC 中的处理：

（5）其它的实施形态：

（1）图像显示系统的结构：

图 1 是本发明的图像显示系统的结构图。该图中，图像显示系统 10 具备演示者 PC20，投影机 30 和多台客户 PC40，演示者 PC20，投影机 30 和用户 PC40 经过 UTP 线缆连接成 LAN，能够进行相互通信。投影机 30 取得演示者 PC20 输出的图像数据，投影其图像。另外，投影机 30 当进行了能够分送图像数据的设定时，直接把上述取得的图像数据发送到用户 PC40。用户 PC40 取得投影机 30 输出的图像数据，在自身的画面上进行显示。

另外，演示者 PC20，投影机 30 和用户 PC40 通过 TCP 协议相互通信，相互收发数据包确立连接，根据需要向数据包分割并发送各个图像数据。图 1 中，在框图中对于演示者 PC20，投影机 30 以及一台用户 PC40 示出其结构，而多台用户 PC40 能够通过与图示结构相同的结构实现。

演示者 PC20 以及用户 PC40 作为能够采用通用的计算机，在预定的 OS 的控制下控制预定的 I／F 或者记录媒体等，能够执行预定的程序。为了构成本发明的图像显示系统，演示者 PC20 具备网络 I／F21，通信控制单元 22，发送控制程序 23，硬盘驱动器（HDD）24，演示程序 25，显示单元 26 和输入装置控制单元 27。

演示者 PC20 是演示者操作的 PC，在利用投影机 30 实施演示时，起动演示程序 25。演示程序 25 是读出预先生成并保存在 HDD24 中的演示数据 24a，通过向显示单元 26 输出图像数据，按照预定的顺序或者任意的顺序显示演示画面的程序。

即，显示单元 26 控制对于未图示的液晶显示器等显示装置的图像显示，输入装置控制单元 27 接受鼠标 27a 等的操作输入，向演示程序 25 输出表示输入操作内容的数据。演示程序 25 根据来自该输入装置控制单元 27 的数据在显示单元 26 上切换演示画面，进行用于使鼠标移动等的处理。

发送控制程序 23 在演示程序 25 的执行下起动，为了由投影机 30 投影与上述显示单元 26 上的演示画面相同的画面，进行显示该演示画面的图像的图像数据的发送控制。另外，在演示者 PC20 中，由网络 I／F21 和通信控制单元 22 实现双向通信。即，通信控制单元 22 根据需要把从发送控制程序 23 传送来的图像数据分割到数据包中，进行添加表示适当发送目标的数据等处理，然后经过网络 I／F21 输出。另外，在该图像数据的发送时，为了确保网络的通信速度或者安全，也可以实施数据的压缩处理或者加密处理。

另外，发送控制程序 23 具备能否分送设定单元 23a，通过该能否分送设定单元 23a 的控制，在上述显示单元 26 和输入装置控制单元 27 中形成未图示的 UI，能够根据演示者的意志设定是否允许对于用户 PC40 的分送。显示该设定内容的数据保存在 HDD24 中，能够在任意的阶段参考。当然，还能够采用在与投影机 30 确立通信等时在 UI 中显示上托菜单，可以设定能否由演示者进行分送等各种结构。

在投影机 30 中，也能够在预定的 OS 的控制下控制预定的 I／F 或者记录媒体等，执行预定的程序。为了构成本发明的图像显示系统，投影机 30 具备网络 I／F31，通信控制单元 32，投影机控制程序 33，投影控制单元 34 和投影单元 35。在投影机 30 中通过网络 I／F31 和通信控制单元 32 实现双向通信，通信控制单元 32 把经过网络 I／F31 接收的数据包根据其标题进行结合生成图像数据的同时，传送到投影机控制程序 33 中。另外，根据需要把从投影机控制程序 33 传送来的图像数据分割到数据包中，进行添加表示适宜的接收目标的数据等处理，经过网络 I／F31 输出。

投影机控制程序 33 进行上述图像数据的收发和基于所接收的图像数据的图像投影的控制。在图像数据的收发中，进行是否能够对于用户 PC40

发送所接收的图像数据的判别或者与成为连接对象的用户 PC40 的双向通信的控制。另外，在图像投影时投影机控制程序 33 起动投影控制单元 34 传送上述接收的图像数据。投影控制单元 34 处理所接收的图像数据，控制在投影单元 35 中的图像投影。

即，投影控制单元 34 处理上述接收的图像数据，生成用于供给到投影单元 35 形成图像的数据。在实施了上述压缩处理或者加密处理的情况下，展开该数据。投影单元35具备经过未图示的透镜在外部的屏幕上投影RGB三色的光形成图像的结构，由上述处理后的数据在 RGB 各色的每个像素上发生光，在屏幕上形成图像。

在用户 PC40 中，也在预定的 OS 的控制下控制预定的 I／F 或者记录媒体等，能够执行预定的程序。为了构成本发明的图像显示系统，用户 PC40 具备网络 I／F41，通信控制单元 42，接收控制程序 43，显示控制单元 44 和显示单元 45。在用户 PC40 中通过网络 I／F41 和通信控制单元 42 实现双向通信，通信控制单元 42 把经过网络 I／F41 接收的数据包根据其标题进行结合，生成图像数据的同时传送到接收控制程序 43。

接收控制程序 43 进行上述图像数据的收发和基于所接收的图像数据的图像显示的控制。在图像数据的收发中，控制与成为连接对象的投影机 30 的双向通信。另外，在进行图像显示时，接收控制程序 43 起动显示控制单元 44，传送上述接收的图像数据。显示控制单元 44 处理接收的图像数据，控制显示单元 45 中的图像显示。即，显示控制单元 44 处理上述接收的图像数据，生成用于供给到显示单元 45 形成图像的数据。显示单元 45 具备未图示的液晶显示器等显示装置等，由上述处理后的数据使 RGB 各色的像素发光，在画面上形成图像。

另外，上述显示控制单元 44 中的处理是与上述投影控制单元 34 同样的处理。在实施上述压缩处理或者加密处理的情况下，通过与上述投影控制单元 34 相同的算法展开该数据。在投影机 30 和用户 PC40 中，由于图像的显示对象在是对于屏幕的投影或者是画面上的显示这一点上不同，因此投影控制单元 34 和显示控制单元 44 为了使得在这些机构上显示图像而

起动各部分时的驱动方法不同。但是，在本实施形态中，在用 RGB 各色成分的像素显示图像的意义上是相同的，作为对于图像数据的处理可以是相同的处理。从而在搭载到投影机 30 和用户 PC40 的模块中有很多共同部分，能够容易地形成本发明的系统。

（2）演示者 PC 中的处理:

以下，说明上述结构中的处理以及工作。首先，根据图 2 所示的流程详细地叙述演示者 PC20 中的发送控制程序 23 的处理。在本实施形态中，演示者 PC20 与投影机 30 进行通信，与用户 PC40 不进行通信。在步骤 S100 中，发送控制程序 23 对于通信控制单元 22 进行对于投影机 30 的连接请求。这时通信控制单元 22 经过网络 I／F21 发送表示连接请求的数据包。在步骤 S110 中经过通信控制单元 22 监视网络 I／F21，判别是否能够从投影机 30 发送表示连接允许的数据包。

如果通信控制单元 22 接收了表示连接允许的数据包，则在步骤 S110 中判定为发送控制程序 23 允许连接，经过通信控制单元 22 进一步监视网络 I／F21，在步骤 S120 判别是否进行分送请求。即，判别是否从投影机 30 发送来表示分送请求的数据包。当在步骤 S120 中没有判别为进行了分送请求时，在步骤 S125 中判别是否成为超时，反复进行步骤 S120 以后的处理直到判别为超时为止。

在没有判别为进行了分送请求的状态下在步骤 S125 中判别为超时的情况下，在步骤 S140 中能否分送设定单元 23a 进行不能分送的设定，向上述通信控制单元 22 发送表示不能分送的数据。另一方面，当在步骤 S120 中判别为进行了分送请求时，在步骤 S130 中判别在能否分送设定单元 23a 中是否已经设定了允许分送的信息。在该步骤 S130 中判别为没有设定允许分送的信息时，在步骤 S140 中向上述通信控制单元 22 发送表示不能分送的数据。

在步骤 S130 中判别为设定了允许分送的信息时，在步骤 S135 中，向上述通信控制单元 22 发送表示允许分送的数据。而且，在步骤 S150 中根据上述演示程序 25 的控制发送表示在显示单元 26 上显示演示画面的图像

数据。这时，根据需要进行适当的压缩处理或者加密处理。在步骤 S160 判断是否结束了演示，反复进行步骤 S150 以后的处理直到在该步骤 S160 判别为结束了演示为止。

通过以上的处理，在演示者 PC20 中，输出用于显示在投影机 30 中投影的演示图像的图像数据。另外，由演示者 PC20 设定能否从投影机 30 对于用户 PC40 分送图像数据，对于投影机 30 发送表示该设定内容的数据。在演示者 PC20 中，虽然发送表示该设定内容的数据，但是该数据仅发送一次就很充分，作为通信的负荷，实质上的负荷仅是图像数据的发送负荷。从而，演示者在操作演示者 PC20 的同时实施演示时，能够防止减少演示者 PC20 的资源，能够非常流畅地进行演示。

（3）投影机中的处理：

其次，根据图 3 所示的流程详细地叙述投影机 30 中的投影机控制程序 33 的处理。在本实施形态中投影机 30 与演示者 PC20 和用户 PC40 双方进行通信。在步骤 S200 中，投影机控制程序 33 经过通信控制单元 32 判别是否接收了连接请求。即，经过通信控制单元 32 监视网络 I／F31，判别上述演示者 PC20 是否接收了在步骤 S100 中输出的表示连接请求的数据包。

在步骤 S200 中判别为接收了连接请求时，在步骤 S210 向通信控制单元 32 经过网络 I／F31 发送表示连接允许的数据包，进行对于上述演示者 PC20 的连接允许。在步骤 S220 中，为了判别是否允许对于用户 PC40 的图像数据的分送，经过网络 I／F31 向通信控制单元 32 发送表示分送请求的数据包。

对于该分送请求，演示者 PC20 判别在上述步骤 S120 中具有分送请求，在步骤 S135 或者步骤 S140 中发送表示分送允许或者不允许的数据。投影机 30 在步骤 S225 中经过通信控制单元 32 监视网络 I／F31，接收该数据的同时判别是否允许分送。当在步骤 S225 中判别为允许分送时在步骤 S230 中进行分送允许的设定，当在步骤 S225 中判别为不允许分送时在步骤 S235 中进行分送不允许的设定。分送允许或者不允许的设定能够采用各种结构，在未图示的 RAM 中预先存储表示分送允许或者不允许的标志等，能够与

此相对应。

如果进行分送允许或者不允许的设定，则投影机控制程序 33 在步骤 S240 中使通信控制单元 32 监视网络 I／F31，接收显示演示画面的图像数据，暂时存储在未图示的 RAM 内。即，把所接收的各个数据包进行结合取得图像数据，存储在 RAM 中。在步骤 S245 中把该接收的图像数据传送到投影控制单元 34，使得投影演示图像。即，投影控制单元 34 处理暂时存储的图像数据，根据需要进行适宜压缩处理或者加密处理的展开等，生成在投影单元 35 中能够显示图像的数据，投影图像。

在步骤 S250 中，从在上述步骤 S230、S235 中设定的内容判别是否设定了分送允许。当在该步骤 S250 中判别为设定了分送允许时，在步骤 S255 中经过通信控制单元 32 监视网络 I／F31，判别从用户 PC40 的哪一个发送了表示连接请求的数据包。在步骤 S255 中判别为从用户 PC40 的某一个发送了表示连接请求的数据包时，在步骤 S260 中对于进行了连接请求的用户 PC40 进行连接允许。即，使通信控制单元 32 经过网络 I／F31 发送表示连接允许的数据包。

接着，在步骤 S265 中，对于进行了上述连接允许的用户 PC40 分送暂时存储在上述 RAM 内的图像数据。即，通信控制单元 32 把该图像数据分割在适当的数据包中，把以连接允许完毕的用户 PC40 为发送目标的数据写入到标题中等，经过网络 I／F31 发送这些数据包。这里，由于分送的图像数据与存储在上述 RAM 内的数据相同，因此能够在由投影控制单元 34 进行的处理之前的状态下直接发送数据。从而，如果是进行了上述压缩处理的数据，则能够在抑制网络负荷的状态下发送。

在进行了步骤 S265 中的图像数据分送的情况下，或者当在步骤 S255 中判别为没有从用户 PC40 的某一个发送出表示连接请求的数据包时，在步骤 S270 中判别是否结束了上述演示。即，使通信控制单元 32 监视网络 I／F31，判别是否接收了最终演示画面。在该步骤 S270 中反复进行上述步骤 S240 以后的处理直到判别为结束了上述演示为止。另外，当在上述步骤 S250 中判别为没有设定分送允许时，在步骤 S275 中判别是否结束了上述

演示。如果判定为没有结束演示则在步骤 S275 中也反复执行步骤 S240 以后的处理。

如以上那样，在投影机 30 从演示者 PC20 接收图像数据，实施在屏幕上投影图像的处理的同时，在设定了分送允许的情况下，对于进行了连接请求的用户 PC40 分送图像数据。与用户 PC40 的通信以及图像数据的分送由于通过投影机 30 进行，因此提供给上述演示者 PC20 分送不允许的情况非常少。另外，由于在投影机 30 中发送图像数据时直接对于用户 PC40 发送上述接收的图像数据，因此在图像数据的分送时没有多少图像处理的负荷，能够流畅地进行通信，能够使用户 PC40 没有感觉到压力而视听演示图像。

进而，作为在图像数据的发送中利用的众所周知的技术，有 RGB 线缆或者同轴线缆等，而在根据这些结构进行投影机 30 中的图像投影时，需要由 RGB 线缆等发送图像数据和机器控制用的双向通信线缆这两条线路。而在本实施形态中，由于经过网络发送图像数据，因此作为把演示者 PC20 与投影机 30 以及投影机 30 与用户 PC40 连接在一起的线缆只要构成网络线缆就很充分。从而，能够通过简单的结构构成图像显示系统。

（4）用户 PC 中的处理：

其次根据图 4 所示的流程详细叙述用户 PC40 中的接收控制程序 43 的处理。在本实施形态中用户 PC40 与用户 PC40 进行通信，而与演示者 PC20 不进行通信。在步骤 S300 中，接收控制程序 43 经过通信控制单元 42 对于投影机 30 发送连接请求。即，通信控制单元 42 经过网络 I／F41 发送表示连接请求的数据包。

在步骤 S310 中，判别对于上述连接请求是否进行了连接允许。即，经过通信控制单元 42 监视网络 I／F41，判别上述投影机 30 是否接收了在步骤 S260 中输出的表示连接允许的数据包。当在该步骤 S310 中判别为进行了连接允许时，在步骤 S320 中接收投影机 30 输出的图像数据。即，使通信控制单元 42 监视网络 I／F41，接收表示演示画面的图像数据的数据包，把它们相结合生成图像数据的同时暂时存储在未图示的 RAM 内。

在步骤 S340 中把该接收的图像数据传送到显示控制单元 44，使得在用户 PC40 的画面上显示演示图像。即，显示控制单元 44 处理暂时存储的图像数据，根据需要进行适宜压缩处理或者加密处理的展开等，生成能够在显示单元 45 中显示图像的数据，显示图像。而且，在步骤 S340 中，使通信控制单元 42 监视网络 I／F41，通过判别是否接收了最终的演示画面，反复进行上述步骤 S320 以后的处理，直到判别为结束了演示为止。

另外，当在上述步骤 S310 判别为对于连接请求没有进行连接允许时，跳过步骤 S320 以后的步骤，不进行图像数据的接收。如以上那样，在用户 PC40 中从投影机 30 接收图像数据在画面上显示演示画面。从而，即使由于远离投影机的投影屏幕，或者投影会场过大等原因视听者处于难以视认投影图像的位置，视听者也能够在手头可靠地视听图像。

（5）其它实施形态：

上述实施形态是实现本发明图像显示系统，投影机，图像显示方法，投影机控制方法，图像显示程序以及投影机控制程序的一个例子，当然也能够采用其它的结构。例如，可以采用仅对于处在演示会场内的视听者的用户 PC40 分送图像数据的结构。例如，在上述实施形态中，虽然当在设定了分送允许时对于进行了连接请求的所有用户 PC40 允许连接，分送了图像数据，但是如果根据口令限制连接允许对象，则能够限制分送目标。

用图 3 以及图 4 的虚线包围的记述示出在通过口令实现限制连接允许对象的结构的情况下应该在图 3 以及图 4 中添加的处理，图 5 示出表示该例子中的工作例的概略图。在该例子中，如在图 5 中作为来自投影机 30 的投影图像示出的那样，在投影画面的一部分上显示口令。从而，从演示者 PC20 发送的图像数据是包括用于显示口令的图像的数据，投影机 30 在步骤 S245 的图像投影时显示口令。

在用户 PC40 中，在实施步骤 S300 的连接请求之前通过键盘等操作输入设备输入口令，在步骤 S300 的连接请求时与表示连接请求的数据一起发送表示该输入的口令的数据。在投影机 30 中，在步骤 S260 中实施连接允许之前取得上述输入的表示口令的数据的同时判别该口令是否正确。而且，

当判别为口令正确时进行步骤 S260 的连接允许处理，当判别为口令不正确时进行步骤 S270 的处理。

为了判别口令是否正确能够采用各种结构。例如，预先把表示正确口令的数据存储在投影机 30 的未图示的 RAM 等中，可以把该存储的正确口令与上述输入的口令进行比较，也可以抽取出在上述步骤 S240 中接收的图像数据中所包含的口令的数据，作为正确的口令，除此以外还能够采用各种结构。总之，通过以上的结构，由于在演示会场内能够视听画面的视听者能够输入正确的口令，因此能够把分送目标限定为会场内的用户 PC40。

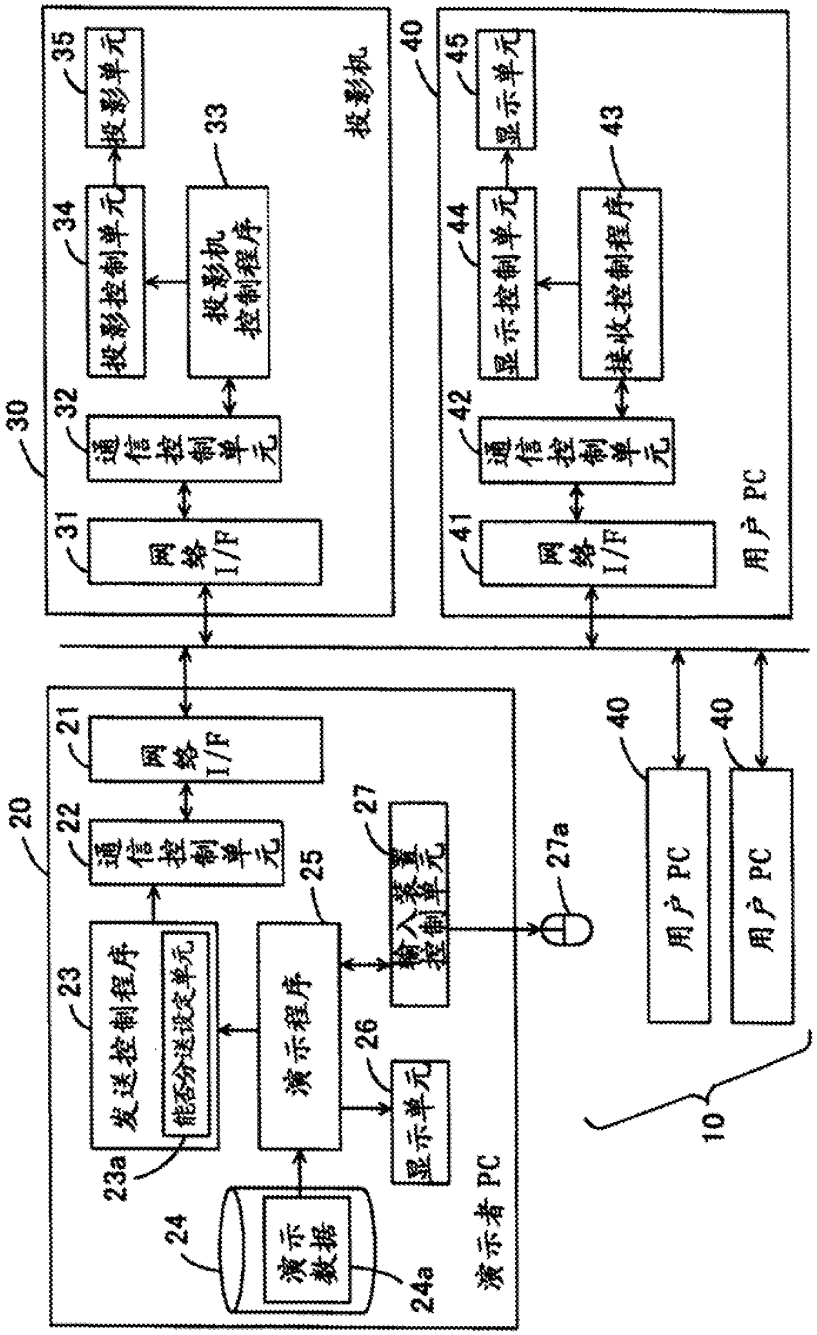

投影机
30
31
网络 I/F
32
通信控制单元
33
投影机控制程序
34
投影控制单元
35
投影单元
40
用户 PC
41
网络 I/F
42
通信控制单元
43
接收控制程序
44
显示控制单元
45
显示单元
演示者 PC
20
21
网络 I/F
22
通信控制单元
23
发送控制程序
能否分送设定单元
23a
24
演示数据
24a
25
演示程序
26
显示单元
27
输入装置控制单元
27a
10

图 1

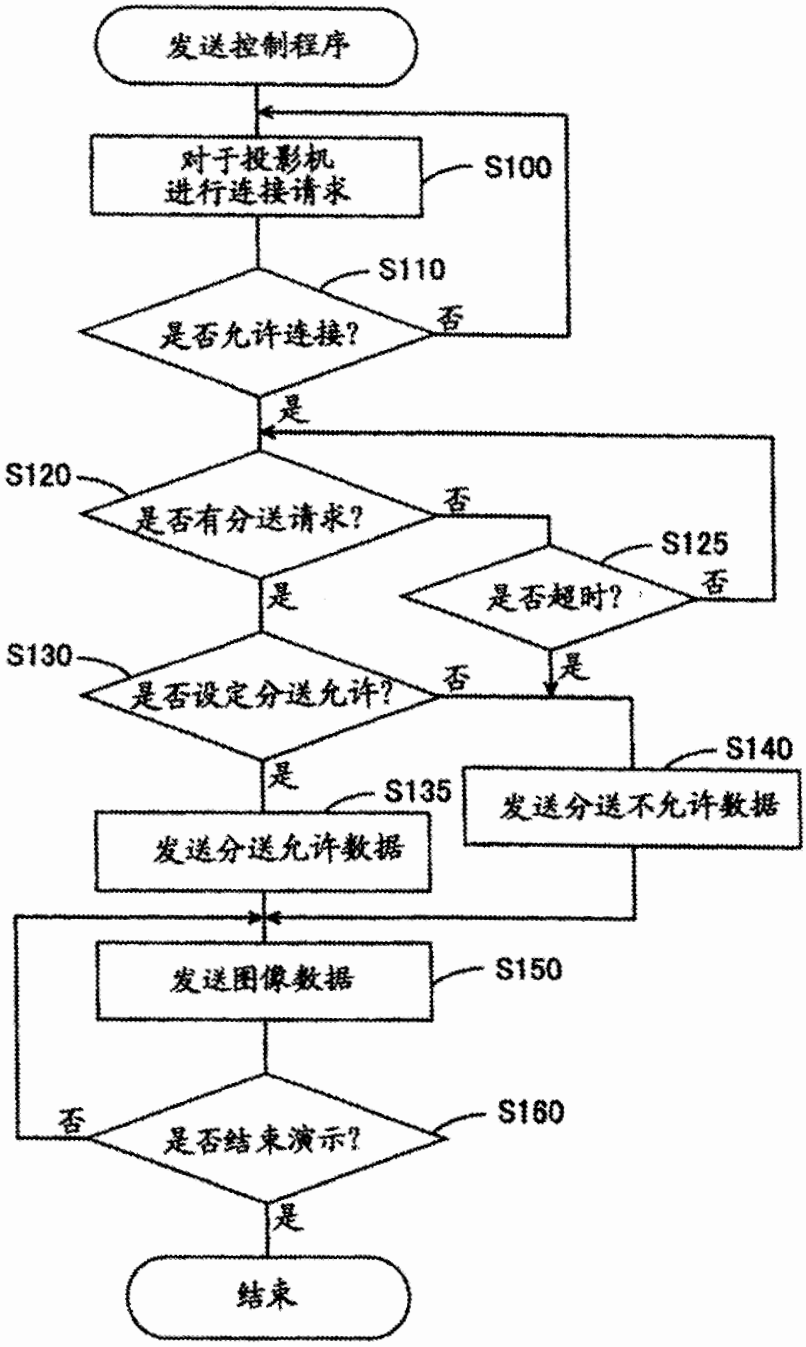

发送控制程序
对于投影机
进行连接请求
S100
S110
是否允许连接?
否
是
S120
是否有分送请求?
否
是
S125
是否超时?
否
是
S130
是否设定分送允许?
否
是
S135
发送分送允许数据
S140
发送分送不允许数据
发送图像数据
S150
S160
是否结束演示?
否
是
结束

图 2

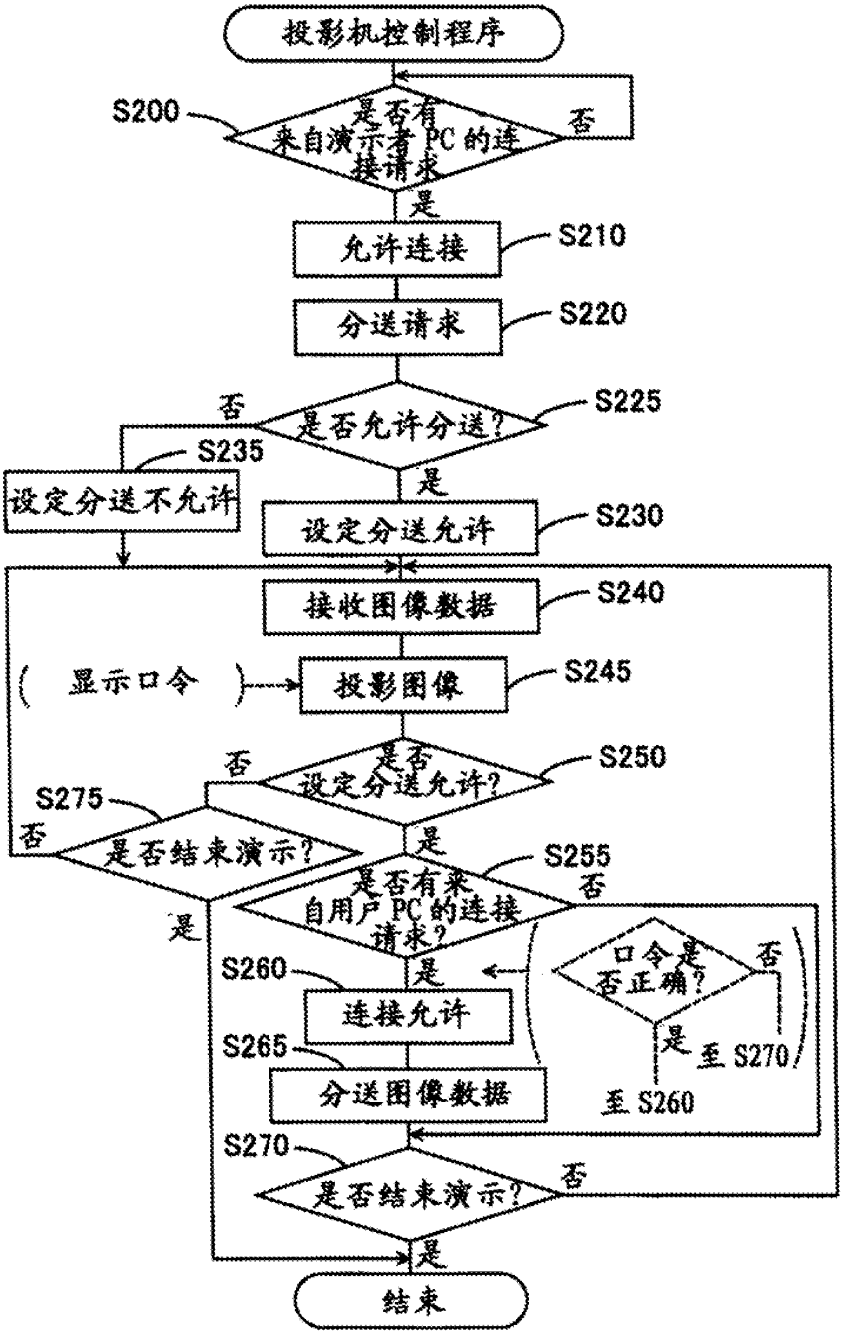

投影机控制程序
S200
是否有来自演示者 PC 的连接请求
否
是
允许连接
S210
分送请求
S220
否
是否允许分送?
S225
S235
设定分送不允许
是
设定分送允许
S230
接收图像数据
S240
显示口令
投影图像
S245
否
是否设定分送允许?
S250
S275
否
是否结束演示?
是
S255
是否有来自用户 PC 的连接请求?
否
是
口令是否正确?
否
是
至 S270
S260
连接允许
S265
分送图像数据
至 S260
S270
是否结束演示?
否
是
结束

图 3

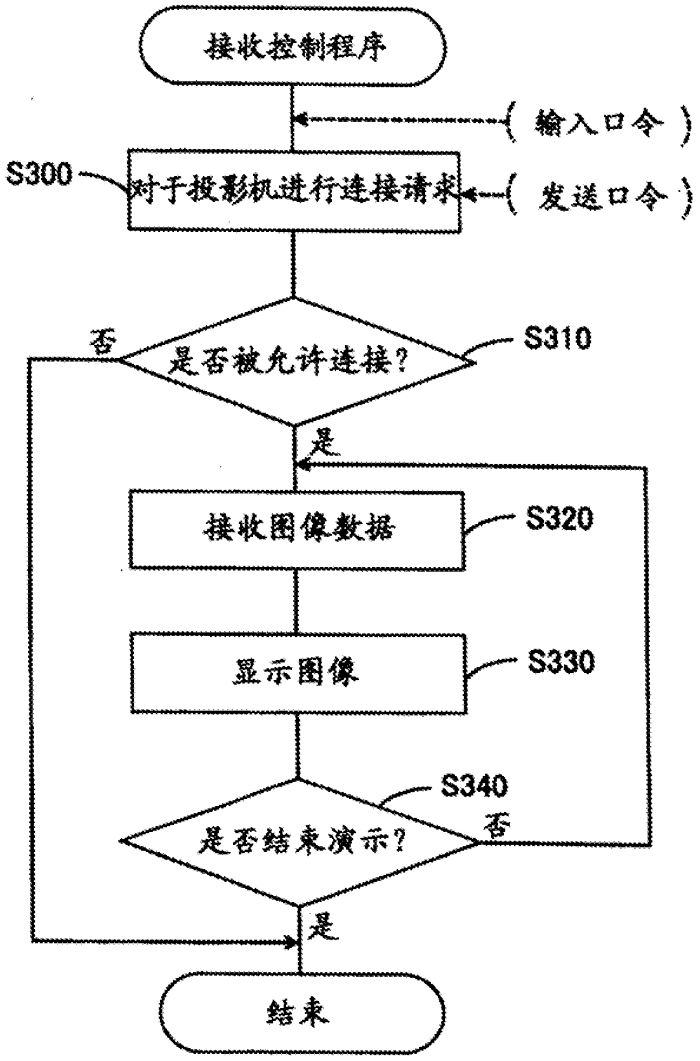

接收控制程序
(输入口令)
S300
对于投影机进行连接请求
(发送口令)
否
是否被允许连接?
S310
是
接收图像数据
S320
显示图像
S330
S340
是否结束演示?
否
是
结束

图 4

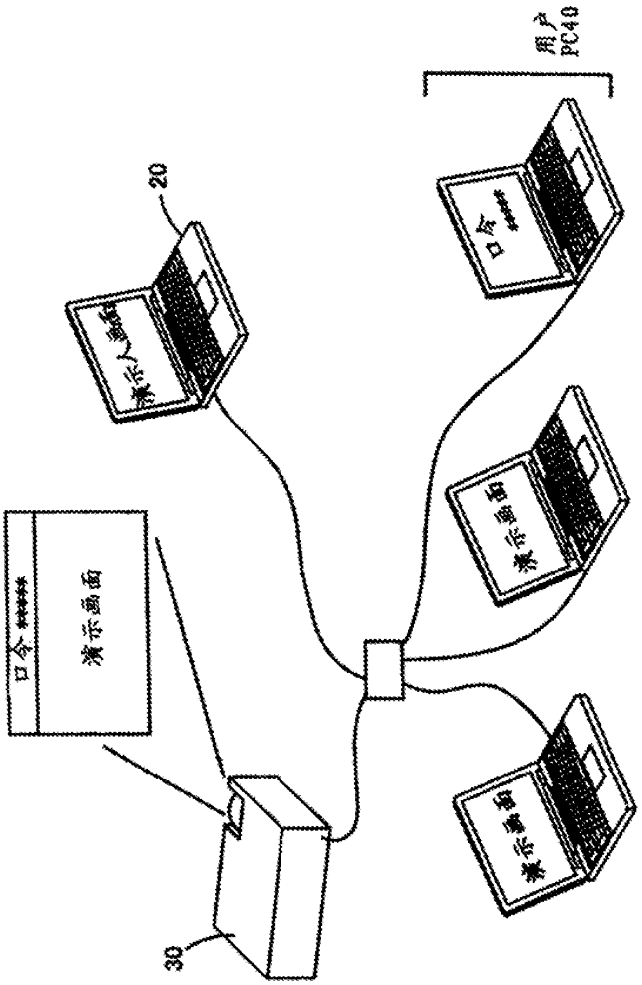


图 5

Espacenet

Bibliographic data: CN101454762 (B) — 2013-06-12

Plug and play peripheral storing driver

Inventor(s): WILDE KEITH; HILL DOUG ± (WILDE KEITH, ; HILL DOUG)

Applicant(s): SMART TECHNOLOGIES ULC ± (SMART TECHNOLOGIES ULC)

Classification: - international: *G06F13/10; G06F3/00; G06F3/041; G06F9/445*
- cooperative: G06F9/4411; G06F9/4413

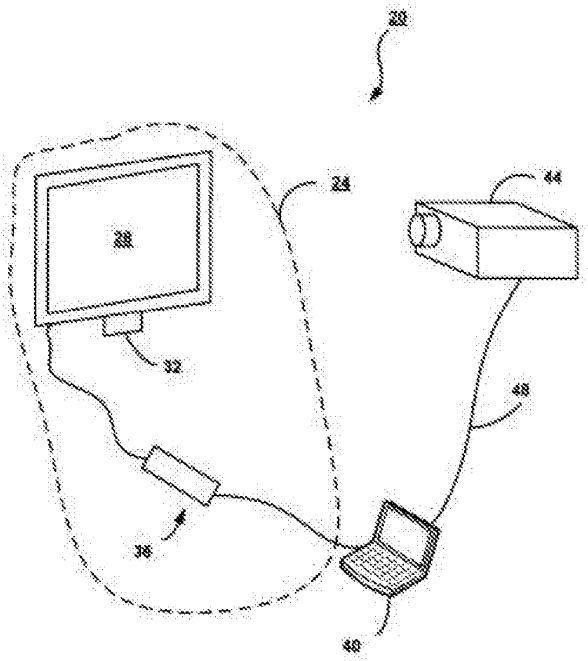
Application number: CN2007819460 20070528

Priority number(s): WO2007CA00938 20070528 ; US20060420600 20060526

Also published as: CN101454762 (A) WO2007137415 (A1) US2008005371 (A1) US8190785 (B2) US2009198839 (A1) more

Abstract of CN101454762 (A)

A plug-and-play device providing a set of functionality comprises a plug-and-play interface, storage, and software stored in the storage. The software is automatically executed by a computer when the plug-and-play device is connected thereto via the plug-and-play interface. The software detects disconnection of the plug-and-play device from the computer and terminates its execution in response thereto. The computer does not persistently store the software thereafter.



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2008.11.26
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G06F 9/445(2006.01)
(56)对比文件
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US 20060081716 A1,2006.04.20,
US 20050278461 A1,2005.12.15, 说明书第34-35,37-41段、权利要求1,3、图4-5.
审查员 杨洁

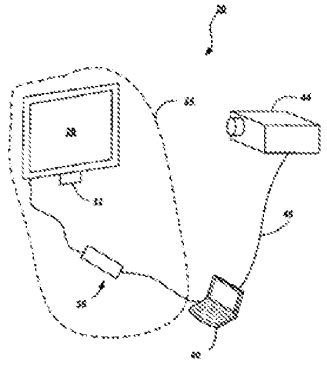
权利要求书2页 说明书6页 附图3页

(54)发明名称

一种交互式输入系统、用于该系统的即插即用电缆及一种交互方法

(57)摘要

一种提供一组功能的即插即用设备包括：即插即用接口；存储器；以及，在所述存储器内存储的软件。当所述即插即用设备经由所述即插即用接口而连接到计算机时，由所述计算机自动执行所述软件。所述软件检测所述即插即用设备与所述计算机的断开，并且响应于所述断开而终止其执行。此后，所述计算机不永久地存储所述软件。



CN 101454762 B

1. 一种交互式输入系统，包括：

具有控制器的交互式表面；

计算设备；以及

将所述计算设备连接到所述交互式表面以允许之间进行双向通信的即插即用电缆，所述即插即用电缆包括：

交互式表面接口；

计算设备接口；

存储器；以及

与所述存储器通信的集线器，所述集线器经由所述计算设备接口向所述计算设备提供存储在所述存储器内的可执行软件用于在将所述即插即用电缆连接到所述计算设备时由所述计算设备自动执行，当所述即插即用电缆将所述交互式表面和所述计算设备互联时，所述即插即用电缆进一步经由所述计算设备接口将校准设置通信到所述计算设备，其中所述校准设置使得由所述集线器提供的被所述计算设备自动执行的可执行软件将从所述交互式表面接收的触摸输入映射至计算设备显示坐标系，并且其中所述可执行软件自动检测所述即插即用电缆与所述计算设备的断开，并且响应于所述断开而终止执行，此后，所述计算设备不永久地存储所述可执行软件和校准设置。

2. 根据权利要求 1 所述的交互式输入系统，其中，所述交互式表面接口和计算设备接口是通用串行总线接口。

3. 根据权利要求 2 所述的交互式输入系统，其中，所述存储器存储 autorun 文件，其指定要自动执行的所述可执行软件。

4. 根据权利要求 3 所述的交互式输入系统，其中，所述存储器被配置为根据致密盘人类接口设备 (CD HID) 简档进行操作。

5. 根据权利要求 2 所述的交互式输入系统，其中，所述可执行软件被复制到在所述计算设备上的临时位置，并且从这个位置被执行，并且其中在从所述计算设备断开所述即插即用电缆时自动从所述临时位置终止和删除所述可执行软件。

6. 根据权利要求 2 所述的交互式输入系统，其中，所述可执行软件向所述计算设备的操作系统注册以后删除所述可执行软件的请求。

7. 根据权利要求 1 所述的交互式输入系统，其中，所述可执行软件被复制到在所述计算设备上的临时位置，并且从这个位置被执行，并且其中在从所述计算设备断开所述即插即用电缆时自动从所述临时位置终止和删除所述可执行软件。

8. 根据权利要求 1 所述的交互式输入系统，其中，所述可执行软件向所述计算设备的操作系统注册以后删除所述可执行软件的请求。

9. 根据权利要求 7 所述的交互式输入系统，其中，所述可执行软件执行存储在所述即插即用电缆的所述存储器中的所述可执行软件的实例，终止其自身的执行以及从所述即插即用电缆的所述存储器执行的所述可执行软件的实例，并且从所述计算设备中的所述临时位置删除所述可执行软件。

10. 根据权利要求 1 所述的交互式输入系统，其中，所述交互式表面显示计算机生成的图形用户界面。

11. 一种与交互式表面进行交互的方法，包括：

在计算设备和所述交互式表面之间连接包括存储器、集线器、计算设备接口和交互式表面接口的即插即用电缆；

通过所述即插即用电缆在所述计算设备和所述交互式表面之间建立双向通信；

自动定位被指定来执行的软件，所述软件被存储在所述即插即用电缆的存储器内，并且在所述计算设备上执行被定位的所述软件；

在所述即插即用电缆连接到所述计算设备和所述交互式表面时自动提取校准设置并且将所述校准设置提供给所述计算设备；

使用所述校准设置将从所述交互式表面接收的触摸输入映射到所述计算设备的所述显示坐标系；并且

在所述即插即用电缆与所述计算设备断开时，终止所述软件的执行，此后，所述计算设备不永久地存储所述软件和校准设置。

12. 根据权利要求 11 所述的方法，其中所述执行包括：将所述软件复制到在所述计算设备上的存储器。

13. 根据权利要求 12 所述的方法，还包括：

向所述计算设备的操作系统注册以后删除所述软件的请求。

14. 一种用于将交互式表面和计算设备互联并在之间建立双向通信的即插即用电缆，所述即插即用电缆包括：

交互式表面接口；

计算设备接口；

存储器；以及

与所述存储器通信的集线器，所述集线器经由所述计算设备接口向所述计算设备提供存储在所述存储器中的可执行软件用于在将所述即插即用电缆连接到所述计算设备时由所述计算设备自动执行，当所述即插即用电缆将所述交互式表面和所述计算设备互联时所述即插即用电缆进一步经由所述计算设备接口将校准设置通信到所述计算设备，其中所述校准设置使得由所述集线器提供的被所述计算设备自动执行的可执行软件将从所述交互式表面接收的触摸输入映射到计算设备显示坐标系，并且其中所述可执行软件自动检测所述即插即用电缆与所述计算设备的断开，并且响应于所述断开而终止执行，此后，所述计算设备不永久地存储所述可执行软件和校准设置。

15. 根据权利要求 14 所述的即插即用电缆，其中所述可执行软件被复制到在所述计算设备上的临时位置，并且从这个位置被执行，并且其中在从所述计算设备断开所述即插即用电缆时自动从所述临时位置终止和删除所述可执行软件。

16. 根据权利要求 14 所述的即插即用电缆，其中所述可执行软件向所述计算设备的操作系统注册以后删除所述可执行软件的请求。

一种交互式输入系统、用于该系统的即插即用电缆及一种交互方法

技术领域

[0001] 本发明一般地涉及计算机外围设备，具体涉及即插即用设备及其使用方法。

[0002] 背景技术

[0003] 即插即用设备是熟知的，并且存在许多类型的即插即用标准，包括通用串行总线（“USB”）、IEEE1394（“FireWire”）和PCMCIA（“PC卡”），最常见的是USB。这样的即插即用设备具有通过即插即用接口对计算机可访问的一组功能。这个功能可以包括但是不限于存储、输入注册、图像捕获、音频输入和输出等。许多组功能被定义为设备类。在将即插即用设备连接到计算机时，完成了电子电路，并且提醒所述计算机的操作系统所述连接。所述操作系统轮询所述即插即用设备以确定可以在即插即用设备上获得什么功能。

[0004] 许多操作系统具有多个预装的驱动器，用于一般的即插即用设备类，诸如USB海量存储器、双按钮鼠标等。如果操作系统具有用于连接到计算机的即插即用设备的设备类的驱动器，则所述驱动器被计算机安装，以便可以访问所述即插即用设备的功能，如果相反所述操作系统不具有用于即插即用设备的设备类的驱动器，则在许多情况下操作系统提示用户安装适当的软件，以使得计算机能够访问所述即插即用设备的功能。

[0005] Wong等人的公开号为2004/0205778的美国专利申请公开了包括驱动器存储器的外围设备。所述外围设备经由即插即用接口连接到计算机，并且对由所述计算机的操作系统识别的多个即插即用装置类的模拟进行循环，直到发现允许驱动器安装程序的自动执行的那个。

[0006] Gotze等人的公开号为2005/0038934的美国专利申请公开了可以在两个模式之间调节的基于USB的外部打印机。在第一模式内，打印机模拟USB海量存储器，以允许向打印机所连接的计算机上安装在打印机的存储器内存储的驱动器。一旦安装了驱动器，则打印机被调节到第二模式内，在该模式中其作为打印机工作。在计算机上安装的驱动器使得能够在打印机上打印。

[0007] 即插即用设备可以采用其他形式。例如，即插即用设备可以具有触摸板的形式，所述触摸板检测触摸输入，并且向所述触摸板所连接的计算机提供对应的输出。为了计算机正确地解译触摸板输出，需要执行校准过程，以便将触摸板输入区的坐标系映射到计算机显示坐标系。在已经执行了校准过程后，结果产生的校准设置被计算机存储，以便可以将触摸板输出正确地映射到计算机显示坐标系。但是，可以明白，所述校准设置对于计算机是特定的。如果触摸板被插入另一个计算机，则必须重新执行校准过程。

[0008] 在多种情况下会不期望有安装软件／驱动器的需要，诸如用户没有计算机的管理权或者仅仅不期望在计算机上安装更多的软件，特别是即插即用设备的连接不常发生或者是一次性的事务。安装软件也可以证明是困难和复杂的任务。例如，用户可能需要从因特网下载软件，或者可能需要定位所述软件／驱动器所定位于的媒体。

[0009] 因此，本发明的目的是提供一种新颖的即插即用设备及其使用方法。

发明内容

[0010] 因此，在一个方面，提供了一种提供一组功能的即插即用设备，包括：

[0011] 即插即用接口；

[0012] 存储器；以及

[0013] 存储在所述存储器内的软件，当所述即插即用设备经由所述即插即用接口而连接到计算机时，由所述计算机自动执行所述软件，所述软件可用于检测所述即插即用设备与所述计算机的断开，并且响应于所述断开而终止其执行，此后，所述计算机不永久地存储所述软件。

[0014] 在一个实施例内，所述软件使得所述计算机能够访问由所述即插即用设备提供的所述一组功能。所述即插即用接口可以是通用串行总线接口。所述存储器可以存储autorun.inf文件，其指定要执行的软件。所述软件可以被复制到在所述计算机上的临时位置，并且从这个位置被执行，并且可以在从所述计算机断开所述即插即用设备时终止和删除所述软件。

[0015] 按照另一个方面，提供了一种与计算机一起使用即插即用设备的方法，包括：

[0016] 检测即插即用设备与所述计算机的连接；

[0017] 自动定位被指定来执行的软件，所述软件被存储在所述即插即用设备的存储器内；

[0018] 利用所述计算机执行所述软件；并且

[0019] 在所述即插即用设备与所述计算机断开时，终止所述软件的执行。

[0020] 按照另一个方面，提供了一种即插即用设备，包括：

[0021] 存储器；以及

[0022] 存储在所述存储器内的设置，所述设置与一组功能相关联。

[0023] 所述即插即用设备可以还包括存储在所述存储器内的软件，当所述即插即用设备与计算机连接时，所述软件提供对所述一组功能的访问。在这种情况下所述一组功能是由所述即插即用设备提供的输入接口。

[0024] 可选地，所述即插即用设备可以包括存储在存储器内的软件，所述软件在所述即插即用设备所连接的计算机上可执行，并且提供对所述一组功能的访问。所述软件可以在执行期间引用所述设置。当所述即插即用设备经由计算机的即插即用接口与所述计算机连接时，所述计算机可以自动执行所述软件，并且所述软件检测所述即插即用设备与所述计算机的断开，并且响应于所述断开而终止执行。在这种情况下，所述计算机此后不永久地存储所述软件。

[0025] 按照另一个方面，提供了一种用于接收输入的即插即用设备，包括：

[0026] 即插即用接口；

[0027] 触摸板，其上显示计算机产生的图像；

[0028] 存储器；以及

[0029] 校准设置，其被存储在所述存储器内，并且对触摸板和计算机产生的图像坐标系进行映射。

[0030] 按照另一个方面，提供了一种提供一组功能的即插即用设备，包括：

[0031] 即插即用接口；

[0032] 存储器；以及

[0033] 存储在所述存储器内的软件，所述软件被复制到所述计算机，并且当所述即插即用设备连接到所述计算机时从其自动被执行，所述软件提供对所述即插即用设备的所述一组功能的访问。

[0034] 通过在所述即插即用设备自身上存储用于所述即插即用设备的软件并且当所述即插即用设备连接到所述计算机时自动将所述软件安装到所述计算机上，所述即插即用设备的用户不必在计算机上预先安装软件 / 驱动器以便访问由所述即插即用设备提供的功能，用户也不需要计算机的管理权限以便使用所述软件。因为在终止时所述软件不永久地被存储在计算机上，因此所述计算机被留在与在连接到所述即插即 用设备之前其所处的状态相同的一般状态。而且，通过在所述即插即用设备上存储设置，当新的计算机连接到所述即插即用设备时，不必执行建立过程。

附图说明

[0035] 现在，将参考附图更全面地说明实施例，其中：

[0036] 图 1 示出了包括触摸板、控制器和电缆的连接到计算机的即插即用设备；

[0037] 图 2 示出了图 1 的电缆的示意图；以及

[0038] 图 3 是图 1 的即插即用设备的一般操作的流程图。

具体实施方式

[0039] 图 1 图解了系统 20，其包括即插即用设备 24，用于对输入进行接收和数字化。在本实施例中，所述即插即用设备 24 包括触摸板 28、控制器 32 和电缆 36。触摸板 28 是由阿尔伯塔省卡尔加里市 (Calgary, Alberta) 的 SMART 技术公司以 SMARTBoard™ 的名称制造和销售的类型。控制器 32 控制触摸板 28 的操作，并且经由电缆 36 与计算机 40 通信。LCD 投影机 44 经由 VGA 电缆 48 连接到计算机 40。计算机 40 控制 LCD 投影机 44 将图像投影到触摸板 28 上而不是在计算机 40 的显示器上呈现。投影机 44 可以位于触摸板 28 的前方或者后方。

[0040] 触摸板 28 向用户提供经由用于提供输入的、诸如笔工具或者手指的指针来与被投影的图像交互的能力。除了由计算机 40 的操作系统提供来作为鼠标工作的软件之外，触摸板 28 不需要额外软件。触摸板 28 的功能被在所述操作系统上不可获得的其他软件大大地增强。如下所述。

[0041] 控制器 32 包括处理器（未示出），其执行存储在非易失性存储器内的固件。一般地，所述固件使得控制器 32 在两个操作模式之一下工作。在初始模式内，控制器 32 操作两个 USB 简档，即绝对鼠标人机接口设备（“HID”）简档和 SMARTBoard HID 简档。所述绝对鼠标 HID 简档允许控制器 32 在指针输入被触摸板 28 检测到时响应于与基本的鼠标功能一起的指针输入而中继绝对位置信息。所述 SMARTBoard HID 是专用的设备类，其能够增强触摸板 28 的功能。被增强的功能包括在绝对鼠标 HID 设备类内可以获得的所有功能外加链接信息、附加的工具信息（按钮、消除器、笔工具选择等）和与控制器 32 的双向通信。在“本地的”操作模式内，控制器 32 终止所述绝对鼠标 HID 简档，并且仅仅操作 SMARTBoard HID 简档。

[0042] 参考图 2 描述电缆 36 的部件。电缆 36 包括 :USB 集线器部件 52,其具有第一 USB 接口 56,用于连接到延伸到触摸板 28 的 USB 电缆 60 ;以及,第二 USB 接口 64,用于连接到延伸到计算机 40 的 USB 电缆 68。第一和第二 USB 接口 56、64 与 USB 集线器 72 通信。

[0043] 被配置按照致密盘 ("CD")HID 简档而工作的存储器 76,即快闪存储器也与 USB 集线器 72 通信。CD HID 简档使得存储器 76 如同 CD 驱动器工作。存储器 76 存储一组软件应用,包括用户应用 (SMARTBoardTools.exe)、服务 (SMARTBoardService.exe)、启动器应用 (SBLauncher.exe)、校准应用 (SMARTBoardCalibrate.exe) 和引用启动器应用的 autorun.inf。而且,存储器 76 可以存储与系统 20 的配置相关联的校准设置。具体地,所述校准设置包括用于利用由 LCD 投影机 44 投影在触摸板 28 的表面上的图像输出来映射由触摸板 28 接收的指针输入的数据。LCD 投影机 44 和触摸板 28 一般相对于彼此固定。结果,一旦通过校准过程确定了它们的相对位置,其中所述校准过程被执行以便产生校准设置、LCD 投影机 44 和触摸板 28 的相对位置,因此就不需要重新确定所述校准设置。

[0044] SMARTBoardTools.exe 应用允许比基本鼠标功能更丰富的一组特征。其包含多个呈现应用、与流行绘图和呈现应用的整合、以及允许用户在任何应用内的文件上或者在计算机 40 的图形用户界面的桌面上 描画的应用,所述图形用户界面的桌面被投影触摸板 28 的表面上并在其上显示。

[0045] 在图 3 内示出了即插即用设备 24 的操作的方法。当即插即用设备 24 连接到计算机 40(步骤 104),并且即插即用设备 24 到计算机 40 的连接被计算机 40 的操作系统检测到时,计算机 40 查询所述即插即用设备 24 以确定即插即用设备 24 提供什么功能 (步骤 108)。当 USB 集线器 72 连接到存储器 76 以及控制器 32 时,USB 集线器 72 查询这两个单元的每个以确定可以获得哪些简档。在本实施例中,存储器 76 通过指示其支持 CD HID 简档而响应。处于初始模式内的控制器 32 通过指示其支持绝对鼠标 HID 简档和 SMARTBoard HID 简档来响应。

[0046] 计算机 40 在接收到这个简档信息时检测对于即插即用设备 24 可以获得的下面的功能 :绝对鼠标 HID 简档、SMARTBoard HID 简档和 CDHID 简档 (步骤 112)。计算机 40 继而安装用于由所述操作系统识别的设备功能的驱动器 (即,对于所述设备功能,所述操作系统具有驱动器) ;即,绝对鼠标 HID 和 CD HID(步骤 116)。当计算机 40 检测到这些功能组的每个时,计算机 40 将它们识别为独立的设备。在这个实施例内的计算机 40 不安装 SMARTBoard HID 简档,因为计算机 40 的操作系统不具有对应的驱动器。计算机 40 然后向被检测的 CD HID 设备分配下一个可以获得的驱动器字母 (步骤 120)。

[0047] 计算机 40 像大多数计算机一样由缺省配置来配置 ;即,其被配置来对于 CD HID 设备搜索名称为 autorun.inf 的文件,所述文件引导计算机 40 来在连接到 CD HID 设备时自动执行特定应用。因此,计算机 40 对于 CD HID 设备查询 autorun.inf,并且在接收到它时,载入和执行在其内包含的指令 (步骤 124)。autorun.inf 文件被 Microsoft **Windows®** 家族的操作系统使用来在特定条件下在检测到特定类型的存储器时执行其中包含的指令。例如,在特定条件下,当包含 autorun.inf 文件的 CD-ROM 盘被插入 CD-ROM 驱动器的盘架时执行 autorun.inf 文件。执行通常在计算机 的操作系统可以获得或者识别了在 autorun.inf 文件内的信息后开始而没有延迟。

[0048] 所述 autorun.inf 文件包含指向可执行的启动器应用 SBLauncher.exe 的指

针。在解析 autorun.inf 文件后，计算机 40 使用所述指针来与一组对应的动态链接库（“DLL”）一起从存储器 76 获得 SBLauncher.exe 应用，并且执行 SBLauncher.exe 应用（步骤 128）。SBLauncher.exe 应用继而将计算机 40 引导来与一些相关联的 DLL 一起地、从存储器 76 向在计算机 40 上的临时目录复制两个可执行文件，即 SMARTBoardTools.exe 和 SMARTBoardService.exe，并且执行它们（步骤 132）。在执行 SMARTBoardService.exe 服务时，所述 SBLauncher.exe 应用终止执行，并且 SMARTBoardService.exe 服务引导计算机 40 来向控制器 32 发送命令，以切换到 SMARTBoard HID 模式（步骤 136）。

[0049] 在启动时，SMARTBoardTools.exe 应用从即插即用设备 24 的存储器 76 查询并且获得校准设置和其他设置（步骤 140）。所述校准设置使得 SMARTBoardTools.exe 应用能够将从触摸板 28 接收的触摸输入映射到计算机显示坐标系。其他设置包括笔盘设置、COM 端口设置、接触过滤设置和用于一些软件应用的用户设置。所有这些设置被存储在标准的 Windows INI 文件内。而且，使用几个 XML 文件来存储用于形成部分 SMARTBoardTools.exe 应用的各种小应用程序的布局和菜单设置。这些小应用程序提供了用于访问各种功能的工具按钮的浮动窗口、在屏键盘等。这些布局和菜单设置被存储在即插即用设备 24 的存储器 76 内的 XML 文件内，并且在 SMARTBoardTools.exe 应用的执行期间被载入和存储在用户目录“C:\Documents and Settings\<user name>\ApplicationData\SMART Technologies Inc.\SMARTBoard Software\”中，其中，<username> 是当前用户的登录名。

[0050] 在获得校准设置时，SMARTBoardTools.exe 应用允许用户与触摸板 28 的交互，所述触摸板 28 将相对于由 LCD 投影机 44 在触摸板 28 的表 面上投影的图像在空间上对准。在执行期间，一些设置被存储在注册表的“HKEY_CURRENT_USER”键内，并且具体地被存储在“Software\SMART Technologies Inc.\SMARTBoard Software\”子键内。这些设置包括应用窗口位置、每个应用的用户设置和近期使用的文件的列表。使用“HKEY_CURRENT_USER”键，因为对于对这个键进行的修改通常没有限制。另外，如果对于“HKEY_CURRENT_USER”键没有访问限制，则在那里写入拼写检查程序设置。

[0051] 在终止所述会话时，可以将计算机 40 从即插即用设备 24 拔出并且移除。当断开即插即用设备 24 时，计算机 40 通知 SBLauncher.exe 应用（步骤 144）。SBLauncher.exe 应用终止 SMARTBoardTools.exe 应用、SMARTBoardService.exe 服务、各种相关的 DLL 和设置的执行，并且从在计算机 40 上的临时位置将它们删除，然后终止其自身的执行（步骤 148）。在终止所述 SBLauncher.exe 应用的执行之前，SBLauncher.exe 应用向 XML 文件写入存储在“C:\Documents and Settings\<username>\Application Data\SMART TechnologiesInc.\SMARTBoardSoftware\”内的用户设置，并且 SBLauncher.exe 应用然后将所述 XML 文件存储在即插即用设备 24 的存储器 76 内。SBLauncher.exe 应用然后删除这些设置和存储在注册表内的设置。一旦从计算机 40 删除了所述设置，则 SBLauncher.exe 应用将一个输入项置于 HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\RunOnce 注册表键内，其当用户接着登录时告知 Windows 删除 SBLauncher.exe 应用，然后终止其执行。

[0052] 如果用户通过关闭 SMARTBoardTools.exe 应用来停止 SMARTBoard 软件，则 SBLauncher.exe 应用执行在即插即用设备 24 的存储器 76 内发现的其自身的实例，导致存储在计算机 40 上的 SBLauncher.exe 应用的实例被删除。

[0053] 如上所述，为了相对于由 LCD 投影机 44 投影在触摸板 28 上的图像 进行的触摸输

入在空间上与被投影的图像对准，必须校准系统 20。因为在由 LCD 投影机 44 投影的图形和触摸板 28 之间的空间关系仅仅当 LCD 投影机 44 和触摸板 28 相对于彼此移动时才改变，因此一般在触摸板 28 和 LCD 投影机 44 被固定在位置上后执行校准。为了校准系统 20，启动 SMARTBoardCalibrate.exe 应用。一旦被启动，则提示用户触摸在触摸板 28 的表面上显示的计算机 40 的图形用户界面上的多个点。产生的触摸板输出用于将由触摸板 28 对准的原始触摸坐标映射到计算机显示坐标系。新捕获的校准设置然后被记录在 Windows INI 文件内，以便它们可以被其他计算机用于利用在其上呈现的图形用户界面来映射从即插即用设备 24 接收的输入。

[0054] 虽然已经针对 USB 说明了系统 20，但是可以使用其他类型的即插即用架构。例如，本领域内的技术人员容易明白，如何将在此所述的系统 20 适应于用于 FireWire 和 PCMCIA 架构等。

[0055] 所述即插即用设备的驱动器可以被存储在独立的 CD HID 设备等上。类似地，校准设置可以存储在独立的可装卸存储器上，诸如 USB 快闪驱动器、可重写光盘等。以这种方式，可以使得现有的校准设置对于连接到所述即插即用设备的其他计算机是可获得的。可选地，可以使用由 SMARTBoard HID 简档启动的双向通信将所述校准设置存储在触摸板的控制器上。

[0056] 在如上所述的实施例内，即插即用设备 24 包括电缆 36，其具有 USB 集线器部件 52，所述 USB 集线器部件 52 经由 USB 电缆 60 而连接到触摸板 28，并且经由 USB 电缆 68 连接到计算机 40。本领域内的技术人员可以明白，USB 集线器部件 52 可以包括一个或多个无线通信接口，用于使得能够通过无线通信信道来执行在触摸板 28 和 USB 集线器部件 52 之间和 / 或在 USB 集线器部件 52 和计算机 40 之间的通信，由此消除对于物理电缆的需要。USB 集线器部件 52 也可以被集成到触摸板 28 内，以便仅仅需要在 USB 集线器部件 52 和计算机 40 之间的有线或者无线的一个通信信道。

[0057] 虽然系统 20 被示出为包括用于向触摸板 28 的表面上投影图像的 LCD 投影机 44，但是本领域内的技术人员可以明白，其他配置是可能的。例如，触摸板 28 可以是在 Morrison 等人的专利号是 6,803,906 的美国专利内公开的形式或者 Morrison 等人的申请号是 11/331,448 的美国专利申请内公开的形式。在这种情况下，触摸屏 28 位于显示单元之上，所述显示单元诸如等离子体显示器或者 LCD 显示器，其从计算机 40 接收显示输入。

[0058] 虽然已经参考触摸板而描述了所述系统，但是所述系统可以是多种其他设备的任何一种，诸如摄像机、声音系统等。例如，当所述即插即用设备是声音系统时，所述设置可以包括已经对于所设置的配置被预先校准到期望水平的、每个扬声器的输出音量。

[0059] 虽然已经参考附图描述了一个实施例，但是本领域内的技术人员可以明白，在不脱离由所附的权利要求限定的其精神和范围的情况下，可以进行修改和变化。

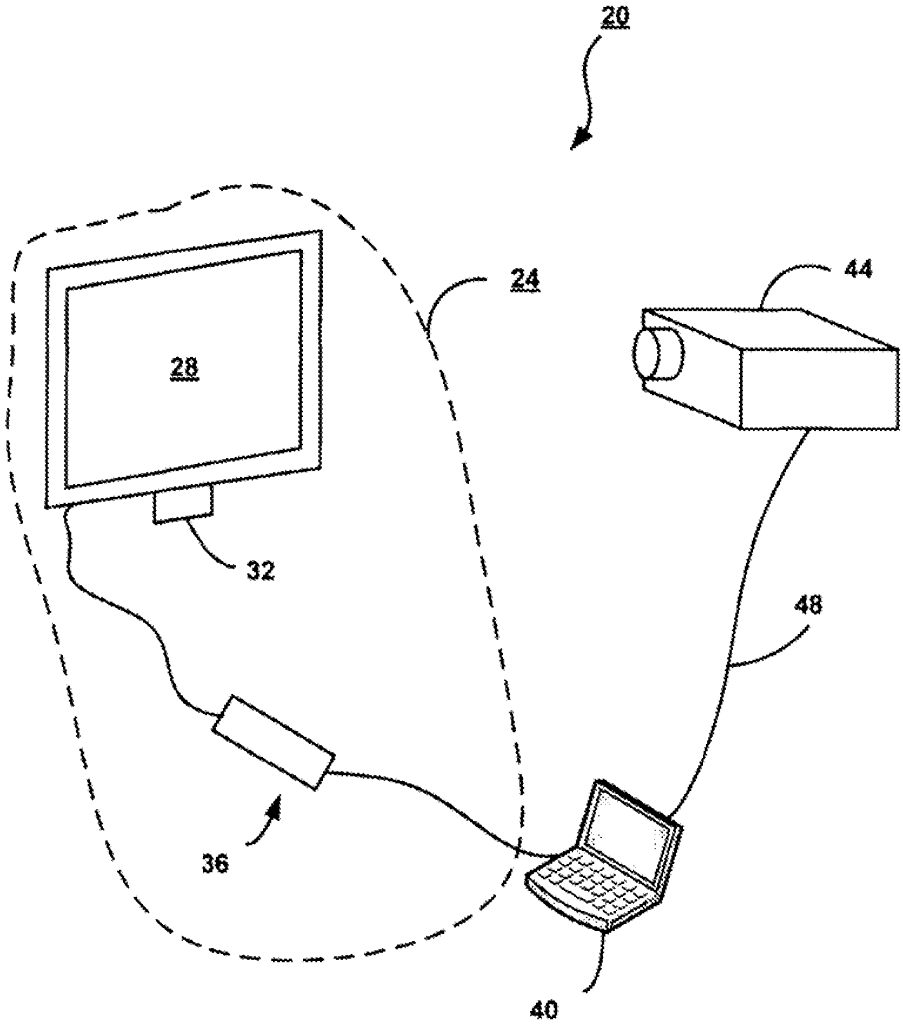


图 1

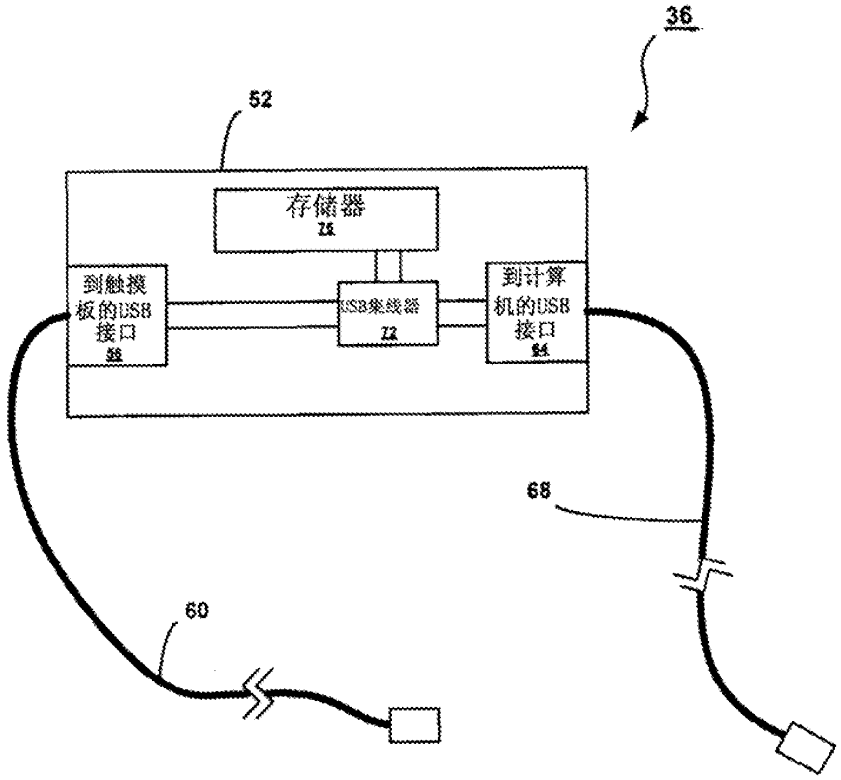


图 2

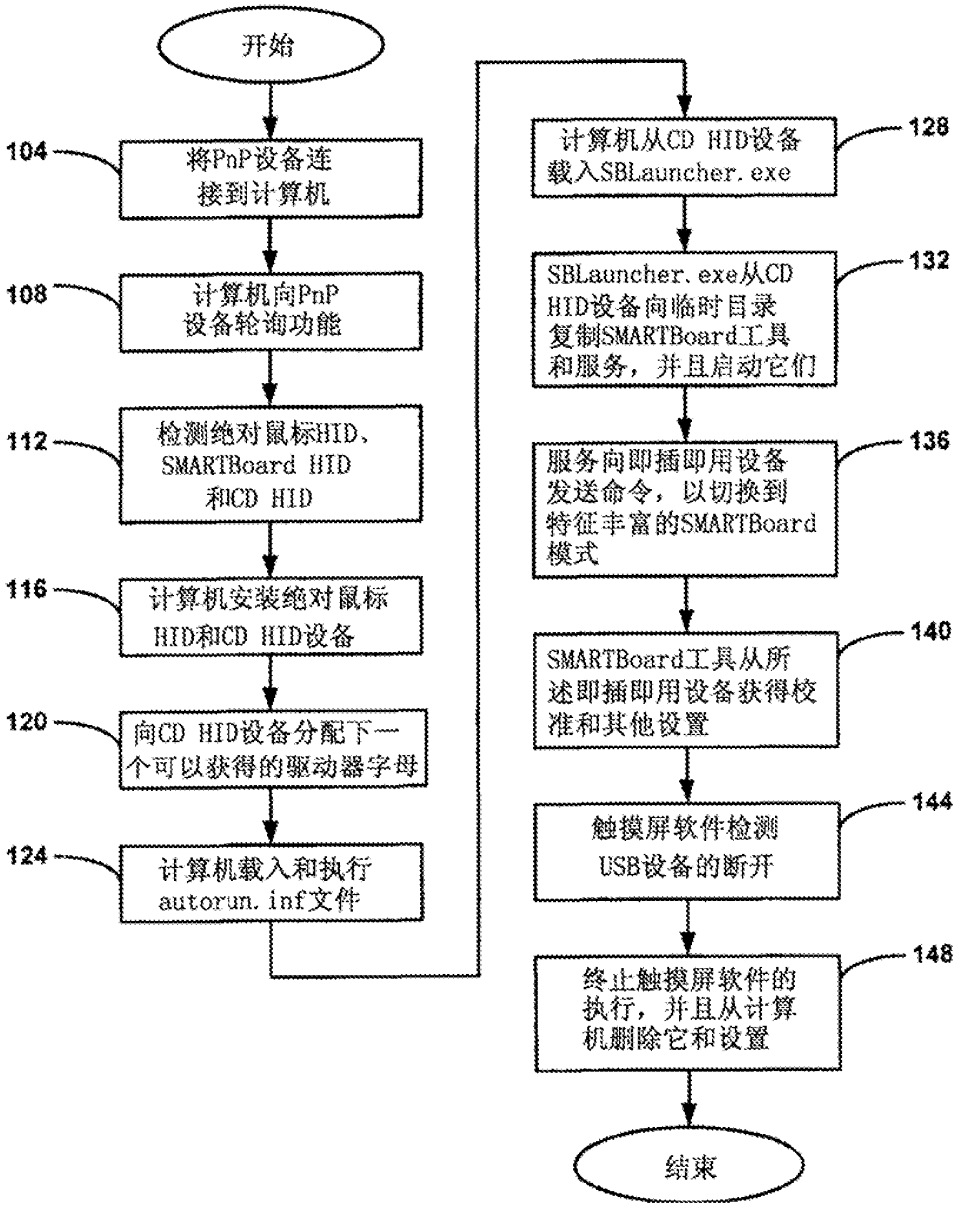

开始
104
将PnP设备连接到计算机
108
计算机向PnP设备轮询功能
112
检测绝对鼠标HID、SMARTBoard HID和CD HID
116
计算机安装绝对鼠标HID和CD HID设备
120
向CD HID设备分配下一个可以获得的驱动器字母
124
计算机载入和执行autorun.inf文件
128
计算机从CD HID设备载入SBLauncher.exe
132
SBLauncher.exe从CD HID设备向临时目录复制SMARTBoard工具和服务，并且启动它们
136
服务向即插即用设备发送命令，以切换到特征丰富的SMARTBoard模式
140
SMARTBoard工具从所述即插即用设备获得校准和其他设置
144
触摸屏软件检测USB设备的断开
148
终止触摸屏软件的执行，并且从计算机删除它和设置
结束

图 3

Espacenet

Bibliographic data: CN101631223 (B) — 2011-04-20

Embedded high definition conference terminal and formation method thereof

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Applicant(s): SHANGHAI HUAPING INFORMATION TECHNOLOGY CO LTD ± (SHANGHAI HUAPING INFORMATION TECHNOLOGY CO., LTD)

Classification: **- international:** ***H04N7/15***
- cooperative:

Application number: CN2009156543 20090817

Priority number(s): CN2009156543 20090817

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Abstract of CN101631223 (B)

The invention discloses an embedded high definition conference terminal, comprising an X86 hardware platform, an embedded operating system capable of being compactible with various X86 hardware, and conference software running under the embedded operating system. The invention also discloses a formation method of the embedded high definition conference terminal, comprising the steps of analyzing the hardware information of the X86 hardware possibly adopted by the embedded high definition conference terminal to be formed, establishing corresponding hardware component information, manufacturingthe conference software running on the embedded high definition conference terminal into an XPE or WES component, and guiding into a component data library, constructing an XPE or WES system image file provided with the conference software,; and guiding in the XPE or WES system image file to the formed X86 hardware platform. The invention has the beneficial effect of effectively solving the compatibility of X86 hardware platform and having stable performance.

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H04N 7/15(2006.01)

审查员 窦芊茜

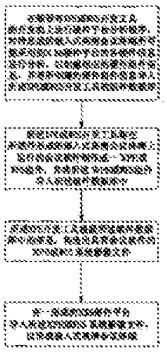
权利要求书 1 页 说明书 3 页 附图 2 页

(54)发明名称

嵌入式高清会议终端及其形成方法

(57)摘要

本发明揭示了一种嵌入式高清会议终端，包括：X86 硬件平台；能兼容各种 X86 硬件的嵌入式操作系统；能在所述嵌入式操作系统下运行的会议软件。本发明还揭示了一种形成嵌入式高清会议终端的方法，包括对待形成的嵌入式高清会议终端所可能采用的 X86 硬件平台的各硬件信息进行分析，以创建相应的硬件组件信息、将在所述待形成的嵌入式高清会议终端上运行的会议软件制作成一 XPE 或 WES 组件，并导入所述组件数据库中、构造具有会议软件的 XPE 或 WES 系统影像文件、在一形成的 X86 硬件平台导入所述 XPE 或 WES 系统影像文件的步骤。本发明的有益效果在于：能够有效地解决 X86 硬件平台的兼容性问题，性能稳定。



CN 101631223 B

1. 一种形成嵌入式高清会议终端的方法，其特征在于，包括以下步骤：

步骤 1、在装设有 Windows XP Embedded 或 Windows Embedded Standard 开发工具的开发机上运行硬件平台分析程序，对待形成的嵌入式高清会议终端所可能采用的 X 86 硬件平台的各硬件信息进行分析，以创建相应的硬件组件信息，并将所创建的硬件组件信息导入所述 Windows XP Embedded 或 Windows Embedded Standard 开发工具的组件数据库；

步骤 2、所述 Windows XP Embedded 或 Windows Embedded Standard 开发工具将在所述待形成的嵌入式高清会议终端上运行的会议软件制作成一 XPE 或 WES 组件，并将所述 XPE 或 WES 组件导入所述组件数据库中；

步骤 3、所述 Windows XP Embedded 或 Windows Embedded Standard 开发工具根据所述组件数据库中的信息，构造出具有会议软件的 XPE 或 WES 系统影像文件；

步骤 4、在一形成的 X86 硬件平台导入所述 XPE 或 WES 系统影像文件，以形成嵌入式高清会议终端。

2. 如权利要求 1 所述的形成嵌入式高清会议终端的方法，其特征在于：所述 XPE 或 WES 系统影像文件小于 200M。

3. 如权利要求 2 所述的形成嵌入式高清会议终端的方法，其特征在于：所可能采用的 X86 硬件平台包括 Intel、华硕、MSI、及硕泰。

嵌入式高清会议终端及其形成方法

技术领域

[0001] 本发明涉及一种嵌入式高清会议终端及其形成方法，特别涉及一种具有自动硬件识别功能的嵌入式高清会议终端及其形成方法。

背景技术

[0002] 视频会议终端市场正面临着巨大的转变。几年以前，机顶盒和移动系统在视频会议市场中占据了主导地位，它们主要都是通过 ISDN 连接，然而当今的市场已开始逐渐转变，视频网络迅速向 IP 网络转变，这不仅影响了会议系统的连接方式，还使视频终端从独立的电信终端转变为了公司 IT 设备中基于 IP 的部分。网络会议和即时通信的广泛流行促使视频会议终端应与整个多媒体视频会议市场相协调。

[0003] 芯片技术的发展使新型的基于软件的 PC 桌面办公变得切实可行。随着价格的逐渐稳定，设备提供商竞相把平面集成系统组装到行政级桌面上；在另一方面，高端“远程显现”系统也模拟把远端与会者带入同一会议室中，这种身临其境的效果在视频质量和带宽能够满足用户需求时。无论是从用户还是从设备提供商来看，中国都是一个炙手可热的市场。显而易见，视频会议终端的市场正经历着转变。

[0004] 在会议终端中，给予嵌入式 XPE 或 WES 的 X86 系列平台的会议终端十分受市场欢迎，然而，由于 X86 平台硬件芯片厂家太多，很容易发生兼容性的问题，而无法开发一块稳定的嵌入式高清会议终端。

发明内容

[0005] 本发明的所要解决的技术方案是提供一种嵌入式高清会议终端及其形成方法，以解决现有技术的不足。

[0006] 为解决上述技术方案，本发明提供一种嵌入式高清会议终端，包括：X86 硬件平台；采用 Microsoft Target Designer 生成的能兼容各种 X86 硬件的嵌入式操作系统；能在所述嵌入式操作系统下运行的会议软件、其包括支持传送与接收图像信号及声音信号的视频会议软件、及音视频解码软件。

[0007] 较佳的，所述 X86 硬件平台包括主板、CPU、显卡、网络适配器、声卡、储存设备、显示器、输入设备及摄像头。

[0008] 较佳的，所述音视频解码软件支持 1280*720 以上的分辨率。

[0009] 较佳的，所述音视频解码软件支持 MPEG1、MPEG2、MPEG4、H.263、H.264、及 H.264+ 格式。

[0010] 较佳的，所述嵌入式操作系统及所述会议软件小于 200MB。

[0011] 一种形成嵌入式高清会议终端的方法，包括以下步骤：步骤 1、在装设有 Windows XP Embedded 或 Windows Embedded Standard 开发工具的开发机上运行硬件平台分析程序，对待形成的嵌入式高清会议终端所可能采用的 X86 硬件平台的各硬件信息进行分析，以创建相应的硬件组件信息，并将所创建的硬件组件信息导入所述 Windows XP

Embedded 或 Windows Embedded Standard 开发工具的组件数据库；步骤 2、所述 Windows XP Embedded 或 Windows Embedded Standard 开发工具将在所述待形成的嵌入式高清会议终端上运行的会议软件制作成一 XPE 或 WES 组件，并将所述 XPE 或 WES 组件导入所述组件数据库中；步骤 3、所述 Windows XP Embedded 或 Windows Embedded Standard 开发工具根据所述组件数据库中的信息，构造出具有会议软件的 XPE 或 WES 系统影像文件；步骤 4、在一形成的 X86 硬件平台导入所述 XPE 或 WES 系统影像文件，以形成嵌入式高清会议终端。

[0012] 较佳的，所述 XPE 或 WES 系统影像文件小于 200M。

[0013] 较佳的，所可能采用的 X86 硬件平台包括 Intel、华硕、MSI、及硕泰。

[0014] 本发明的有益效果在于：能够有效地解决 X86 硬件平台的兼容性问题，性能稳定。

附图说明

[0015] 图 1 为嵌入式会议终端构成示意图。

[0016] 图 2 为形成嵌入式高清会议终端的方法。

具体实施方式

[0017] 下面结合附图详细说明本发明的优选实施例。

[0018] 请参阅图 1，一种嵌入式高清会议终端，包括：

[0019] X86 硬件平台，包括主板、CPU、显卡、网络适配器、声卡、储存设备、显示器、输入设备及摄像头；

[0020] 采用 Microsofi Target Designer 生成的能兼容各种 X86 硬件的嵌入式操作系统；

[0021] 能在所述嵌入式操作系统下运行的会议软件、其包括支持传送与接收图像信号及声音信号的视频会议软件、及音视频解码软件，其中，所述音视频解码软件支持 1280*720 以上的分辨率，所述音视频解码软件支持 MPEG1、MPEG2、MPEG4、H.263、H.264 及 H.264+ 格式，所述嵌入式操作系统及所述会议软件小于 200MB。

[0022] 请参阅图 2，一种形成嵌入式高清会议终端的方法，包括以下步骤：

[0023] 步骤 1、在装设有 Windows XP Embedded 或 Windows Embedded Standard 开发工具的开发机上运行硬件平台分析程序（即 Target Analyzer 工具），对待形成的嵌入式高清会议终端所可能采用的 X86 硬件平台的各硬件信息进行分析，以创建相应的硬件组件信息，并将所创建的硬件组件信息导入所述 Windows XP Embedded 或 Windows Embedded Standard 开发工具的组件数据库；具体地说，运行 Target Designer 工具，在预订目录下生成 Devices.pmq 文件，文件将包含 X86 平台的硬件信息，将 Devices.pmq 文件生成 XPE(Windows XP Embedded) 或 WES(Windows Embedded Standard) 组件，保存至组件数据库中，在多种 X86 平台上运行 TargetDesigner 工具，得到各种 X86 硬件平台的硬件信息，保存至组件数据库中，将所有 Devices.pmq 文件生成的宏组件 Demo Platform Component，加入配置 (Configuration) 中，如此，各个 X86 硬件平台的信息全部添加到配置中。

[0024] 步骤 2、所述 Windows XP Embedded 或 Windows Embedded Standard 开发工具将

在所述待形成的嵌入式高清会议终端上运行的会议软件制作成一 XPE 或 WES 组件，并将所述 XPE 或 WES 组件导入所述组件数据库中；

[0025] 步骤 3、所述 Windows XP Embedded 或 Windows Embedded Standard 开发工具根据所述组件数据库中的信息，构造出具有会议软件的 XPE 或 WES 系统影像（Image）文件；

[0026] 步骤 4、在一形成的 X86 硬件平台导入所述 XPE 或 WES 系统影像文件，以形成嵌入式高清会议终端。

[0027] 进一步的，所述 XPE 或 WES 系统文件小于 200M。

[0028] 进一步的，所可能采用的 X 86 硬件平台包括 Intel、华硕、MSI、及硕泰。

[0029] 进一步的，所述会议软件能够实现高清地远程视频通话的功能。

[0030] 由于开发后的嵌入式高清会议终端包括了多种 X86 硬件平台，能够有效地解决 X86 硬件平台的兼容性问题，性能稳定。

[0031] 以上实施例仅用以说明而非限制本发明的技术方案。 不脱离本发明精神和范围的任何修改或局部替换，均应涵盖在本发明的权利要求范围当中。

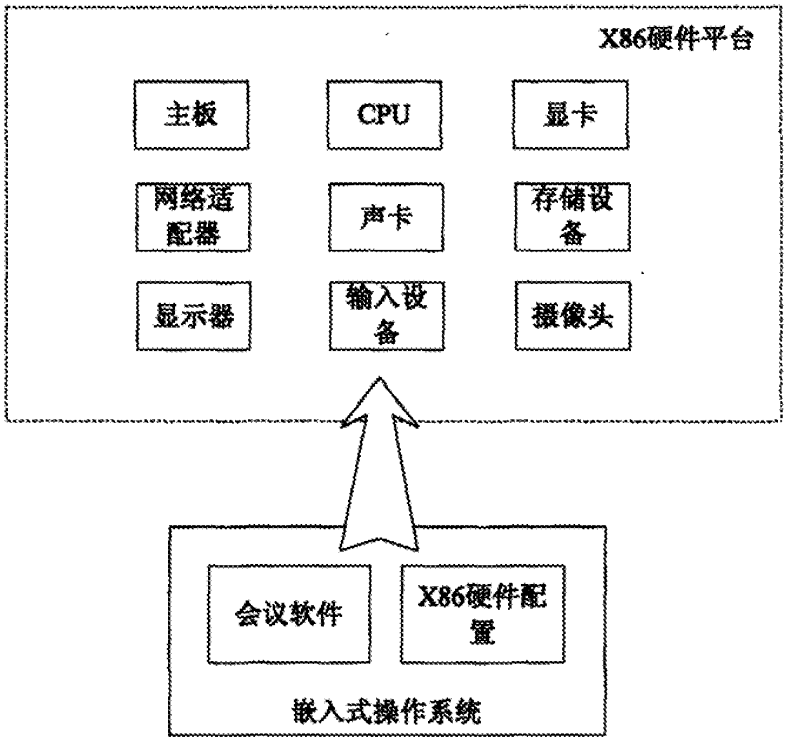

X86硬件平台
主板
CPU
显卡
网络适配器
声卡
存储设备
显示器
输入设备
摄像头
会议软件
X86硬件配置
嵌入式操作系统

图 1

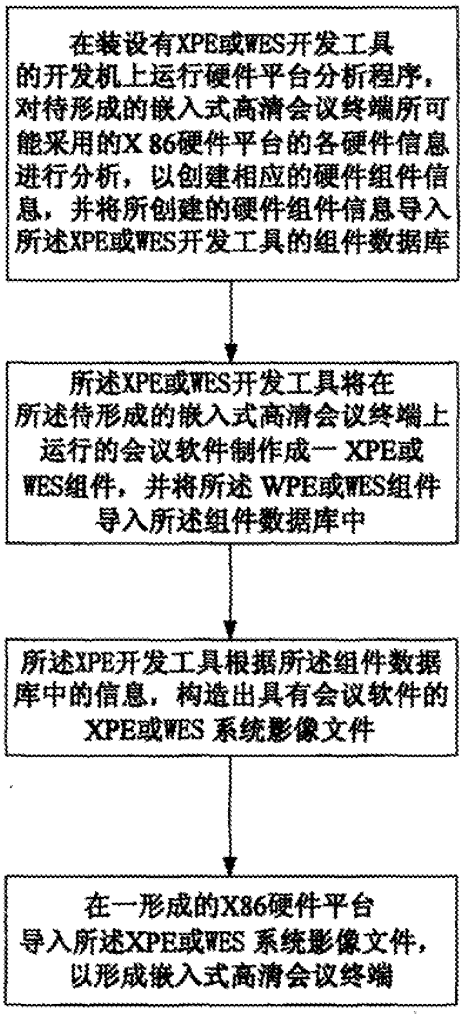

在装设有XPE或WES开发工具的开发机上运行硬件平台分析程序，对待形成的嵌入式高清会议终端所可能采用的X 86硬件平台的各硬件信息进行分析，以创建相应的硬件组件信息，并将所创建的硬件组件信息导入所述XPE或WES开发工具的组件数据库
所述XPE或WES开发工具将在所述待形成的嵌入式高清会议终端上运行的会议软件制作成一 XPE或WES组件，并将所述 WPE或WES组件导入所述组件数据库中
所述XPE开发工具根据所述组件数据库中的信息，构造出具有会议软件的XPE或WES 系统影像文件
在一形成的X86硬件平台导入所述XPE或WES 系统影像文件，以形成嵌入式高清会议终端

图 2

Espacenet

Bibliographic data: CN101965609 (A) — 2011-02-02

Method and apparatus for displaying video data from multiple source computers in a multi-monitor computer system

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Applicant(s): SMART TECHNOLOGIES ULC ± (SMART TECHNOLOGIES ULC)

Classification: - international: ***G09G5/00; G09G5/14; H04L12/04***
- cooperative: **G06F3/1423**; **G06F3/1454**; G06F3/14; G09G2370/04; G09G5/001

Application number: CN20098106596 20090107

Priority number(s): WO2009CA00013 20090107 ; US20080019553P 20080107

Also published as: WO2009086629 (A1) US2011035448 (A1) US8938487 (B2) KR20100108422 (A) EP2240925 (A1) more

Abstract of CN101965609 (A)

An apparatus, method and computer program product, for displaying video data from at least one source computer in a multi-monitor computer system, are provided. The apparatus includes a source computer interface for receiving at least video data from at least one source computer, and a multi-monitor interface for providing video data to multiple monitors. A processing structure coordinates routing of video data received via the multi-monitor interface to the monitors based on display requests received from the at least one source computer.

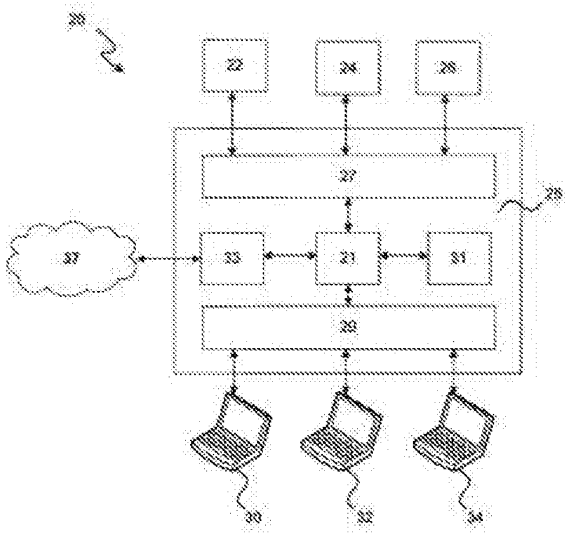


Fig. 1

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(74)专利代理机构 中原信达知识产权代理有限责任公司 11219
代理人 周亚荣 安翔

(51)Int.Cl.
G09G 5/00(2006.01)
G09G 5/14(2006.01)
H04L 12/04(2006.01)

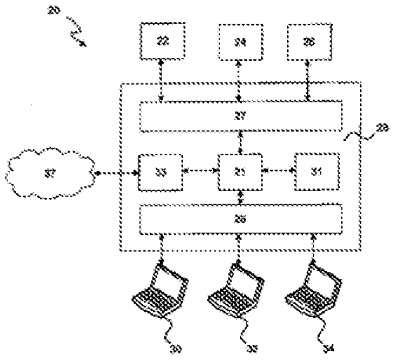
权利要求书 3 页 说明书 12 页 附图 8 页

(54)发明名称

显示来自多监视器计算机系统中的多个源计算机的视频数据的方法和装置

(57)摘要

提供了一种用于显示来自多监视器计算机系统中的至少一个源计算机的视频数据的装置、方法和计算机程序产品。该装置包括用于从至少一个源计算机接收至少视频数据的源计算机接口以及用于向多个监视器提供视频数据的多监视器接口。处理结构基于从至少一个源计算机接收到的显示请求来协调接收到的视频数据经由多监视器接口到监视器的路由。



CN 101965609 A

1. 一种用于显示来自多监视器计算机系统中的至少一个源计算机的视频数据的装置，包括：

源计算机接口，所述源计算机接口用于从至少一个源计算机接收至少视频数据；

多监视器接口，所述多监视器接口用于向多个监视器提供视频数据；以及

处理结构，所述处理结构基于从所述至少一个源计算机接收到的显示请求来协调视频数据经由所述多监视器接口到所述监视器的路由。

2. 根据权利要求 1 所述的装置，其中，所述源计算机接口包括多个源计算机接口设备，每个源计算机接口设备用于从相应的源计算机接收至少视频数据。

3. 根据权利要求 1 至 2 中的一项所述的装置，其中，所述多监视器接口包括多个监视器接口设备，每个监视器接口设备用于向相应的监视器提供视频数据。

4. 根据权利要求 1 至 3 中的一项所述的装置，进一步包括：

存储设备，所述存储设备用于存储至少视频数据。

5. 根据权利要求 1 至 4 中的一项所述的装置，进一步包括：

网络接口，所述网络接口向远程计算机发送至少视频数据并且从远程计算机接收至少视频数据。

6. 根据权利要求 1 至 5 中的一项所述的装置，其中，所述处理结构将来自每个源计算机的视频数据路由到相应的监视器。

7. 根据权利要求 1 至 6 中的一项所述的装置，其中，所述处理结构响应于接收显示请求来创建用于使所述请求源计算机与被请求的监视器相关联的电子预留记录。

8. 根据权利要求 7 所述的装置，其中，所述处理结构仅在视频数据在请求时没有被路由到被请求的监视器的情况下创建所述电子预留记录。

9. 根据权利要求 7 所述的装置，其中，所述处理结构向提供所述显示请求的所述源计算机通知所述显示请求已经被准许。

10. 根据权利要求 1 至 9 中的一项所述的装置，其中，所述处理结构引起用于手动地准许或拒绝从源计算机接收到的显示请求的管理员界面的显示。

11. 一种显示来自多监视器计算机系统中的至少一个源计算机的视频数据的方法，包括：

从至少一个源计算机接收至少视频数据；以及

基于从所述至少一个源计算机接收到的显示请求来协调所接收到的视频数据到相应的监视器的路由。

12. 根据权利要求 11 所述的方法，进一步包括：

向所述至少一个源计算机提供用于包括在显示请求中的监视器标示符。

13. 根据权利要求 12 所述的方法，其中，所述协调包括：

从请求源计算机接收将其相应的视频数据路由到与所述接收到的监视器标识符相对应的被请求的监视器的包括监视器标识符的显示请求。

14. 根据权利要求 13 所述的方法，进一步包括：

在视频数据已经被路由到所述被请求的监视器的情况下拒绝所述显示请求。

15. 根据权利要求 12 所述的方法，进一步包括：

创建用于使所述请求源计算机与所述被请求的监视器相关联的电子预留记录。

16. 根据权利要求 12 所述的方法，进一步包括：

在所述被请求的监视器已经与源计算机相关联的情况下，创建用于使所述请求源计算机与替选监视器相关联的电子预留记录。

17. 根据权利要求 15 至 16 中的一项所述的方法，其中，根据所述电子预留记录来协调所述路由。

18. 根据权利要求 12 至 17 中的一项所述的方法，进一步包括：

与相应的监视器标识符相关联地向所述至少一个源计算机提供监视器可用性数据，以指示视频数据是否已经被路由到所述监视器。

19. 根据权利要求 11 至 18 所述的方法，进一步包括：

在视频数据已经被路由到所有的所述监视器的情况下，对显示请求进行排队。

20. 根据权利要求 11 至 19 中的一项所述的方法，进一步包括：

引起用于手动地准许或拒绝从源计算机接收到的显示请求的管理员界面的显示。

21. 一种包含计算机程序的计算机可读介质，所述计算机程序用于显示来自多监视器计算机系统中的至少一个源计算机的视频数据，所述计算机程序包括：

从至少一个源计算机接收至少视频数据的程序代码；以及

基于从所述至少一个源计算机接收到的显示请求来协调所接收到的视频数据到多个监视器的路由的程序代码。

22. 一种包括多个监视器的系统，所述多个监视器在操作上与至少一个计算设备相关联，所述至少一个计算设备用于从至少一个源计算机接收至少视频数据并且执行显示管理程序，所述显示管理程序基于从所述至少一个源计算机接收到的显示请求来协调所接收到的视频数据到相应的各个监视器的路由。

23. 根据权利要求 22 所述的系统，其中，所述显示管理程序向所述至少一个源计算机提供每个监视器所特有的监视器标识符，以供由相应的用户进行选择，从而将其包括在显示请求中。

24. 根据权利要求 22 所述的系统，其中，在被请求的监视器还没有与另一源计算机相关联的情况下，所述显示管理程序响应于接收到显示请求来创建使请求源计算机与所述被请求的监视器相关联的电子预留记录。

25. 根据权利要求 22 至 24 中的一项所述的系统，其中，所述显示管理程序呈现用户界面，所述用户界面用于使得所述至少一个计算设备的用户能够查看和准许从所述源计算机接收到的显示请求。

26. 根据权利要求 23 至 24 所述的系统，其中，在请求源计算机提供了包括用于已经与另一源计算机相关联的被请求的监视器的监视器标识符的显示请求的情况下，所述显示管理程序拒绝所述显示请求。

27. 根据权利要求 23 所述的系统，其中，在请求源计算机提供了包括用于已经与另一源计算机相关联的被请求的监视器的监视器标识符的显示请求的情况下，所述显示管理程序自动地使所述被请求的监视器与所述另一源计算机分离，并且使所述被请求的监视器与所述请求源计算机相关联。

28. 根据权利要求 27 所述的系统，其中，所述显示管理程序自动地使所分离的另一源计算机与替选监视器相关联。

29. 根据权利要求 23 至 28 所述的系统，其中，使得每个源计算机显示表示每个监视器的用户可选择的图标。

30. 根据利要求 29 所述的系统，其中，使得每个源计算机与每个监视器的图标相关联地显示用于每个监视器的可用性消息。

31. 根据权利要求 29 所述的系统，其中，在相应的监视器与源计算机相关联的情况下，每个可用性消息包括标识当前正在使用所述监视器的所述源计算设备的信息。

32. 根据权利要求 22 至 31 所述的系统，进一步包括存储器，所述存储器用于存储从所述至少一个源计算机中的一个或多个接收到的至少视频数据。

33. 根据权利要求 22 至 31 所述的系统，其中，所述显示管理程序将显示请求的队列存储在所述存储器中。

34. 根据权利要求 33 所述的系统，其中，所述管理员界面使得用户能够调整存储在所述队列中的显示请求，从而使源计算机与可用监视器相关联。

显示来自多监视器计算机系统中的多个源计算机的视频数据的方法和装置

技术领域

[0001] 下文一般地涉及多监视器计算机系统，并且具体地，涉及用于显示来自多监视器计算机系统中的可能多个源计算机的视频数据的装置、方法和计算机程序产品。

背景技术

[0002] 使用物理显示器设备来便利会议变得越来越流行。根据环境，物理显示器设备可以是许多类型（例如，液晶显示器 (LCD)、阴极射线管 (CRT)、交互式白板 (IWB) 或其它显示器面板等）和 / 或不同尺寸中的一个。通常，从诸如个人计算机等的单个计算设备中的视频卡向物理显示器设备提供视频数据，并且将该物理显示器设备置于在会议室中，以便于对所有的会议参加者都可见。这样的物理显示器设备用于呈现幻灯片、视频数据、照片、图表等以在演讲期间进行使用或者用于讨论。在具有多个贡献者的会议室中，可以使用多个物理显示器设备，并且以一对一的方式将每一个连接到参与者各自的计算设备。

[0003] 多监视器计算机系统包括连接到单个计算设备的多个物理显示器设备。多监视器计算机系统针对计算机程序提供增加的显示区域，并且变得越来越流行。为了支持多个物理显示器设备，许多个人计算机中的视频卡具有多个插孔，以接纳来自多于一个的物理显示器设备的电缆。替选地，一些个人计算机具有多个视频卡以接纳来自多于一个的物理显示器设备的电缆。在任何一种情况下，响应于执行一个或多个计算机程序而由计算设备的视频卡生成的视频数据都被输出到物理显示器设备以进行显示。其它多监视器计算机系统具有联网的物理显示器设备，其中，物理显示器设备经由无线或有线网络来进行连接，并且经由该网络连接来向物理显示器设备提供视频数据以进行显示。

[0004] 在会议期间常常期望在单个物理显示器设备上呈现来自多个源计算设备的视频数据。这通常通过以物理方式从一个源计算设备拔出物理显示器设备中的一个的电缆并将其插入另一个中来完成。然而，以物理方式交换电缆可能是相当不方便并且耗时的，尤其是在多监视器计算机系统中。此外，以物理方式从源计算设备移除电缆使得不可能将其视频数据连同另一个的视频数据同时显示在同一物理显示器设备上。

[0005] 如将认识到的，期望改善来自多监视器计算机系统中的多个计算设备的视频数据的显示。因此，本发明的目的至少在于提供一种用于显示来自多监视器计算机系统的多个源计算机的视频数据的新颖的方法以及采用该方法的新颖的装置。

发明内容

[0006] 根据一方面，提供了一种用于显示来自多监视器计算机系统中的至少一个源计算机的视频数据的装置，包括：

[0007] 源计算机接口，该源计算机接口用于从至少一个源计算机接收至少视频数据；

[0008] 多监视器接口，该多监视器接口用于向多个监视器提供视频数据；以及

[0009] 处理结构，该处理结构基于从至少一个源计算机接收到的显示请求来协调经由多

监视器接口向监视器路由视频数据。

[0010] 根据另一方面，提供了一种显示来自多监视器计算机系统中的至少一个源计算机的视频数据的方法，包括：

[0011] 从至少一个源计算机接收至少视频数据；以及

[0012] 基于从至少一个源计算机接收到的显示请求来协调对相应监视器的接收到的视频数据的路由。

[0013] 根据本发明的另一方面，提供了一种计算机可读介质，该计算机可读介质包含用于显示来自多监视器计算机系统中的至少一个源计算机的视频数据的计算机程序，该计算机程序包括：

[0014] 从至少一个源计算机接收至少视频数据的程序代码；以及

[0015] 基于从所述至少一个源计算机接收到的显示请求来协调对多个监视器的接收到的视频数据的路由的程序代码。

[0016] 根据另一方面，提供了一种系统，该系统包括：多个监视器，该多个监视器在操作上与至少一个计算设备相关联，该至少一个计算设备用于从至少一个源计算机接收至少视频数据并且执行显示管理程序，该显示管理程序基于从所述至少一个源计算机接收到的显示请求来协调对相应的各个监视器的接收到的视频数据的路由。

[0017] 本发明的装置、方法、计算机可读介质和系统支持在多个监视器上的对来自至少一个源计算机的视频数据的显示的集中式协调，至少减少对于插入和拔出物理电缆的需要，并且基本上使得在多个监视器上显示和协调来自一个或多个源计算机的视频数据的过程变得容易。

附图说明

[0018] 现在将参考附图来更全面地描述实施例，在附图中：

[0019] 图 1 是多监视器计算机系统的示意性表示；

[0020] 图 2 示出了部署在会议室中并且包括连接到单个中央计算机的多个交互式白板和多个膝上型源计算机的多监视器计算机系统；

[0021] 图 3 示出了图 2 的交互式白板和两个膝上型计算机，来自两个膝上型计算机的视频数据被路由以在相应的各个交互式白板上进行显示；

[0022] 图 4a 是在与在中央计算机上运行的主机显示管理程序进行交互的相应的源计算机上运行的客户端显示管理程序的示意性表示；

[0023] 图 4b 是示出用于共享视频数据的步骤的流程图；

[0024] 图 5A 至图 5B 示出了用于创建请求源计算机与监视器之间的关联并且用于在监视器上显示来自请求源计算机的视频数据的过程的流程图；

[0025] 图 6 是使得在源计算机处显示的用于选择期望在其上显示视频数据的监视器的对话框的图示；以及

[0026] 图 7 是示出用于从源计算机向相关监视器提供视频数据的过程的流程图。

具体实施方式

[0027] 现在转到图 1，示出了多监视器计算机系统，并且通常用附图标记 20 来标识该多

监视器计算机系统。如可以看到的，在该实施例中，多监视器计算机系统包括多个物理显示器设备 22、24、26，其中的每一个都连接到公共计算设备，在该情况下为中央计算机 28。物理显示器设备 22、24、26 可以采取多种形式。例如，物理显示器设备可以是相同类型或不同类型的监视器（例如，液晶显示器 (LCD)、阴极射线管 (CRT)、等离子显示器设备或其它类型的显示器面板）和 / 或可以具有相同或不同的分辨率。替选地，物理显示器设备 22、24、26 可以是交互式白板 (IWB)。每个 IWB 可以是许多类型中的一个，该类型包括但不限于，模拟电阻式、电容式、基于照相机、电磁性、表面声波等。当然，物理显示器设备 22、24、26 可以是监视器与 IWB 的组合。一个或多个其它计算设备也与中央计算机 28 进行通信。在该实施例中，示出了与中央计算机 28 进行通信的三 (3) 个膝上型计算机 30、32、34。膝上型计算机 30、32、34 可以通过诸如以太网或通用串行总线 (USB) 连接的有线通信链路来与中央计算机 28 进行通信，或者可以通过诸如射频 (RF) 或蓝牙 TM 连接的无线通信链路来与中央计算机 28 进行通信。出于本申请的目的，将可互换地使用“监视器”和“物理显示器设备”来引用上文所阐述的监视器、IWB、或任何其它这样的物理显示器设备中的任何一个。

[0028] 如在以下段落中将更详细描述的，如将要描述的，中央计算机 28 被布置或编程为显示来自多监视器计算机系统中的多个源膝上型计算机 30、32、34 的视频数据。中央计算机 28 包括用于从多个源计算机 30、32、34 接收视频数据的源计算机接口 29。根据实现，源计算机接口 29 可以是用于处理与源计算机 30、32、34 的有线和 / 或无线通信链路的单个设备，或者包括一组源计算机接口设备，其中的每个都处理与源计算机 30、32、34 中的相应一个的通信。中央计算机 28 还包括用于向监视器 22、24 和 26 提供视频数据的多监视器接口 27。根据实现，多监视器计算机接口 27 可以是用于处理与监视器 22、24 和 26 的有线和 / 或无线通信链路的单个设备，或者包括一组监视器接口设备，其中的每一个都处理与监视器 22、24、26 中的相应一个的通信。

[0029] 中央计算机 28 包括处理器 21，该处理器 21 根据存储在非易失性存储器 31 中并且在系统存储器中执行的软件的指令，基于来自源计算机 30、32、34 的请求来协调将接收到的视频数据经由多监视器接口 27 提供给监视器 22、24、26。

[0030] 除存储用于协调多监视器计算机系统 20 的软件之外，存储器 31 还存储用户可调整的和非用户可调整的配置参数以在协调期间进行使用。根据需要，存储器 31 还被配置为存储用于可选屏幕捕捉及其它目的的视频数据，诸如用于在源计算机 30、32、34 和中央计算机 28 之间的文件共享和传送。同样出于该目的，可以将外部存储器设备（未示出）连接到中央计算机 28。

[0031] 中央计算机 28 还包括与中央计算机 28 的其它组件互连的网络接口 33，用于经由网络 37 发送和接收视频数据并且处理来自远程源计算机（未示出）的显示请求。还可以使用网络接口 33 来提供对另一存储器设备（未示出）的访问。可以通过因特网、虚拟专用网络 (VPN) 或类似通信链路经由窗口共享软件来进行与其它远程源计算机的通信。窗口共享软件可以是多种类型中的一个，诸如由本申请的受让人，加拿大亚伯达省卡尔加里市的 SMART 技术有限公司提供的类型，名为 SynchronEyes™、Bridgit™ 或 LinQ™，或者由第三方提供的类型，名为 WebEx™、Microsoft Remote Desktop、Netmeeting、Windows Live™ 或 VNC™。

[0032] 图 2 和图 3 示出了多监视器计算机系统 20，该多监视器计算机系统 20 被部署在会

议室中并且具有物理显示器设备 22 至 26，物理显示器设备 22 至 26 采取在不同的间隔位置处安装在会议室的墙壁上的交互式白板 (IWB) 的形式。经由安装在中央计算机 28 中的视频卡的相应插孔所接纳的电缆或者经由网络连接来将每个 IWB 连接到中央计算机 28（未示出）。该配置中的膝上型计算机 30 至 34 经由无线通信链路来与中央计算机 28 进行通信。替选地，每个 IWB 可以包括嵌入式处理单元，该嵌入式处理单元控制其显示器，并且直接从膝上型计算机 30 至 34 中的一个或多个接收通信。

[0033] 在该实施例中，IWB 22 和 24 是由本申请的受让人、加拿大亚伯达省卡尔加里市的 SMART 技术有限公司制造的 6001 系列交互式白板。如可以看到的，每个 IWB 22、24 包括具有触摸表面 72 的模拟电阻式触摸屏 70。触摸表面 72 被边框 74 包围。工具托盘 76 被附连到与触摸表面 72 的底部边缘邻近的边框 74，并且容纳用于与触摸表面 72 进行交互的一个或多个工具。

[0034] 悬臂 (boom) 组件 82 经由安装支架 84 被安装在触摸屏 70 之上。悬臂组件 82 包括从安装支架 84 向外延伸并且支撑邻近其远端处的投影仪 88 的大体水平的悬臂 86。投影仪 88 指向触摸屏 70，使得由投影仪 88 投射的图像被呈现在触摸表面 72 上。

[0035] 在每个 IWB 22、24 的操作期间，投影仪 88 接收来自中央计算机 28 的视频输出，并且将该视频图像投射到触摸表面 72 上。该视频图像可以是中央计算机 28 的桌面或膝上型计算机 30 至 34 中的一个的桌面。当用户用诸如手指、笔工具或其它物体的指示器接触触摸表面 72 时，该接触由 IWB 来检测，并且触摸屏 (x，y) 坐标的接触位置被传送到中央计算机 28。作为响应，中央计算机 28 将触摸屏 (x，y) 坐标映射成计算机显示器坐标，并且处理该得到的输入。根据得到的输入的性质，可以将触摸表面接触处理为写入或绘画 (draw) 或作为鼠标事件。因此，触摸表面 72 上的指示器接触或跨越接触表面 72 的指示器移动可以由中央计算机 28 记录为写入或绘画，或者用于控制加载在中央计算机 28 上的一个或多个应用程序的执行。中央计算机 28 还更新被传送到投影仪 88 的视频输出，使得在触摸表面 72 上呈现的视频图像反映指示器活动。

[0036] IWB 26 是由本申请的受让人、加拿大亚伯达省卡尔加里市的 SMART 技术有限公司制造的 DViT 基于照相机的交互式白板，并类似于美国专利 No. 6, 803, 906 ；No. 6, 972, 401 ；和 No. 7, 236, 162 中所述的那些，其全部内容通过引用并入本文中。IWB 26 包括包围诸如等离子体显示器或 LCD 的投影设备的显示屏的矩形边框或框架 100。将工具托盘 102 附连到边框 100，并且容纳用于与投影设备进行交互的一个或多个笔工具。投影设备接收来自中央计算机 28 的视频输出，并且在其显示屏 106 上显示视频图像。邻近边框 100 的至少两个角来提供数字照相机 104。数字照相机 104 具有包容显示屏 106 并且扫视显示屏 106 的重叠视野。

[0037] 在操作期间，数字照相机 104 从不同视点获取大体上扫视显示屏 106 的图像并且生成图像数据。由数字照相机 104 获取的图像数据由机载 (on-board) 数字信号处理器来处理，以确定在捕捉到的图像数据中是否存在指示器。当确定了在捕捉到的图像数据中存在指示器时，数字信号处理器生成指示器信息分组 (PIP) 并且将该 PIP 传送到主控制器。在接收到 PIP 时，主控制器使用三角测量法来处理该 PIP，以确定捕捉到的图像中的指示器相对于显示屏 (x，y) 坐标的位置。以该方式，在响应于捕捉到的图像来生成 PIP 时，可以将投影设备的显示屏 106 转换 (turn) 为交互式触摸表面来跟踪指示器在显示屏 106 上的位

置和移动。由主控制器生成的显示屏 (x,y) 坐标被传送到中央计算机 28。类似地,作为响应,中央计算机 28 将显示屏 (x, y) 坐标映射成计算机显示器坐标并且处理该得到的输入。根据得到的输入的性质,可以将显示屏 106 接触处理为写入或绘画或作为鼠标事件。因此,显示屏 106 上的指示器接触或跨越显示屏 106 的指示器移动可以由中央计算机 28 记录为写入或绘画,或用于控制加载在中央计算机 28 上的一个或多个应用程序的执行。中央计算机 28 还更新传送到投影设备的视频输出,使得在其触摸屏 106 上呈现的视频图像反映指示器活动。

[0038] 图 4A 示出了执行显示管理程序的多监视器计算机系统 20 的软件结构。每个源计算机 30、32、34 都运行客户端显示管理程序 112,其能够与在中央计算机 28 上运行的主机显示管理程序 114 进行通信。客户端显示管理程序 112 将由源计算机 30 的用户发起的视频数据显示请求传递到中央计算机 28 处的主机显示管理程序 114。如将描述的,一旦显示请求自动地或通过其用户 (通常为会议主持人或管理员) 被主机显示管理程序 114 准许,客户端显示管理程序 112 就还处理对主机显示管理程序 114 的视频数据的发送。

[0039] 根据实施例,主机显示管理程序 114 对源计算机 30、32、34 进行轮询,以确定其是否准备好提供或共享视频数据。主机显示管理程序 114 结合用户输入或自动地进行关于是否准许显示请求以及关于视频数据将被路由到哪个监视器的确定。主机显示管理程序 114 向在相应源计算机 30、32、34 上运行的客户端显示管理程序 112 发送准许 / 拒绝 / 等待消息,以指示相应的显示请求已经被允许、拒绝或由于监视器的目前不可用而导致正在排队。根据该实施例,还在源计算机 30、32 或 34 与中央计算机 28 之间交换其它信息,例如,监视器标识符、包括哪个源计算机当前与特定监视器相关联的监视器可用性消息、监视器 22、24、26 和源计算机 30、32、34 的可用屏幕分辨率。

[0040] 图 4b 是示出用于如由源计算机 30、32、34 中的一个的用户发起的用于共享视频数据并且从而向中央计算机 28 提供视频数据的步骤的流程图 120。使用在源计算机 30 上运行的客户端显示管理程序 112 的接口,源计算机 30 的用户选择共享视频数据 (步骤 122)。基于该选择,由在源计算机 30 上运行的客户端显示管理程序 112 将显示请求提供给在中央计算机 28 上运行的主机显示管理程序 114。从而向中央计算机 28 通知源计算机 30 可用于提供用于在监视器 22、24、26 中的一个上进行显示的视频数据。然后,中央计算机 28 决定是否准许该显示请求 (步骤 124)。

[0041] 为了促进监视器显示请求的协调使用户满意,主机显示管理程序 114 为在相应源计算机 22、24、26 上运行的每个客户端显示管理程序 112 提供监视器标识符。每个监视器标识符独特地标识中央计算机 28 针对其协调视频数据的路由的监视器 30、32、34。然后,源计算机 30、32、34 可以向其相应的用户呈现监视器标识符以有助于选择用于显示的监视器,并且由用户发起的显示请求因此可以包括与用户的选择相对应的监视器标识符。如将结合图 6 讨论的,主机显示管理程序 114 还与相应的监视器标识符相关联地提供哪些监视器 30、32、34 已经与源计算机相关联的可用性消息指示。

[0042] 图 5a 和图 5b 示出了用于基于在中央计算机 28 处从源计算机 30 接收到的显示请求 (步骤 210) 来向监视器 22、24、26 中的一个共享源计算机 30 的视频数据的过程 200 的流程图。如果显示请求包括标识源计算机 30 的用户想要向其发送视频数据的特定监视器的监视器标识符 (步骤 212),则进行检查以确定特定被请求的监视器是否已经与另一源计

算机（在该情况下，为源计算机 32 或 34）相关联（或者“被共享到另一源计算机”）。这将是在特定被请求的监视器实际上正在显示另一源计算机的视频数据（步骤 214）时，或者在已经建立了关联并且被请求的监视器上的视频数据的显示即将发生时的情况。如果特定被请求的监视器还没有被共享到另一源计算机，则被请求的监视器由中央计算机 28 预留用于请求源计算机 30（步骤 216）。更特别地，创建使源计算机 30 与被请求的监视器相关联的存储器 31 中的电子预留记录。

[0043] 一旦已经以该方式建立了关联，则向请求源计算机 30 通知该预留（步骤 234）。一旦已被通知了该预留，请求源计算机 30 生成并且向中央计算机 28 发送用于在预留的监视器 22 上显示视频数据的指令。

[0044] 然后，将用于在预留的监视器上显示视频数据的指令与存储器 31 中的预留记录作比较，以确保源计算机 30 确实被授权在预留的监视器 22 上显示视频数据。然后，进行检查以确定是否需要管理员 / 主持人进行对于显示的进一步许可（步骤 236）。在该实施例中，管理员 / 主持人是中央计算机 28 的用户。在需要进一步的许可的情况下，在中央计算机 28 的本地屏幕（未示出）上为管理员 / 主持人提供作为用户界面的一部分的对话框，并且提供准许或拒绝该预留的机会。还为管理员 / 主持人提供修改电子预留记录或创建新的电子预留记录以实际上使请求源计算机 30 与替选监视器相关联的机会（步骤 242）。如果管理员拒绝该请求，则源计算机 30 接收拒绝监视器共享请求消息，并且不经由中央计算机 28 向被请求的监视器转发视频数据（步骤 244）。如果管理员确认该预留，则由中央计算机 28 根据由源计算机 30 提供的包括显示参数（如果需要）的显示指令来自动地调整预留的监视器的分辨率，并且在源计算机 30 与中央计算机 28 之间建立视频数据传送连接，使得视频数据被提供给预留的监视器来进行显示（步骤 238）。在管理员选择通过使另一可用监视器与请求源计算机 30 相关联来调整预留的情况下，相应地修改电子预留请求，创建新的电子预留请求来替代原始的电子预留请求，或不论电子预留请求如何中央计算机 28 都将视频数据路由到替选监视器（步骤 246），并且然后过程前进到步骤 238。

[0045] 在替选实施例中，主机显示管理程序自动地决定确认还是拒绝该预留，或者将不同的可用监视器指配给请求源计算机 30。在做出决定（例如，在步骤 238 或步骤 244）之后，优选地删除没有指配给源计算机 30 的预留的监视器的电子预留记录。

[0046] 在步骤 214 处，在被请求的监视器当前正在显示视频数据并且因此已经被共享的情况下，在步骤 218 处进行检查以确定是否自动地拒绝新的显示请求。在被请求的监视器当前被共享的情况下，是否自动地拒绝显示请求的决定优选地基于在中央计算机 28 上运行的主机显示管理程序 112 的用户可调整的设置。基于该设置，这时可以拒绝该请求（步骤 220）。否则，进行检查以确定是否可以替换当前共享被请求的监视器的源计算机（步骤 222），使得当前源计算机与被请求的监视器分离，并且使请求源计算机 30 与被请求的监视器相关联。是否自动地替换现有监视器共享的决定优选地基于在中央计算机 28 上运行的主机显示管理程序 114 的用户可调整的设置。

[0047] 在可以替换现有监视器共享的情况下，作出尝试来预留另一可用监视器用于将被替换的源计算机，并且预留被请求的监视器用于请求源计算机 30（步骤 224）。然后，该过程移动到步骤 234，并如上文所述地继续。

[0048] 如果在步骤 222 处，可以不替换被请求的监视器与其当前源计算机之间的现有关

联，则在步骤 226 处进行关于是否存在任何可用监视器的检查。如果没有显示源计算机的视频数据（例如，没有"共享到"源计算机），则认为该监视器可用。在至少一个监视器可用的情况下，基于预留协议来预留可用监视器中的一个用于请求源计算机（步骤 228）。预留协议的细节可以包括诸如基于请求源计算机所连接（如果是有线连接）到的中央计算机 28 中的特定插孔来选择监视器的规则。其它规则诸如由请求源计算机的用户以其选择请求源计算机共享视频数据的顺序、下一个可用监视器所连接（如果是有线连接）到的中央计算机 28 中的特定插孔、监视器以其连接到中央计算机 28 的顺序、或最近监视器使用的顺序。可以采用其它这样的规则或规则的协议。

[0049] 然后，向请求源计算机通知该预留（以及被请求的监视器不可用）（步骤 234），并且过程如上所述地继续。在该实例中，对话框弹出以向请求源计算机的用户通知被请求的监视器不可用，但是可以选择一个或多个替选监视器。

[0050] 在步骤 226 处，在不存在可用的监视器的情况下，那么来自请求源计算机的显示请求在存储器 31 中进行排队（步骤 230），直至使用中央计算机 28 的管理员选择该请求并指定用于请求源计算机的监视器预留（步骤 232），或者直至监视器变得可用（步骤 226）。这时，过程随后如上文所述从步骤 228 开始继续。

[0051] 在步骤 212 处，在来自请求源计算机的显示请求不包括监视器标识符的情况下，那么过程在步骤 226 立即继续，以确定是否有任何监视器可用，并且如果是这样，则根据如上所述的协议和主机显示管理程序 114 的设置来自动地或通过管理员 / 主持人选择来选择监视器。

[0052] 图 6 是在中央计算机 28 或在源计算机 30、32、34 处本地地显示的用于选择用于显示视频数据的监视器 22、24、26 的对话框 150 的图示。如上所指示的，该对话框使得用户能够查看与中央计算机 28 与之进行通信的监视器的监视器标识符以及状态和分辨率信息。例如，如图 6 所示，第三监视器 156 当前正在显示 Andy 的源计算机的桌面，并且第一和第二监视器 152 和 154 可用于显示来自中央计算机 28 与之进行通信的其它源计算机的视频数据。

[0053] 图 7 是示出在步骤 238 处用于将视频数据从源计算机 30 提供到相关监视器的过程 300 的流程图。以为源计算机的本地显示准备视频数据相同的方式在源计算机处准备视频数据（步骤 310）。然后，将视频数据处理成适合于通过源计算机 30 与中央计算机 28 之间的有线或无线连接传输到中央计算机 28 的格式（步骤 312）。在实施例中，对视频数据进行压缩和编码，以便于保持视频数据在传输期间的完整性，并且减少发送的视频数据量。然后，处理的视频数据被发送到中央计算机 28（步骤 314），并且被路由到相关监视器来进行显示（步骤 316）。

[0054] 应当理解，完全运行的多监视器计算机系统 20 可以具有同时协调下的许多本地和 / 或远程源计算机 30、32、34 和许多监视器 22、24、26，以便于实时地实现来自多监视器计算机系统 20 中的多个源计算机的视频数据的有用的和同时显示。

[0055] 虽然已经描述了采用单个中央计算机 28 的实施例，但是应当理解，可以将多个这样的计算机 28 互连，以便于提供更大的范围来显示来自多个源的视频数据。例如，可以经由中央计算机 28 之间的对等连接将每个都具有相应的中央计算机 28 的多个会议地点进行互连。这将使得能够经由与在另一会议地点处的会议参与者的对等连接来共享连接到一个

会议地点处的一个中央计算机 28 的源计算机视频数据，反之亦然。为了有助于该范围的系统的协调，可能有用的是，经由配置设置来指定会议室中的一个或多个监视器是“远程”监视器，而其余监视器是“本地的”。这可以通过限制可用于本地源计算机的监视器选择以便于向被预留作为远程的那些监视器提供视频数据来实现。

[0056] 虽然已描述了实施例，由此源计算机的用户能够使用号码或图形用户界面来请求监视器，但可以使用其它方法。例如，可能要求请求源计算机的用户在进行显示请求时预先处理监视器连接代码，以便于根据允许用户在哪些监视器上显示来自其正在操作的源计算机的视频数据来促进安全水平和协调性。某些有资格的用户可以在会议之前接收到其独特的监视器连接代码，使得有资格的用户能够使用其独特的连接代码来向某些监视器提供视频数据，同时防止具有连接到网络的源计算机的其它会议出席人这样做。

[0057] 应当理解，上述发明不限于用膝上型源计算机来进行使用，而是可以用于用作源计算机和 / 或中央计算机 28 的各种类型的便携式计算机，诸如蜂窝式电话、PDA（个人数字助理）或台式计算机。

[0058] 附录 A 是软件代码和关于该软件代码的注释，用于找到包括标识符的主机（中央）计算机的监视器信息，向远程（源）客户端发送主机的监视器信息，并且针对要在其上显示的监视器来提示远程（源）客户端，以在如上所述的识别监视器期间进行使用。

[0059] 用于显示来自多监视器计算机系统中的多个源计算机的视频数据的上述装置和所述方法可以包括或者完全或部分地由程序模块来实现，程序模块包括但不限于例程、程序、对象组件、数据结构等，并且可以被实现为存储在计算机可读介质上的计算机可读程序代码。计算机可读介质是能够存储随后可以由计算机系统读取的数据的任何数据存储设备。计算机可读介质的示例包括，例如，只读存储器、随机存取存储器、USB 密钥、闪速存储器（诸如 SD 卡）、CD-ROM、磁带和光学数据存储设备。计算机可读程序代码还可以分布在包括耦接的计算机系统的网络上，使得以分布式方式存储和执行计算机可读程序代码。

[0060] 虽然本文所述的实施例包括发起对中央计算机 28 的显示请求的提供的源计算机，但可以有替换方案。例如，中央计算机 28 可以发起针对源计算机 30、32、34 的“共享”状态的其硬件连接的周期性轮询作为一种形式的显示请求，指示一个或多个源计算机可用于提供视频数据。

[0061] 虽然上文已经描述了特定实施例，但本领域的技术人员应当认识到，在不脱离所附权利要求所限定的本发明的精神和范围的情况下可以进行修改和变更。

[0062] 附录 A

[0063] 1.）找到主机计算机的监视器信息

[0064] 以下监视器代码可在下列各项处获得：

[0065] svn://calsvn0/LinQ/trunk/Source/libSharedData/MonitorData.cpp

[0066] svn://calsvn0/LinQ/trunk/Source/libSharedData/MonitorData.h

[0067] 使用枚举函数来检索关于系统上的不同显示器的信息

[0068] HDC hdcScreen = ::GetDC(0)；

[0069] EnumDisplayMonitors(hdcScreen,NULL,MonitorEnumProc,

[0070] (LPARAM)this)；

[0071] ::ReleaseDC(0,hdcScreen)；

[0072] 枚举函数如下：

[0073] // 枚举函数最初由 Dan Mitchell 写出，作为 Bridgit 会议软件的一

[0074] // 部分

[0075] BOOL CALLBACK MonitorEnumProc(HMONITOR hmon, HDC hdcmon,

[0076] LPRECT rectmon, LPARAM lparam)

[0077] {

[0078] CMonitorData*pData = (CMonitorData*)lparam ;

[0079] MONITORINFOEX mix ;

[0080] mix.cbSize = sizeof(mix) ;

[0081] int iMonitor = pData- > GetMonitorCount() ;

[0082] int iDepth = GetDeviceCaps(hdcmon, BITSPIXEL) ;

[0083] iDepth* = GetDeviceCaps(hdcmon, PLANES) ;

[0084] GetMonitorInfo(hmon, (MONITORINFO*)&mix) ;

[0085] // 使用已经在阵列（它是静态定义的阵列）中的数据结构。

[0086] // 在当其已经锁定其桌面时具有读取颜色深度的问题的情况下使

[0087] // 用现有值（而不是创建整个新 sMONITOR 结构）。

[0088] IMonitorModel::sMONITOR monNew = pData-

[0089] > GetMonitorByIndexUnchecked(iMonitor) ;

[0090] monNew.rcMonitor = mix.rcMonitor ;

[0091] monNew.csName = mix.szDevice ;

[0092] monNew.hMon = hmon ;

[0093] monNew.bPrimary = (mix.dwFlags & MONITORINFOF_PRIMARY) ;

[0094] monNew.iDepth = iDepth ;

[0095] // 如果其已经锁定其桌面，则在 Windows XP 下为此获得 -1，因

[0096] // 为（猜测）对 enumdisplaymonitors 的调用不知何故出现错误。

[0097] // 在该情况下，使用我们有的最后一个值，只要该值是有效的。

[0098] if(monNew.iDepth == -1)

[0099] {

[0100] if(monNew.iLastDepth == -1)

[0101] {

[0102] // 这是非常坏的消息 _ 我们不知道在该情况下该做什么，因此让我

[0103] // 们仅仅猜测 32bpp。

[0104] // 这使得出错的可能性很大，但是 -1 是更严重的错误。

[0105] monNew.iDepth = 32 ;

[0106] }

[0107] monNew.iDepth = monNew.iLastDepth ;

[0108] }

[0109] monNew.iLastDepth = monNew.iDepth ;

[0110] // 现在添加新的监视器

[0111] pData->AddMonitor(monNew);

[0112] return TRUE;

[0113] }

[0114] 2.)向远程客户端发送主机的监视器信息

[0115] 一旦我们具有主机PC的监视器信息,我们就可以将其发送到客户端PC,使得它知道哪些监视器可用。这是我们从主机发送到客户端以概述哪些监视器可用及其尺寸和位置是什么的消息。

[0116] 该文件可在以下处获得:

[0117] svn://calsvn0/LinQ/trunk/Source/libSharedData/message_controller.h

[0118] //

[0119] //CSMsg_ControllerRemoteMonitorSetup等级

[0120] class CSMsg_ControllerRemoteMonitorSetup:public

[0121] CSMsg_Controller

[0122] {

[0123] public:

[0124] CAtlArray<IRemoteMonitorModel::sREMOTEMONITOR>

[0125] m_caMonitors;

[0126] //默认构造函数

[0127] CSMsg_ControllerRemoteMonitorSetup()

[0128] {m_caMonitors.RemoveAll();};

[0129] //外出构造函数

[0130] CSMsg_ControllerRemoteMonitorSetup(CAtlArray<IRemote

[0131] MonitorModel::sREMOTEMONITOR>&caMonitors)

[0132] {m_caMonitors.Append(caMonitors);};

[0133] //进入构造函数

[0134] CSMsg_ControllerRemoteMonitorSetup(CSerializer*pSerial)

[0135] :CSMsg_Controller(pSerial)

[0136] {

[0137] WORD wNumRect = pSerial->GetWord();

[0138] for(int i = 0;i<wNumRect;i++)

[0139] {

[0140] IRemoteMonitorModel::sREMOTEMONITOR mon;

[0141] mon.bPrimary = (bool)pSerial->GetBool();

[0142] mon.bSharing = (bool)pSerial->GetBool();

[0143] CAtlString csString;

[0144] pSerial->GetString(csString);

[0145] mon.csName = csString;

[0146] mon.hMon = (HMONITOR)pSerial->GetDWord();

[0147] mon.iDepth = pSerial->GetDWord();

```
[0148]                mon.iLastDepth = mon.iDepth;
[0149]                POINT ptTopLeft = pSerial->GetPoint();
[0150]                POINT ptBotRight = pSerial->GetPoint();
[0151]                mon.rcMonitor = CRect(ptTopLeft,ptBotRight);
[0152]                m_caMonitors.Add(mon);
[0153]            }
[0154]        };
[0155]        virtual ~CSMsg_ControllerRemoteMonitorSetup(){};
[0156]        virtual CONTROLLERMESSAGES GetControllerMsgType(){return
[0157]    CONTROLLER_REMOTEMONITORSETUP_MSG;};
[0158]        virtual CAtlString ToString()
[0159]        {
[0160]        CAtlString csTemp;
[0161]        CsTemp.Format(_T(" [CSMsg]DontrollerRemoteMonitorSetup::%d
[0162]    monitors]"),m_caMonitors.GetCount());
[0163]        return csTemp+CSMsg_Controller::ToString();
[0164]        }
[0165]    virtual int GetSize()
[0166]    {
[0167]         int rSize = CSMsg_Controller::GetSize()+sizeof(WORD);
[0168]         for(int i = 0;i < (int)m_caMonitors.GetCount();i++)
[0169]         {
[0170]                  rSize+ = sizeof(BYTE);
[0171]                  rSize+ = sizeof(BYTE);
[0172]                  rSize+ =
[0173]    (m_caMonitors[i].csName.GetLength())*sizeof(TCHAR)+sizeof(WORD);
[0174]                  rSize+ = sizeof(DWORD);
[0175]                  rSize+ = sizeof(DWORD);
[0176]                  rSize+ = 8;//2 个点,每点 4 个字节
[0177]        }
[0178]        return rSize;
[0179]    }
[0180]    virtual void Serialize(CBufferSerializer*pSerial)
[0181]    {
[0182]        CSMsg_Controller::Serialize(pSerial);
[0183]        WORD wNumMon = (WORD)m_caMonitors.GetCount();
[0184]        pSerial->PutWord(wNumMon);
[0185]        for(int i = 0;i < wNumMon;i++)
[0186]        {
```

[0187] pSerial->PutByte(m_caMonitors[i].bPrimary);

[0188] pSerial->PutByte(m_caMonitors[i].bSharing);

[0189] pSerial->PutString(m_caMonitors[i].csName);

[0190] pSerial->PutDWord((DWORD)m_caMonitors[i].hMon));

[0191] pSerial->PutDWord(m_caMonitors[i].iDepth);

[0192] pSerial->PutPoint(m_caMonitors[i].rcMonitor.TopLeft());

[0193] pSerial->PutPoint(m_caMonitors[i].rcMonitor.BottomRight());

[0194] }

[0195] }

[0196] };

[0197] 每当主计算机上的监视器设置改变时，或者当有人开始或停止共享到监视器时发送该消息。

[0198] 3.）针对要在其上进行显示的监视器提示远程客户端：

[0199] 如果当我们决定进行共享时存在多于一个可用的监视器，则我们：

[0200] CMultiMonitorDlg dlg;

[0201] INT_PTR rv = dlg.DoModal();

[0202] 其启动多监视器选择对话：

[0203] svn://calsvn0/LinQ/trunk/Source/ZephyrClient/MultiMonitorDlg.cpp

[0204] svn://calsvn0/LinQ/trunk/Source/ZephyrClient/MultiMonitorDlg.h

[0205] 当选择了监视器时，将 HMONITOR 值发送到主机计算机并且在匹配物理显示器上开始观看。

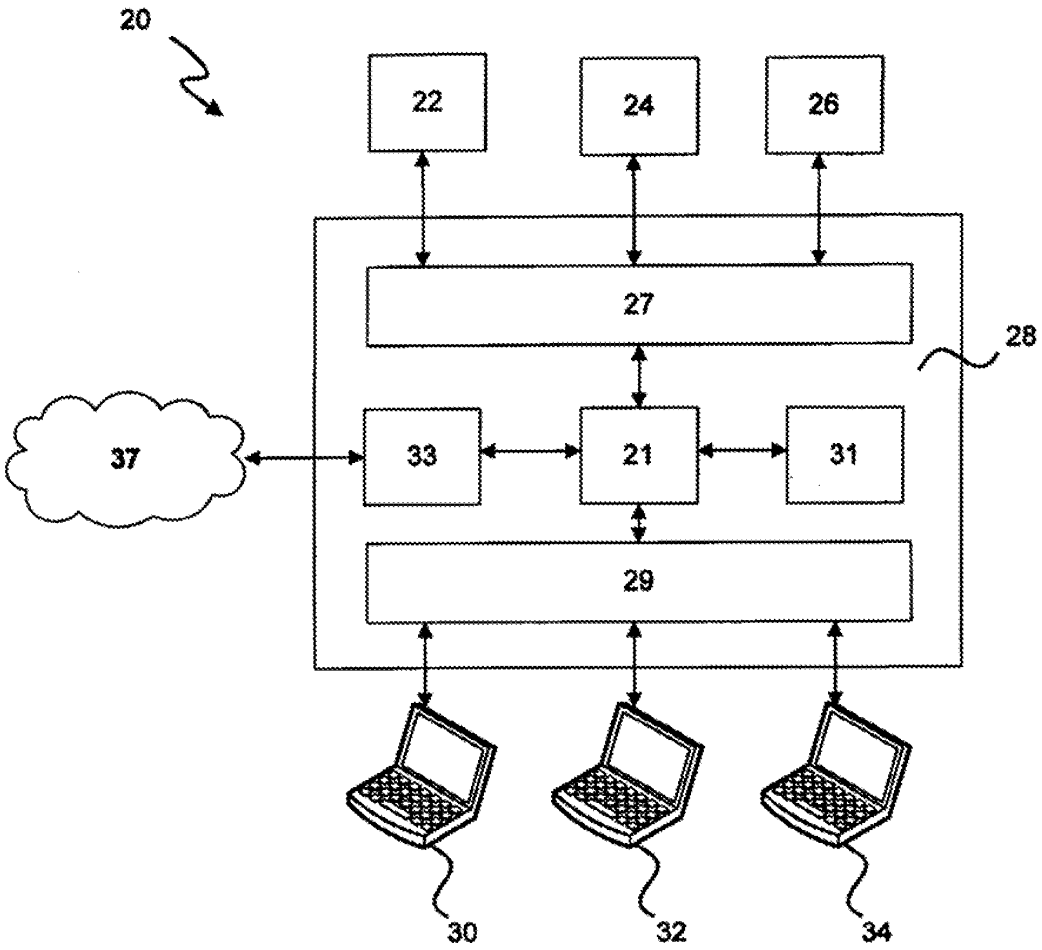


图 1

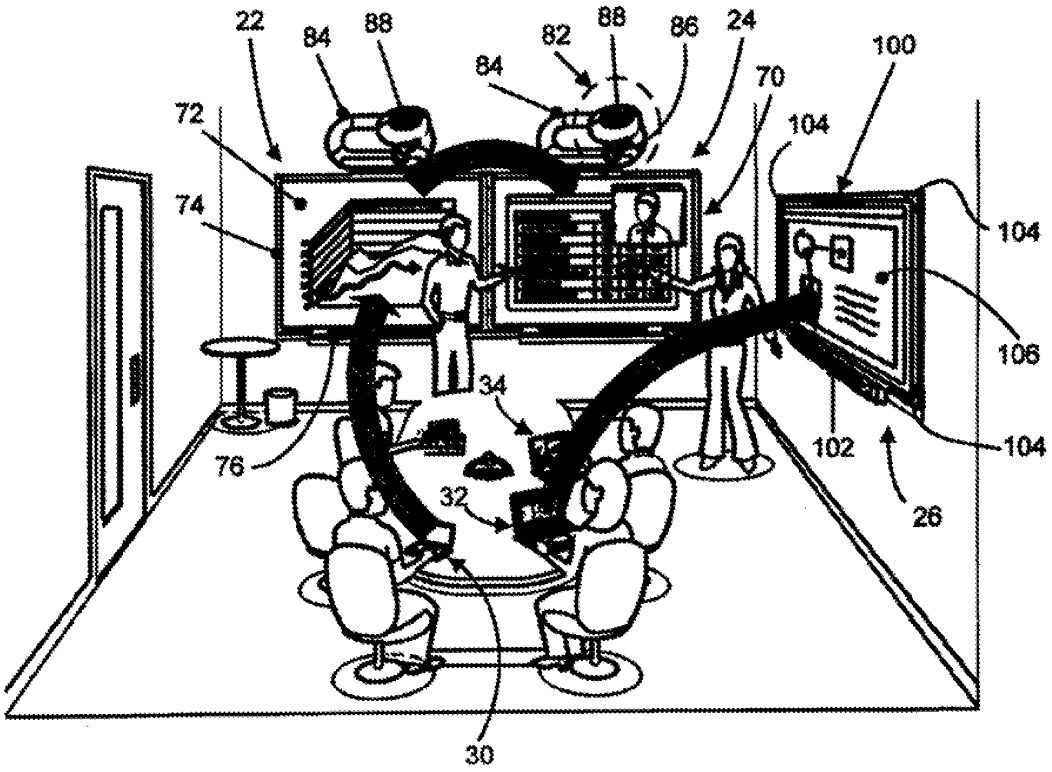

22
84
88
82
88
86
24
84
100
70
72
104
74
104
106
34
76
102
104
32
26
30

图 2

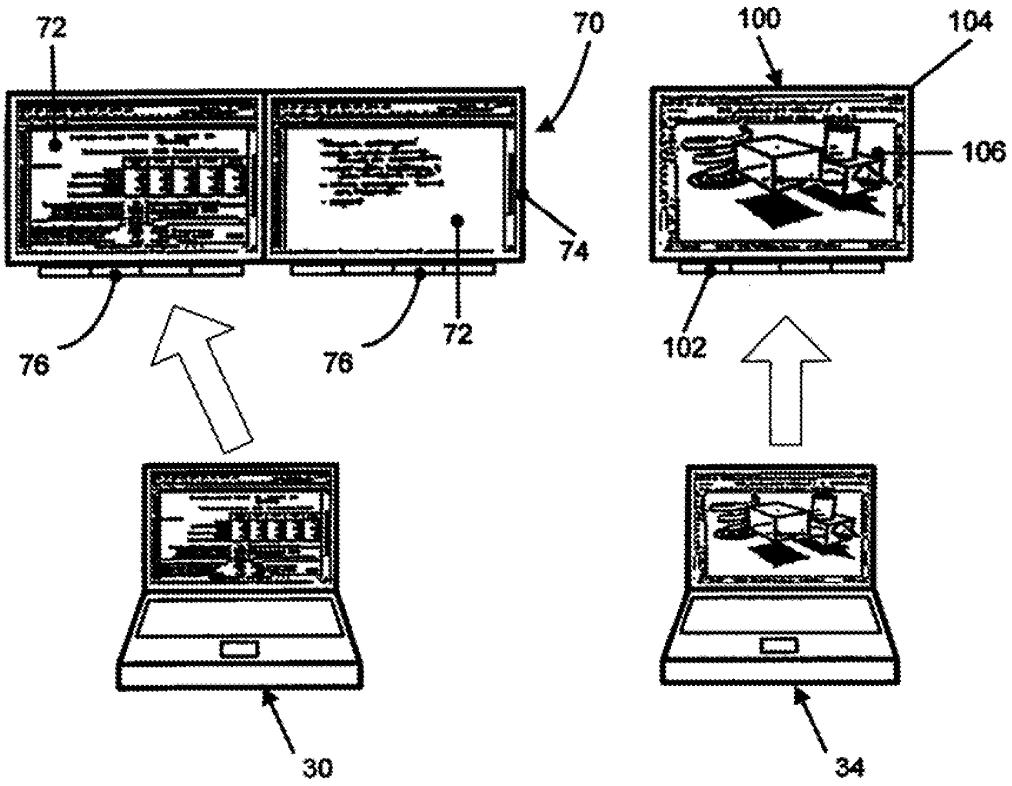

72
70
100
104
106
74
76
72
76
102
30
34

图 3

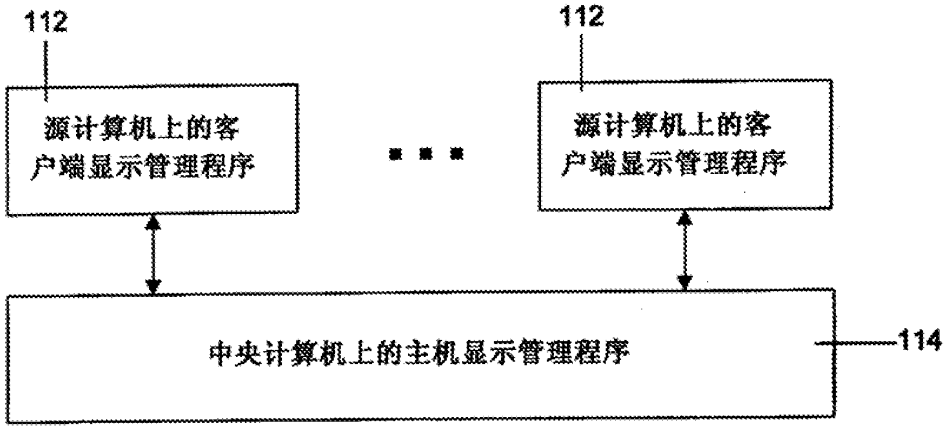

112
112
源计算机上的客户端显示管理程序
源计算机上的客户端显示管理程序
中央计算机上的主机显示管理程序
114

图 4A

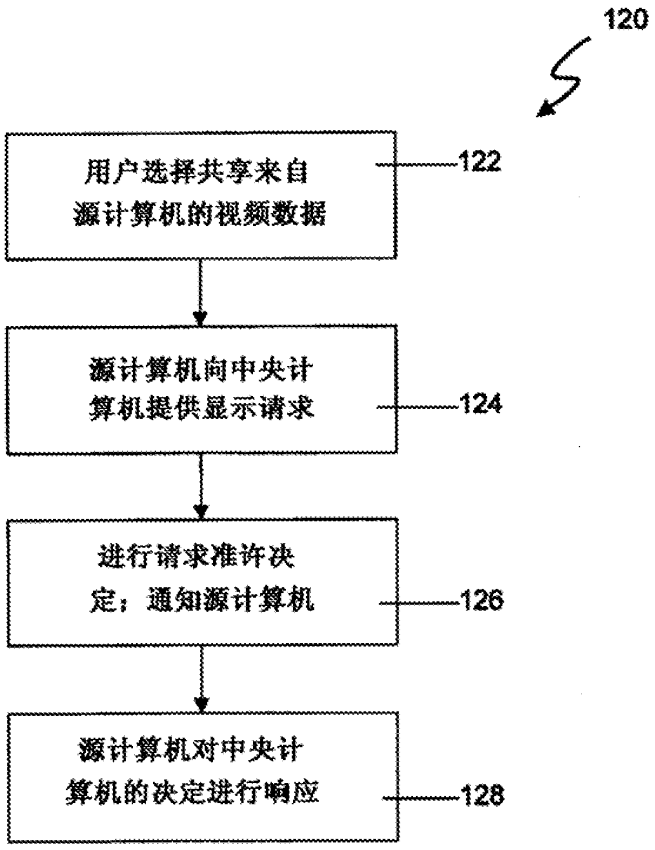

120
用户选择共享来自源计算机的视频数据
122
源计算机向中央计算机提供显示请求
124
进行请求准许决定；通知源计算机
126
源计算机对中央计算机的决定进行响应
128

图 4B

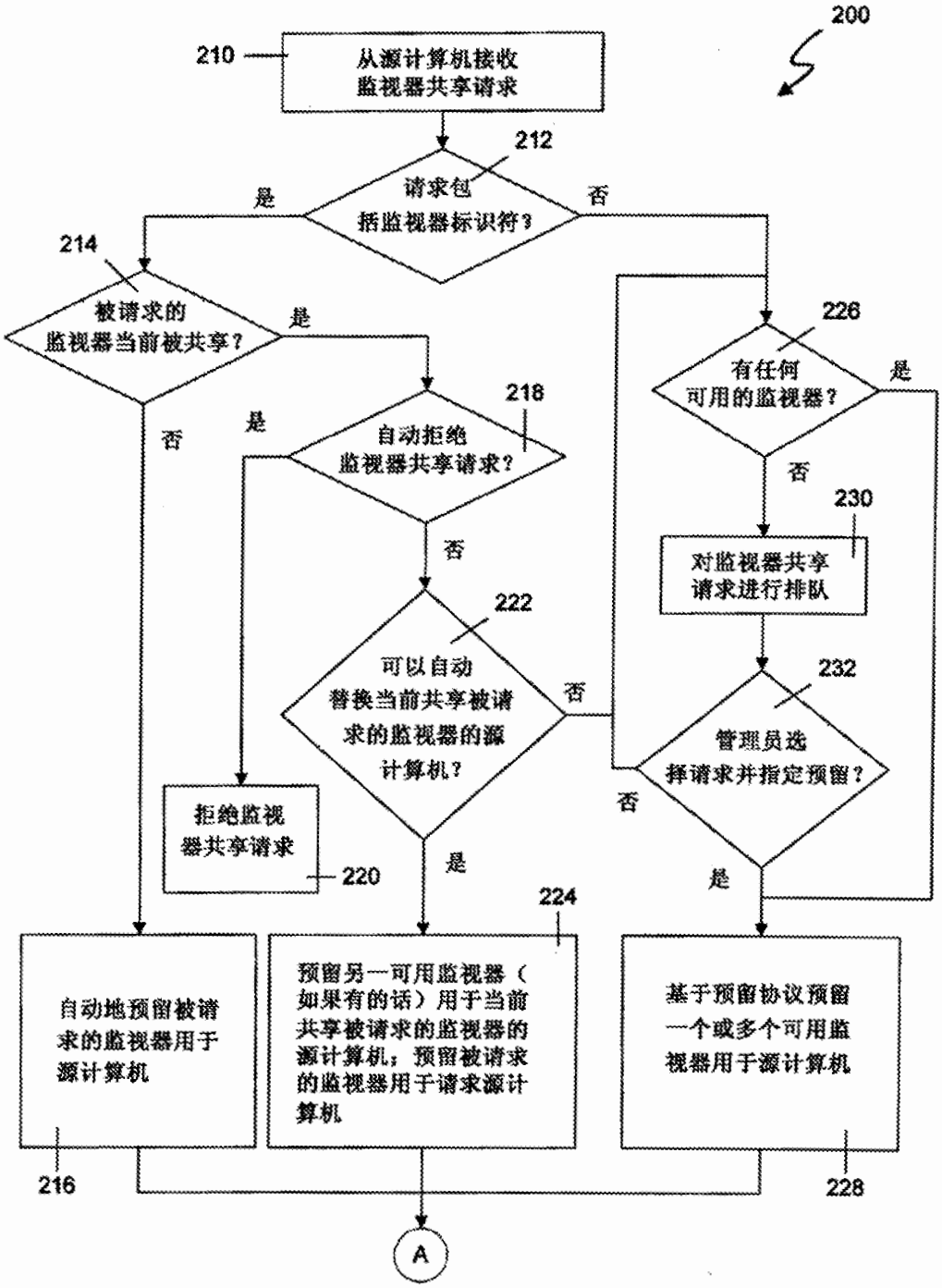

200
210
从源计算机接收监视器共享请求
212
请求包括监视器标识符？
是
否
214
被请求的监视器当前被共享？
是
否
218
自动拒绝监视器共享请求？
是
否
222
可以自动替换当前共享被请求的监视器的源计算机？
否
是
拒绝监视器共享请求
220
224
预留另一可用监视器（如果有的话）用于当前共享被请求的监视器的源计算机；预留被请求的监视器用于请求源计算机
自动地预留被请求的监视器用于源计算机
216
226
有任何可用的监视器？
是
否
230
对监视器共享请求进行排队
232
管理员选择请求并指定预留？
否
是
基于预留协议预留一个或多个可用监视器用于源计算机
228
A

图 5A

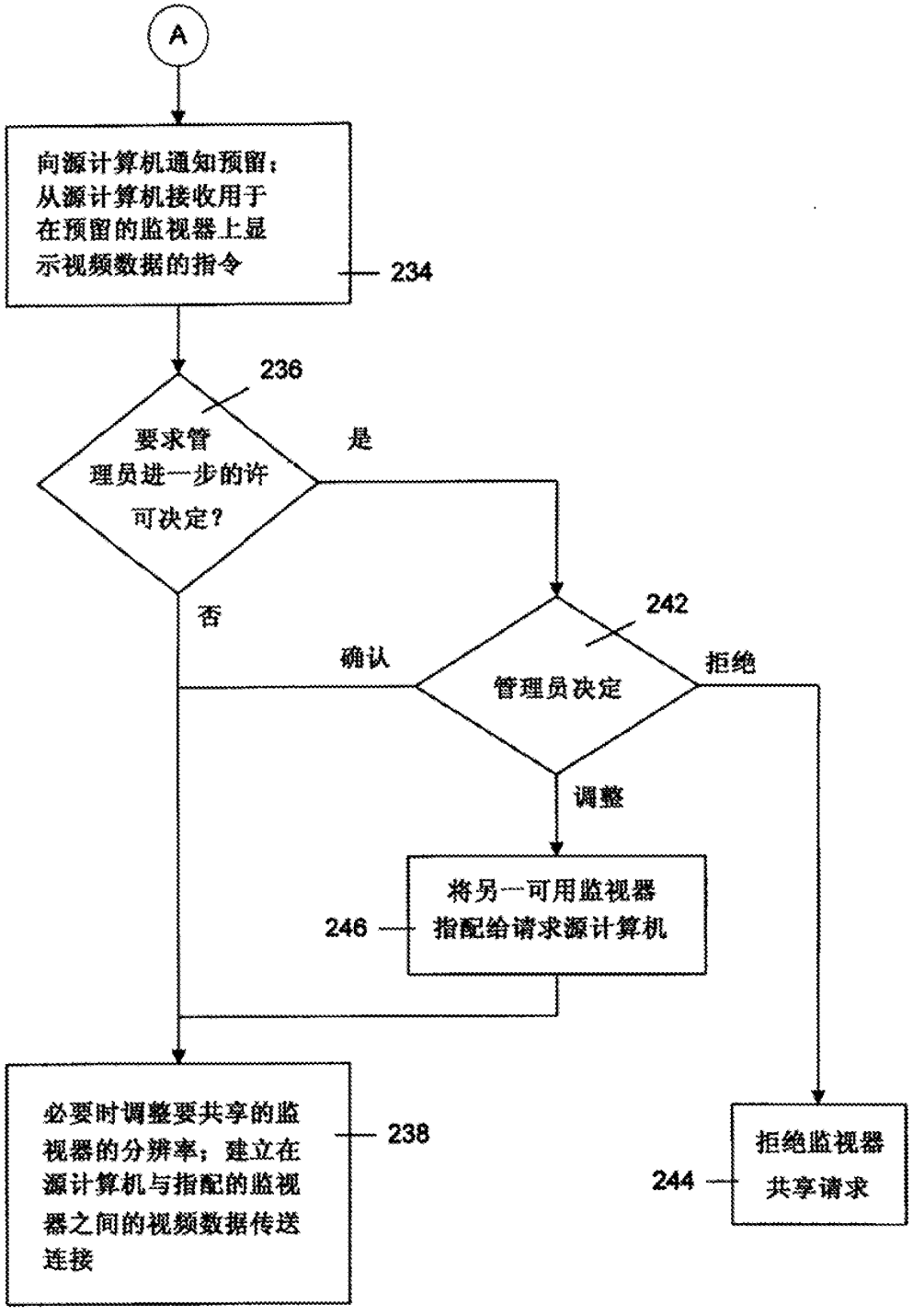

A
向源计算机通知预留；从源计算机接收用于在预留的监视器上显示视频数据的指令
234
236
要求管理员进一步的许可决定？
是
否
242
管理员决定
确认
拒绝
调整
将另一可用监视器指配给请求源计算机
246
必要时调整要共享的监视器的分辨率；建立在源计算机与指配的监视器之间的视频数据传送连接
238
拒绝监视器共享请求
244

图 5B

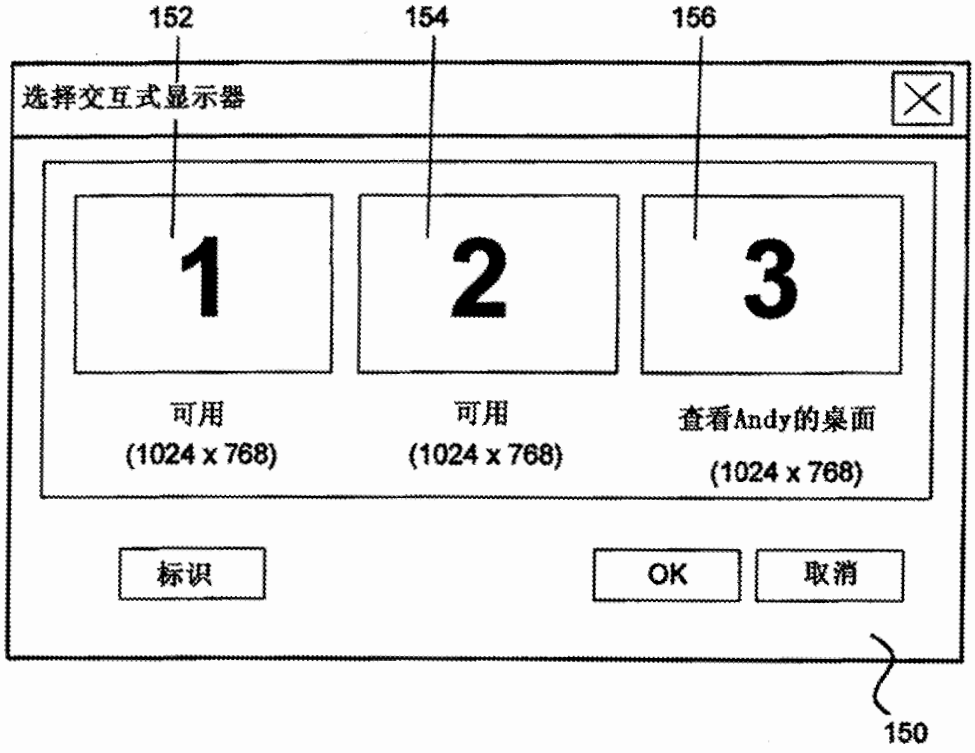

152
154
156
选择交互式显示器
1
2
3
可用
(1024 x 768)
可用
(1024 x 768)
查看Andy的桌面
(1024 x 768)
标识
OK
取消
150

图 6

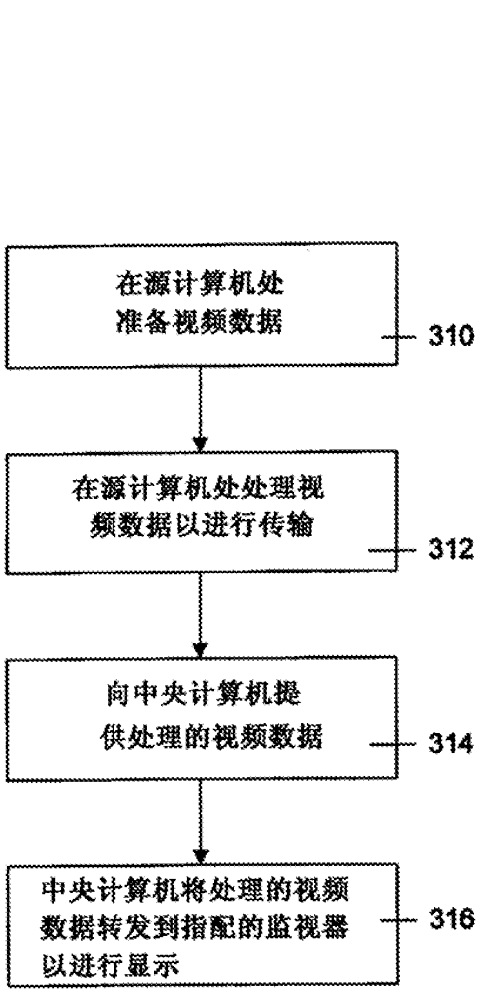

300
在源计算机处
准备视频数据
310
在源计算机处处理视
频数据以进行传输
312
向中央计算机提
供处理的视频数据
314
中央计算机将处理的视频
数据转发到指配的监视器
以进行显示
316

图 7

Espacenet

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Wireless communication terminal, wireless communication system and recording medium recording computer program

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- cooperative: **H04W36/0022**; H04W88/06

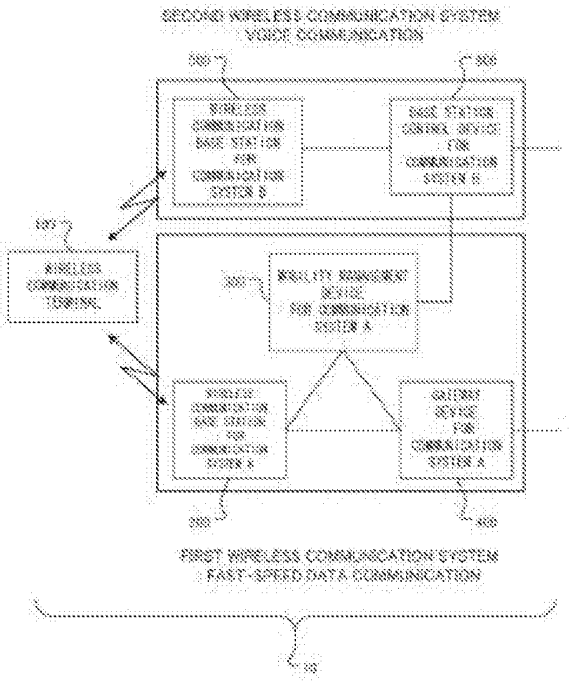
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Abstract of CN102045864 (A)

The present invention provides a wireless communication terminal, a wireless communication system and a recording medium recording computer program. The wireless communication terminal has a first wireless communication unit which performs data communication via a first wireless communication system and a second wireless communication unit which performs voice communication via a second wireless communication system. When an instruction of starting a voice communication is given, a temporal withdrawal process is started to the first wireless communication system, and an acquiring process of the second wireless communication system is started. After the voice communication ends, until a predetermined time elapses, an acquiring state of the second wireless communication system by the second wireless communication unit is continued.; After the predetermined time has elapsed, the acquiring state of the second wireless communication system is cancelled, and a temporal withdrawal cancelling process is started to the first wireless communication system.


SECOND WIRELESS COMMUNICATION SYSTEM
VOICE COMMUNICATION
FIRST WIRELESS COMMUNICATION SYSTEM
FAST-SPEED DATA COMMUNICATION

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H04B 17/00(2006.01)

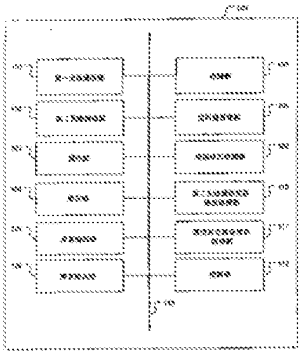
权利要求书 4 页 说明书 16 页 附图 9 页

(54)发明名称

无线通信终端、无线通信系统以及记录有计算机程序的记录介质

(57)摘要

本发明提供无线通信终端、无线通信系统以及记录有计算机程序的记录介质。一种无线通信终端，具备：第一无线通信部，进行经由第一无线通信系统的数据通信；以及第二无线通信部，进行经由第二无线通信系统的声音通信；在被指示了声音通信开始的情况下，对第一无线通信系统开始进行暂时脱离处理，开始第二无线通信系统的捕捉处理，在声音通信结束后经过规定的时间为止，持续上述第二无线通信部的第二无线通信系统的捕捉状态，在经过规定时间后，将第二无线通信系统的捕捉状态解除，对第一无线通信系统开始暂时脱离解除处理。



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1. 一种无线通信终端，其特征在于，具备：

第一无线通信部，以第一无线通信方式进行经由第一无线通信系统的数据通信；

第二无线通信部，以能够进行声音通信的第二无线通信方式进行经由第二无线通信系统的声音通信；以及

控制部，控制上述第一无线通信部和上述第二无线通信部；

上述控制部，

在被指示了声音通信的开始的情况下，

通过上述第一无线通信部对上述第一无线通信系统执行暂时脱离处理，并通过上述第二无线通信部执行上述第二无线通信系统的捕捉处理；

在上述声音通信结束之后，在满足规定的条件的情况下，

使上述第二无线通信部持续上述第二无线通信系统的捕捉状态。

2. 如权利要求 1 所述的无线通信终端，其特征在于，

上述控制部在上述声音通信结束之后持续上述第二无线通信系统的捕捉状态的期间，被指示了上述声音通信的开始的情况下，通过捕捉到的上述第二无线通信系统再开始上述声音通信。

3. 如权利要求 1 所述的无线通信终端，其特征在于，

上述控制部，

在上述声音通信结束后经过规定的时间为止，

使上述第二无线通信部持续上述第二无线通信系统的捕捉状态；

在经过上述规定的时间之后，

使上述第二无线通信部解除上述第二无线通信系统的捕捉状态；

使上述第一无线通信部对上述第一无线通信系统开始暂时脱离解除处理。

4. 如权利要求 3 所述的无线通信终端，其特征在于，

上述无线通信终端还具备检测部；

上述控制部，

在上述声音通信结束后经过上述规定的时间为止的期间，由上述检测部检测到规定的终端状态的情况下，

将上述第二无线通信部的上述第二无线通信系统的捕捉状态解除；

通过上述第一无线通信部对上述第一无线通信系统开始暂时脱离解除处理。

5. 如权利要求 4 所述的无线通信终端，其特征在于，

上述检测部具备对上述无线通信终端的开闭状态进行检测的机构；

上述控制部，

在上述声音通信结束后经过上述规定的时间为止的期间，由上述检测部检测到上述无线通信终端的关闭状态的情况下，

将上述第二无线通信部的上述第二无线通信系统的捕捉状态解除；

通过上述第一无线通信部对上述第一无线通信系统开始暂时脱离解除处理。

6. 如权利要求 4 所述的无线通信终端，其特征在于，

上述检测部具备对上述无线通信终端的周围的亮度进行检测的机构；

上述控制部，

在上述声音通信结束后经过上述规定的时间为止的期间，由上述检测部检测到上述无线通信终端的周围的亮度成为基准以下的情况下，

将上述第二无线通信部的上述第二无线通信系统的捕捉状态解除，并通过上述第一无线通信部对上述第一无线通信系统开始暂时脱离解除处理。

7. 如权利要求 4 所述的无线通信终端，其特征在于，

上述检测部具备对上述无线通信终端的运动进行检测的机构；

上述控制部，

在从上述声音通信结束后经过上述规定的时间为止的期间，由上述检测部检测到上述无线通信终端的运动成为基准以下的情况下，

将上述第二无线通信部的上述第二无线通信系统的捕捉状态解除，并通过上述第一无线通信部对上述第一无线通信系统开始暂时脱离解除处理。

8. 如权利要求 4 所述的无线通信终端，其特征在于，

上述检测部具备对上述无线通信终端所具备的规定的应用程序的起动状态进行检测的机构；

上述控制部，

在从上述声音通信结束后经过上述规定的时间为止的期间，由上述检测部检测到上述规定的应用程序的起动的情况下，

将上述第二无线通信部的上述第二无线通信系统的捕捉状态解除，并通过上述第一无线通信部对上述第一无线通信系统开始暂时脱离解除处理。

9. 如权利要求 4 所述的无线通信终端，其特征在于，

上述检测部具备对用户的规定的动作进行检测的机构；

上述控制部，

在从上述声音通信结束后经过上述规定的时间为止的期间，由上述检测部检测到上述规定的动作的情况下，

将上述第二无线通信部的上述第二无线通信系统的捕捉状态解除，并通过上述第一无线通信部对上述第一无线通信系统开始暂时脱离解除处理。

10. 如权利要求 3 所述的无线通信终端，其特征在于，

上述无线通信终端还具备取得通信对方的信息的通信对方确定信息取得部；

在经过上述规定的时间之前，上述通信对方确定信息取得部已被起动的情况下，

上述控制部使上述第二无线通信部持续上述第二无线通信系统的捕捉状态，直到上述通信对方确定信息取得部结束处理为止。

11. 如权利要求 3 所述的无线通信终端，其特征在于，

上述检测部具备对用户的规定的行为进行检测的机构；

在经过上述规定的时间之前由上述检测部检测到用户的规定的行为的情况下，上述控制部使上述第二无线通信部持续上述第二无线通信系统的捕捉状态。

12. 如权利要求 1 所述的无线通信终端，其特征在于，

上述控制部，

具备第二无线通信关联信息取得部，该第二无线通信关联信息取得部取得与由上述第二无线通信部进行的声音通信关联的信息；

在上述声音通信结束之后，根据上述第二无线通信关联信息取得部取得的信息，

使上述第二无线通信部执行持续上述第二无线通信系统的捕捉状态的处理，或者

执行使上述第二无线通信部解除上述第二无线通信系统的捕捉状态、并使上述第一无线通信部对上述第一无线通信系统开始暂时脱离解除处理的处理。

13. 如权利要求 12 所述的无线通信终端，其特征在于，

上述第二无线通信关联信息取得部所取得的信息包含通话对方信息，该通信对方信息表示上述声音通信的通话对方。

14. 如权利要求 12 所述的无线通信终端，其特征在于，

上述第二无线通信关联信息取得部所取得的信息包含表示上述声音通信的成立或不成立的信息。

15. 如权利要求 12 所述的无线通信终端，其特征在于，

上述第二无线通信关联信息取得部所取得的信息是包含上述声音通信的结束状态的信息。

16. 一种无线通信终端，其特征在于，具备：

第一无线通信机构，以第一无线通信方式进行经由第一无线通信系统的数据通信；

第二无线通信机构，以能够进行声音通信的第二无线通信方式进行经由第二无线通信系统的声音通信；以及

控制机构，控制上述第一无线通信机构和上述第二无线通信机构；

上述控制机构，

在被指示了声音通信的开始的情况下，

通过上述第一无线通信机构对上述第一无线通信系统执行暂时脱离处理，并通过上述第二无线通信机构执行上述第二无线通信系统的捕捉处理；

在上述声音通信结束之后，在满足规定的条件的情况下，

使上述第二无线通信机构持续上述第二无线通信系统的捕捉状态。

17. 一种无线通信系统，其特征在于，

具备进行数据通信的第一无线通信系统、进行声音通信的第二无线通信系统以及无线通信终端，

在被指示了上述声音通信的开始的情况下，在进行上述第二无线通信系统的声音通信之前，上述无线通信终端对上述第一无线通信系统开始暂时脱离处理，在上述声音通信结束之后，上述无线通信终端对上述第一无线通信系统开始暂时脱离解除处理，

在满足规定的条件的情况下，上述无线通信终端不对上述第一无线通信系统开始暂时脱离解除处理，在此期间被指示了上述声音通信的开始的情况下，对上述第二无线通信系统开始声音通信处理。

18. 一种记录介质，记录有对计算机的动作进行控制的计算机程序，该计算机具备：第一无线通信机构，进行经由第一无线通信系统的数据通信；以及第二无线通信机构，进行经由第二无线通信系统的声音通信，上述记录介质的特征在于，

记录有计算机程序，该计算机程序使计算机执行如下处理，即：

在被指示了上述声音通信的开始的情况下，

对上述第一无线通信系统执行暂时脱离处理，并执行上述第二无线通信系统的捕捉处

理，

在上述声音通信结束之后，在满足规定的条件的情况下，

持续上述第二无线通信系统的捕捉状态。

无线通信终端、无线通信系统以及记录有计算机程序的记录介质

[0001] 相关申请的交叉引用

[0002] 本申请基于 2009 年 10 月 21 日提出申请的日本专利申请 2009-242894 号。在本说明书中，将日本专利申请 2009-242894 号的说明书、权利要求书、附图的所有内容作为参照引用。

技术领域

[0003] 本发明涉及对应于两个以上无线通信方式的无线通信终端、无线通信系统以及记录有计算机程序的记录介质。

背景技术

[0004] 当前，作为下一代高速无线通信方式（或者下一代高速无线通信系统），推进了 LTE(Long Term Evolution：长期演进）的开发。LTE 具有最大 20MHz 的宽的带宽，通过在下行通信中采用 OFDMA(Orthogonal FrequencyDivision Multiple Access：正交频分多址）以及 MIMO(Multiple Input MultipleOutput：多输入多输出）、在上行通信中采用 SC-FDMA(Single-CarrierFrequency Division Multiple Access：单载波频分多址）等，在下行通信中最大能够实现超过 300Mbps，在上行通信中最大能够实现 75Mbps。

[0005] 由于 LTE 是为包通信特殊化的通信方式，所以能够想到即使是能够利用 LTE 的无线通信终端，对于基于线路交换的声音通信，也会利用 W-CDMA 或 cdma2000 1x 那样的以往的通信方式。在总是同时等待声音通信用的无线通信系统和 LTE 系统两者的无线通信终端中，无线通信终端的通常的等待中的消耗电流变大。在仅等待 LTE 系统的无线通信终端中，在通常状态下不能接受声音来信，所以作为所谓的“电话”的功能不再成立。在仅等待声音通信用的无线通信系统的无线通信终端中，不能发挥 LTE 的不间断 IP 连接性的优点。

[0006] 为了解决这些问题，在 LTE 系统中，可以考虑 CS(Circuit Switched：线路转接）Fallback（回落）的功能。在 CS Fallback 中，将来自 W-CDMA 或 cdma2000 1x 等的声音通信用无线通信系统的声音来信通知通传（tunneling）到 LTE 系统上，传送给无线通信终端。接收到声音来信通知的无线通信终端对 LTE 系统进行暂时脱离（中断：Suspend）处理，并对声音通信用无线通信系统进行线路连接处理而执行声音通信。在声音通信结束后，无线通信终端对声音通信用无线通信系统进行线路释放处理，对 LTE 系统进行暂时脱离解除（再开始：Resume）处理，回到等待 LTE 系统的状态。CS Fallback 的动作并不限于声音来信处理，在声音发信处理的情况下也是同样的动作。

[0007] 如上所述，通常采用仅能够等待 LTE 系统的 LTE 的无线通信终端与采用了能够等待声音通信用无线通信系统和 LTE 系统两者的 LTE 的无线通信终端相比能够减小消耗电流。除此以外，在采用仅能够等待 LTE 系统的 LTE 的无线通信终端中，具有还能够接受声音来信的优点（例如，参照非专利文献：3GPP TS 23.272V8.4.0(2009-06)，“3rd Generation Partnership Project；Technical Specification Group Services and System Aspects；

Circuit SwitchedFallback in Evolved Packet System;Stage 2(Release 8)")。

[0008] 但是,在以往的采用 LTE 的无线通信终端中,在短期间内连续发生声音来信或声音发信的情况下,例如在通过声音来信而开始的通话结束后立即重新打电话的情况下,或在虽然进行了声音发信处理但由于对方没有应答而立即向别的对方打电话的情况下,由于 LTE 系统的暂时脱离处理和暂时脱离解除处理进行动作,所以存在在发信处理中花费时间的问题。此外,在以往的采用 LTE 的无线通信终端中,将用于进行暂时脱离解除处理的控制消息和用于进行暂时脱离处理的控制消息在无线上短期间内收发,因而存在浪费无线资源的问题。

[0009] 此外,在具备以第一无线通信方式进行数据通信的第一无线通信部、和以能够进行声音通信的第二无线通信方式进行通信的第二无线通信部的无线通信终端中,一般也会发生与上述同样的问题。

发明内容

[0010] 本发明是鉴于如上所述的问题而做出的,目的是提供一种在连续进行声音通信处理的情况下,能够防止声音通信处理时间花费较长,并且能够防止无线资源的浪费的无线通信终端、无线通信系统以及记录有计算机程序的记录介质。

[0011] 为了达到上述目的,有关本发明的第 1 观点的无线通信终端,具备:

[0012] 第一无线通信部,以第一无线通信方式进行经由第一无线通信系统的数据通信;

[0013] 第二无线通信部,以能够进行声音通信的第二无线通信方式进行经由第二无线通信系统的声音通信;以及

[0014] 控制部,控制上述第一无线通信部和上述第二无线通信部;

[0015] 上述控制部,

[0016] 在被指示了声音通信的开始的情况下,

[0017] 通过上述第一无线通信部对上述第一无线通信系统执行暂时脱离处理,并通过上述第二无线通信部执行上述第二无线通信系统的捕捉处理;

[0018] 在上述声音通信结束之后,在满足规定的条件的情况下,

[0019] 使上述第二无线通信部持续上述第二无线通信系统的捕捉状态。

[0020] 为了达到上述目的,有关本发明的第 2 观点的无线通信终端,具备:

[0021] 第一无线通信机构,以第一无线通信方式进行经由第一无线通信系统的数据通信;

[0022] 第二无线通信机构,以能够进行声音通信的第二无线通信方式进行经由第二无线通信系统的声音通信;以及

[0023] 控制机构,控制上述第一无线通信机构和上述第二无线通信机构;

[0024] 上述控制机构,

[0025] 在被指示了声音通信的开始的情况下,

[0026] 通过上述第一无线通信机构对上述第一无线通信系统执行暂时脱离处理,并通过上述第二无线通信机构执行上述第二无线通信系统的捕捉处理;

[0027] 在上述声音通信结束之后,在满足规定的条件的情况下,

[0028] 使上述第二无线通信机构持续上述第二无线通信系统的捕捉状态。

[0029] 为了达到上述目的，有关本发明的第 3 技观点的无线通信系统，

[0030] 具备进行数据通信的第一无线通信系统、进行声音通信的第二无线通信系统以及无线通信终端，

[0031] 在被指示了上述声音通信的开始的情况下，在进行上述第二无线通信系统的声音通信之前，上述无线通信终端对上述第一无线通信系统开始暂时脱离处理，在上述声音通信结束之后，上述无线通信终端对上述第一无线通信系统开始暂时脱离解除处理，

[0032] 在满足规定的条件的情况下，上述无线通信终端不对上述第一无线通信系统开始暂时脱离解除处理，在此期间被指示了上述声音通信的开始的情况下，对上述第二无线通信系统开始声音通信处理。

[0033] 为了达到上述目的，有关本发明的第 4 观点的记录介质，记录有对计算机的动作进行控制的计算机程序，该计算机具备：第一无线通信机构，进行经由第一无线通信系统的数据通信；以及第二无线通信机构，进行经由第二无线通信系统的声音通信，

[0034] 上述记录介质记录有计算机程序，该计算机程序使计算机执行如下处理，即：

[0035] 在被指示了上述声音通信的开始的情况下，

[0036] 对上述第一无线通信系统执行暂时脱离处理，并执行上述第二无线通信系统的捕捉处理，

[0037] 在上述声音通信结束之后，在满足规定的条件的情况下，

[0038] 持续上述第二无线通信系统的捕捉状态。

[0039] 根据有关本发明的无线通信终端、无线通信系统以及记录有程序的记录介质，在连续进行声音通信处理的情况下，能够比以往缩短声音通信处理时间。此外，根据有关本发明的无线通信终端、无线通信系统以及记录有计算机程序的记录介质，能够抑制无线资源的浪费。

附图说明

[0040] 图 1 是有关本发明的实施方式 1 的无线通信系统的结构图。

[0041] 图 2 是图 1 所示的无线通信终端的结构图。

[0042] 图 3 是表示以往的 CSFB 处理的处理流程的概念图。

[0043] 图 4A 及图 4B 是表示有关本发明的实施方式 1 的无线通信终端的处理流程的图。

[0044] 图 5 是表示有关本发明的实施方式 1 的无线通信系统的处理流程的概念图。

[0045] 图 6 是表示有关本发明的实施方式 2 的无线通信终端的处理流程的概念图。

[0046] 图 7 是表示有关本发明的实施方式 3 的无线通信终端的处理流程的概念图。

[0047] 图 8 是表示有关本发明的实施方式 4 的无线通信终端的处理流程的概念图。

[0048] 图 9 是表示有关本发明的实施方式 5 的无线通信终端的处理流程的概念图。

具体实施方式

[0049] 以下，对有关本发明的实施方式的无线通信终端及无线通信系统进行说明。

[0050] （实施方式 1）

[0051] 系统整体结构

[0052] 有关本实施方式的无线通信系统 10 如图 1 所示，包括无线通信终端 100、无线通信

基站 200、移动管理装置 300、网关装置 400、无线通信基站 500 以及基站控制装置 600。

[0053] 无线通信基站 200、移动管理装置 300、网关装置 400 是构成第一无线通信系统（以下称作通信系统 A）的网络装置。通信系统 A 例如支持 LTE、HSPA(High Speed Packet Access：高速分组接入）、EV-DO、WiMAX 等通信方式，主要提供高速的数据通信服务。另外，虽然没有图示，但除此以外也可以包括认证服务器、加入者信息管理服务器、策略 / 收费控制服务器等。

[0054] 无线通信基站 500、基站控制装置 600 是构成第二无线通信系统（以下称作通信系统 B）的网络装置。通信系统 B 例如支持 W-CDMA、cdma2000 1x、PHS(Personal Handy phone System：个人手持式电话系统）等通信方式，主要提供声音通信服务。不仅提供声音通信服务，有时还提供数据通信服务。另外，虽然没有图示，但除此以外也可以包括认证服务器、加入者信息管理服务器、策略 / 收费控制服务器等。

[0055] 无线通信基站 200 经由无线接口，而与管辖区域（小区）内的无线通信终端 100 进行无线通信（主要是高速数据通信）。例如，在 LTE 系统的情况下，ENB(Evolved Node B：演进性节点 B）对应于此。

[0056] 移动管理装置 300 具有无线通信终端 100 的位置信息管理、会话 (session) 管理、连接的网关装置管理等功能。例如，在 LTE 系统的情况下，MME(Mobility Management Entity：移动性管理实体）对应于此。

[0057] 网关装置 400 具有数据通信量的转送、移交时的数据转送路径切换等功能。例如，在 LTE 系统的情况下，S-GW(Serving Gateway：服务网关）对应于此。

[0058] 无线通信基站 500 经由无线接口，而与管辖区域（小区）内的无线通信终端 100 进行无线通信（主要是声音通信）。例如，Node B、BTS(Base Transceiver Station：基准收发站）、BS(Base Station：基站）对应于此。

[0059] 基站控制装置 600 进行无线通信终端 100 的位置登记、认证、收发信处理、移交控制等。例如，RNC(Radio Network Control：无线网络控制器）、MSC(Mobile Switching Center：移动交换中心）对应于此。

[0060] 图 1 所示的无线通信系统 10 中，通过将基站控制装置 600 和移动管理装置 300 连接，成为能够进行通信系统 A 与通信系统 B 的相互连接的具备相互连接性的结构。在图 1 中，两者直接连接，但也可以在两者之间夹装 CS IWS(Circuit Switched fallback Interworking Solution function：线路转接回落互操作功能实体）那样的装置。

[0061] 另一方面，无线通信终端 100 对应于上述通信系统 A 和通信系统 B，构成为能够与无线通信基站 200 及无线通信基站 500 进行无线通信。以下，参照图 2 具体地说明该结构。

[0062] 图 2 是表示无线通信终端 100 的结构的结构图。

[0063] 无线通信终端 100 如图 2 所示，具备第一无线通信部 101、第二无线通信部 102、操作部 103、显示部 104、声音输出部 105、声音输入部 106、存储部 107、定时器管理部 108、终端状态检测部 109、第二无线通信关联信息取得部 110、通信对方确定信息取得部 111、控制部 112 以及总线 113。

[0064] 第一无线通信部 101 支持通信系统 A，经由无线通信基站 200 收发各种数据。此外，第一无线通信部 101 基于 LTE、HSPA、EV-DO、WiMAX 等无线通信方式进行无线通信。

[0065] 第二无线通信部 102 支持通信系统 B，经由无线通信基站 500 进行声音通话和各种

数据的收发。此外，第二无线通信部 102 基于 W-CDMA、cdma2000 1x、PHS 等无线通信方式进行无线通信。

[0066] 操作部 103 具备键盘、光标键、数字键等，受理来自用户的操作，并将操作信号输入到控制部 112 中。

[0067] 显示部 104 由点矩阵型的 LCD(Liquid Crystal Display) 面板等显示面板、驱动电路等构成。显示部 104 通过控制部 112 的控制而显示任意的数据（例如字符、图像、影像等）。

[0068] 声音输出部 105 具备扬声器、DAC(Digital Analog Converter ;数字模拟转换器）等，例如，对从第二无线通信部 102 接收到的声音信号实施 DA 变换，通过扬声器放音。

[0069] 声音输入部 106 具备麦克风等，在通话时等收集声音信号，并对第二无线通信部 102 供给该声音信号。

[0070] 存储部 107 由内置在无线通信终端 100 中的存储器、可拆卸的外部存储器等构成，存储各种程序及数据。存储部 107 例如存储控制部 112 的动作控制用程序。此外，存储部 107 将通话目标的名称、电话号码、邮件地址、其他属性信息等分别建立对应，作为电话簿存储。

[0071] 定时器管理部 108 例如由软件定时器等构成，基于控制部 112 的控制，计测从某个时点起的经过时间，判断是否经过了规定的时间。

[0072] 终端状态检测部 109 在声音通话结束后间接地检测用户的否定再通话的可能性的行为。具体而言，终端状态检测部 109 由检测无线通信终端 100 的关闭状态（在无线通信终端 100 是开闭式的便携电话等的情况下）的开关、检测周围的亮度的光传感器、检测无线通信终端 100 的振动及朝向的加速度传感器、取得无线通信终端 100 所具备的各种应用的起动状态的程序等中的某种、或者它们的组合构成。

[0073] 这里，开闭状态检测开关在无线通信终端 100 是折叠型的情况下，检测无线通信终端 100 被折叠而难以进行声音通信的状态，在无线通信终端 100 是滑动型的情况下，检测两个壳体被叠合而难以进行声音通信的状态等。

[0074] 此外，光传感器检测无线通信终端 100 的周围的亮度为基准水平以下（周围变暗）的情况。

[0075] 加速度传感器检测无线通信终端 100 的振动及朝向。

[0076] 起动检测程序检测无线通信终端 100 所具备的应用程序被起动的情况。

[0077] 第二无线通信关联信息取得部 110 取得与第二无线通信部 102 进行的无线通信关联的信息。所谓与第二无线通信部 102 进行的无线通信关联的信息，例如是正在进行通信的对方（通话目标）的名称、电话号码、识别信息等的对方信息、通信所花费的时间、通信结束理由等。这些信息通过从存储部 107 读出、监视第二无线通信部 102 的通信、由基站控制装置 600 经由无线通信基站 500 通知、等的方法取得。

[0078] 通信对方确定信息取得部 111 例如是访问存储在无线通信终端 100 的存储部 107 中的电话簿的功能、通过用户操作来受理发信电话号码的输入的功能、Web 上的电话号码数据库访问功能等中的某种、或者它们的组合。

[0079] 控制部 112 由微处理单元等构成，执行存储在存储部 107 中的动作控制用的程序，控制无线通信终端 100 整体的动作。

[0080] 总线 113 在图 2 所示的各部 101 ～ 112 之间相互传送数据。

[0081] 以往的 CSFB 处理的流程

[0082] 下面，利用图 3，对以往的 CS Fallback（以下简称作 CSFB）功能的动作进行说明。另外，无线通信系统的结构以及无线通信终端的功能结构与图 1 及图 2 所示的是同样，所以省略说明。

[0083] 作为初始状态，假设无线通信终端 100 在通信系统 A 中处于待机状态 (S100)。所谓待机状态，是无线通信终端 100 对属于通信系统 A 的小区（或者无线基站）完成同步处理、并接收到由该小区报告的关于通信系统 A 的系统信息的状态，是所谓的“camp on”的状态。进而，在待机状态下，无线通信终端 100 有时对通信系统 A 的网络装置（移动管理装置 300 或网关装置 400）请求位置登记处理、会话 (Session) 或承载 (Bearer) 的建立处理等。由于无线通信终端 100 通常处于通信系统 A 的待机状态，因此具有数据通信的起动时间变快，网络侧能够对无线通信终端 100 起动服务等的优点。

[0084] 在步骤 S100 的状态下，在从通话对方（未图示）向无线通信终端 100 进行了声音发信处理的情况下，以无线通信终端 100 为目的地的声音来信通知被传送到通信系统 B 的基站控制装置 600(S101)。基站控制装置 600 将以无线通信终端 100 为目的地的声音来信通知跨过通信系统 A 与 B 之间，传送给通信系统 A 的移动管理装置 300(S102)。移动管理装置 300 将以无线通信终端 100 为目的地的声音来信通知经由无线通信基站 200 传送给无线通信终端 100(S103)。在步骤 S102、S103 中，将通信系统 B 的声音来信通知在通信系统 A 的控制消息上通传而传送。

[0085] 接收到声音来信通知的无线通信终端 100 经由无线通信基站 200 对移动管理装置 300 传送 CSFB 开始通知 (S104)。移动管理装置 300 对无线通信基站 200 传送 CSFB 开始通知 (S105)。

[0086] 无线通信终端 100 定期地测量待机小区的接收状态和周边小区的接收状态，对无线通信基站 200 报告其结果 (S106)。所谓接收状态，是 RSSI(Received Signal Strength Indicator：接收信号强度指示）、RSRP(ReferenceSignal Received Power：参考信号接收功率）、RSRQ(Reference SignalReceived Quality：参考信号接收质量）等。上述测量和结果报告是基本上与声音来信通知的有无无关而恒常地进行的动作。但是，也可以以声音来信通知接收为契机开始处理。

[0087] 接收到了无线通信终端 100 发送的测量结果报告的无线通信基站 200 对无线通信终端 100 通知重定向 (redirection) 指示，起动连接释放处理 (S107)。重定向目标及重定向定时由无线通信基站 200 根据测量结果报告的内容决定。在连接释放处理中，无线通信终端 100 和无线通信基站 200 分别将为了在两者间进行无线通信而确保的无线资源释放，并将关联的管理信息等删除。如果需要，则在两者之间交换控制消息。

[0088] 如果连接释放处理完成，则无线通信基站 200 对移动管理装置 300 传送连接释放通知 (S108)。接收到了连接释放通知的移动管理装置 300 对网关装置 400 进行暂时脱离（暂停 (suspend)）处理 (S109)。在暂时脱离处理中，移动管理装置 300 和网关装置 400 将为了传送以无线通信终端 100 为目的地的数据而确保的通信资源进行部分释放或者暂时停止、或者将关联的管理信息等进行部分删除。如果需要，则在两者之间交换控制消息。此外，也可以使以无线通信终端 100 为目的地的数据的缓冲功能有效。总之，通过这里不将通

信资源及管理信息全部释放、全部删除，在之后的暂时脱离解除处理中能够在短时间内再开始通信。

[0089] 另一方面，在步骤S107中进行了连接释放处理的无线通信终端100进行通信系统B的捕捉处理(S110)。此时，无线通信终端100在通信系统B中进行全小区探索，或按照步骤S107的重定向指示，决定要捕捉的无线通信基站500。

[0090] 接着，无线通信终端100对捕捉到的通信系统B的无线通信基站500进行来信应答处理及连接建立处理(S111)。无线通信基站500在与基站控制装置600之间进行来信应答处理及连接建立处理(S112)。

[0091] 如果步骤S111、S112的处理完成，则无线通信终端100成为能够在通信系统B上进行声音通话的状态(S113)。

[0092] 如果声音通话结束，则无线通信终端100进行与无线通信基站500之间的连接释放处理(S114)。此外，无线通信基站500进行与基站控制装置600之间的连接释放处理(S115)。在通信系统B中，基本上联系无线通信终端100与无线通信基站500之间的无线资源的确保状况，具有在无线通信基站500及基站控制装置600中需要的通信资源。因此，基本上不具有仅对无线通信基站500或基站控制装置600保留通信资源的暂时脱离处理及暂时脱离解除处理的功能。

[0093] 连接释放处理完成后的无线通信终端100在通信系统A中进行小区探索，选择待机的小区(S116)。无线通信终端100经由所选择的小区的无线通信基站200对移动管理装置300传送CSFB结束通知(S117)。接收到了CSFB结束通知的移动管理装置300对网关装置400进行暂时脱离解除(再继续(resume))处理(S118)。在暂时脱离解除处理中，移动管理装置300和网关装置400在步骤S109中进行部分释放或暂时停止的通信资源的再确保或再开始，或进行部分删除的管理信息的再建立。如果需要，则在两者之间交换控制消息。此外，也可以将以无线通信终端100为目的地缓冲的数据开始向无线通信终端100转送。并且，无线通信终端100成为通信系统A中的待机状态(S119)。

[0094] 以上是以往的声音来信时的CSFB处理的流程。声音发信时的CSFB处理的流程在通信系统B的捕捉前对网关装置400进行暂时脱离处理、在通信系统B中的声音通信结束后再捕捉通信系统A而对网关装置400进行暂时脱离解除处理的情况与声音来信时的流程相同。

[0095] 有关实施方式1的无线通信终端100处理的流程

[0096] 接着，参照图4A及图4B，说明有关实施方式1的无线通信终端100的处理。

[0097] 另外，图4A及图4B所示的各步骤通过由控制部112执行存储在存储部107中的动作控制程序，通过控制部112的控制来执行。

[0098] 如果将无线通信终端100的电源接通(S200)，则控制部112控制第一无线通信部101，捕捉通信系统A。第一无线通信部101在通信系统A中成为待机状态(S201)。此时，不进行第二无线通信部102的通信系统B的捕捉处理及接收状态测量。在此状态下，在接收到声音通信开始指示的情况下(S202：是)，控制部112对通信系统A(即无线通信基站200)经由第一无线通信部101发送CSFB开始通知(S203)。另一方面，在没有接收到声音通信开始指示的情况下(S202：否)，控制部112等到接收到声音通信开始指示(S202)。另外，所谓声音通信开始指示，是与图3的步骤S103同样的来自其他终端装置的声音来信通

知、或用户操作操作部 103 而进行发信操作，控制部 112 发出的声音发信处理开始指示。此外，步骤 S203 的 CSFB 开始通知与图 3 的步骤 S104 的 CSFB 开始通知相同。

[0099] 在步骤 S203 中发送了 CSFB 开始通知之后，控制部 112 等待接收从通信系统 A 的基站 200 经由第一无线通信部 101 向通信系统 B 的转移指示 (S204)。这相当于图 3 的步骤 S107 的重定向指示。如果第一无线通信部 101 接收到向通信系统 B 的转移指示 (S204 ：是)，则控制部 112 通过第二无线通信部 102 进行通信系统 B 的捕捉处理 (S205)。即，进行捕捉无线通信基站 500 的处理。这相当于图 3 的步骤 S110。如果通信系统 B 的小区的捕捉成功 (S206 ：是)，则控制部 112 经由第二无线通信部 102 对该小区发送发信请求 (S207)。这相当于图 3 的步骤 S111 的处理。另一方面，在通信系统 B 的小区的捕捉失败的情况下 (S206 ：否)，控制部 112 通过第一无线通信部 101 在通信系统 A 中重新进行小区选择 (S208)，回到步骤 S201 的状态。

[0100] 在执行了步骤 S207 之后，无线通信终端 100 在控制部 112 的控制下，在通信系统 B 中成为通话状态 (S209)。这相当于图 3 的步骤 S113。

[0101] 无线通信终端 100 如果结束通信系统 B 中的通话 (S210 ：是)，则定时器管理部 108 使定时器开始计测 (S211)。例如，在用户操作操作部 103 而指示了通话结束的情况下，在由通信系统 B 指示了通信的切断的情况下，或者在来自通信系统 B 的无线通信基站 500 的接收电波的强度为基准值以下而将通信切断的情况下等，控制部 112 响应于来自第二无线通信部 102 的通话切断的通知等，控制定时器管理部 108，开始计时。

[0102] 如果经过规定的时间而定时器到时 (S212 ：是)，则定时器管理部 18 将该情况通知给控制部 112。控制部 112 响应于通知，控制第一无线通信部 101，进行通信系统 A 的捕捉处理 (S213)。这相当于图 3 的步骤 S116。另外，这里规定的时间设定为认为用户再次进行发信操作的可能性较高的长度，例如设定为 30 秒。

[0103] 如果通信系统 A 的小区的捕捉成功 (S216 ：是)，则控制部 112 控制第一无线通信部 101，对该小区发送 CSFB 结束通知 (S217)。这相当于图 3 的步骤 S117。如果以上完成，则回到第一无线通信部 101 的、通信系统 A 中的待机状态 (S201)。这相当于图 3 的步骤 S119。在步骤 S216 中通信系统 A 的小区的捕捉失败的情况下 (S216 ：否)，控制部 112 控制第一无线通信部 101 及第二无线通信部 102，在所有的无线通信系统中重新进行小区选择 (S218)。如果能够捕捉到通信系统 A，则回到步骤 S201 的状态。在不能捕捉到通信系统 A 的情况下，进行通信系统 B 的捕捉处理、或进行圈外休眠处理等 (未图示)。另外，在持续接收到声音通信开始指示的情况下，重复进行以上的处理。

[0104] 在步骤 S212 中判断为定时器未到时的情况下 (S212 ：否)，无线通信终端 100 保持通信系统 B 中的待机状态 (S214)。这里，控制部 112 在接收到声音通信开始指示的情况下 (S215 ：是)，使控制回到步骤 S207，经由第二无线通信部 102 对通信系统 B 的小区发送发信请求。另一方面，如果没有接收到声音通信开始指示 (S215 ：否)，则回到定时器是否到时的判断处理 (S212)。

[0105] 如以上说明，本实施方式的无线通信终端 100 在通信系统 B 中的声音通话结束后，不是立即转移到通信系统 A 的捕捉处理，而是在满足一定的条件的情况下，即在满足规定的时间内这一条件的情况下，维持通信系统 B 的捕捉状态，然后转移到通信系统 A 的捕捉处理。通过采用该处理顺序，在声音通话结束之后、在规定的时间内由用户进行了发信操作的

情况下，能够不进行以往需要的步骤S203到S206的处理而对通信系统B发送发信请求。因此，能够缩短声音通信开始之前的时间。此外，在此期间，不需要发送步骤S217的CSFB结束通知和步骤S203的CSFB开始通知，还能够节约无线资源。

[0106] 无线通信系统10的处理的流程

[0107] 接着，利用图5对有关实施方式1的无线通信系统10的处理流程进行说明。本处理流程的大部分与图3相同，对于与图3相同的处理赋予与图3相同的序号。

[0108] 步骤S 100到S115的动作与图3的处理相同。即，作为初始状态，假设无线通信终端100在通信系统A中处于待机状态(S100)。在待机状态(步骤S100)下，在由通话对方以无线通信终端100为目的地进行了声音发信处理的情况下，以无线通信终端100为目的地的声音来信通知传送到通信系统B的基站控制装置600(S101)。基站控制装置600将以无线通信终端100为目的地的声音来信通知跨过通信系统A和B之间而传送给通信系统A的移动管理装置300(S102)。移动管理装置300将以无线通信终端100为目的地的声音来信通知经由无线通信基站200传送给无线通信终端100(S103)。

[0109] 接收到了声音来信通知的无线通信终端100经由无线通信基站200对移动管理装置300传送CSFB开始通知(S104)。移动管理装置300对无线通信基站200传送CSFB开始通知(S105)。

[0110] 无线通信终端100定期地测量待机小区的接收状态和周边小区的接收状态，对无线通信基站200报告其结果(S106)。

[0111] 接收到了无线通信终端100发送测量结果报告的无线通信基站200对无线通信终端100通知重定向指示，起动连接释放处理(S107)。

[0112] 如果连接释放处理完成，则无线通信基站200对移动管理装置300传送连接释放通知(S108)。接收到了连接释放通知的移动管理装置300对网关装置400进行暂时脱离(暂停)处理(S109)。在暂时脱离处理中，移动管理装置300和网关装置400将为了传送以无线通信终端100为目的地的数据而确保的通信资源进行部分释放或暂时停止，或将关联的管理信息等进行部分删除。

[0113] 在步骤S107中进行了连接释放处理的无线通信终端100进行通信系统B的捕捉处理(S110)。

[0114] 接着，对捕捉到的通信系统B的无线通信基站500进行来信应答处理及连接建立处理(S111)。无线通信基站500在与基站控制装置600之间进行来信应答处理及连接建立处理(S112)。

[0115] 如果步骤S111、S112的处理完成，则无线通信终端100成为能够在通信系统B上进行声音通话的状态(S113)。

[0116] 如果声音通话结束，则无线通信终端100进行与无线通信基站500之间的连接释放处理(S114)。此外，无线通信基站500进行与基站控制装置600之间的连接释放处理(S115)。

[0117] 如果声音通话结束、且在S114、S115中将无线通信终端100与无线通信基站500间的连接、无线通信基站500与基站控制装置600间的连接释放，则无线通信终端100的定时器管理部108起动定时器(S120)。这相当于图4B的步骤S211。如果在此状态下经过规定的时间而定时器到时(S121)，则向步骤S116的待机小区选择处理转移。在定时器到时之

前，无线通信终端 100 保持通信系统 B 中的待机状态。其后的步骤 S117 到 S119 的动作与图 3 的处理相同。在 S119 的状态下对无线通信终端 100 有新的声音通信开始指示的情况下，再次进行步骤 S104 到 S110 的一系列的处理，向声音通话处理转移。

[0118] 但是，在步骤 S121 的定时器到时前、对无线通信终端 100 有新的声音通信开始指示的情况下（相当于图 4B 的 S215 ：是），无线通信终端 100 对无线通信基站 500 发出声音通信开始请求 (S122)，进行连接建立处理、声音通信处理 (S123)。然后，在定时器到时的情况下 (S121)，进行与图 3 的 S116 到 S119 所示的处理同样的处理。

[0119] 通过如以上那样进行处理，在连续进行声音通信动作时，能够缩短声音通信开始之前的时间，能够提高无线通信系统的方便性。此外，由于在此期间不需要发送步骤 S117 的 CSFB 结束通知和 S104 的 CSFB 开始通知，所以还能够节约无线资源。

[0120] 另外，也可以由用户设定操作部 103，以便能够将由定时器计测的“规定的时间”设定、存储到存储部 107 等中。在此情况下，在步骤 S211 中，控制部 112 读取存储在存储部 107 中的时间，定时器管理部 108 将所读取的时间设定到定时器中。

[0121] 此外，也可以是，控制部 112 每次计时并记录从声音通话的结束到下次声音通话的开始的时间，将其统计处理，并将认为用户再次进行发信操作的可能性较高的时间自动设定为规定的时间。例如，也可以是求出从通话结束到再通话的时间并进行统计处理，将覆盖再通话的 80％以上的时间设定为规定时间。

[0122] （实施方式 2）

[0123] 在实施方式 1 中，在声音通话结束后经过规定的时间为止，第二通信部 102 维持捕捉了通信系统 B 的状态。但是，在显然用户不再进行声音通话情况下，希望将通信系统 A 的暂时脱离状态迅速解除。以下，说明在判断为用户不进行声音通话的情况下，即使从声音通话结束起是规定时间内、也结束暂时脱离状态的实施方式。

[0124] 另外，本实施方式的无线通信系统 10 和无线通信终端 100 的结构分别与图 1 及图 2 所示的结构相同。

[0125] 此外，这些基本动作也与参照图 4A 及图 4B、图 5 说明的动作大致相同，以下，参照图 6 对无线通信终端 100 的动作的特征性的部分进行说明。

[0126] 在本实施方式中，也是控制部 112 进行图 4A 及图 4B 的步骤 S200 ～ S209 的处理，通过通信系统 B 进行声音通话，如果检测到通话结束 (S210 ：是)，则起动定时器 (S211)。在步骤 S211 中开始计测的定时器没有到时的期间 (S212 ：否)，控制部 112 基于终端状态检测部 109 检测到的值，进行是否为用户不进行声音通话的状态、具体而言无线通信终端 100 是否为规定的终端状态的判断处理 (S219)。对于该判断处理在后面说明。在判断为成为了规定的终端状态的情况下 (S219 ：是)，无线通信终端 100 不等待定时器到时而转移到通信系统 A 的捕捉处理 (S213)。在判断为没有成为规定的终端状态的情况下 (S219 ：否)，无线通信终端 100 保持通信系统 B 中的待机状态 (S214)。

[0127] 这样，通过在通信系统 B 中的声音通话结束后的规定的时间处于通信系统 B 的待机状态，在规定时间的期间用户进行了发信操作的情况下能够缩短声音通信开始之前的时间。进而，在虽然是经过规定的时间之前、但用户进行了表示不进行声音通话的规定的动作的情况下，具体而言，在无线通信终端 100 的状态成为了规定的状态的情况下，通过回到通信系统 A 的待机状态，在用户进行发信操作的可能性变低的情况下成为在通信系统 A 中能

够迅速起动数据通信的状态，能够提高使用方便性。

[0128] 这里，说明步骤 S219 的判断处理的具体例。

[0129] 例如，假设无线通信终端 100 是将多个壳体通过铰链结合的折叠型，终端状态检测部 109 由检测无线通信终端 100 的开闭状态的开关构成。在此情况下，在声音通话结束后，如果无线通信终端 100 被折叠，则通常理解为用户没有再开始声音通话的意愿。所以，在无线通信终端 100 成为闭合的状态的情况下，终端状态检测部 109 根据用户的规定的动作判断为无线通信终端 100 成为了规定的终端状态。

[0130] 此外，假设例如无线通信终端 100 是多个壳体可滑动地结合的滑动型，终端状态检测部 109 由检测多个壳体被叠合面紧凑化的关闭状态的开关构成。在此情况下，在声音通话结束后，如果构成无线通信终端 100 的壳体被叠合面关闭，则通常理解为用户没有再开始声音通话的意愿。所以，在无线通信终端 100 成为闭合的状态的情况下，终端状态检测部 109 根据用户的规定的动作判断为无线通信终端 100 成为了规定的终端状态。在这些情况下，如果由终端状态检测部 109 检测到无线通信终端 100 被闭合，则控制部 112 看作为“是”判断，进行通信系统 A 的捕捉处理。

[0131] 这样，通过在通信系统 B 中的声音通话结束后的规定时间处于通信系统 B 的待机状态，在规定的时间的期间用户进行了发信操作的情况下，能够缩短声音通信开始之前的时间。进而，在声音通话结束后，在虽然是经过规定的时间之前、但无线通信终端 100 被闭合的情况下，通过回到通信系统 A 的待机状态，在用户进行发信操作的可能性变低的情况下成为在通信系统 A 中能够迅速起动数据通信的状态。因而，能够提高使用方便性。

[0132] 此外，也可以将规定的终端状态设为“无线通信终端 100 被从亮处放到暗处的状态”。在此情况下，终端状态检测部 109 例如由检测无线通信终端 100 的周围的亮度的光传感器构成。在此情况下，如果终端状态检测部 109 检测到无线通信终端 100 的周围的亮度从比基准亮的状态变化为比基准暗的状态，则控制部 112 在步骤 S219 中判断为“是”，进行通信系统 A 的捕捉处理。无线通信终端 100 的周围的亮度从比基准亮的状态变化为比基准暗的状态的情况例如是无线通信终端 100 被放到了包中或袋中那样的暗处的情况。

[0133] 这样，通过在通信系统 B 中的声音通话结束后的规定的时间处于通信系统 B 的待机状态，在规定的时间的期间用户进行了发信操作的情况下能够缩短声音通信开始之前的时间。进而，在虽然是经过规定的时间之前、但无线通信终端 100 被放到包中等的情况下，通过回到通信系统 A 的待机状态，在用户进行发信操作的可能性变低的情况下能够在通信系统 A 中迅速起动数据通信。因而，能够提高使用方便性。

[0134] 此外，也可以将规定的终端状态设为“无线通信终端 100 被放置到稳定的地方的状态”。在此情况下，终端状态检测部 109 例如由检测无线通信终端 100 的振动及朝向的加速度传感器或接触传感器构成。在此情况下，如果终端状态检测部 109 检测到无线通信终端 100 的运动比规定的大小小，则控制部 112 在步骤 S219 中判断为“是”，进行通信系统 A 的捕捉处理。无线通信终端 100 的运动比规定的大小小的情况例如是无线通信终端 100 被放置到桌子上或支架 (cradle) 那样的稳定的地方的情况。

[0135] 这样，通过在通信系统 B 中的声音通话结束后的规定时间处于通信系统 B 的待机状态，在规定的时间的期间用户进行了发信操作的情况下，能够缩短声音通信开始之前的时间。进而，在虽然是经过规定的时间之前、但无线通信终端 100 被放置到桌子上等的情况

下，通过回到通信系统 A 的待机状态，在用户进行发信操作的可能性变低的情况下成为在通信系统 A 中能够迅速起动数据通信的状态，能够提高使用方便性。

[0136] 此外，也可以将规定的终端状态设为“无线通信终端 100 具备的规定的应用被起动的状态”。在此情况下，终端状态检测部 109 例如由取得无线通信终端 100 具备的各种应用的起动状态的程序等构成。在此情况下，如果由终端状态检测部 109 检测到存储在无线通信终端 100 的存储部 107 中的规定的应用程序被起动，则控制部 112 在步骤 S219 中判断为“是”，进行通信系统 A 的捕捉处理。规定的应用程序是与声音通信无关的应用，例如是照相机的应用程序、电视的应用程序、浏览器的应用程序、邮件的应用程序等。另外，在通过用户操作明示地发出了通信系统 B 中的待机状态解除的指示的情况下也是同样的。此外，这里所说的应用程序的起动，不仅包括从最初起动应用程序的情况，还包括以步骤 S202 的声音通信开始指示为触发而再开始已中断的应用程序的执行、或在后台动作的应用程序开始动作的情况。

[0137] 这样，通过在通信系统 B 中的声音通话结束后的规定的时间处于通信系统 B 的待机状态，在规定的时间的期间用户进行了发信操作的情况下能够缩短声音通信开始之前的时间。进而，在虽然是经过规定的时间之前、但与声音通信无关的应用被起动的情况下，通过回到通信系统 A 的待机状态，在用户进行发信操作的可能性变低的情况下成为能够在通信系统 A 中迅速起动数据通信的状态，能够提高使用方便性。

[0138] 另外，“规定的终端状态”并不限定于以上例示的状态。此外，将以上例示的状态怎样组合都可以。例如，也可以在步骤 S219 中检测到无线通信终端 100 被闭合、或者检测到无线通信终端 100 的周围从明变化为暗的情况下转移到通信系统 A 的捕捉处理。

[0139] （实施方式 3）

[0140] 在上述实施方式 1 及 2 中，如果在声音通话结束后经过一定期间，则将通信系统 B 释放，但在用户进行了准备下一声音通话的规定的行为的情况下等，继续捕捉通信系统 B 反而效率更好。以下，说明在用户准备声音通话的情况下继续捕捉通信系统 B 的实施方式 3。

[0141] 另外，本实施方式中的无线通信系统 10 和无线通信终端 100 的结构分别与图 1 及图 2 所示的结构相同。

[0142] 此外，这些基本动作也与参照图 4A 及图 4B、图 5 说明的动作大致相同，以下，参照图 7 对无线通信终端 100 的动作的特征性的部分进行说明。

[0143] 在本实施方式中，也是控制部 112 进行图 4A 及图 4B 的步骤 S200 ～ S209 的处理，通过通信系统 B 进行声音通话。控制部 112 如果检测到通话结束 (S210 ：是)，则起动定时器 (S211)。

[0144] 在步骤 S211 中开始了计测的定时器没有到时的期间 (S212 ：否)，控制部 112 进行通信对方确定信息取得部 111 是否已被起动的判断处理 (S220)。通信对方确定信息取得部 111 已被起动的状态，例如是电话簿 (地址簿) 功能已被起动的状态、通过用户操作开始了发信电话号码的输入的状态、接入了 Web 上的电话号码数据库功能等的状态的某个或它们的组合等、用户进行了规定的行为的状态。在判断为通信对方确定信息取得部 111 已被起动的情况下 (8220 ：是)，等待已被起动的通信对方确定信息取得部 111 的处理结束 (S221)。在通信对方确定信息取得部 111 的处理已结束的情况下 (S221 ：是)，回到图 4B 的

S211，将定时器复位，重新开始计测。在判断为通信对方确定信息取得部 111 没有被起动的情况下（S220 ：否），无线通信终端 100 保持通信系统 B 中的待机状态（S214）。

[0145] 这样，在声音通话结束后经过规定的时间之前、电话簿功能等被起动的情况下，通过在该电话簿功能等的处理结束之前处于通信系统 B 的待机状态，在此期间用户进行了发信操作的情况下能够缩短声音通信开始之前的时间，能够提高使用方便性。

[0146] 另外，并不限于通话先信息取得部的起动以及通信对方信息的取得，也可以是，在检测到理解为用户开始了用于声音通话的处理的规定的行为的情况下，例如在检测到在无线通信终端 100 上连接了耳机的情况下，返回到图 4B 的步骤 S211。通过这样，在用户进行了发信操作的情况下能够缩短声音通信开始之前的时间，能够提高使用方便性。

[0147] （实施方式 4）

[0148] 根据已结束的声音通话的内容及种类的不同，有用户再开始声音通信的可能性较小、与维持捕捉了通信系统 B 的状态相比迅速切换到捕捉通信系统 A 的状态效率更好的情况。以下，说明对应于这样的情况的实施方式 4。

[0149] 另外，本实施方式中的无线通信系统 10 和无线通信终端 100 的结构分别与图 1 以及图 2 所示的结构相同。

[0150] 此外，它们的基本动作也与参照图 4A 及图 4B、图 5 说明的动作大致相同，以下，参照图 8 说明无线通信终端 100 的动作的特征性的部分。

[0151] 在本实施方式中，也是控制部 112 进行图 4A 及图 4B 的步骤 S200 ～ S209 的处理，通过通信系统 B 进行声音通话。控制部 112 如果检测到通话结束（S210 ：是），则经由第二无线通信关联信息取得部 110 取得与第二无线通信部 102 进行的无线通信关联的信息，控制部 112 基于该信息进行紧前的声音通话是否满足规定条件的判断处理（S222）。对于该判断处理在后面说明。

[0152] 在步骤 S222 中，在判断为满足规定条件的情况下（S222 ：是），定时器管理部 108 开始定时器的计时（S211）。如果经过规定的时间而定时器到期（S212 ：是），则进行通信系统 A 的捕捉处理（S213）。另一方面，在定时器没有到期的期间（S212 ：否），无线通信终端 100 保持通信系统 B 中的待机状态（S214）。

[0153] 另一方面，在步骤 S222 的判断处理中判断为不满足规定条件的情况下（S222 ：否），立即进行通信系统 A 的捕捉处理（S213）。

[0154] 这样，在通信系统 B 中的声音通话结束后，通常立即回到通信系统 A 的待机状态，成为能够在通信系统 A 中迅速起动数据通信的状态，仅在满足规定条件的情况下，使得在规定的时间的期间处于通信系统 B 的待机状态，由此，在规定的时间的期间用户进行了发信操作的情况下能够缩短声音通信开始之前的时间，能够提高使用方便性。

[0155] 这里，说明步骤 S222 的判断处理的具体例。

[0156] 作为相应于规定条件的例子，可以举出“紧前的声音通话的通话对方是无人值守电话网络服务的情况”。在此情况下，对无人值守电话网络服务打电话，在该通话结束之后对留下了无人值守电话消息的对方立即重新打电话的可能性较高。因此，在规定时间的期间保持通信系统 B 中的待机状态。在除此以外的情况下立即回到通信系统 A 的待机状态。作为另一例，可以举出“紧前的通话对方是事前登记的、经常相互打电话的组成员的情况”的例子。在此情况下，对组成员中的一个人打电话、在该通话结束后立即对同组的其他成员

重新打电话的可能性较高。因此，在规定时间的期间保持通信系统 B 中的待机状态。在除此以外的情况下立即回到通信系统 A 的待机状态。

[0157] 为了实现这些处理，例如，第二无线通信关联信息取得部 110 具有在第二无线通信部 102 的发信时保存通话对方信息的功能、在来信时保存由无线通信基站通知的通话对方信息的功能、将它们读出的功能等。此外，在存储部 107 中事前保存有事前确定的通话对方的信息。控制部 112 在步骤 S222 中判断第二无线通信关联信息取得部 110 取得的信息是否与记录在存储部 107 中的指定的通话对方信息一致，在一致的情况下判断为紧前的声音通话满足规定条件。

[0158] 这样，在通信系统 B 中的声音通话结束后，通常立即回到通信系统 A 的待机状态，成为能够在通信系统 A 中迅速起动数据通信的状态，仅在与指定的通话对方结束了通话时，在规定的时间的期间处于通信系统 B 的待机状态，由此在规定的时间的期间用户进行了发信操作的情况下能够缩短声音通信开始之前的时间，能够提高使用方便性。

[0159] 例如，在图 4B 的步骤 S209 中，也可以将不能正常地开始声音通话的情况判断为满足规定的条件。在此情况下，如果 S209 中的声音通话不成立，则用户立即对同一对方打电话、或对别的对方打电话的可能性较高，所以在规定的时间的期间保持通信系统 B 中的待机状态。在除此以外的情况下立即回到通信系统 A 的待机状态。在此情况下，第二无线通信关联信息取得部 110 是具有保存第二无线通信部 102 的发信处理的成功与否的功能、将其读出的功能等的处理部。控制部 112 在第二无线通信关联信息取得部 110 取得的声音通话成功与否信息表示声音通话不成立的情况下，判断为紧前的声音通话满足规定条件，前进到步骤 S211，在规定的时间的期间保持通信系统 B 中的待机状态。在除此以外的情况下立即回到通信系统 A 的待机状态。

[0160] 这样，在通信系统 B 中的声音通话结束后，通常立即回到通信系统 A 的待机状态，成为能够在通信系统 A 中迅速起动数据通信的状态，仅在紧前的声音通话不成立的情况下，使得在规定的时间的期间处于通信系统 B 的待机状态，由此，在规定的时间的期间用户进行了发信操作的情况下能够缩短声音通信开始之前的时间，能够提高使用方便性。

[0161] 此外，也可以是，在步骤 S209 的声音通话没有正常结束时，在步骤 S222 中判断为紧前的声音通话满足规定的“规定条件”。在声音通话没有正常结束的情况下，用户立即对同一对方打电话的可能性较高。因此，在声音通话没有正常结束的情况下，在规定的时间的期间保持通信系统 B 中的待机状态。在除此以外的情况下立即回到通信系统 A 的待机状态。在此情况下，第二无线通信关联信息取得部 110 由具有取得并保存第二无线通信部 102 的通信结束时的电波状况的功能、将其读出的功能等的处理部、或者由保存表示是否从无线通信基站接收到了正常结束通话通知的信息的功能、将其读出的功能等的处理部、或者由监视第二无线通信部 102 的通话状况（声音通话继续的状态还是无声状态）的功能、保存结束通话时点的通话状况的功能、将其读出的功能等的处理部等构成。此外，控制部 112 在第二无线通信关联信息取得部 110 取得的声音通话结束状态信息表示不是正常的通话结束的情况下，在步骤 S222 中判断为紧前的声音通话满足预定条件，在规定的时间的期间保持通信系统 B 中的待机状态。在除此以外的情况下立即回到通信系统 A 的待机状态。

[0162] 这样，在通信系统 B 中的声音通话结束后，通常立即回到通信系统 A 的待机状态，成为能够在通信系统 A 中迅速起动数据通信的状态，仅在紧前的声音通话异常结束的情况

下，使得在规定的时间的期间处于通信系统 B 的待机状态，由此，在规定的时间的期间用户进行了发信操作的情况下能够缩短声音通信开始之前的时间，能够提高使用方便性。

[0163] 另外，判断为紧前的声音通话满足规定的条件的条件是例示，也可以设定其他条件、或将上述条件适当组合等。例如，也可以是，在紧前的声音通话的通话对方已预先登记的情况、声音通话没有正常开始的情况、声音通话没有正常结束的情况中的某一个成立的情况下，判断为紧前的声音通话满足规定条件。

[0164] （实施方式 5）

[0165] 参照图 9 的流程图说明具备上述实施方式 2 ～实施方式 4 的全部功能的无线通信终端 100 的动作。

[0166] 另外，本实施方式中的无线通信系统 10 和无线通信终端 100 的结构分别与图 1 及图 2 所示的结构相同。

[0167] 首先，在本实施方式中，也是控制部 112 进行图 4A 及图 4B 的步骤 S200 ～ S209 的处理，通过通信系统 B 进行声音通话。

[0168] 接着，如果检测到通话结束 (S210 ：是)，则控制部 112 经由第二无线通信关联信息取得部 110 取得与第二无线通信部 102 进行的无线通信关联的信息，控制部 112 基于该信息进行紧前的声音通话是否满足规定条件的判断处理 (S222)。

[0169] 在通话目标不是指定的通话目标、并且将声音通话正常开始且结束的情况下，且在判断为紧前的声音通话不满足规定条件的情况下 (S222 ：否)，立即进行通信系统 A 的捕捉处理 (S213)。

[0170] 另一方面，在因通话目标是指定的通话目标、或者不能正常开始声音通话、或者不能正常结束声音通话等的理由而判断为紧前的声音通话满足规定的条件的情况下 (S222 ：是)，控制部 112 使定时器管理部 108 开始定时器的计时 (S211)。如果定时器到时 (S212 ：是)，则进行通信系统 A 的捕捉处理 (S213)。

[0171] 另一方面，在步骤 S211 中开始了计测的定时器没有到时的期间 (S212 ：否)，控制部 112 基于用户是否进行了表示不进行声音通信的行为、例如基于终端状态检测部 109 检测到的值，进行是否成为了规定的终端状态的判断处理 (S219)。在判断为成为了规定的终端状态的情况下 (S219 ：是)，无线通信终端 100 不等待定时器的到时而转移到通信系统 A 的捕捉处理 (S213)。在判断为不是规定的终端状态的情况下 (S219 ：否)，控制部 112 进行用户是否开始了声音通信的准备、例如是否起动了通信对方确定信息取得部 111 的判断处理 (S220)。在判断为通信对方确定信息取得部 111 已起动的情况下 (S220 ：是)，等待已起动的通信对方确定信息取得部 111 的处理结束 (S221)。在通信对方确定信息取得部 111 的处理已结束的情况下 (S221 ：是)，回到步骤 S211，将定时器复位，重新开始计测。在判断为通信对方确定信息取得部 111 没有起动的情况下 (S220 ：否)，无线通信终端 100 保持通信系统 B 中的待机状态 (S214)。

[0172] 这里，在接收到了声音通信开始指示的情况下 (S215 ：是)，回到步骤 S207，对通信系统 B 的小区发送发信请求。如果没有接收到声音通信开始指示 (S215 ：否)，则回到定时器是否到时的判断处理 (S212)。另外，步骤 S219 的判断处理、和步骤 S220 的判断处理的顺序也可以相反。

[0173] 通过进行上述那样的处理，在连续进行声音通信动作时，能够缩短声音通信开始

之前的时间，能够提高使用方便性。此外，在此期间，由于不需要发送 S217 的 CSFB 结束通知和 S203 的 CSFB 开始通知，所以还能够节约无线资源。

[0174] 另外，本发明并不限定于上述实施方式，当然包括在其技术范围内能够做出的各种变更、改良。例如，图 1 及图 2 所示的无线通信系统的结构及无线通信终端的功能结构也可以包括图 1 及图 2 所示的结构要件以外的结构要素，根据情况，也可以与图 1 及图 2 所示的结构不同。例如，也可以将定时器管理部 108、第二无线通信关联信息取得部 110、通信对方确定信息取得部 111 等作为控制部 112 的功能的一部分。此外，可以将终端状态检测部 109 的终端状态的条件及第二无线通信关联信息取得部 110 的规定的条件等进行各种组合，作为声音通信系统的捕捉状态的继续条件。

[0175] 上述实施方式 1 ～ 5 并不需要全部组合，可以适当组合而使用。此外，也可以将用来使控制部 112 执行上述动作的动作控制程序例如记录在记录介质中、或经由网络分发、或保存到存储部 107 中。

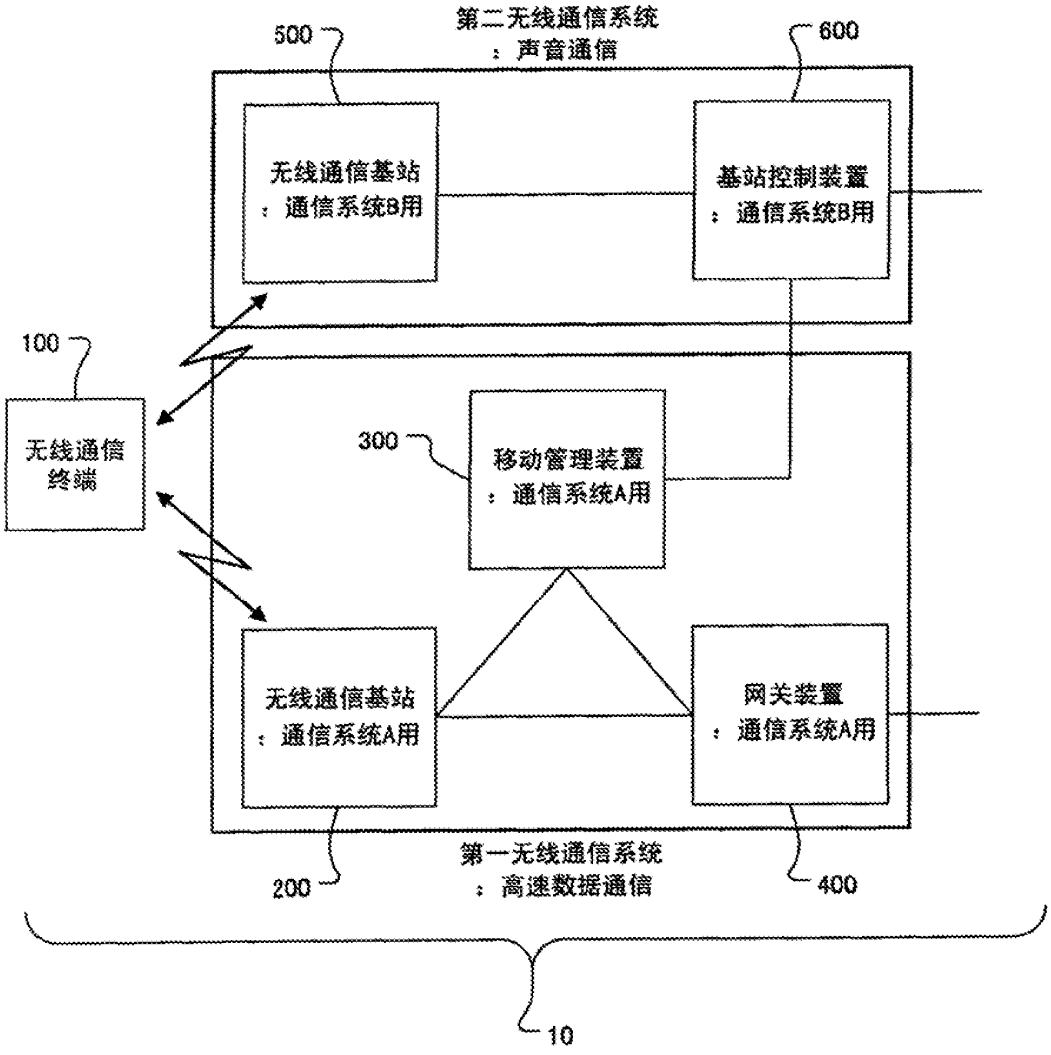

第二无线通信系统
：声音通信
500
600
无线通信基站
：通信系统B用
基站控制装置
：通信系统B用
100
无线通信
终端
300
移动管理装置
：通信系统A用
无线通信基站
：通信系统A用
网关装置
：通信系统A用
第一无线通信系统
：高速数据通信
200
400
10

图 1

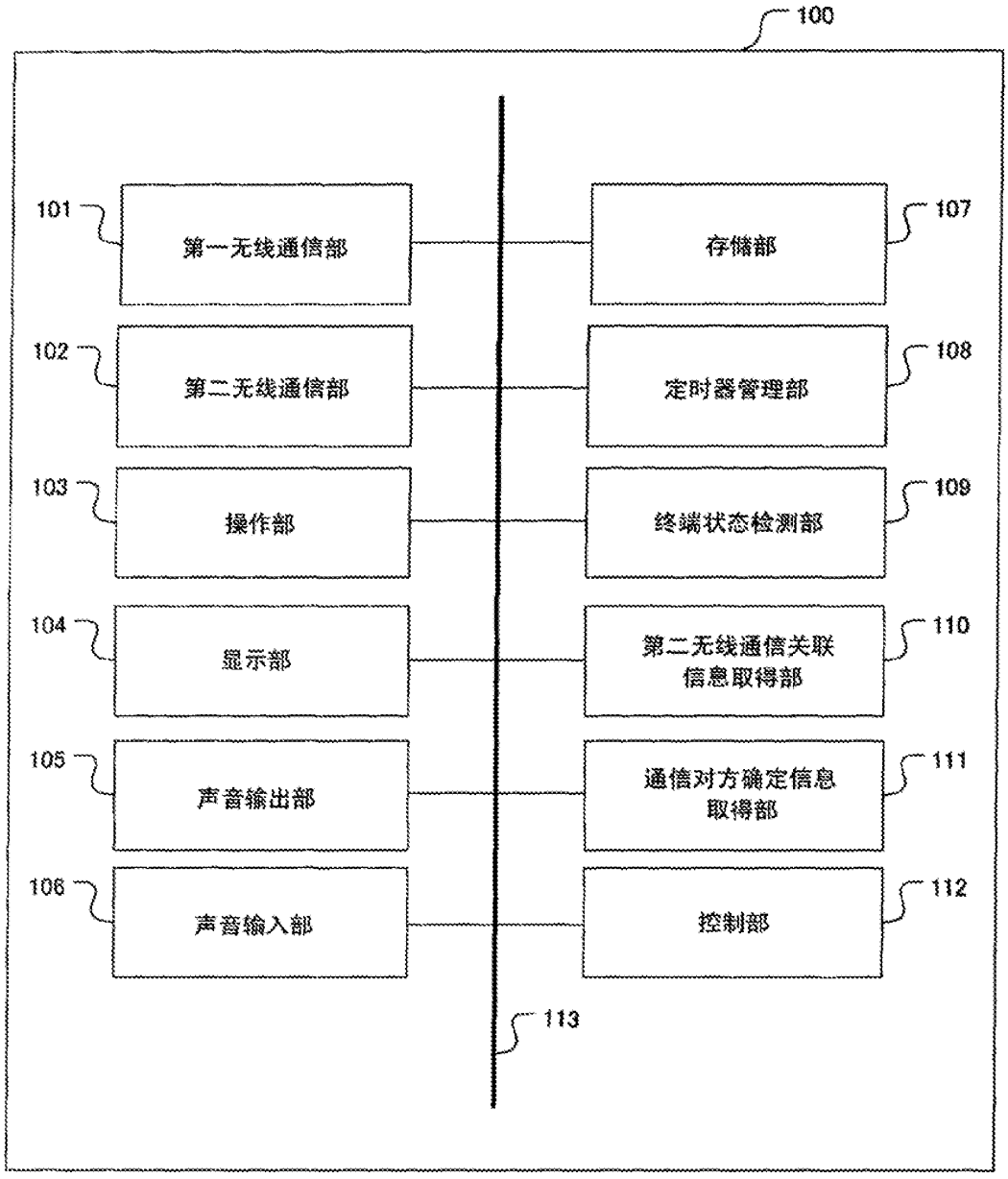

100
101
第一无线通信部
102
第二无线通信部
103
操作部
104
显示部
105
声音输出部
106
声音输入部
107
存储部
108
定时器管理部
109
终端状态检测部
110
第二无线通信关联信息取得部
111
通信对方确定信息取得部
112
控制部
113

图 2

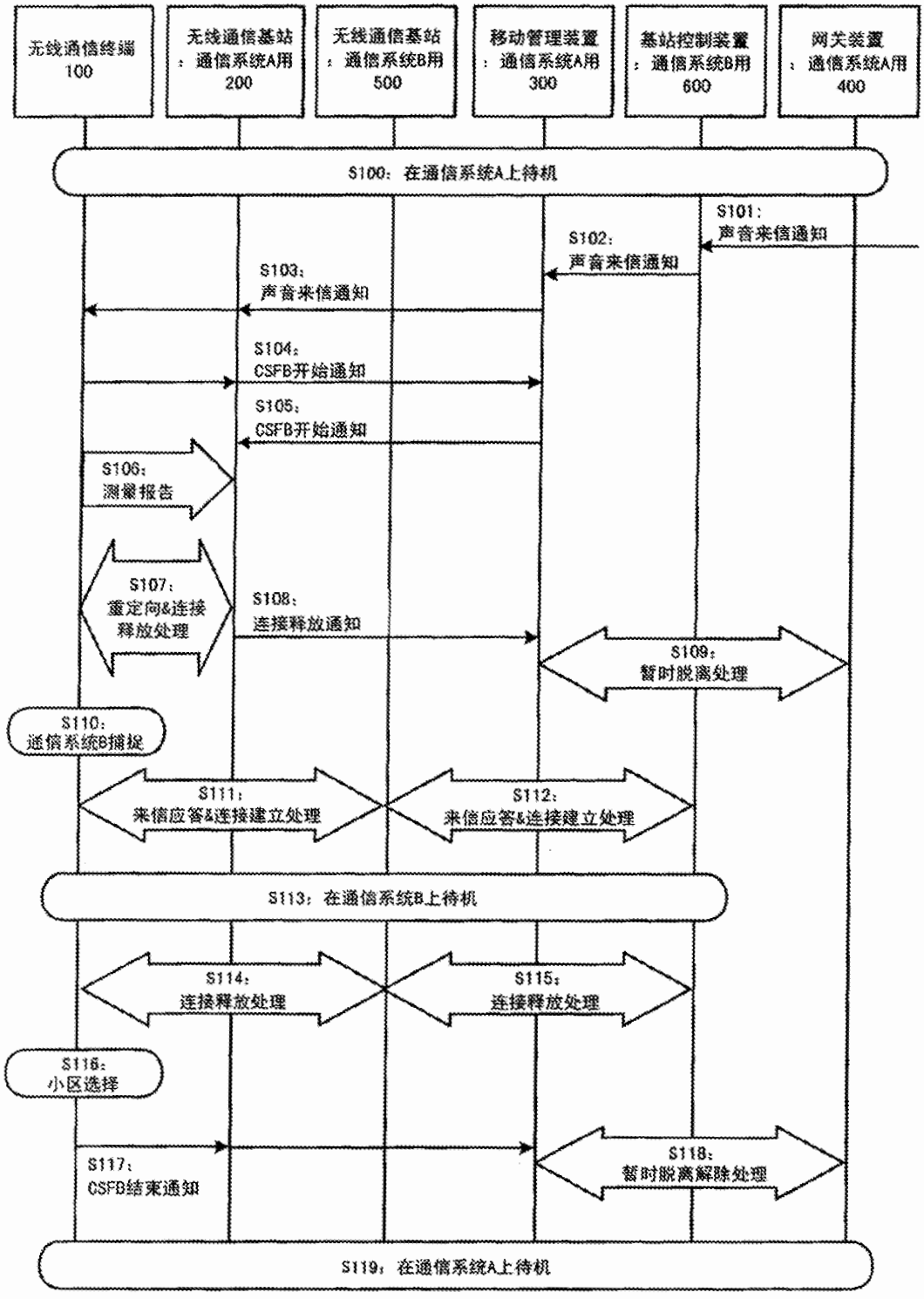

无线通信终端 100
无线通信基站：通信系统A用 200
无线通信基站：通信系统B用 500
移动管理装置：通信系统A用 300
基站控制装置：通信系统B用 600
网关装置：通信系统A用 400
S100：在通信系统A上待机
S101：声音来信通知
S102：声音来信通知
S103：声音来信通知
S104：CSFB开始通知
S105：CSFB开始通知
S106：测量报告
S107：鉴定向&连接释放处理
S108：连接释放通知
S109：暂时脱离处理
S110：通信系统B捕捉
S111：来信应答&连接建立处理
S112：来信应答&连接建立处理
S113：在通信系统B上待机
S114：连接释放处理
S115：连接释放处理
S116：小区选择
S117：CSFB结束通知
S118：暂时脱离解除处理
S119：在通信系统A上待机

图 3

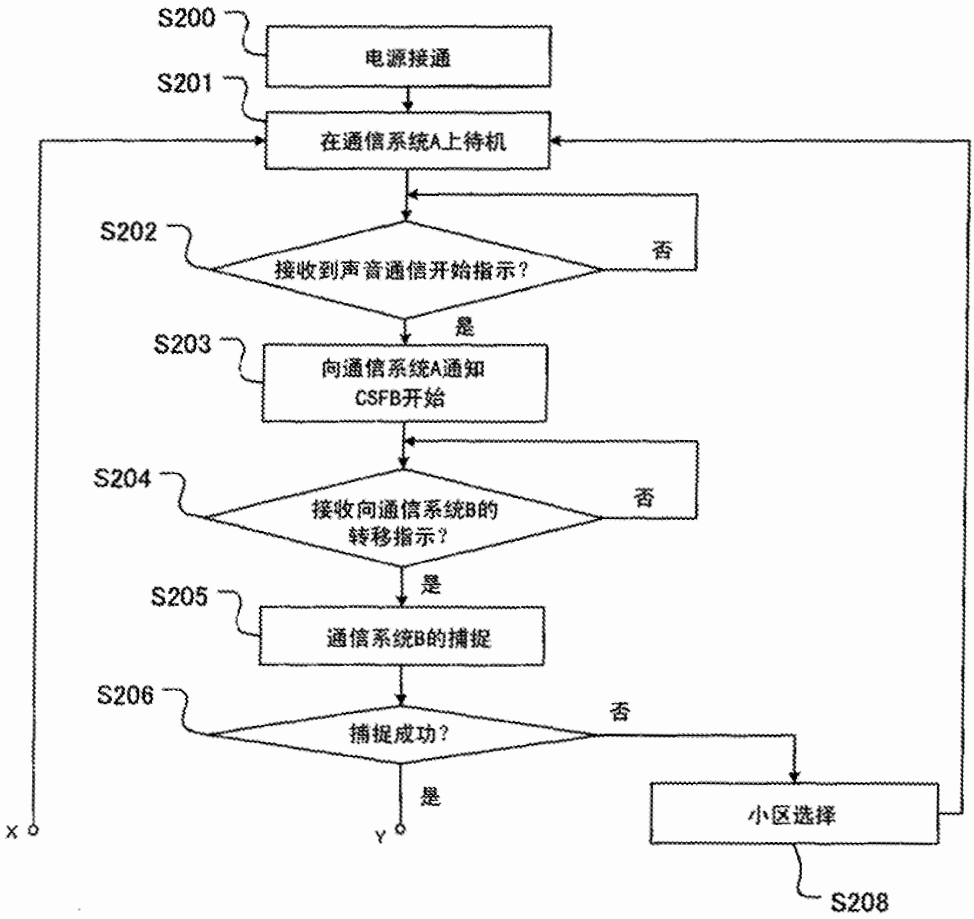

S200
电源接通
S201
在通信系统A上待机
S202
接收到声音通信开始指示？
否
是
S203
向通信系统A通知
CSFB开始
S204
接收向通信系统B的
转移指示？
否
是
S205
通信系统B的捕捉
S206
捕捉成功？
否
是
小区选择
S208
X
Y

图 4A

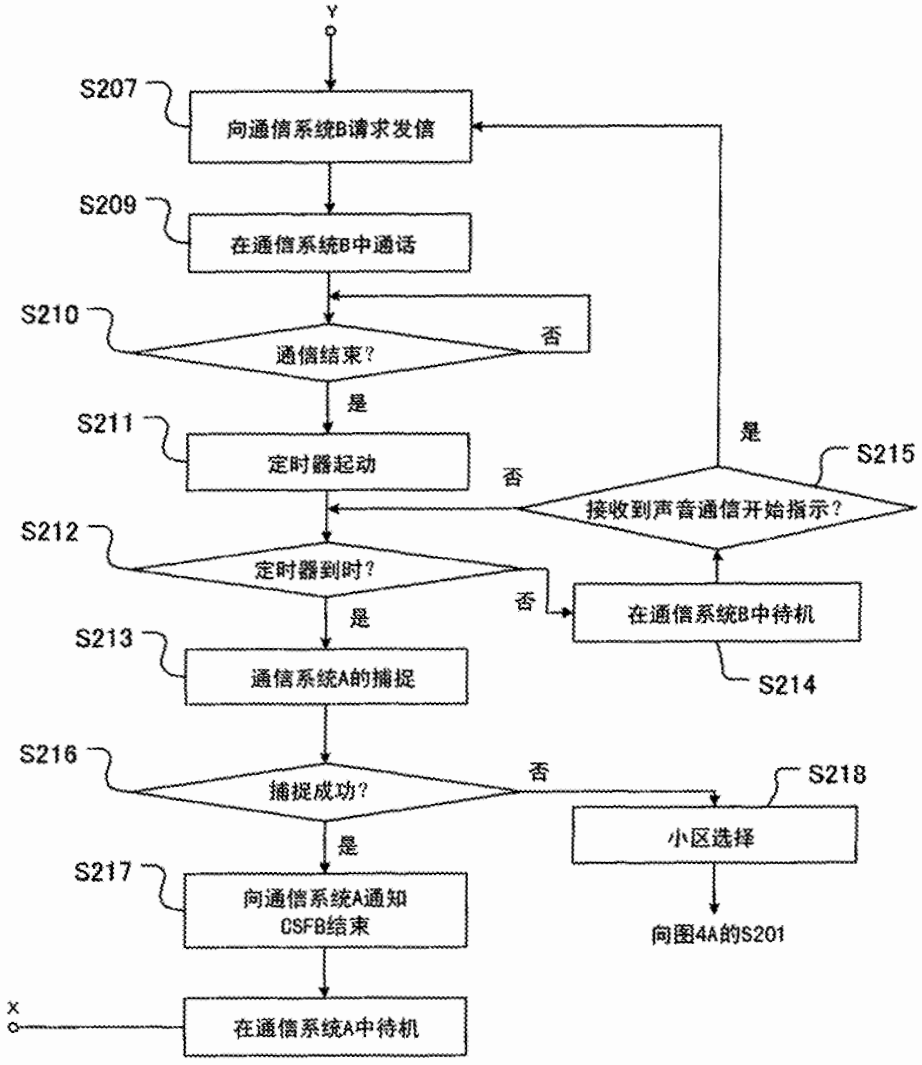

Y
S207
向通信系统B请求发信
S209
在通信系统B中通话
S210
通信结束?
否
是
S211
定时器起动
S215
是
否
接收到声音通信开始指示?
S212
定时器到时?
否
是
在通信系统B中待机
S214
S213
通信系统A的捕捉
S216
捕捉成功?
否
S218
小区选择
向图4A的S201
是
S217
向通信系统A通知
CSFB结束
X
在通信系统A中待机

图 4B

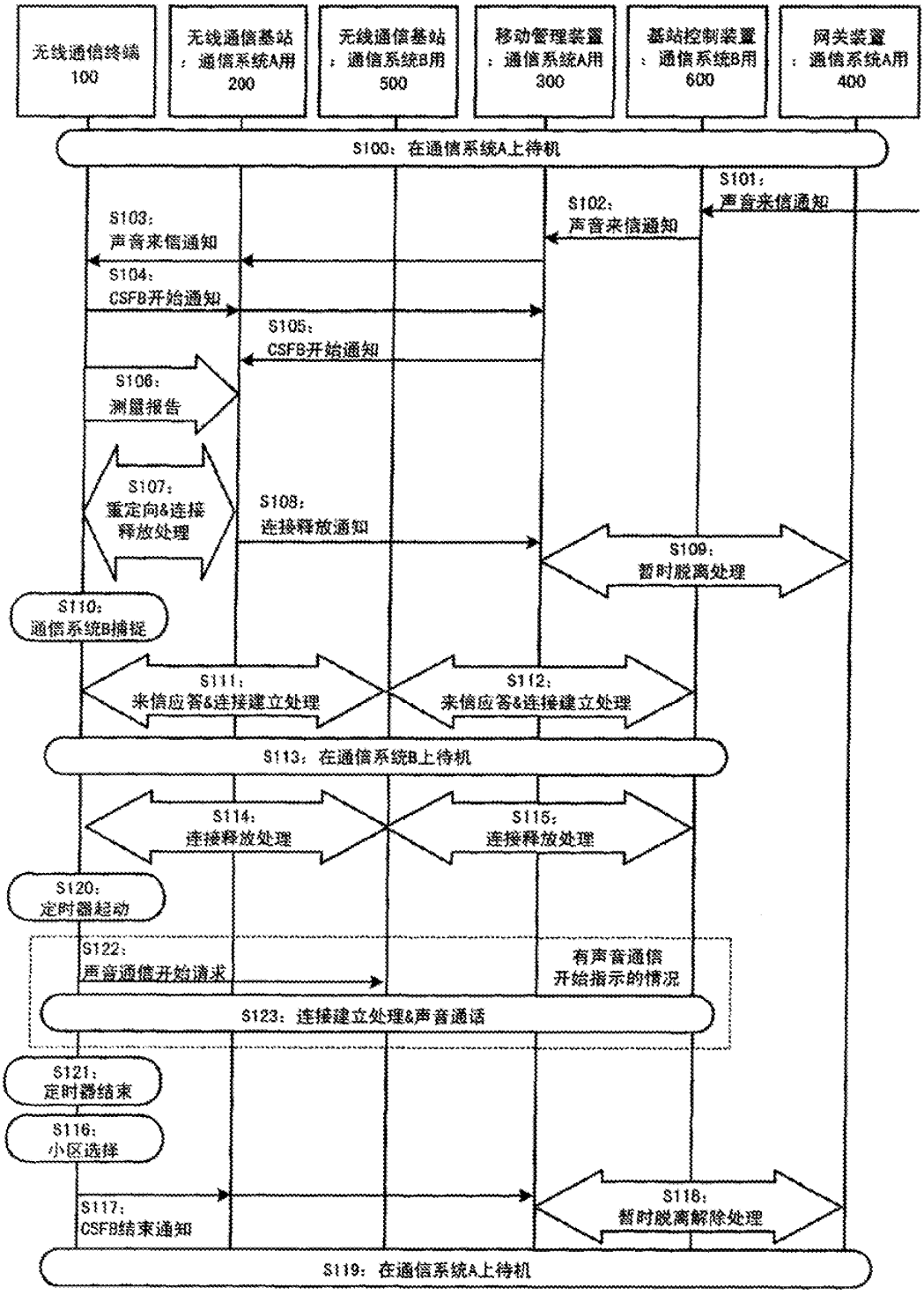

无线通信终端 100
无线通信基站：通信系统A用 200
无线通信基站：通信系统B用 500
移动管理装置：通信系统A用 300
基站控制装置：通信系统B用 600
网关装置：通信系统A用 400
S100：在通信系统A上待机
S101：声音来信通知
S102：声音来信通知
S103：声音来信通知
S104：CSFB开始通知
S105：CSFB开始通知
S106：测量报告
S107：重定向&连接释放处理
S108：连接释放通知
S109：暂时脱离处理
S110：通信系统B捕捉
S111：来信应答&连接建立处理
S112：来信应答&连接建立处理
S113：在通信系统B上待机
S114：连接释放处理
S115：连接释放处理
S120：定时器起动
S122：声音通信开始请求
有声音通信开始指示的情况
S123：连接建立处理&声音通话
S121：定时器结束
S116：小区选择
S117：CSFB结束通知
S118：暂时脱离解除处理
S119：在通信系统A上待机

图 5

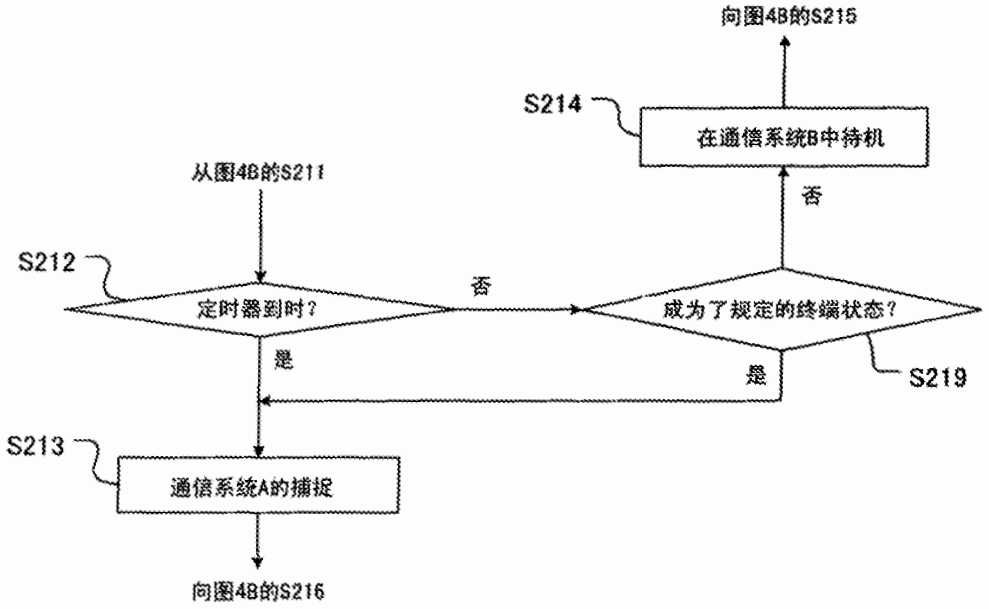

向图4B的S215
S214
在通信系统B中待机
从图4B的S211
否
S212
定时器到时?
否
成为了规定的终端状态?
是
是
S219
S213
通信系统A的捕捉
向图4B的S216

图 6

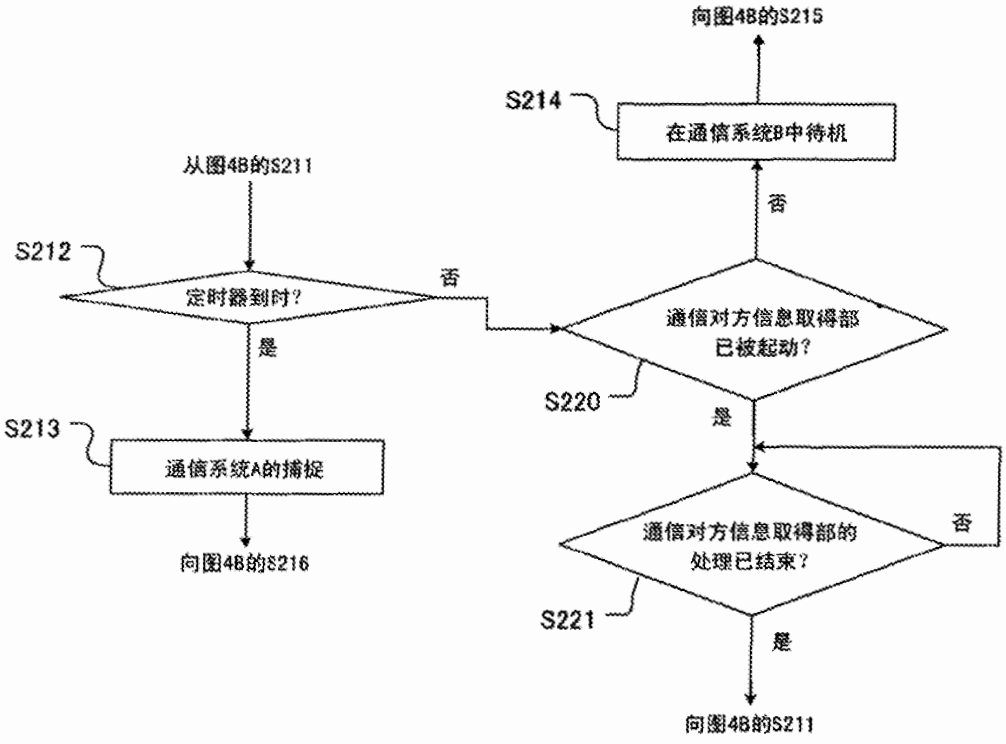

向图4B的S215
S214
在通信系统B中待机
从图4B的S211
否
S212
定时器到时?
否
通信对方信息取得部
已被起动?
是
S220
S213
通信系统A的捕捉
是
通信对方信息取得部的
处理已结束?
否
S221
是
向图4B的S216
向图4B的S211

图 7

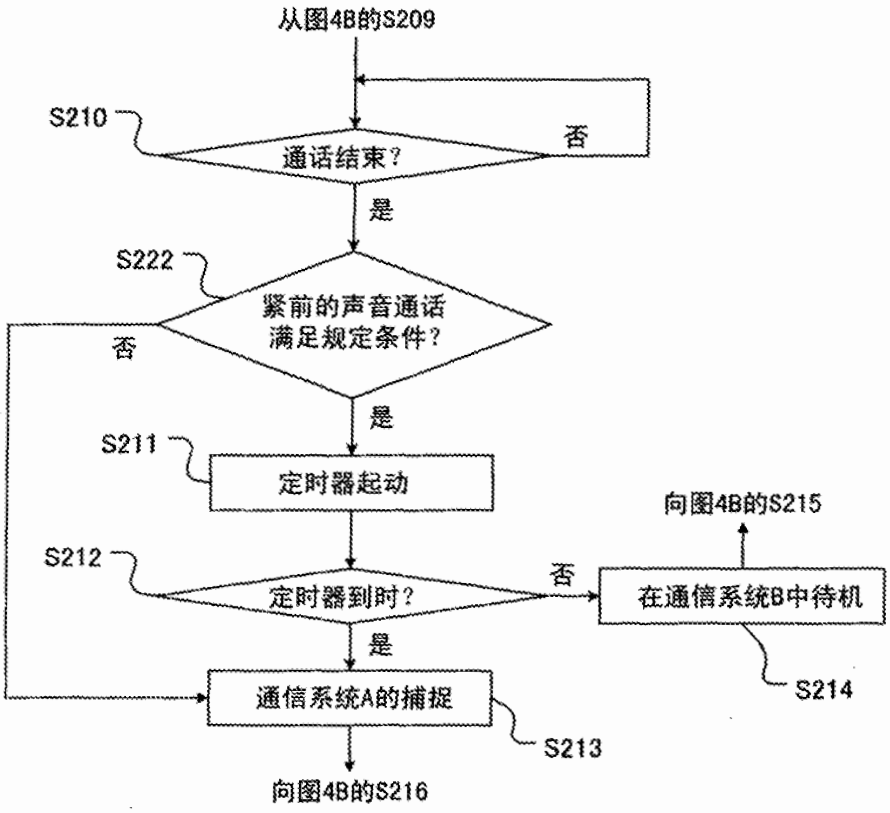

从图4B的S209
S210
通话结束？
否
是
S222
紧前的声音通话
满足规定条件？
否
是
S211
定时器起动
S212
定时器到时？
否
是
向图4B的S215
在通信系统B中待机
S214
通信系统A的捕捉
S213
向图4B的S216

图 8

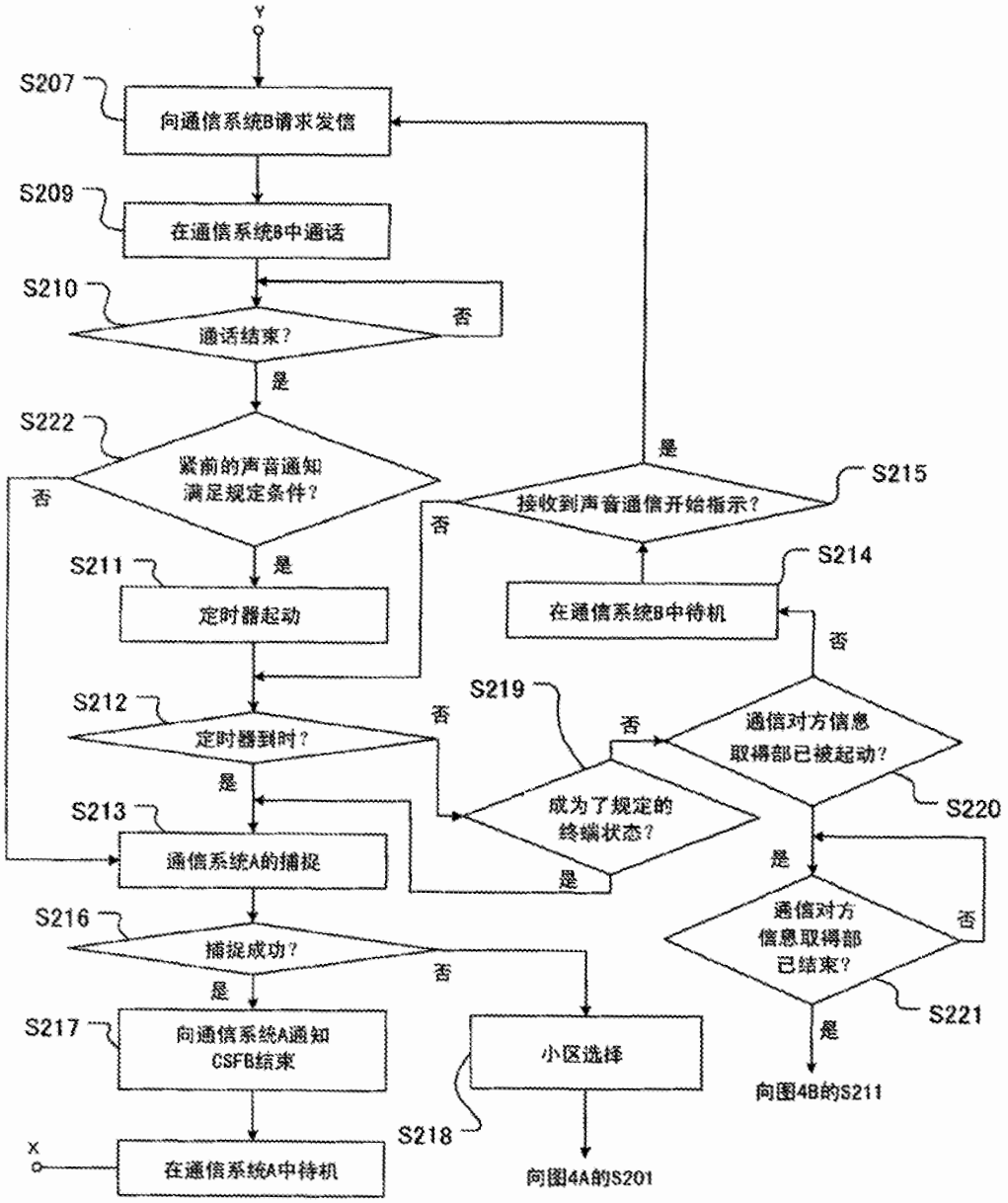

Y
S207
向通信系统B请求发信
S209
在通信系统B中通话
S210
通话结束?
否
是
S222
紧前的声音通知
满足规定条件?
否
是
S211
定时器起动
S212
定时器到时?
否
是
S213
通信系统A的捕捉
S216
捕捉成功?
否
是
S217
向通信系统A通知
CSFB结束
X
在通信系统A中待机
S218
小区选择
向图4A的S201
S215
接收到声音通信开始指示?
是
否
S214
在通信系统B中待机
否
S219
通信对方信息
取得部已被起动?
否
成为了规定的
终端状态?
是
S220
是
通信对方
信息取得部
已结束?
否
S221
是
向图4B的S211

图 9

Electronic Acknowledgement Receipt

EFS ID:	27998146
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:	06-JAN-2017
Filing Date:	03-MAR-2015
Time Stamp:	16:57:14
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	613096 6a9a39ead298203ad7d45f820580e0c1961b7570	no	5

Warnings:

Information:					
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Warnings:					
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3	Non Patent Literature	BRAN3005_FOA_02NOV16.pdf	445839 19fbe334d7e1d9d7510ccc3e94b834ca5057d2e1	no	13
Warnings:					
Information:					
4	Non Patent Literature	CN_1stOA_10OCT16_filing.pdf	3590316 8a7b105cdc50abcf4fe844cf0ea904bc95b54798	no	15
Warnings:					
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5	Non Patent Literature	CN_1stOA_14OCT16_filing.pdf	3154598 5386cace1d2a88a56e5cd9f0ebf1acb35857554e	no	14
Warnings:					
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6	Non Patent Literature	EP_SR_03NOV16.pdf	700384 7b0cb4f3cb3989702dbdab0d8528a984d3059d22	no	9
Warnings:					
Information:					
7	Foreign Reference	WO2010105335A1.pdf	1746786 845fe8f74c9c94ec2025deb09f37e3a8b49419b7	no	47
Warnings:					
Information:					
8	Foreign Reference	EP1385336A2_corresp_CN1476242.pdf	3439920 b76881e8827e4d3f9ddda1eb896c72569cb129e4	no	53
Warnings:					
Information:					

9	Foreign Reference	CN1476242A_filing.pdf	21093996 2fbfce9802ff048256808617c9345030d725c043	no	85
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Warnings:					
Information:					
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13	Foreign Reference	CN101965609A_filing.pdf	6096998 66cda304c39cf5e9e6810c751faf47a7fe70f59e	no	26
Warnings:					
Information:					
14	Foreign Reference	CN102045864A_filing.pdf	8713776 7e935b1f8cd9e83a3e3ca96b2e5b85100a0c5793	no	32
Warnings:					
Information:					
		Total Files Size (in bytes):	61580539		

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New International Application Filed with the USPTO as a Receiving Office

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

PTO/SB/08a (01-10)
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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	Eric T. Oberly
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
	1					

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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20090064302	A1	2009-03-05	COLELLA	

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FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							
	2							

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NON-PATENT LITERATURE DOCUMENTS Remove

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	Eric T. Oberly
	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]
	1	European Office Action dated August 1, 2016, for EP 12762258.7.	
	2	U.S. Office Action dated June 17, 2016, for 14/278,442.	
	3	U.S. Office Action dated June 17, 2016, for 14/725,401.	

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Examiner Signature		Date Considered	

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

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

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

CERTIFICATION STATEMENT

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

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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)	2016-09-19
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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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

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

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

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

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

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

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

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

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

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

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Electronic Acknowledgement Receipt

EFS ID:	26962168
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:	19-SEP-2016
Filing Date:	03-MAR-2015
Time Stamp:	16:01:08
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	Non Patent Literature	EP_OA_01AUG16.pdf	89864 cc1c05c2358d7ba614f7394488ed41c3a1ed88ea	no	4

Warnings:

Information:					
2	Non Patent Literature	BEEL3001C_NFOA_17JUN16.pdf	1387715 474b37c54b00dc0217f5ab507bade67fe6f0723d	no	33
Warnings:					
Information:					
3	Non Patent Literature	BEEL3002CIPC_NFOA_17JUN16.pdf	1265510 8d74212f7612be277b2ed2e6b3b1aa68dee13a9a	no	30
Warnings:					
Information:					
4	Information Disclosure Statement (IDS) Form (SB08)	BEEL3004_IDS_SB08_filing.pdf	612223 5128d69fcd4adfbef09efc5b08701c2ec94ffdc9	no	4
Warnings:					
Information:					
		Total Files Size (in bytes):	3355312		

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<u>New Applications Under 35 U.S.C. 111</u>
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.

<u>National Stage of an International Application under 35 U.S.C. 371</u>
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.

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

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

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
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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	Heny Tsai
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
	1					

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U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20110023096	A1	2011-01-27	XIAO et al.	cited in Office Action
	2	20070033289	A1	2007-02-08	NUYTTENS et al.	
	3	20140082227	A1	2014-03-20	BEEL et al.	

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
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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	Heny Tsai
	Attorney Docket Number	BEEL3004/BEU/TL

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NON-PATENT LITERATURE DOCUMENTS [Remove]

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	US Office Action dated March 29, 2016, for 14/395,364.	
	2	Marc AL-HAMES et al., Audio-Visual Processing in Meetings: Seven Questions and Current AMI Answers, 2006.	
	3	Mood indicators on electronic meeting tools" IBM, IP.com number: IPCOMOOOO1171D, Publication Date: March 12, 2003.	

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EXAMINER SIGNATURE

Examiner Signature		Date Considered	

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

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

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

CERTIFICATION STATEMENT

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

OR

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

See attached certification statement.

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

☒ A certification statement is not submitted herewith.

SIGNATURE

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

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2016-05-25
Name/Print	THOMAS LEE	Registration Number	66396

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EFS ID:	25872673
Application Number:	14344836
International Application Number:	
Confirmation Number:	1046
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First Named Inventor/Applicant Name:	Koen Simon Herman Beel
Customer Number:	23364
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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Non Patent Literature	BRAN3005_NFOA_29MAR16.pdf	899434 c2921b693aeaee1f5012de64c572ad51790575ec	no	26
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	Application Number	14344836
	Filing Date	2015-03-03
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	2184
	Examiner Name	Dean Phan
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	1	2007/137415	WO	A1	2007-12-06	SMART TECH INC	cited in EP Office Communication	

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Name/Print	THOMAS J. MOORE	Registration Number	28974

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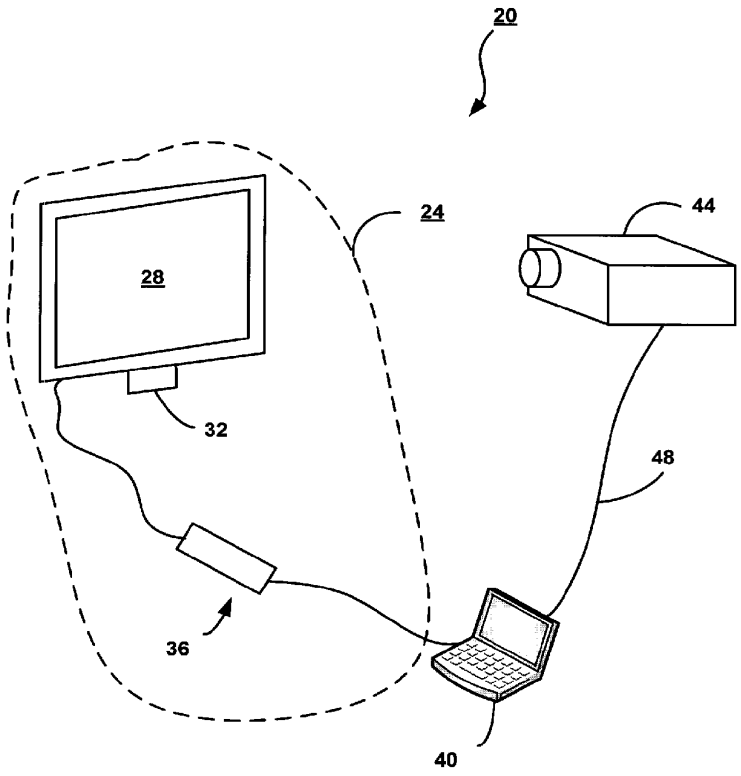
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[Continued on next page]

(54) Title: PLUG AND PLAY PERIPHERAL STORING DRIVER



(57) Abstract: A plug-and-play device providing a set of functionality comprises a plug-and-play interface, storage, and software stored in the storage. The software is automatically executed by a computer when the plug-and-play device is connected thereto via the plug-and-play interface. The software detects disconnection of the plug-and-play device from the computer and terminates its execution in response thereto. The computer does not persistently store the software thereafter.

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PLUG AND PLAY PERIPHERAL STORING DRIVER

Field of the Invention

[0001] The present invention relates generally to computer peripheral devices and more specifically, to a plug-and-play device and a method of using the same.

Background of the Invention

[0002] Plug-and-play devices are well known and many types of plug-and-play standards exist, including universal serial bus ("USB"), IEEE1394 ("FireWire") and PCMCIA ("PC Card"), with the most common being USB. Such plug-and-play devices have a set of functionality that is accessible to a computer through a plug-and-play interface. This functionality can include, but is not limited to, storage, input registration, image capturing, audio input and output, etc. Many sets of functionality are defined as device classes. Upon connection of a plug-and-play device to a computer, an electronic circuit is completed and the operating system of the computer is alerted of the connection. The operating system polls the plug-and-play device to determine what functionality is available on the plug-and-play device.

[0003] Many operating systems possess a number of pre-loaded drivers for generic plug-and-play device classes, such as USB mass storage, a two-button mouse, etc. If the operating system is in possession of a driver for the device class of the plug-and-play device connected to the computer, the driver is loaded by the computer so that the functionality of the plug-and-play device can be accessed. If, instead, the operating system does not possess a driver for the device class of the plug-and-play device, the operating system in many cases prompts the user to install the appropriate software to enable the computer to access the functionality of the plug-and-play device.

[0004] U.S. Patent Application Publication No. 2004/0205778 to Wong *et al.* discloses a peripheral device that includes driver storage. The peripheral device connects to a computer via a plug-and-play interface and cycles through

the emulation of a number of plug-and-play device classes recognized by the operating system of the computer until one is found that permits auto-execution of a driver installation program.

[0005] U.S. Patent Application Publication No. 2005/0038934 to Gotze *et al.* discloses a USB-based peripheral printer that can be conditioned between two modes. In a first mode, the printer emulates USB mass storage to permit installation of drivers stored in memory of the printer onto a computer to which the printer is connected. Once the drivers are installed, the printer is conditioned into a second mode, in which it behaves as a printer. The drivers installed on the computer enable printing on the printer.

[0006] Plug-and-play devices may take other forms. For example, the plug-and-play device may be in the form of a touch panel that detects touch input and provides corresponding output to a computer to which the touch panel is connected. In order for the computer to interpret the touch panel output properly, a calibration process needs to be performed in order to map the coordinate system of the touch panel input field to the computer display coordinate system. After the calibration process has been performed, the resulting calibration settings are stored by the computer so that the touch panel output can be correctly mapped to the computer display coordinate system. As will be appreciated however, the calibration settings are particular to the computer. If the touch panel is plugged into another computer, the calibration process must be re-performed.

[0007] The need to install software/drivers can be undesirable in a number of situations, such as where a user does not possess administrative rights for the computer or simply does not desire to install yet more software on the computer, especially where the connection of the plug-and-play device is infrequent or a one-time affair. Installing software may also prove to be a difficult or complicated task. For example, the user may need to download software from the Internet or may need to locate media upon which the software/drivers are located.

[0008] It is therefore an object of the present invention to provide a novel plug-and-play device and method of using the same.

Summary of the Invention

[0009] Accordingly, in one aspect there is provided a plug-and-play device providing a set of functionality, comprising:

a plug-and-play interface;

storage; and

software stored in said storage, said software being automatically executed by a computer when said plug-and-play device is connected thereto via said plug-and-play interface, said software being operable to detect disconnection of said plug-and-play device from said computer and terminate its execution in response thereto, said computer not persistently storing said software thereafter.

[0010] In one embodiment, the software enables the computer to access the set of functionality provided by the plug-and-play device. The plug-and-play interface can be a universal serial bus interface. The storage can store an autorun.inf file that specifies the software for execution. The software can be copied to a temporary location on the computer and executed therefrom, and can be terminated and deleted upon disconnection of the plug-and-play device from the computer.

[0011] According to another aspect, there is provided a method of using a plug-and-play device with a computer, comprising:

detecting connection of a plug-and-play device to said computer;

automatically locating software specified for execution, said software being stored in memory of said plug-and-play device;

executing said software with said computer; and

terminating execution of said software upon disconnection of said plug-and-play device from said computer.

[0012] According to yet another aspect, there is provided a plug-and-play device, comprising:

storage; and

settings stored in said storage, said settings being associated with a set of functionality.

[0013] The plug-and-play device can further include software stored in the storage, the software providing access to the set of functionality when the plug-and-play device is connected to a computer. The set of functionality in this case is an input interface provided by the plug-and-play device.

[0014] Alternatively, the plug-and-play device can include software stored in the storage, the software being executable on a computer to which the plug-and-play device is connected and providing access to the set of functionality. The software can reference the settings during execution. The software can be automatically executed by the computer when the plug-and-play device is connected thereto via a plug-and-play interface thereof, with the software detecting disconnection of the plug-and-play device from the computer and terminating execution in response thereto. In this case, the computer does not persistently store the software thereafter.

[0015] According to yet another aspect, there is provided a plug-and-play device for receiving input, comprising:

a plug-and-play interface;

a touch panel on which a computer-generated image is displayed;

storage; and

calibration settings stored in said storage and mapping touch panel an computer-generated image coordinate systems.

[0016] According to still yet another aspect, there is provided a plug-and-play device providing a set of functionality, comprising:

a plug-and-play interface;

storage; and

software stored in said storage, said software being copied to said computer and executed therefrom automatically when said plug-and-play device is connected to said computer, said software providing access to said set of functionality of said plug-and-play device.

[0017] By storing software for the plug-and-play device on the plug-and-play device itself that automatically loads onto the computer when the plug-and-play device is connected to the computer, the user of the plug-and-play device

need not pre-install software/drivers on the computer in order to access the functionality offered by the plug-and-play device nor does the user require administrative rights for the computer in order to use the software. As the software is not stored persistently on the computer upon termination, the computer is left in the same general state as it was in before connection to the plug-and-play device. Further, by storing settings on the plug-and-play device, a setup process need not be performed when a new computer is connected to the plug-and-play device.

Brief Description of the Drawings

[0018] Embodiments will now be described more fully with reference to the accompanying drawings in which:

Figure 1 shows a plug-and-play device comprising a touch panel, a controller and a cable, coupled to a computer;

Figure 2 shows a schematic diagram of the cable of Figure 1; and

Figure 3 is a flow chart of the general operation of the plug-and-play device of Figure 1.

Detailed Description of the Embodiments

[0019] Figure 1 illustrates a system 20 comprising a plug-and-play device 24 for receiving and digitizing input. In this embodiment, the plug-and-play device 24 comprises a touch panel 28, a controller 32 and a cable 36. Touch panel 28 is of the type manufactured and sold by SMART Technologies, Inc. of Calgary, Alberta under the name SMARTBoard™. The controller 32 controls the operation of the touch panel 28 and is in communication with a computer 40 via the cable 36. An LCD projector 44 is coupled to the computer 40 via a VGA cable 48. The computer 40 controls the LCD projector 44 to project images otherwise presented on a display of the computer 40 onto the touch panel 28. The projector 44 may be positioned in front of or behind the touch panel 28.

[0020] The touch panel 28 provides a user with the ability to interact with the projected images via a pointer, such as a pen tool or a finger, for the purpose of providing input. The touch panel 28 requires no extra software other than that provided by the operating system of the computer 40 to work as a mouse. The functionality of the touch panel 28 is greatly enhanced by additional software not available on the operating system, as will be described below.

[0021] The controller 32 comprises a processor (not shown) that executes firmware stored in non-volatile storage. Generally, the firmware causes the controller 32 to operate in one of two operational modes. In an initial mode, the controller 32 operates two USB profiles, namely an absolute mouse human interface device ("HID") profile and a SMARTBoard HID profile. The absolute mouse HID profile allows the controller 32 to relay absolute position information in response to pointer input, as it is detected by the touch panel 28, along with basic mouse functions. The SMARTBoard HID is a proprietary device class that enables enhanced functionality for the touch panel 28. The enhanced functionality includes all of the functionality available in the absolute mouse HID device class, plus inking information, additional tool information (buttons, eraser, pen tool selection, etc.) and two-way communications with the controller 32. In a "native" operating mode, the controller 32 terminates the absolute mouse HID profile and only operates the SMARTBoard HID profile.

[0022] The components of the cable 36 are described with reference to Figure 2. The cable 36 comprises a USB hub component 52 that has a first USB interface 56 for connection to a USB cable 60 extending to the touch panel 28, and a second USB interface 64 for connection to a USB cable 68 extending to the computer 40. Both the first and second USB interfaces 56, 64 are in communication with a USB hub 72.

[0023] Also in communication with the USB hub 72 is storage 76, namely flash memory, that is configured to operate in accordance with the compact disk ("CD") HID profile. The CD HID profile enables storage 76 to behave like a CD drive. Storage 76 stores a set of software applications,

including a user application (SMARTBoardTools.exe), a service (SMARTBoardService.exe), a launcher application (SBLauncher.exe), a calibration application (SMARTBoardCalibrate.exe) and an autorun.inf file that references the launcher application. Further, the storage 76 can store calibration settings associated with the configuration of the system 20. In particular, the calibration settings include data for mapping pointer input received by the touch panel 28 with image output projected by the LCD projector 44 onto the surface of the touch panel 28. The position of the LCD projector 44 and the touch panel 28 are generally fixed relative to one another. As a result, once their relative positions are determined through the calibration process that is performed in order to generate the calibration settings, the relative positions of the LCD projector 44 and touch panel 28 and hence, the calibration settings do not have to be re-determined.

[0024] The SMARTBoardTools.exe application permits a richer set of features than basic mouse functionality. It contains a number of presentation applications, integration into popular drawing and presentation applications, and an application to allow users to ink over documents in any application or over the desktop of the graphical user interface of the computer 40 that is projected onto and displayed on the surface of the touch panel 28.

[0025] The method of operation of the plug-and-play device 24 is shown in Figure 3. When the plug-and-play device 24 is connected to the computer 40 (step 104), and the connection of the plug-and-play device 24 to the computer 40 is detected by the operating system of the computer 40, the computer 40 queries the plug-and-play device 24 to determine what functionality is provided by the plug-and-play device 24 (step 108). As the USB hub 72 is connected to storage 76 as well as to the controller 32, the USB hub 72 queries each of these two units to determine what profiles are available. In this embodiment, the storage 76 responds by indicating that it supports the CD HID profile. The controller 32, which is in the initial mode, responds by indicating that it supports the absolute mouse HID profile and the SMARTBoard HID profile.

[0026] The computer 40, upon receiving this profile information, detects that the following functionality is available for the plug-and-play device 24: the absolute mouse HID profile, the SMARTBoard HID profile and CD HID profile (step 112). The computer 40 in turn loads the drivers for the device functionality recognized by the operating system (i.e. for which the operating system has drivers); namely, the absolute mouse HID and CD HID (step 116). As each of these sets of functionality are detected by the computer 40, the computer 40 recognizes them as separate devices. The computer 40 in this embodiment, does not load the SMARTBoard HID profile, as the operating system of the computer 40 does not possess a corresponding driver. The computer 40 then assigns the detected CD HID device the next available drive letter (step 120).

[0027] Computer 40 is configured as the majority of computers are by default; that is, it is configured to search CD HID devices for a file named autorun.inf that will direct the computer 40 to automatically execute a specific application upon connection to a CD HID device. Accordingly, computer 40 queries the CD HID device for autorun.inf and, upon receiving it, loads and executes the instructions contained therein (step 124). The autorun.inf file is used by the Microsoft Windows® family of operating systems to execute, under certain conditions, the instructions contained therein upon detection of certain types of storage devices. For example, under certain conditions, the autorun.inf file is executed when a CD-ROM disk, containing the autorun.inf file, is inserted into the bay of a CD-ROM drive. Execution typically begins without delay after the information in the autorun.inf file becomes available to or is recognized by the operating system of the computer.

[0028] The autorun.inf file contains a pointer to the executable launcher application, SBLauncher.exe. Upon parsing the autorun.inf file, the computer 40 uses the pointer to obtain the SBLauncher.exe application from the storage 76, along with a set of corresponding dynamic link libraries ("DLLs"), and executes the SBLauncher.exe application (step 128). The SBLauncher.exe application, in turn, directs the computer 40 to copy two executable files, namely, SMARTBoardTools.exe and SMARTBoardService.exe, along with

some associated DLLs, from the storage 76 to a temporary directory on the computer 40 and execute them (step 132). Upon execution of the SMARTBoardService.exe service, the SBLauncher.exe application terminates execution and the SMARTBoardService.exe service directs the computer 40 to send a command to the controller 32 to switch to the SMARTBoard HID mode (step 136).

[0029] Upon launch, the SMARTBoardTools.exe application queries and obtains from storage 76 of the plug-and-play device 24, the calibration settings and other settings (step 140). The calibration settings enable the SMARTBoardTools.exe application to map touch input received from the touch panel 28 to the computer display coordinate system. The other settings include pen tray settings, COM port settings, contact filter settings and user settings for some of the software applications. All of these settings are stored in a standard Windows INI file. Further, several XML files are used to store layout and menu settings for various applets forming part of the SMARTBoardTools.exe application. These applets provide a floating window of toolbuttons for accessing various functionality, an on-screen keyboard, etc. These layout and menu settings are stored in XML files in the storage 76 of the plug-and-play device 24, and are loaded and saved in the user directory "C:\Documents and Settings\<user name>\Application Data\SMART Technologies Inc.\SMARTBoard Software\" during execution of the SMARTBoardTools.exe application, where <user name> is the login name of the current user.

[0030] Upon obtaining the calibration settings, the SMARTBoardTools.exe application permits user interaction with the touch panel 28 to be registered spatially relative to the images projected on the surface of the touch panel 28 by the LCD projector 44. During execution, some settings are stored in the "HKEY_CURRENT_USER" key of the registry and, in particular, in the "Software\SMART Technologies Inc.\SMARTBoard Software\" subkey. These settings include application window positions, user settings for each application and a list of recently used files. The "HKEY_CURRENT_USER" key is used as there are generally no restrictions on modifications made to this key. In addition, if there are no access

restrictions on the "HKEY_LOCAL_MACHINE" key, spell checker settings are written there.

[0031] Upon termination of the session, the computer 40 can be unplugged from the plug-and-play device 24 and removed. When the plug-and-play device 24 is disconnected, the computer 40 notifies the SBLauncher.exe application (step 144). The SBLauncher.exe application proceeds to terminate execution of and delete the SMARTBoardTools.exe application, the SMARTBoardService.exe service, the various related DLLs and settings from the temporary locations on the computer 40 and then proceeds to terminate execution of itself (step 148). Before termination of execution of the SBLauncher.exe application, the SBLauncher.exe application writes the user settings stored in "C\Documents and Settings\<user name>\Application Data\SMART Technologies Inc.\SMARTBoard Software\" to XML files which it then stores in storage 76 of the plug-and-play device 24. The SBLauncher.exe application then deletes these settings and those stored in the registry. Once the settings are deleted from the computer 40, the SBLauncher.exe application places an entry in the HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\RunOnce registry key which tells Windows to delete the SBLauncher.exe application when the user logs in next, and then terminates its execution.

[0032] If the user stops the SMARTBoard software by closing the SMARTBoardTools.exe application, then the SBLauncher.exe application executes the instance of itself found in the storage 76 of the plug-and-play device 24 resulting in the instance of the SBLauncher.exe application stored on the computer 40 being deleted.

[0033] As noted above, in order for touch input made relative to an image projected onto the touch panel 28 by the LCD projector 44 to be registered spatially with the projected image, the system 20 must be calibrated. As the spatial relation between the image projected by the LCD projector 44 and the touch panel 28 changes only when the LCD projector 44 and the touch panel 28 are moved relative to one another, calibration is generally performed after the touch panel 28 and LCD projector 44 are fixed at a location. In order

to calibrate the system 20, the SMARTBoardCalibrate.exe application is launched. Once launched, the user is prompted to touch a number of points on the graphical user interface of the computer 40 that is displayed on the surface of the touch panel 28. The resulting touch panel output is used to map the raw touch coordinates registered by the touch panel 28 to the computer display coordinate system. The newly-captured calibration settings are then recorded in the Windows INI file so that they can be used by other computers to map input received from the plug-and-play device 24 with the graphical user interface presented thereon.

[0034] While the system 20 has been described with specificity to USB, other types of plug-and-play architectures can be utilized. For example, those of skill in the art will readily understand how to adapt the system 20 described herein for use with FireWire and PCMCIA architectures and the like.

[0035] The drivers for the plug-and-play device can be stored on a separate CD HID device or the like. Similarly, the calibration settings can be stored on a separate removable storage, such as a USB flash drive, rewritable optical disk, etc. In this manner, existing calibration settings can be made available to other computers that are coupled to the plug-and-play device. Alternatively, the calibration settings can be stored on the touch panel's controller using the two-way communication enabled by the SMARTBoard HID profile.

[0036] In the embodiment described above, the plug-and-play device 24 comprises a cable 36 having a USB hub component 52 connected to the touch panel 28 via a USB cable 60 and connected to the computer 40 via a USB cable 68. Those of skill in the art will appreciate that the USB hub component 52 may comprise one or more wireless communication interfaces to enable communications between the touch panel 28 and the USB hub component 52 and/or between the USB hub component 52 and the computer 40 to be carried out over wireless communication channels thereby obviating the need for the physical cables. The USB hub component 52 may also be integrated into the touch panel 28 so that only one communication channel, either wired or wireless, between the USB hub component 52 and the computer 40 is required.

[0037] Although the system 20 is shown to include an LCD projector 44 to project images onto the surface of the touch panel 28, those of skill in the art will appreciate that other configurations are possible. For example, the touch panel 28 may be of the form disclosed in U.S. Patent No. 6,803,906 to Morrison et al. or U.S. Patent Application No. 11/331,448 to Morrison et al. In this case, the touch panel 28 overlies a display unit such as a plasma display or LCD display that receives display input from the computer 40.

[0038] While the system has been described with reference to a touch panel, the system can be any one of a number of other devices, such as cameras, sound systems, etc. For example, where the plug-and-play device is a sound system, the settings can include the output volumes for each speaker that have been previously calibrated to desired levels for the set configuration.

[0039] Although an embodiment has been described with reference to the accompanying drawings, those of skill in the art will appreciate that modifications and variations may be made without departing from the spirit and scope thereof as defined by the appended claims.

What is claimed is:

1. A plug-and-play device providing a set of functionality, comprising:
a plug-and-play interface;
storage; and
software stored in said storage, said software being automatically executed by a computer when said plug-and-play device is connected thereto via said plug-and-play interface, said software being operable to detect disconnection of said plug-and-play device from said computer and terminate its execution in response thereto, said computer not persistently storing said software thereafter.

2. The plug-and-play device of claim 1, wherein said software enables said computer to access the set of functionality provided by said plug-and-play device.

3. The plug-and-play device of claim 1, wherein said plug-and-play interface is a universal serial bus interface.

4. The plug-and-play device of claim 3, wherein said storage stores an autorun.inf file that specifies said software for execution.

5. The plug-and-play device of claim 4, wherein said storage is configured to operate in accordance with a CD HID profile.

6. The plug-and-play device of claim 3, wherein upon connection of said plug-and-play device to said computer, said software is copied to a temporary location on said computer and executed therefrom, and is terminated and deleted upon disconnection of the plug-and-play device from the computer.

7. The plug-and-play device of claim 6, wherein said software registers a request with the operating system of said computer to delete said software at a later time.

8. The plug-and-play device of claim 1, wherein upon connection of said plug-and-play device to said computer, said software is copied to a temporary location on said computer and executed therefrom, and is terminated and deleted upon disconnection of the plug-and-play device from the computer.

9. The plug-and-play device of claim 8, wherein said software registers a request with the operating system of said computer to delete said software at a later time.

10. A method of using a plug-and-play device with a computer, comprising:

detecting connection of the plug-and-play device to said computer;

automatically locating software stored in memory of said plug-and-play device specified for execution;

executing said software with said computer; and

terminating execution of said software upon disconnection of said plug-and-play device from said computer.

11. The method of claim 10, further comprising, prior to said executing, copying said software to temporary storage on said computer.

12. The method of claim 11, further comprising registering a request with the operating system of said computer to delete said software at a later time.

13. A plug-and-play device, comprising:

storage; and

settings stored in said storage, said settings being associated with a set of functionality.

14. The plug-and-play device of claim 13, wherein said settings are calibration settings.

15. The plug-and-play device of claim 13, wherein said settings are user settings.

16. The plug-and-play device of claim 13, further comprising:

software stored in said storage, said software providing access to said set of functionality when said plug-and-play device is connected to a computer.

17. The plug-and-play device of claim 14, wherein said set of functionality is an input interface provided by said plug-and-play device.

18. The plug-and-play device of claim 17, further comprising:

software stored in said storage, said software being executable on a computer to which said plug-and-play device is connected to provide access to said set of functionality.

19. The plug-and-play device of claim 18, wherein said software references said calibration settings during execution.

20. The plug-and-play device of claim 19, wherein said software is automatically executed by said computer when said plug-and-play device is connected thereto via a plug-and-play interface thereof, said software detecting disconnection of said plug-and-play device from said computer and

terminating execution in response thereto, said computer not persistently storing said software thereafter.

21. The plug-and-play device of claim 14, further comprising:
calibration software for determining said calibration settings.

22. The plug-and-play device of claim 14, further comprising a touch panel on which images are presented, said calibration settings mapping touch panel and presented image coordinate systems.

23. A plug-and-play device for receiving input, comprising:
a plug-and-play interface;
a touch panel on which a computer-generated image is displayed;
storage; and
calibration settings stored in said storage and mapping touch panel and computer-generated image coordinate systems.

24. The plug-and-play device of claim 23, wherein said computer-generated image is a graphical user interface.

25. The plug-and-play device of claim 24, wherein said plug-and-play interface is a universal serial bus interface.

26. The plug-and-play device of claim 23, further comprising:
calibration software stored in said storage for execution by a computer to determine said calibration settings.

27. A plug-and-play device providing a set of functionality, comprising:
a plug-and-play interface;

storage; and

software stored in said storage, said software being copied to said computer and executed therefrom automatically when said plug-and-play device is connected to said computer, said software providing access to the set of functionality provided by said plug-and-play device.

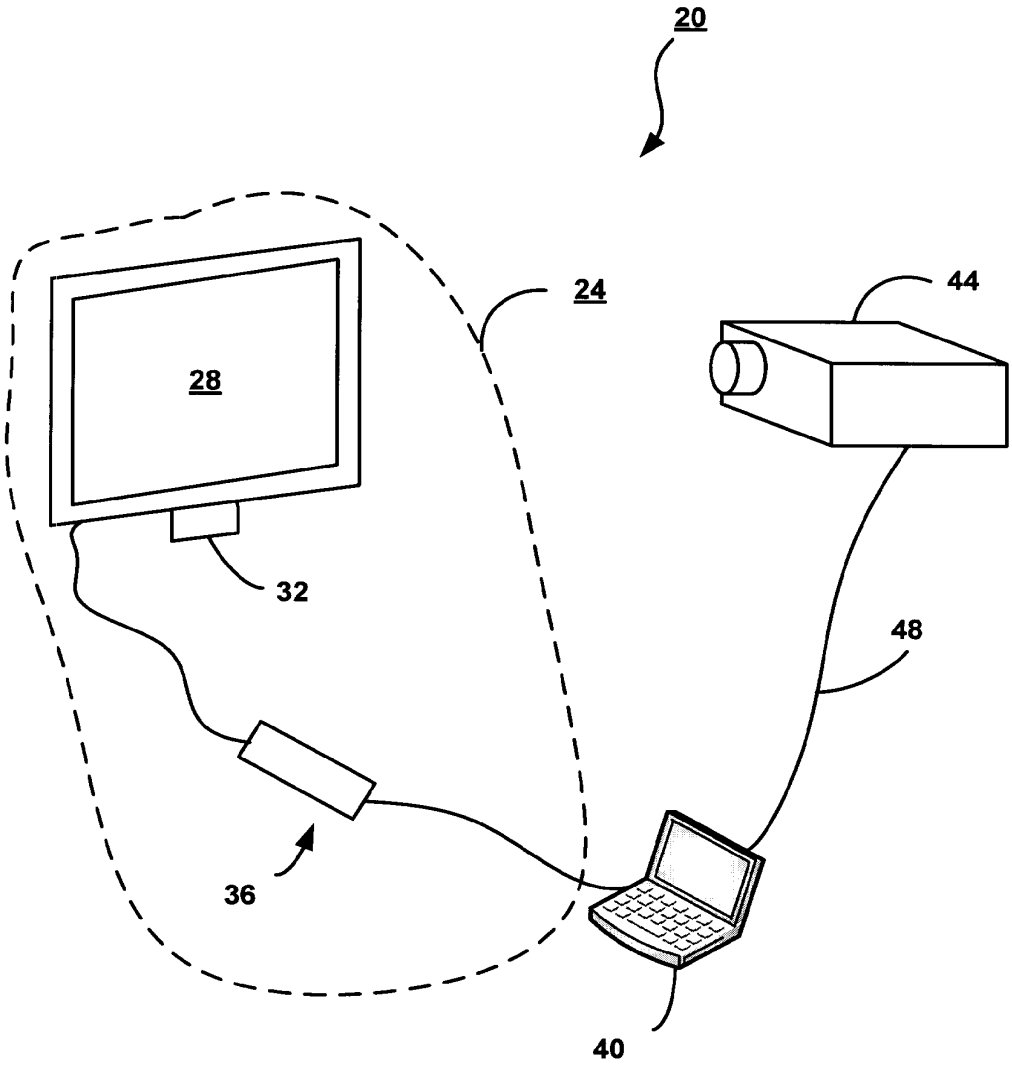


Fig. 1

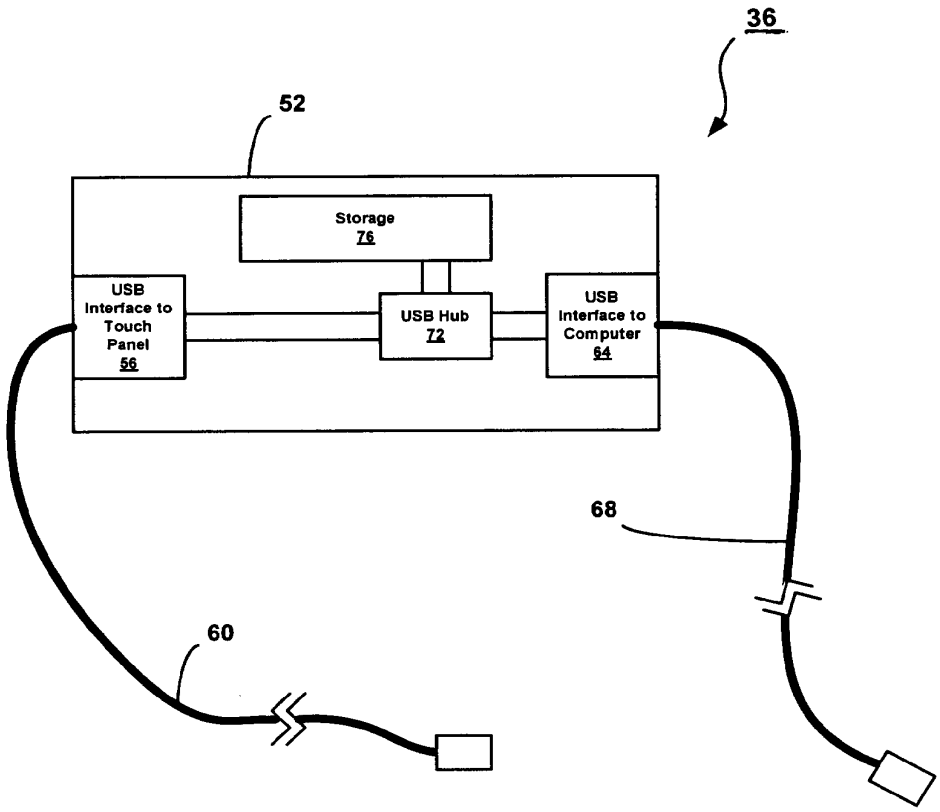

36
52
Storage
76
USB
Interface to
Touch
Panel
56
USB Hub
72
USB
Interface to
Computer
64
68
60

Fig. 2

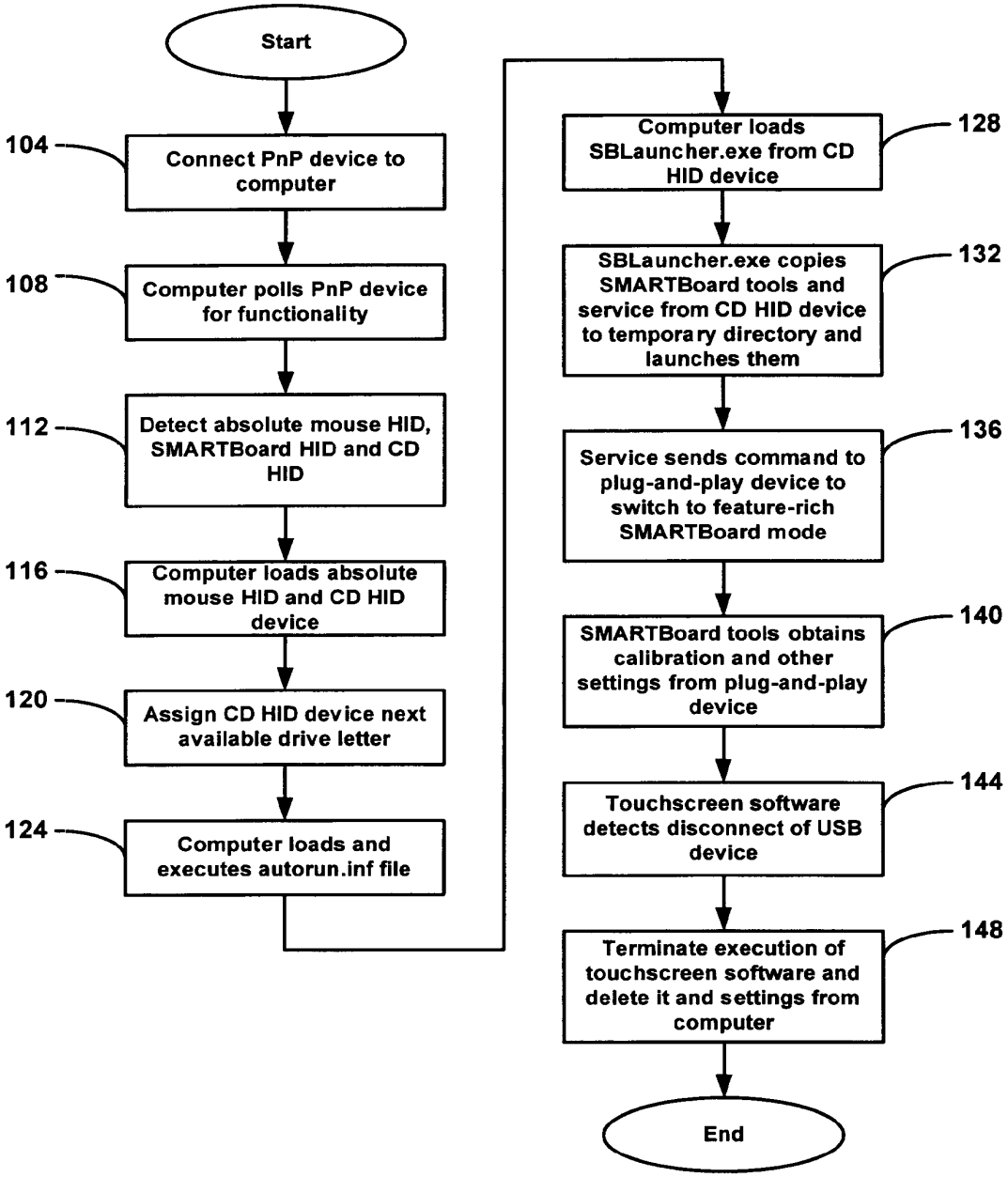

Start
104
Connect PnP device to computer
108
Computer polls PnP device for functionality
112
Detect absolute mouse HID, SMARTBoard HID and CD HID
116
Computer loads absolute mouse HID and CD HID device
120
Assign CD HID device next available drive letter
124
Computer loads and executes autorun.inf file
128
Computer loads SBLauncher.exe from CD HID device
132
SBLauncher.exe copies SMARTBoard tools and service from CD HID device to temporary directory and launches them
136
Service sends command to plug-and-play device to switch to feature-rich SMARTBoard mode
140
SMARTBoard tools obtains calibration and other settings from plug-and-play device
144
Touchscreen software detects disconnect of USB device
148
Terminate execution of touchscreen software and delete it and settings from computer
End

Fig. 3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA2007/000938

A. CLASSIFICATION OF SUBJECT MATTER
IPC: ***G06F 13/10*** (2006.01) , ***G06F 3/00*** (2006.01) , ***G06F 3/041*** (2006.01) , ***G06F 9/445*** (2006.01)
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
G06F-13/*, G06F-3/*, G06F-9/*

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used)
WEST, Delphion, Qpat and IEEE(keywords: plug and play, USB, peripheral, driver, store, download, load, install, detect, connect, attach, disconnect, detach, delete, terminate, efficient, touch screen, display, pannel, request, calibrate, user settings, CD-HID and schedule)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2005/0278461 A1 (OHTA (US)) Published 15 Dec. 2005 (15-12-2005) **	13 to 19, 21 and 27
Y	Abstract, Paragraphs [0032] to [0041] and Figure 4 **	1 to 12, 20, 22 to 26
X	US 6,898,653 B2 (SU ET AL. (TW)) Published 24 May 2005 (24-05-2005) **	13 to 19, 21 and 27
Y	Abstract, Column 1, line 52 to Column 4 line 50 and Figure 1 **	1 to 12, 20, 22 to 26

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
21 June 2007 (21-06-2007)	15 August 2007 (15-08-2007)

Name and mailing address of the ISA/CA	Authorized officer
Canadian Intellectual Property Office Place du Portage I, C114 - 1st Floor, Box PCT 50 Victoria Street Gatineau, Quebec K1A 0C9 Facsimile No.: 001-819-953-2476	Niall Zelem 819- 953-9814

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6,085,265 (KOU (US)) 4 Jul. 2000 (04-07-2000) ** Abstract, Column 3, lines 49 to 52, Column 11, lines 1 to 17 and Figure 1 **	1 to 12 and 20
Y	US 2002/0118180 A1 (MARTIN (CA)) 29 Aug. 2002 (29-08-2002) ** Paragraph [0041], Paragraph [0043] and Paragraphs [0051] to [0072] **	22 to 26

Patent Document Cited in Search Report	Publication Date	Patent Family Member(s)	Publication Date
US2005278461	15-12-2005	EP1662385 A2	31-05-2006
		JP2005353073 A	22-12-2005
US6898653	24-05-2005	EP1434128 A1	30-06-2004
US6085265	04-07-2000	NONE	
US2002118180	29-08-2002	CA2058219 A1	22-04-1993
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		JP6110608 A	22-04-1994
		US5448263 A	05-09-1995
		US6141000 A	31-10-2000
		US6337681 B1	08-01-2002
		US6747636 B2	08-06-2004
		US2004263488 A1	30-12-2004

Electronic Acknowledgement Receipt

EFS ID:	24798391
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 J. Moore/Kaitlyn Miller
Filer Authorized By:	Thomas J. Moore
Attorney Docket Number:	BEEL3004/TJM/TL
Receipt Date:	04-FEB-2016
Filing Date:	03-MAR-2015
Time Stamp:	13:55:51
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	612119 e9282dbdd4b0596f3cf09e86b5830ef315512efe	no	4

Warnings:	
Information:	

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2	Non Patent Literature	EP_OA_21DEC15.pdf	206825 a1c8ce21cc42699ae5d7946221b2f4b08e23e26e	no	7
Warnings:					
Information:					
3	Foreign Reference	WO2007137415A1.pdf	914042 a4a4453b250c2be8046b3390d2c6742449713bb1	no	25
Warnings:					
Information:					
			Total Files Size (in bytes):	1732986	

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for 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.

Office of Petitions: Routing Sheet



Application No. 14/344,836

This application is being forwarded to your office for further processing. A decision has been rendered on a petition filed in this application, as indicated below. For details of this decision, please see the document PET.OP.DEC filed on the same date as this document.

- [x] **GRANTED**
- [ ] **DISMISSED**
- [ ] **DENIED**

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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/TJM/TL	1046

23364 7590 12/31/2015

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

EXAMINER	
PHAN, DEAN	

ART UNIT	PAPER NUMBER
2184	

NOTIFICATION DATE	DELIVERY MODE
12/31/2015	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

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

Applicants: Koen Simon Herman Beel et al
Appl. No.: 14/344,836
International Filing Date: September 14, 2012
Title: ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS
Attorney Docket: BEEL3004/TJM/TL
Pub. No.: US20150169477A1
Pub. Date: June 18, 2015

This is a decision on the request for a corrected patent application publication under 37 CFR 1.221(b), received on August 14, 2015, for the above-identified application.

The request is granted.

The corrected patent application publication will be published in due course, unless the patent issues before the application is republished.

Inquiries relating to this matter may be directed to Karen Creasy at (571) 272-3208.

/Christopher Bottorff/

Christopher Bottorff
Petitions Examiner
Office of Petitions

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	Examiner:	Dean Phan
First Inventor:	Koen Simon Herman BEEL	Art Unit:	2184
Attorney No.:	BEEL3004/TJM/TL	Customer No.:	23364
For:	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS		

REQUEST FOR REPUBLICATION UNDER 37 C.F.R. § 1.221(b)

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

INTRODUCTORY COMMENTS

This request is made to correct errors in the publication of the above-identified application, which was published as U.S. patent application publication no. 2015/0169477 A1 on June 18, 2015.

This request for republication of the application under 37 C.F.R. § 1.221(b) is filed because the Office made a material mistake which is apparent from the Office records. This request is timely submitted within 2 months of the date of the publication of the application.

As indicated in MPEP 1130(A)(D), for applications filed on or after September 16, 2012, when the publication does not include the proper benefit claim, a material mistake has been made. In this case, as evidenced in the Application Data Sheet filed March 13, 2014, the present application is the national stage entry of PCT/EP2012/068167, and claims the benefit of provisional application 61/534,592 filed September 14, 2011, provisional application 61/635,234, filed April 18, 2012, and is a continuation-in-part of U.S. application 13/270,659, filed October 11, 2011.

However, as shown on the cover sheet of U.S. publication 2015/0169477 at INID code (60), the Office has mistakenly duplicated the benefit claim to Provisional Application no. 61/534,592 instead of including Provisional application 61/635,234, filed April 18, 2012. Additionally, the Office has mistakenly identified at INID code (63) that the pending application is a continuation of application no. 13/270,659, instead of a continuation-in-part application of application no. 13/270,659.

In view of the improper benefit claims listed on the publication, Applicants submit that the Office has made a material mistake in the publication of the application.

Moreover, Applicants submit that a material mistake was made in the publication of claim 95. Specifically, Applicants request correction of claim 95 which has mistakenly included the term "means fir" instead of "means for," which could lead to an improper understanding of the claimed features. The correct term "means for" is shown on page 7 of the Preliminary Amendment filed March 13, 2015.

A sequential listing of the mistakes is appended hereto and identifies: i) the location of the correct originally filed text; ii) the location of the mistakes in the published text; and iii) the correction requested.

Favorable consideration of this requests is requested. No fee is required for this correction and republication, since the mistake was made by the Office.

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Date: August 14, 2015

Respectfully submitted,

/Thomas J. Moore/

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Attorney for Applicants
Registration No. 28,974

Attorney Docket: BEEL3004/TJM/TL
Patent Application No.: 14/344,836
Filed: March 3, 2015
Publication No. 2015/0169477 A1
Publication Date: June 18, 2015

List of Errors and Requested Corrections
in Patent Application Publication

No.	Text As Filed Location	Publication Location	Correction Required
1.	Application Data Sheet filed March 13, 2014 at page 4 under the Heading Domestic Benefit/National Stage Information	Cover Sheet: At INID code (60).	Change: Provisional application No. 61/534,592, filed on Sep. 14, 2011, provisional application No. 61/534,592, filed on Sep. 14, 2011. To: Provisional application No. 61/534,592, filed on Sep. 14, 2011, provisional application No. 61/635,234, filed on Apr. 18, 2012.
2.	Application Data Sheet filed March 13, 2014 at page 4 under the Heading Domestic Benefit/National Stage Information	Cover Sheet: At INID code (63).	Change: Continuation of application No. 13/270,659, filed on Oct. 11, 2011, now Pat. No. 8,756,348. To: Continuation-in-part of application No. 13/270,659, filed on Oct. 11, 2011, now Pat. No. 8,756,348.
3.	Preliminary Amendment filed March 13, 2014 at page 7.	Page 18 at claim 95.	Change: The system of claim 92 further comprising means fir presenting the peripheral device to the processing device as a composite device and wherein pre-installed generic drivers drive different device interfaces independently. To: The system of claim 92 further comprising means for presenting the peripheral device to the processing device as a composite device and wherein pre-installed generic drivers drive different device interfaces independently.

US 20150169477A1

(19) **United States**

(12) **Patent Application Publication**

Beel et al.

(10) **Pub. No.: US 2015/0169477 A1**

(43) **Pub. Date: Jun. 18, 2015**

(54) **ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS**

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(73) Assignee: **BARCO N.V.**, Kortrijk (BE)

(21) Appl. No.: **14/344,836**

(22) PCT Filed: **Sep. 14, 2012**

(86) PCT No.: **PCT/EP2012/068167**

§ 371 (c)(1),
(2), (4) Date: **Mar. 3, 2015**

Related U.S. Application Data

(63) Continuation-in-part ~~Continuation~~ of application No. 13/270,659, filed on Oct. 11, 2011, now Pat. No. 8,756,348.

(60) Provisional application No. 61/534,592, filed on Sep. 14, 2011, provisional application No. ~~61/534,592,~~ 61/635,234 filed on ~~Sep. 14, 2011.~~ Apr. 18, 2012.

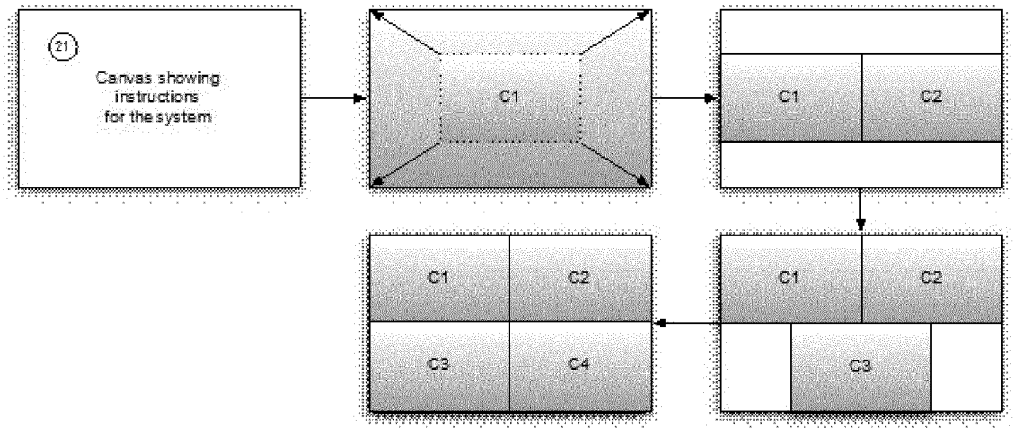
Publication Classification

(51) **Int. Cl.**
G06F 13/10 (2006.01)
G06F 9/445 (2006.01)

(52) **U.S. Cl.**
CPC ***G06F 13/102*** (2013.01); ***G06F 9/44505*** (2013.01)

(57) **ABSTRACT**

An electronic meeting tool and method for communicating arbitrary media content from users at a meeting comprises 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. A peripheral device adapted to communicate the user selected arbitrary media content via the communications network is a connection unit comprising a connector adapted to couple to a port of a processing device having a second display, a memory and an operating system, and a transmitter. A program is adapted to obtain user selected arbitrary media content, said program leaving a zero footprint on termination. The user may trigger transfer of said user selected arbitrary media content to said transmitter.



[0324] 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.

[0325] Some examples for pairing

[0326] 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.

[0327] The Signal strength of the wireless channel to the base node is used to identify which base nod is to be used

[0328] 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

[0329] Manual pairing (e.g. by entering IP address, hostname, wireless ID (like SSID on WiFi))

1-81. (canceled)

82. A method for connecting a processing device to a communications network, the processing device having a memory, a display and an operating system with pre-installed generic drivers providing a generic communications protocol for communication between processing device and a standard class of peripheral devices, the method comprising:

a) coupling a peripheral device to the processing device, the peripheral device having a transceiver;

b) 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;

c) coupling the processing device to a communications network via the peripheral device;

d) 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.

83. The method of claim **82** 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.

84. The method of claim **82** 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.

85. The method of claim **82** 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.

86. The method of claim **82**, wherein a client application is stored on the peripheral device which when run on the processing device obtains screen scraped data.

87. The method of claim **86** wherein the client application is a portable application.

88. The method of claim **82** wherein the peripheral device is adapted to anal se an incoming signal from the processing device and if no audio is received, the incoming signal is discarded.

89. The method of claim **88** wherein if audio is received, the peripheral device will initiate an additional connection to the base unit through the communications network.

90. The method of claim **82** further comprising time-stamping synchronously the audio with the data stream.

91. The method of claim **90** further comprising encoding, optionally encrypting the audio data.

92. A system for connecting a processing device to a communications network, the processing device having a memory, a display and an operating system with pre-installed generic drivers providing a generic communications protocol for communication between processing device and a standard class of peripheral devices, the system comprising:

a) means for coupling a peripheral device to the processing device, the peripheral device having a transceiver;

b) means for 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;

c) means for coupling the processing device to a communications network via the peripheral device;

d) means for 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.

93. The system of claim **92** further comprising means for 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.

94. The system of claim **92** further comprising means for 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.

95. The system of claim **92** further comprising ~~means for~~ means for presenting the peripheral device to the processing device as a composite device and wherein pre-installed generic drivers drive different device interfaces independently.

96. The system of claim **92** wherein a client application is stored on the peripheral device which when run on the processing device obtains screen scraped data.

97. The system of claim **96** wherein the client application is a portable application.

98. The system of claim **92** wherein the peripheral device is adapted to analyse an incoming signal from the processing device and if no audio is received, the incoming signal is discarded.

99. The system of claim **98** wherein if audio is received, the peripheral device will initiate an additional connection to the base unit through the communications network.

100. The system of claim **92** further comprising time-stamping synchronously the audio stream with the data stream.

101. The system of claim **100** further comprising means for encoding, optionally encrypting the audio data.

Electronic Acknowledgement Receipt

EFS ID:	23214671
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 J. Moore/Kaitlyn Miller
Filer Authorized By:	Thomas J. Moore
Attorney Docket Number:	BEEL3004/TJM/TL
Receipt Date:	14-AUG-2015
Filing Date:	03-MAR-2015
Time Stamp:	15:48:02
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	Request/Corrected Patent Application Publications	BEEL3004_repub_reqst_13AUG 15.pdf	72921 283257eae353029b3c3a22f75b822749a69 90c40	no	3
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2	Request/Corrected Patent Application Publications	BEEL3004_marked_up_pub_13 AUG15.pdf	1082989 f3371f8931668ddc2f256ff271395c280cdc2dce	no	2

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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	Dean Phan
Attorney Docket Number	BEEL3004/TJM/TL

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	Application Number	14344836
	Filing Date	2015-03-03
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	2184
	Examiner Name	Dean Phan
	Attorney Docket Number	BEEL3004/TJM/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]
	1	European Office Communication dated June 15, 2015, for EP 12762258.7.	☐

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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	Dean Phan
	Attorney Docket Number	BEEL3004/TJM/TL

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

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

☐ See attached certification statement.

☐ 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 J. Moore/	Date (YYYY-MM-DD)	2015-07-21
Name/Print	THOMAS J. MOORE	Registration Number	28974

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

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Electronic Acknowledgement Receipt

EFS ID:	22975440
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 J. Moore/Kaitlyn Miller
Filer Authorized By:	Thomas J. Moore
Attorney Docket Number:	BEEL3004/TJM/TL
Receipt Date:	21-JUL-2015
Filing Date:	03-MAR-2015
Time Stamp:	16:05:21
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	612033 14c56343d303ee90230c982bfb0864c48f4465d8	no	4
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A U.S. Patent Number Citation or a U.S. Publication Number Citation is required in the Information Disclosure Statement (IDS) form for autoloading of data into USPTO systems. You may remove the form to add the required data in order to correct the Informational Message if you are citing U.S. References. If you chose not to include U.S. References, the image of the form will be processed and be made available within the Image File Wrapper (IFW) system. However, no data will be extracted from this form. Any additional data such as Foreign Patent Documents or Non Patent Literature will be manually reviewed and keyed into USPTO systems.

2	Non Patent Literature	EP_OA_15JUN15.pdf	155793 e44a3a43fa8017a32c89d97cd176d9652ad8c2ea	no	5

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Information:

Total Files Size (in bytes):	767826

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New Applications Under 35 U.S.C. 111

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

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

New International Application Filed with the USPTO as a Receiving Office

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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/TJM/TL

CONFIRMATION NO. 1046

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

PUBLICATION NOTICE



Title:ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS

Publication No.US-2015-0169477-A1
Publication Date:06/18/2015

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

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

23364
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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: 03/13/2015

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 A SHELTON

Telephone: (571) 272-3926

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		1700	BEEL3004/TJM/TL	21	3

CONFIRMATION NO. 1046

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

FILING RECEIPT

OC000000073881217

Date Mailed: 03/13/2015

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 is a CON of 13/270,659 10/11/2011 PAT 8756348
which claims benefit of 61/534,592 09/14/2011

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 - A proper **Authorization to Permit Access to Application by Participating Offices** (PTO/SB/39 or its equivalent) has been received by the USPTO.

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: 06/18/2015
Non-Publication Request: No
Early Publication Request: No
Title

ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS

Preliminary Class

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

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

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).

SelectUSA

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 community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
In re Application of:

Application No.:	14/344,836	**Examiner:**	Unassigned
Filing Date:	March 13, 2014	**Art Unit:**	Unassigned
First Inventor:	Koen Simon Herman BEEL	**Customer No.:**	23364
Attorney No.:	BEEL3004/TJM/TL	**Confirm. No.:**	1046
For:	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS		

RESPONSE TO NOTIFICATION OF MISSING REQUIREMENTS UNDER 35 U.S.C. 371

Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Sir:

INTRODUCTORY COMMENTS

This is responsive to the Notification of Missing Requirements mailed in this application on August 7, 2014, wherein the Office requires that a declaration be submitted. This Response is submitted with a Pre-AIA Declaration executed by the inventors and a Supplemental Application Data Sheet to reflect the change in address of the inventor, Yoav NIR.

A petition and appropriate fee to extend the period of reply by five months is concurrently filed herewith.

REMARKS

Reconsideration of the pending application is respectfully requested on the basis of the following particulars.

Specifically, the declaration is hereby submitted herewith.

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.

BACON & THOMAS, PLLC
625 Slaters Lane, Fourth Floor
Alexandria, Virginia 22314-1176
Phone: (703) 683-0500

Respectfully submitted,

/Thomas J. Moore/

Date: March 3, 2015

THOMAS J. MOORE
Attorney for Applicants
Registration No. 28,974

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Application No.:	14/344,836	**Confirm. No.:**	1046
Filing Date:	March 13, 2014	**Art Unit:**	TBD
First Inventor:	Koen Simon Herman BEEL	**Customer No.:**	23364
Attorney No.:	BEEL3004/TJM/TL	**Examiner:**	TBD
For:	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS		

CORRECTION OR UPDATE OF APPLICATION DATA SHEET
(Supplemental ADS)

Commissioner for Patents

Sir:

Applicant submits below an update to the last Application Data Sheet (ADS) submitted in the subject application on March 13, 2014. This updates the address of second inventor Yoav NIR.

Please charge any additional fees required or credit any overpayments in connection with this paper to Deposit Account No. 02-0200.

Section Heading (include main heading and subheading(s) as appropriate)	**Correction or Update** (interlineate, bracket or underline changes)
Inventor Information, Inventor 2, Residence Information, City	~~Rekkem~~ Komen
Inventor Information, Inventor 2, Mailing Address of Inventor, Address 1	~~Lentedreef 21~~ rue de Ten Brielen 19
Inventor Information, Inventor 2, Mailing Address of Inventor, City	~~Rekkem~~ Komen
Inventor Information, Inventor 2, Mailing Address of Inventor, Postal Code	~~B-8930~~ B-7780

Please charge any additional fees required or credit any overpayments in connection with this paper to Deposit Account No. 02-0200.

BACON & THOMAS, PLLC
625 Slaters Lane, Fourth Floor
Alexandria, Virginia 22314-1176
Phone: (703) 683-0500
Facsimile: (703) 683-1080

Date: March 3, 2015

Respectfully submitted,

/Thomas J. Moore/

THOMAS J. MOORE
Attorney for Applicants
Registration No. 28,974

Electronic Patent Application Fee Transmittal	
Application Number:	14344836
Filing Date:	
Title of Invention:	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS
First Named Inventor/Applicant Name:	Koen Simon Herman BEEL
Filer:	Thomas J. Moore/Kaitlyn Miller
Attorney Docket Number:	BEEL3004/TJM/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($)
Basic Filing:				
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($)
Extension - 5 months with $0 paid	1255	1	3000	3000
Miscellaneous:				
		Total in USD ($)		**3000**

Electronic Acknowledgement Receipt	
EFS ID:	21651127
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 J. Moore/Kaitlyn Miller
Filer Authorized By:	Thomas J. Moore
Attorney Docket Number:	BEEL3004/TJM/TL
Receipt Date:	03-MAR-2015
Filing Date:	
Time Stamp:	15:36:39
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$3000
RAM confirmation Number	2285
Deposit Account	020200
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. 1.492 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Extension of Time	BEEL3004_EOT_Form.pdf	156602 375c4049dfb0d5ebc23d248c205daaaae7ecd295	no	2
Warnings:					
Information:					
2	Oath or Declaration filed	BEEL3004_PreAIA_Dec.pdf	448871 0e9853ec4601739b54cce13ac4e9af4e1e2c489d	no	2
Warnings:					
Information:					
3	Applicant Response to Pre-Exam Formalities Notice	BEEL3004_Rsp_MissReq_Dec_03MAR15.pdf	118827 8726fc5bf56882ee3183235695374de74a67484d	no	2
Warnings:					
Information:					
4	Application Data Sheet	BEEL3004_Supp_ADS_InvAddrs.pdf	105679 825ded37333c86491aba0b5ef0676719f304ea61	no	2
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
5	Fee Worksheet (SB06)	fee-info.pdf	30608 ae94b7d5ec6ed6e8392549bfa93f944f5848bd2e	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	860587		

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

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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

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

PTO/AIA/22 (03-13)
Approved for use through 3/31/2013. 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 displays a valid OMB control number.

PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)	Docket Number (Optional) BEEL3004/TJM/TL
Application Number 14/344,836	Filed March 13, 2014
For ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS	
Art Unit	Examiner

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	$
☐	Two months (37 CFR 1.17(a)(2))	$600	$300	$150	$
☐	Three months (37 CFR 1.17(a)(3))	$1,400	$700	$350	$
☐	Four months (37 CFR 1.17(a)(4))	$2,200	$1,100	$550	$
☑	Five months (37 CFR 1.17(a)(5))	$3,000	$1,500	$750	$ 3000

☐ Applicant asserts small entity status. See 37 CFR 1.27.

☐ Applicant certifies micro entity status. See 37 CFR 1.29.
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

☐ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☑ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 02-0200.

☑ Payment made via EFS-Web.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the

☐ applicant.

☑ attorney or agent of record. Registration number 28,974.

☐ attorney or agent acting under 37 CFR 1.34. Registration number _____.

/Thomas J. Moore/	March 3, 2015
Signature	Date
THOMAS J. MOORE	703-683-0500
Typed or printed name	Telephone Number

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.

☐ * Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.136(a). The information is required to obtain or retain a benefit by the public, which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop PCT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Privacy Act Statement

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

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

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

ATTORNEY/DOCKET NO: BEEL3004/TJM/TL

DECLARATION FOR PATENT APPLICATION

As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name; I believe that I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention (Design, if applicable) entitled:

ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS

the specification of which (check one):
☐ is attached hereto, or ☑ was filed on: March 13, 2014 as U.S. Application Number or PCT International Application Number: 14/344,836 and (if applicable) was amended on: _____.
I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment(s) referred to above. I acknowledge the duty to disclose information which is material to patentability as defined in *Title 37, Code of Federal Regulations, '1.56*. I hereby claim foreign priority benefits under *Title 35, United States Code '119* of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

PRIOR FOREIGN APPLICATION(S)			PRIORITY CLAIMED	
Number	**Country**	**Day/Month/Year Filed**	**Yes**	**No**

☐ Additional Priority Application(s) Listed on Following Page(s)

I HEREBY CLAIM THE BENEFIT UNDER TITLE 35 U.S. CODE '119(E) OF ANY U.S. PROVISIONAL APPLICATIONS LISTED BELOW.	
Application Number	**Day/Month/Year Filed**
61/534,592	14/09/2011
61/635,234	18/04/2012

☐ Additional Provisional Application(s) Listed on Following Page(s)

I hereby claim the benefit under *Title 35, United States Code, '120* of any United States application(s) or PCT international application(s) designating The United States of America listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of *Title 35, United States Code, '112*, I acknowledge the duty to disclose information which is material to patentability as defined in *Title 37, Code of Federal Regulations, '1.56* which became available between the filing date of the prior application(s) and the national or PCT international filing date of this application:

Application Number	Filing Date	Status - Patented, Pending or Abandoned
13/270,659	October 11, 2011	Pending

☐ Additional US/PCT Priority Application(s) listed on Following Page(s)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under *section 1001 of title 18 of the United States Code* and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Send correspondence to: **BACON & THOMAS, PLLC**
Customer Number: 23364
625 Slaters Lane, 4th Floor
Alexandria, VA 22314-1176

Telephone Calls to: **Bacon & Thomas, PLLC**
(703) 683-0500

FULL NAME OF FIRST OR SOLE INVENTOR	CITIZENSHIP
Koen Simon Herman BEEL	Belgium
RESIDENCE ADDRESS Zandstraat 20a, Eke B-9810, Belgium	POST OFFICE ADDRESS IS THE SAME AS RESIDENCE ADDRESS UNLESS OTHERWISE SHOWN BELOW
DATE 30/07/2015	SIGNATURE

☑ See following page(s) for additional joint inventors.

ATTORNEY/DOCKET NO: BEEL3004/TJM/TL

CONTINUATION OF DECLARATION FOR PATENT APPLICATION

FULL NAME OF JOINT INVENTOR	CITIZENSHIP
Yoav NIR	Belgium
RESIDENCE ADDRESS ~~Lentedreef 21, Rekkem, B-8930, Belgium~~ rue de Ten Brielen 19 7780 KOMEN BELGIUM	POST OFFICE ADDRESS IS THE SAME AS RESIDENCE ADDRESS UNLESS OTHERWISE SHOWN BELOW rue de Ten Brielen 15, 7780 KOMEN BELGIUM
DATE 23/02/2015	SIGNATURE

FULL NAME OF JOINT INVENTOR	CITIZENSHIP
Filip Josephine Johan LOUWET	Belgium
RESIDENCE ADDRESS De Wijngaard 1, Knesselare B-9910, Belgium	POST OFFICE ADDRESS IS THE SAME AS RESIDENCE ADDRESS UNLESS OTHERWISE SHOWN BELOW
DATE 30/11/15	SIGNATURE

FULL NAME OF JOINT INVENTOR	CITIZENSHIP
Guy COEN	Belgium
RESIDENCE ADDRESS Louis Camustraat 25, Aalst B-9300, Belgium	POST OFFICE ADDRESS IS THE SAME AS RESIDENCE ADDRESS UNLESS OTHERWISE SHOWN BELOW
DATE 30/11/15	SIGNATURE

FULL NAME OF JOINT INVENTOR	CITIZENSHIP
RESIDENCE ADDRESS	POST OFFICE ADDRESS IS THE SAME AS RESIDENCE ADDRESS UNLESS OTHERWISE SHOWN BELOW
DATE	SIGNATURE

☐ See following pages for additional joint inventors/priority applications.

POWER OF ATTORNEY BY APPLICANTS

TITLE OF INVENTION: ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS

This power revokes any previous powers of attorney given in:

☒ United States application number 14/344,836 filed on March 13, 2014.

I (we) hereby appoint Practioners associated with the following Customer Number as my/our attorney, and to transact all business in the United States Patent and Trademark Office connected therewith for the application identified above:

Customer Number: 23364

Please recognize or change the correspondence address for the above-identified application to the address associated with the above-mentioned Customer Number.

I (we) am/are the Applicant as:

☒ Assignee or Person to Whom the Inventor is Under an Obligation to Assign. This revocation and appointment to the above-identified Practitioners is to the exclusion of the inventor(s).

Non-Inventor Applicant

Non-Inventor Entity Name	BARCO N.V.		
Signature	X	Date	X October 6, 2014
Name and Title	X Filip Pinkelan, Barco Sr. VP - COO		

☐ Additional Inventor(s) Applicants(s) is/are being named on the supplemental sheet(s) attached hereto.

Electronic Acknowledgement Receipt

EFS ID:	21582319
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 J. Moore/Kaitlyn Miller
Filer Authorized By:	Thomas J. Moore
Attorney Docket Number:	BEEL3004/TJM/TL
Receipt Date:	24-FEB-2015
Filing Date:	
Time Stamp:	13:33:54
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	Power of Attorney	BEEL3004_POA.pdf	61970 df61b681856cb5df7f78cd5a656d0adc9796b4ca	no	1

Warnings:	
Information:	

Total Files Size (in bytes):	61970

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

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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

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

PTO/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	2014-03-13
First Named Inventor	Koen Simon Herman BEEL
Art Unit	
Examiner Name	
Attorney Docket Number	BEEL3004/TJM/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
	1					

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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

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NON-PATENT LITERATURE DOCUMENTS Remove

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14344836
	Filing Date	2014-03-13
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	
	Examiner Name	
	Attorney Docket Number	BEEL3004/TJM/TL

	1	Martin Trautschold, iPhone 4 Made Simple, 2010, Apress, Pages 1-819.	☐

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EXAMINER SIGNATURE

Examiner Signature		Date Considered	

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

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14344836
	Filing Date	2014-03-13
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	
	Examiner Name	
	Attorney Docket Number	BEEL3004/TJM/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 J. Moore/	Date (YYYY-MM-DD)	2014-10-31
Name/Print	THOMAS J. MOORE	Registration Number	28,974

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

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

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

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

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

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

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

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

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

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

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

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

Electronic Acknowledgement Receipt

EFS ID:	20576691
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 J. Moore/Kaitlyn Miller
Filer Authorized By:	Thomas J. Moore
Attorney Docket Number:	BEEL3004/TJM/TL
Receipt Date:	31-OCT-2014
Filing Date:	
Time Stamp:	15:39:46
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	612035 84b48630effedc2fd5deafbbc2927bce35fa102b	no	4

Warnings:	
Information:	

A U.S. Patent Number Citation or a U.S. Publication Number Citation is required in the Information Disclosure Statement (IDS) form for autoloading of data into USPTO systems. You may remove the form to add the required data in order to correct the Informational Message if you are citing U.S. References. If you chose not to include U.S. References, the image of the form will be processed and be made available within the Image File Wrapper (IFW) system. However, no data will be extracted from this form. Any additional data such as Foreign Patent Documents or Non Patent Literature will be manually reviewed and keyed into USPTO systems.

2	Non Patent Literature	Trautschold_NPL.pdf	18436547 cd94c3390e9eb752359d4b71faf1f37ae834b1cf	no	819

Warnings:

Information:

Total Files Size (in bytes):	19048582

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New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

PTO/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	2014-03-13
First Named Inventor	Koen Simon Herman BEEL
Art Unit	
Examiner Name	Unassigned
Attorney Docket Number	BEEL3004/TJM/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
	1					

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U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14344836
	Filing Date	2014-03-13
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	
	Examiner Name	Unassigned
	Attorney Docket Number	BEEL3004/TJM/TL

	1	International Preliminary Report on Patentability (IPRP) dated March 27, 2014, for PCT/EP2012/068166.	☐
	2	International Preliminary Report on Patentability (IPRP) dated March 27, 2014, for PCT/EP2012/068167.	☐
	3	International Preliminary Report on Patentability (IPRP) dated March 27, 2014, for PCT/EP2012/068168.	☐

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

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

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

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14344836
	Filing Date	2014-03-13
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	
	Examiner Name	Unassigned
	Attorney Docket Number	BEEL3004/TJM/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 J. Moore/	Date (YYYY-MM-DD)	2014-10-09
Name/Print	THOMAS J. MOORE	Registration Number	28974

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

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

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

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

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

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

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

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

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

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

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

Electronic Acknowledgement Receipt

EFS ID:	20377670
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 J. Moore/Kaitlyn Miller
Filer Authorized By:	Thomas J. Moore
Attorney Docket Number:	BEEL3004/TJM/TL
Receipt Date:	09-OCT-2014
Filing Date:	
Time Stamp:	16:54:20
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	Non Patent Literature	BAR0210PCT_IPRP.pdf	536789 00e43d44c3f7f6a3ee7f70b59811d5c434dd198b	no	6

Warnings:	
Information:	

2	Non Patent Literature	BAR0443PCT_IPRP.pdf	503427 d6e4e5735694fe76a73bda1ec63eb0c8c5ac6f38	no	6
Warnings:					
Information:					
3	Non Patent Literature	BAR0448PCT_IPRP.pdf	556942 3e88b7f50acbd56f02c84b10705cfd3cf616dde0	no	7
Warnings:					
Information:					
4	Information Disclosure Statement (IDS) Form (SB08)	BEEL3004_IDS_SB08.pdf	612168 acc322d594357bedf9dea848b062f9e7c68432fc	no	4
Warnings:					
Information:					

A U.S. Patent Number Citation or a U.S. Publication Number Citation is required in the Information Disclosure Statement (IDS) form for autoloading of data into USPTO systems. You may remove the form to add the required data in order to correct the Informational Message if you are citing U.S. References. If you chose not to include U.S. References, the image of the form will be processed and be made available within the Image File Wrapper (IFW) system. However, no data will be extracted from this form. Any additional data such as Foreign Patent Documents or Non Patent Literature will be manually reviewed and keyed into USPTO systems.

Total Files Size (in bytes):	2209326

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.

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/TJM/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 FORMALITIES LETTER

OC000000070059325

Date Mailed: 08/07/2014

NOTIFICATION OF MISSING REQUIREMENTS UNDER 35 U.S.C. 371 IN THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US)

The following items have been submitted by the applicant or the IB to the United States Patent and Trademark Office as a Designated Office (37 CFR 1.495).

- Priority Document
- 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
- 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
- Application Data Sheet (37 CFR 1.76) filed on 03/13/2014

The following items **MUST** be furnished within the period set forth below in order to complete the requirements for acceptance under 35 U.S.C. 371:

- Oath or declaration of the inventors, in compliance with 37 CFR 1.497(a) and (b), identifying the application by the International application number and international filing date.

ALL OF THE ITEMS SET FORTH ABOVE MUST BE SUBMITTED WITHIN TWO (2) MONTHS FROM THE DATE OF THIS NOTICE OR BY 32 MONTHS FROM THE PRIORITY DATE FOR THE APPLICATION, WHICHEVER IS LATER. FAILURE TO PROPERLY RESPOND WILL RESULT IN ABANDONMENT.

The time period set above may be extended by filing a petition and fee for extension of time under the provisions of 37 CFR 1.136(a).

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)

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

FORM PCT/DO/EO/905 (371 Formalities Notice)

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 you are not using EFS-Web to submit your reply, you must include a copy of this notice.

CHARITTA A SHELTON

Telephone: (571) 272-3926

FORM PCT/DO/EO/905 (371 Formalities Notice)

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.

MULTIPLE DEPENDENT CLAIM FEE CALCULATION SHEET Substitute for Form PTO-1360 (For use with Form PTO/SB/06)	Application Number 14344836	Filing Date
	Applicant(s) Koen Simon Herman BEEL	
	* May be used for additional claims or amendments	

CLAIMS	AS FILED		AFTER FIRST AMENDMENT		AFTER SECOND AMENDMENT	
	Indep	Depend	Indep	Depend	Indep	Depend
1	1		---	---		
2		1	---	---		
3		1	---	---		
4		1	---	---		
5		(1)	---	---		
6		(1)	---	---		
7		(1)	---	---		
8		(1)	---	---		
9		(1)	---	---		
10		(1)	---	---		
11	1		---	---		
12		1	---	---		
13		1	---	---		
14		1	---	---		
15		(1)	---	---		
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17		(1)	---	---		
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45		(1)	---	---		
46		(1)	---	---		
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50		(1)	---	---		

	*		*		*	
	Indep	Depend	Indep	Depend	Indep	Depend
51		(1)	---	---		
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53		(1)	---	---		
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100				1		

MULTIPLE DEPENDENT CLAIM FEE CALCULATION SHEET Substitute for Form PTO-1360 (For use with Form PTO/SB/06)	Application Number 14344836	Filing Date
	Applicant(s) Koen Simon Herman BEEL	

* May be used for additional claims or amendments

CLAIMS	AS FILED		AFTER FIRST AMENDMENT		AFTER SECOND AMENDMENT	
	Indep	Depend	Indep	Depend	Indep	Depend
101				1		
102			1			
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Total Indep	2		3		0	
Total Depend	79	↵	18	↵	0	↵
Total Claims	81		21		0	

	*		*		*	
	Indep	Depend	Indep	Depend	Indep	Depend
151						
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PTO-1390 (05-13)
Approved for use through 6/30/2013. OMB 0651-0021
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A SUBMISSION UNDER 35 U.S.C. 371

Attorney Docket No.	
BEEL3004/TJM/TL	
U.S. Application No. (if known, see 37 CFR 1.5)	

International Application No.	International Filing Date	Priority Date Claimed
PCT/EP2012/068167	September 14, 2012	September 14, 2011

Title of Invention
ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS

First Named Inventor
Koen Simon Herman BEEL

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information.

1. ☑ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). NOTE: The express request under 35 U.S.C. 371(f) will not be effective unless the requirements under 35 U.S.C. 371(c)(1), (2), and (4) for payment of the basic national fee, copy of the International Application and English translation thereof (if required), and the oath or declaration of the inventor(s) have been received.
2. ☑ A copy of the International Application (35 U.S.C. 371(c)(2)) is attached hereto (not required if the International Application was previously communicated by the International Bureau or was filed in the United States Receiving Office (RO/US)).
3. An English language translation of the International Application (35 U.S.C. 371(c)(2))
   a. ☐ is attached hereto.
   b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
4. An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4))
   a. ☐ is attached.
   b. ☐ was previously filed in the international phase under PCT Rule 4.17(iv).

Items 5 to 8 below concern amendments made in the international phase.

PCT Article 19 and 34 amendments

5. ☐ Amendments to the claims under PCT Article 19 are attached (not required if communicated by the International Bureau) (35 U.S.C. 371(c)(3)).
6. ☐ English translation of the PCT Article 19 amendment is attached (35 U.S.C. 371(c)(3)).
7. ☐ English translation of annexes (Article 19 and/or 34 amendments only) of the International Preliminary Examination Report is attached (35 U.S.C. 371(c)(5)).

Cancellation of amendments made in the international phase

8a. ☐ Do not enter the amendment made in the international phase under PCT Article 19.

8b. ☐ Do not enter the amendment made in the international phase under PCT Article 34.

NOTE: A proper amendment made in English under Article 19 or 34 will be entered in the U.S. national phase application absent a clear instruction from applicant not to enter the amendment(s).

The following items 9 to 17 concern a document(s) or information included.

9. ☑ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
10. ☑ A preliminary amendment.
11. ☑ An Application Data Sheet under 37 CFR 1.76.
12. ☐ A substitute specification. NOTE: A substitute specification cannot include claims. See 37 CFR 1.125(b).
13. ☐ A power of attorney and/or change of address letter.
14. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13*ter*.3 and 37 CFR 1.821-1.825.
15. ☐ Assignment papers *(cover sheet and document(s))*. Name of Assignee: _____
16. ☐ _____ 37 CFR 3.73(c) Statement *(when there is an Assignee)*.

This collection of information is required by 37 CFR 1.414 and 1.491-1.492. The information is required to obtain or retain a benefit by the public, which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 15 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop PCT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

U.S. APPLN. No. (if known – see 37 CFR 1.5)	INTERNATIONAL APPLICATION No.	ATTORNEY DOCKET No.
	PCT/EP2012/068167	BEEL3004/TJM/TL

17. ☐ Other items or information:

The following fees have been submitted.	CALCULATIONS	PTO USE ONLY
18. ☑ Basic national fee (37 CFR 1.492(a)) **$280**	$ 280.00	
19. ☑ Examination fee (37 CFR 1.492(c)) If the written opinion prepared by ISA/US or the international preliminary examination report prepared by IPEA/US indicates all claims satisfy provisions of PCT Article 33(1)-(4) ..... **$0** All other situations **$720**	$ 720.00	
20. ☑ Search fee (37 CFR 1.492(b)) If the written opinion prepared by ISA/US or the international preliminary examination report prepared by IPEA/US indicates all claims satisfy provisions of PCT Article 33(1)-(4) ..... **$0** Search fee (37 CFR 1.445(a)(2)) has been paid on the international application to the USPTO as an International Searching Authority .....**$120** International Search Report prepared by an ISA other than the US and provided to the Office or previously communicated to the US by the IB .....**$480** All other situations **$600**	$ 480.00	
TOTAL OF 18, 19, and 20 =	$ 1480.00	
☐ Additional fee for specification and drawings filed in paper over 100 sheets (excluding sequence listing in compliance with 37 CFR 1.821(c) or (e) in an electronic medium or computer program listing in an electronic medium) (37 CFR 1.492(j)). Fee for each additional 50 sheets of paper or fraction thereof **$400**		

Total Sheets	Extra Sheets	Number of each addition 50 or fraction thereof (round **up** to a whole number)	RATE	
- 100 =	/ 50 =		x **$400**	$

Surcharge of **$140.00** for furnishing any of the search fee, examination fee, or the oath or declaration after the date of commencement of the national stage (37 CFR 1.492(h)).	$ 140.00	

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	21 - 20 =	1	x **$80**	$ 80	
Independent claims	3 - 3 =		x **$420**	$	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			**+ $780**	$	
Processing fee of **$140.00** for furnishing the English translation later than 30 months from the earliest claimed priority date (37 CFR 1.492(i)). **+**				$	
TOTAL OF ABOVE CALCULATIONS =				$	
☐ **Applicant asserts small entity status.** See 37 CFR 1.27. Fees above are reduced by ½.					
☐ **Applicant certifies micro entity status.** See 37 CFR 1.29. Fees above are reduced by ¾. Applicant must attach form PTO/SB/15A or B or equivalent.					
TOTAL NATIONAL FEE =				$ 1700.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00** per property. **+**				$	
TOTAL FEES ENCLOSED =				$ 1700.00	
				Amount to be refunded:	$
				Amount to be charged:	$

a. ☐ A check in the amount of $_____ to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. _____ in the amount of $_____ to cover the above fees.

c. ☑ The Director is hereby authorized to charge additional fees which may be required, or credit any overpayment, to Deposit Account No. 02-0200 as follows:

i. ☑ any required fee.

ii. ☑ any required fee except for excess claims fees required under 37 CFR 1.492(d) and (e) and multiple dependent claim fee required under 37 CFR 1.492(f).

d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038. The PTO-2038 should only be mailed or faxed to the USPTO. However, when paying the basic national fee, the PTO-2038 may NOT be faxed to the USPTO.

ADVISORY: If filing by EFS-Web, do **NOT** attach the PTO-2038 form as a PDF along with your EFS-Web submission. Please be advised that this is **not** recommended and by doing so your **credit card information may be displayed via PAIR**. To protect your information, it is recommended to pay fees online by using the electronic payment method.

NOTE: Where an appropriate time limit under 37 CFR 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the International Application to pending status.

Correspondence Address

☑ The address associated with Customer Number: 23364 **OR** ☐ Correspondence address below

Name					
Address					
City		State		Zip Code	
Country		Telephone			
Email					

Signature	/Thomas J. Moore/	Date	March 13, 2014
Name (Print/Type)	THOMAS J. MOORE	Registration No. (Attorney/Agent)	28,974

Privacy Act Statement

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

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

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	BEEL3004/TJM/TL
	Application Number	
Title of Invention	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS	

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

Secrecy Order 37 CFR 5.2

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

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Koen Simon Herman		BEEL	

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

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Prefix	Given Name	Middle Name	Family Name	Suffix
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Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

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Inventor 3 Remove

Legal Name

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	BEEL3004/TJM/TL
	Application Number	
Title of Invention	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS	

Prefix	Given Name	Middle Name	Family Name	Suffix
	Filip Josephine Johan		LOUWET	

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City	Knesselare	State/Province	
Postal Code	B-9910	Country i	BE

Inventor 4 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Guy		COEN	

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

City	Aalst	Country of Residence i	BE

Mailing Address of Inventor:

Address 1	Louis Camustraat 25		
Address 2			
City	Aalst	State/Province	
Postal Code	B-9300	Country i	BE

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

Correspondence Information:

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

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

Customer Number	23364		
Email Address	mail@baconthomas.com	Add Email	Remove Email

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	BEEL3004/TJM/TL
	Application Number	
Title of Invention	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS	

Application Information:

Title of the Invention	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS		
Attorney Docket Number	BEEL3004/TJM/TL	**Small Entity Status Claimed** ☐	
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	6	**Suggested Figure for Publication (if any)**	

Filing By Reference :

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

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

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

Publication Information:

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

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

Representative Information:

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

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	23364		

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	BEEL3004/TJM/TL
	Application Number	
Title of Invention	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS	

Domestic Benefit/National Stage Information:

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

Prior Application Status	Expired		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	Claims benefit of provisional	61/534592	2011-09-14
Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	Continuation in part of	13/270659	2011-10-11
Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	Claims benefit of provisional	61/635234	2012-04-18
Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	a 371 of international	PCT/EP2012/068167	2012-09-14

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

Foreign Priority Information:

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

Remove

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

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	BEEL3004/TJM/TL
	Application Number	
Title of Invention	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS	

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

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

Authorization to Permit Access:

☒ Authorization to Permit Access to the Instant Application by the Participating Offices

If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing this Authorization.

Applicant Information:

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

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	BEEL3004/TJM/TL
	Application Number	
Title of Invention	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS	

Applicant 1 Remove

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

Clear

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

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

Name of the Deceased or Legally Incapacitated Inventor :

If the Applicant is an Organization check here. ☒

Organization Name	BARCO N.V.		
Mailing Address Information:			
Address 1	Pres. Kennedypark 35		
Address 2			
City	Kortrijk	**State/Province**	
Country [i]	BE	Postal Code	B-8500
Phone Number		Fax Number	
Email Address			

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

Assignee Information including Non-Applicant Assignee Information:

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Assignee 1

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

Remove

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

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	BEEL3004/TJM/TL
	Application Number	
Title of Invention	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS	

Organization Name	BARCO N.V.

Mailing Address Information For Assignee including Non-Applicant Assignee:

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

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

Signature:

Remove

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications

Signature	/Thomas J. Moore/			Date (YYYY-MM-DD)	2014-03-13
First Name	THOMAS	Last Name	MOORE	Registration Number	28974

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

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

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

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

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

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

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

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

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

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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

International Patent Application No. PCT/EP2012/068167

PCT/DO/EO/US

International Filing Date: September 14, 2014

Attorney Docket: BEEL3004/TJM/TL

Applicant: Koen Simon Herman BEEL et al.

For: ELECTRONIC TOOL AND METHODS FOR MEETINGS

PRELIMINARY AMENDMENT BEFORE EXAMINATION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

INTRODUCTORY COMMENTS

This paper accompanies documents submitted to initiate national stage processing of the above-identified international patent application.

Before calculating the filing fee and before formal examination of the application on the merits, it is desired to amend the application in accordance with the following particulars.

AMENDMENTS

AMENDMENTS TO THE ABSTRACT

The abstract is amended as shown on a following page under the heading "AMENDMENTS TO THE ABSTRACT".

AMENDMENTS TO THE CLAIMS

The claims are amended as shown in the following pages under the heading "LIST OF CURRENT CLAIMS". This listing of claims supersedes all prior listing of claims presented in this application, shows currently proposed amendments and shows the current status of all claims in the application.

The amendments to the claims of this application, which originated in a foreign country, are submitted before examination on the merits and are not intended to have a narrowing effect for the purpose of patentability, but rather are made for one or more of the

following reasons: (i) to remove drawing reference numerals unnecessary under U.S. practice; (ii) to remove or reduce multiple dependent claims to reduce the filing fee; (iii) to revise the original language originating in a foreign country to better conform to customary English usage and style for U.S. patent claiming; (iv) to revise original non-U.S. claim terminology into more appropriate English claim terms having a scope of meaning consistent with the original intended language in preparation for U.S. examination; (v) to remove limitations having an effect in a foreign country which is different and unintended under U.S. practice (i.e., changing "consisting of" to "comprising"); (vi) to remove or amend original claim language that could be regarded as alternative expressions that are acceptable under foreign patent practice but possibly subject to objection under U.S. practice, typically having a broadening or neutral effect in the amended claim; and/or (vii) to improve the clarity or meaning of the original language.

In the case of amendments effectively changing an original claim element expressed as a "means plus function" that could raise a presumption of claim expression under 35 U.S.C. 112, 6th paragraph to a structural expression or to an expression removing the presumption of a "means-plus-function" statement, it is not intended to narrow the claim so amended for purposes of patentability, but rather to place the claim in a form considered to be intended by the applicant from a foreign country where claim limitations described in terms of means-plus-function do not have the same effect as under U.S. practice. Thus, such amendments are intended to establish a full range of equivalents to the claim elements so amended under the U.S. doctrine of equivalents and beyond the range associated with "means-plus-function" expressions according to 35 U.S.C. 112, 6th paragraph, just as if the claim so amended was presented originally in its amended form.

All rights are reserved to the original disclosed and claimed subject matter and any cancellation of claims is made without prejudice or disclaimer.

AMENDMENTS TO THE ABSTRACT

The original Abstract is cancelled in favor of the new Abstract presented on the following page.

ABSTRACT

An electronic meeting tool and method for communicating arbitrary media content from users at a meeting comprises 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. A peripheral device adapted to communicate the user selected arbitrary media content via the communications network is a connection unit comprising a connector adapted to couple to a port of a processing device having a second display, a memory and an operating system, and a transmitter. A program is adapted to obtain user selected arbitrary media content, said program leaving a zero footprint on termination. The user may trigger transfer of said user selected arbitrary media content to said transmitter.

LIST OF CURRENT CLAIMS

1-81. (Cancelled)

82. (New) A method for connecting a processing device to a communications network, the processing device having a memory, a display and an operating system with pre-installed generic drivers providing a generic communications protocol for communication between processing device and a standard class of peripheral devices, the method comprising:
a) coupling a peripheral device to the processing device, the peripheral device having a transceiver;
b) 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;
c) coupling the processing device to a communications network via the peripheral device;
d) 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.

83. (New) The method of claim 82 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.

84. (New) The method of claim 82 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.

85. (New) The method of claim 82 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.

86. (New) The method of claim 82, wherein a client application is stored on the peripheral device which when run on the processing device obtains screen scraped data.

87. (New) The method of claim 86 wherein the client application is a portable application.

88. (New) The method of claim 82 wherein the peripheral device is adapted to anal se an incoming signal from the processing device and if no audio is received, the incoming signal is discarded.

89. (New) The method of claim 88 wherein if audio is received, the peripheral device will initiate an additional connection to the base unit through the communications network.

90. (New) The method of claim 82 further comprising time-stamping synchronously the audio with the data stream.

91. (New) The method of claim 90 further comprising encoding, optionally encrypting the audio data.

92. (New) A system for connecting a processing device to a communications network, the processing device having a memory, a display and an operating system with pre-installed generic drivers providing a generic communications protocol for communication between processing device and a standard class of peripheral devices, the system comprising:
a) means for coupling a peripheral device to the processing device, the peripheral device having a transceiver;
b) means for 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;
c) means for coupling the processing device to a communications network via the peripheral device;
d) means for 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.

93. (New) The system of claim 92 further comprising means for 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.

94. (New) The system of claim 92 further comprising means for 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.

95. (New) The system of claim 92 further comprising means for presenting the peripheral device to the processing device as a composite device and wherein pre-installed generic drivers drive different device interfaces independently.

96. (New) The system of claim 92 wherein a client application is stored on the peripheral device which when run on the processing device obtains screen scraped data.

97. (New) The system of claim 96 wherein the client application is a portable application.

98. (New) The system of claim 92 wherein the peripheral device is adapted to analyse an incoming signal from the processing device and if no audio is received, the incoming signal is discarded.

99. (New) The system of claim 98 wherein if audio is received, the peripheral device will initiate an additional connection to the base unit through the communications network.

100. (New) The system of claim 92 further comprising time-stamping synchronously the audio stream with the data stream.

101. (New) The system of claim 100 further comprising means for encoding, optionally encrypting the audio data.

102. (New) 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 audio 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 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.

REMARKS

Examination of the application as amended is respectfully requested.

Respectfully submitted,
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/Thomas J. Moore/

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Application Number	
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First Named Inventor	Koen Simon Herman BEEL
Art Unit	
Examiner Name	
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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6966035	B1	2005-11-15	Suess et al.	Cited in Specification
	2	8316138	B2	2012-11-20	Chang	

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	1	20100087139	A1	2010-04-08	Glass	Cited in Specification and German Search Report
	2	20060095376	A1	2006-05-04	Mitchell et al.	Cited in Specification
	3	20090198839	A1	2009-08-06	Banerjee et al.	Cited in Specification
	4	20110115689	A1	2011-05-19	Sugiyama et al.	Cited in Specification

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	5	20020196378	A1	2002-12-26	Slobodin et al.	Cited in Specification
	6	20130067121	A1	2013-05-14	Beel et al.	Related U.S. App. 13/270,659
	7	20130050254	A1	2013-02-28	Tran et al.	Cited in related U.S. App. 13/270,659
	8	20120331509	A1	2012-12-27	Laksono	Cited in related U.S. App. 13/270,659
	9	20070005809	A1	2007-01-04	Kobayashi et al.	Cited in GB 2501471 Search Report
	10	20100302130	A1	2010-12-02	Kikuchi et al.	Cited in GB 2501471 Search Report
	11	20070244970	A1	2007-10-18	Watanabe et al.	Cited in GB 2501471 Search Report
	12	20060031779	A1	2006-02-09	Theurer et al.	Cited in PCT/EP2012/068169 Search Report
	13	20050036509	A1	2005-02-17	Acharya et al.	Cited in PCT/EP2012/068168 Search Report and ISR
	14	20040263636	A1	2004-12-30	Cutler et al.	Cited in PCT/EP2012/068168 Search Report and ISR
	15	20090046139	A1	2009-02-19	Cutler et al.	Cited in German Search Report

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	1	00/52887	WO	A1	2000-09-08	MICROSOFT CORPORATION	Cited in PCT/EP2012/068169	☐
	2	1246395	EP	A1	2002-10-02	MOTOROLA, INC.	Cited in PCT/EP2012/068169	☐
	3	1187480	EP	A1	2002-03-13	TELESUITE CORP.	Cited in ISR and PCT/EP2012/068168	☐

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	1	International Search Report (ISR) dated March 6, 2013, for PCT/EP2012/068166.	☐
	2	International Search Report (ISR) dated March 19, 2013, for PCT/EP2012/068167.	☐
	3	International Search Report (ISR) dated March 4, 2013, for PCT/EP2012/068168.	☐
	4	International Search Report (ISR) dated January 28, 2013, for PCT/EP2012/068169.	☐

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	5	British Search Report dated August 28, 2012, for GB 1206841.7.	☐
	6	German Search Report dated November 17, 2011, for DE 102011055443.2.	☐
	7	Jiang et al., "A Novel Wireless Approach for Conference Projecting and Cooperating", Lecture Notes in Computer Science, Vol. 4159, pp. 688-697, 2006. (cited in GB 1206841.7 Search Report)	☐

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

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☐ The fee set forth in 37 CFR 1.17 (p) has been 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 J. Moore/	Date (YYYY-MM-DD)	2014-03-13
Name/Print	THOMAS J. MOORE	Registration Number	28974

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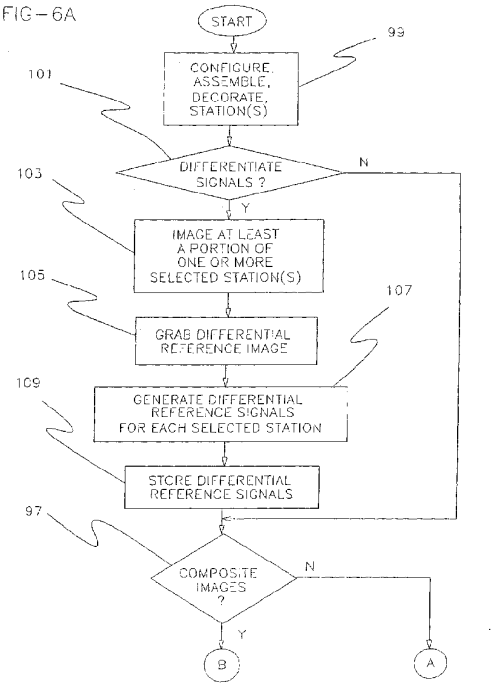
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Remarks:
This application was filed on 03 - 12 - 2001 as a divisional application to the application mentioned under INID code 62.

(54) Teleconferencing method and system

(57) A method and system (10) provides a face-to-face video conference utilizing a video mirror comprising a first station (12) having a first predetermined sensory setting; at least a second station (14) having a second sensory setting; the second station being remote from the first station; and an imaging system for capturing an image or sub-image at the first station, displaying at least a portion of said image or sub-image at the first station. The imaging system includes a differentiator for generating a differential signal (101) in response to a comparison of a differential referecnce signal to an input signal generally corresponding to the image captured at the first station. The imaging system also include a compositor for compositing the differential signal with one or more other image signals and/or a predetermined composite signal to provide a composited video image (97) which appears visually contiguous and seamless.

FIG-6A

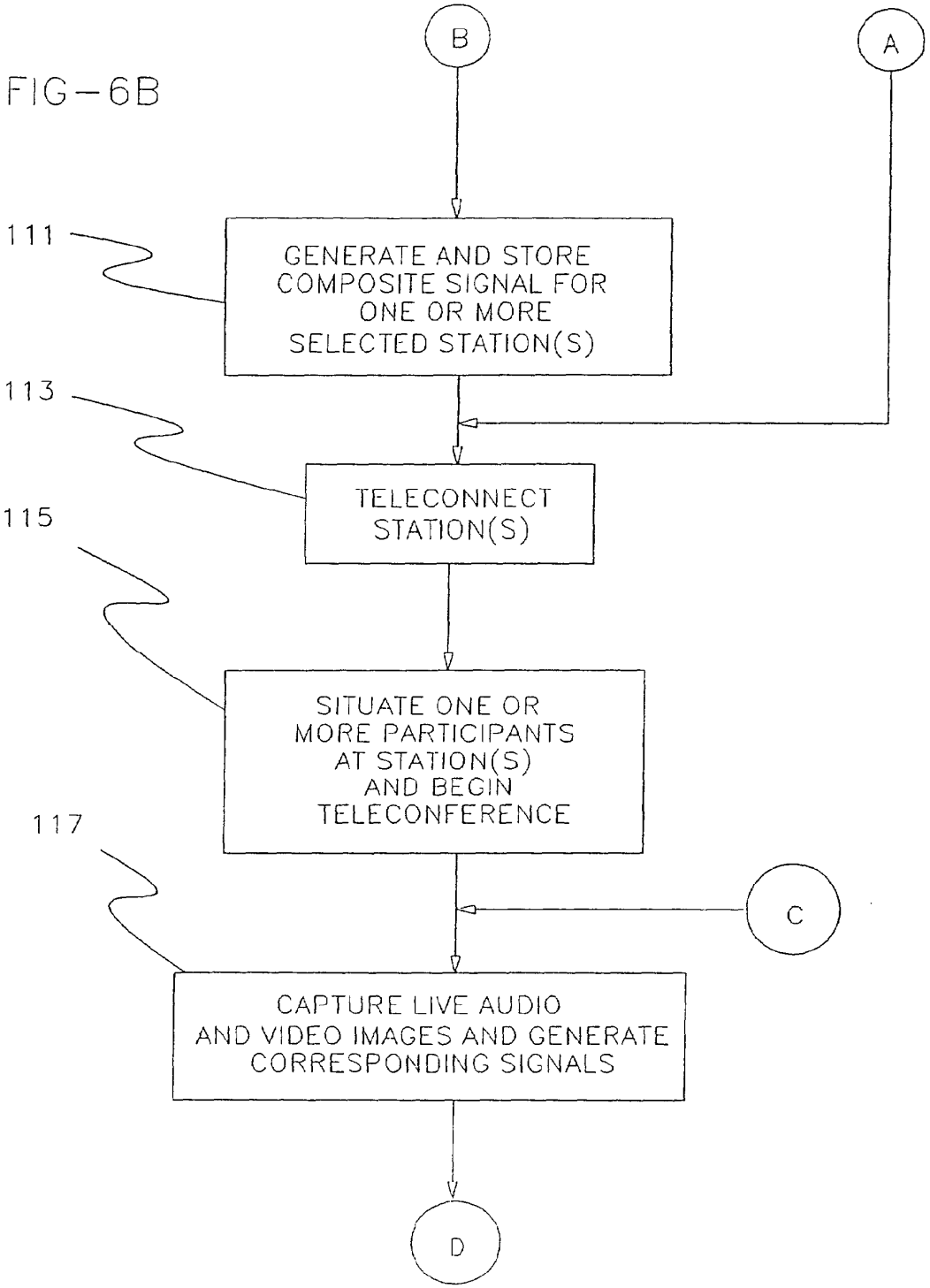


EP 1 187 480 A1

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(Cont. next page)

FIG-6B


B
A
111
GENERATE AND STORE COMPOSITE SIGNAL FOR ONE OR MORE SELECTED STATION(S)
113
TELECONNECT STATION(S)
115
SITUATE ONE OR MORE PARTICIPANTS AT STATION(S) AND BEGIN TELECONFERENCE
117
C
CAPTURE LIVE AUDIO AND VIDEO IMAGES AND GENERATE CORRESPONDING SIGNALS
D

Description

Background of the Invention

[0001] The present invention is related to a video conferencing system and method and, more particularly, to a teleconferencing system which is capable of producing a "video mirror" at a station such that any participants at one or more remote stations may be imaged and displayed in the video mirror at the station so that they appear to be present or face-to-face with any participants at the station.

[0002] Visual telephone systems presently provide communication between at least two locations for allowing a video conference among participants situated at each station. An objective in some video conferencing arrangements is to provide a plurality of television cameras at one location. The outputs of those cameras are transmitted along with audio signals to a corresponding plurality of television monitors at a second location such that the participants at the first location are perceived to be present or face-to-face with participants at the second location. In achieving good face-to-face presence, the number of conferees included in the video picture from each camera is normally limited to a few people, typically one to four. There are usually a like number of monitors at the receiving station, each strategically focused, aligned and positioned so that their displays appear contiguous, seamless and properly aligned. The apparatuses and methods employed heretofore to achieve proper positioning, focus and alignment have been complex and costly.

[0003] Further, the images captured by the plurality of cameras must be arranged and displayed so that they generate a non-overlapping and/or contiguous field of view, for example, as described in U. S. Patent No. 4,890,314 which issued to Judd et al. on December 26, 1989 and which is hereby incorporated by reference and made a part hereof.

[0004] The prior art systems have also been deficient because they have failed to provide means for generating an image, such as an image of a plurality of participants, at one station, differentiating the image to provide a differentiated image and subsequently compositing the differentiated image with a predetermined composite image to provide a composited image which complements or becomes visually complementary, contiguous or integrated with the remote station when the image is displayed at the remote station.

[0005] Another problem with prior art video conferencing systems is eye contact among participants at the stations. Typically, a camera is placed somewhere above the display monitor at which a participant is observing a display of the participant from the remote station. Consequently, the camera captures the participant at an angle above the participants viewing level or head. Thus, when an image of that participant is displayed at the remote station, it appears as if the participant is looking down (e.g., towards the ground). Previous solutions to this problem have required complex optical systems and methods using, for example, a plurality of lenses and mirrors. The solutions have usually been designed for use when the camera is capturing an image of a single participant, and they fall short when simultaneously capturing images of multiple participants.

[0006] The prior art stations themselves were not architecturally designed in a modular form so that they could be easily assembled, decorated and combined with a video image or sub-image from the remote station in a manner which would enhance the virtual presence environment.

Summary of the Invention

[0007] It is, therefore, a primary object of the present invention to provide a face-to-face teleconferencing system which enables a plurality of participants at a plurality of stations to teleconference such that the participants generally appear face-to-face with one or more participants at remote stations in the teleconferencing system.

[0008] Another object of this invention is to provide a differentiator or differentiating means which facilitates differentiating at least one image captured at a station into a differentiated image which will ultimately be transmitted to at least one remote station.

[0009] Another object of this invention is to provide a method and system for compositing an image or sub-image received from a remote station with a predetermined composite image to provide a composited image, at least a portion of which is displayed at the station.

[0010] Still another object of the invention is to provide a system or method which provides a display having wide aspect ratio while utilizing cameras which generate images having smaller aspect ratios.

[0011] Still another object of the invention is to provide a method and system for defining a predetermined sensory setting at one or more stations in order to enhance the virtual presence environment at that station.

[0012] Still another object of the present invention is to provide a method and apparatus for imaging subjects at one station, processing such images, and displaying such images at a remote station such that such images complement and become and/or become visually integrated with the remote station.

[0013] Another object of this invention is to provide a method and apparatus which is capable of generating a composite image having a plurality of different resolutions.

[0014] Still another object of the present invention is to provide a "video mirror" at a station.

[0015] Yet another object of the invention is to provide an imaging system which provides a simplified means capturing substantially eye level images of participants at stations while also providing means for simultaneously displaying images at such stations.

[0016] Still another object of this invention is to pro-

vide a system and method for compositing a plurality of signals corresponding to a plurality of images from at least one station to provide a contiguous or seamless composite image.

[0017] Still another object is to provide a method and system for providing a plurality of teleconferencing stations that have complementary predetermined sensory settings which facilitate creating a face-to-face environment when images of such settings and participants are displayed at remote stations.

[0018] Another object of the invention is to provide a method and apparatus for generating a video mirror such that an image having a predetermined sensory setting of participants or subjects captured at one station may be displayed at a remote station having a different predetermined sensory setting, yet the remote participants will appear face-to-face in the same predetermined setting as the participants or subjects at the one station.

[0019] In one aspect, this invention comprises an image generator for use in a teleconferencing system comprising a differentiator for comparing a differential reference image to an input video image from a station and for generating a differential image in response thereto, and a compositor associated with a remote station for receiving the differential image and for combining that differential image with a predetermined composite image to provide a composite image.

[0020] In another aspect, this invention comprises a conferencing system comprising a first station comprising a first sensory area defining a first aura, a second station comprising a second sensory area defining a second aura, and an image system for generating a first station image of at least a portion of the first sensory area and also for displaying a composite image corresponding to the first station image at the second station such that the first and second auras become visually combined to provide an integrated face-to-face environment at the second station.

[0021] In another aspect, this invention comprises an image system for use in a conference environment comprising a station having a first conference area and a remote station having a remote video area, the image system comprising a compositor for compositing a first signal which generally corresponds to a video image of a portion of the first conference area with a composite reference signal to provide a composite image signal; and a display for displaying the composited image signal at the remote video area such that the first and second stations appear complementarily integrated.

[0022] In still another aspect of the invention, this invention comprises a teleconferencing system comprising a sensory setting, a second station having a second predetermined sensory setting; and an imaging system for capturing an image at the first station and displaying at least a portion of the image at the second station such that it becomes generally visually integrated with the second predetermined sensory setting.

[0023] In another aspect of this invention, this invention comprises a station for use in a teleconferencing environment comprising a first station predetermined setting, first image sensing means associated with the first station predetermined setting for capturing images at the station for transmission to a remote station, audio means for transmitting and/or receiving audio signals from at least one remote station, and display means for displaying an image including at least one sub-image transmitted to the station from the remote station so that the image becomes integrated with the first station predetermined setting to facilitate providing a face-to-face presence teleconference.

[0024] In still another aspect of the invention, this invention comprises a method for providing a virtual presence conference in a teleconferencing system having a first station and a second station comprising the step of displaying an image formed from at least one sub-image from the first station at a predetermined location in the second station such that the image becomes visually integrated with the second station to define a single predetermined aura at the second station.

[0025] In yet another aspect of the invention, this invention comprises a method for teleconferencing comprising the steps of teleconnecting a first station having a first setting to a second station having a second setting; and displaying a composite image including an image of at least a portion of the first station at the second station such that when the composite image is displayed at the second station it cooperates with the second setting to facilitate providing a face-to-face environment at the second station.

[0026] In still another aspect, this invention comprises a method for teleconferencing comprising generating at least one first station signal generally corresponding to a first station image of the first station, comparing the at least one first station signal to a differential reference signal corresponding to a first reference image and generating at least one differential signal comprising a portion of the first station image in response thereto, compositing the at least one differential signal with a predetermined composite signal corresponding to a predetermined image to provide at least one composite image, and displaying the at least one composite image corresponding to the composite signal at a second station.

[0027] In yet another aspect, this invention comprises a method for generating a seamless image at a station from a plurality of sub-images at least one of which is received from a remote station comprising the steps of generating the plurality of sub-images, and combining the plurality of sub-images with a predetermined composite image to provide the seamless image.

[0028] These advantages and objects, and others, may be more readily understood in connection with the following specification, claims and drawings.

Brief Description of the Accompanying Drawings

[0029] Figs. 1A and 1B, taken together, show a teleconferencing system according to one embodiment of this invention;

[0030] Fig. 2 is a partly broken away top view of a first station of the teleconferencing system shown in Fig. 1A;

[0031] Figs. 3A and 3B, taken together, show another embodiment of the present invention wherein the stations have different predetermined sensory settings;

[0032] Figs. 4A and 4B, taken together, show still another embodiment of the invention having stations which have predetermined sensory settings which are designed, decorated and defined to be complementary and/or substantially identical;

[0033] Figs. 5A and 5B, taken together, provide a visual illustration of the images corresponding to some of the signals generated by the teleconferencing system; and

[0034] Figs. 6A-6D, taken together, show a schematic diagram of a method according to an embodiment of this invention.

Detailed Description of Preferred Embodiment

[0035] Referring now to Figs. 1A and 1B, a teleconferencing system 10 is shown having a first station or suite 12 and a second station or suite 14. The first station 12 comprises a first conference or sensory area 16, and the second station 14 comprises a second conference or sensory area 18-1, respectively. The first and second stations 12 and 14 also comprise a first video area 20 and a second video area 22-1, respectively, associated with the first and second conference areas 16 and 18-1. The first video area 20 is generally integral with a wall 32h in the first station 12. Likewise, the second video area 22-1 is generally integral with a wall 32h-1 in the second station 14. In the embodiment being described, the first and second stations are geographically remote from each other, but they could be situated on the same premises if desired.

[0036] For ease of illustration, the construction and modular assembly of the stations in teleconferencing system 10 will be described in relation to the first station 12. As shown in the sectional top view of Fig. 2, the first station 12 is shown assembled or constructed into a generally elongated octagonal shape. The first station 12 comprises a plurality of modular members 32a-32h which include walls 32a, 32c-e, 32g-h, doors in wall members 32b and 32f and entry facade 32f-1. The first station 12 also comprises a ceiling 34 (Fig. 1A) which is mounted on the members 32a-32h with suitable fasteners, such as nuts, bolts, adhesives, brackets, or any other suitable fastening means. Notice that the ceiling 34 has a dropped or sunken portion 34a which supports appropriate lighting fixtures 56.

[0037] In the embodiment being described, each of the members 32a-32h and the ceiling 34 is molded or formed to provide or define an environment having a unique architectural setting and/or sensory setting. For example, as illustrated in Fig. 1A, the wall member 32a may be formed to provide a plurality of stones 36, a plurality of columns 38, and an arch 40 to facilitate defining a first predetermined setting 12a having a Roman/Italian motif, theme or aura. One or more of the members 32a-32h may be provided with inlays, wall decorations (like picture 58 in Figs. 1A and 2), or even a permanent frosted glass window and frame arrangement 42 mounted therein. Furthermore, members 32b and 32f (Fig. 2) may be provided with sliding doors 44 which facilitate entering and exiting the first station 12 and which are designed to complement or further enhance the Roman/Italian motif.

[0038] In the embodiment being described, notice that member 32h (Figs. 1A and 2) is formed to provide a stone and pillar appearance and texture complementary to the stone and pillar appearance and texture of the wall members, such as member 32a. Also, the member 32a may be shaped to frame or mask a rear projection screen 46, as shown. The function and operation of the rear projection screen 46 will be described later herein. In the embodiment being described, the rear projection screen 46 comprises a high resolution lenticular rear projection screen which is either integral with or mounted directly to member 32h to provide a first video area 20 having a usable projection area of about 52 inches by 92 inches (1,32m×2,34m) with an associated aspect ratio of 16:9.

[0039] Each of the members 32a-32h and ceiling 34 are created in separate modular units using a plurality of molds (not shown). In the embodiment being described, a suitable material for molding the members 32a-32h and ceiling 34 to provide a granite-like appearance may be Gypsum, but they could be formed from other suitable material such as stone or clay-based materials, ceramic, paper, cardboard, foam, wood, Styrofoam and the like. As illustrated in 1A and 2, the member 32d may be provided with a shelf or mantle 33. The various members 32a-32h are assembled together as shown in Fig. 2 and secured together with suitable support braces 48 which may be secured to the walls 32a-32h with any suitable fastener such as screws, bolts, an adhesive or the like. After the first station 12 is assembled and the ceiling 34 is secured thereto, it has a length of about 14 feet, 6 inches (4,42m) (indicated by double arrow L in Fig. 2) and a width of about 12 feet, 0 inches (3,66m) (indicated by double arrow W in Fig. 2). The first station 12 has an approximate height from floor to ceiling 34 of about 8 feet, 6 inches (2,59m). Further, the members 32a, 32c, 32e and 32g have a width (indicated by double arrow Y in Fig. 2) of about 5 feet, 0 inch (1,52m). Finally, the back wall member 32d and front wall member 32h comprises a width of about 7 feet, 8 inches (2,33m) (indicated by double arrow X in Fig. 2).

[0040] After the members 32a-32h and ceiling 34 are assembled, the first station 12 may be further decorated,

designed or ornamented with a plurality of subjects, decorations or ornaments which facilitate providing the first predetermined sensory setting 12a which defines a first aura, motif or theme. Likewise, the second station 14 maybe further provided or ornamented with a plurality of subjects, decorations or ornaments which facilitate providing a second predetermined sensory setting 14a which defines a second aura, motif or theme. For example, as illustrated in Fig. 1A, the predetermined sensory setting 12a of the first station 12 may be further decorated with a table 50, table decorations, pillar and wall decorations, carpet (not shown), plants 54 and other wall decorations (not shown) to further enhance the Roman/Italian motif, theme or aura. The first and second predetermined sensory settings 12a and 14a may also comprise appropriate lighting fixtures 56 and appropriate furnishings, such as chairs 60 and tables 61, which complement the predetermined setting to further facilitate defining the Roman/Italian theme or motif for the stations 12 and 14.

[0041] It should be appreciated that once the first and second stations 12 and 14 are assembled and ornamented or decorated to provide their respective first and second predetermined sensory settings 12a and 14a, they define an aura, theme or motif which facilitates providing or creating a very sensual and impressionable environment. Providing such a station, such as station 12, with a strong sensory environment facilitates enhancing the virtual presence illusion created by teleconferencing system 10 of the present invention.

[0042] It should also be appreciated, however, that although the first station 12 and second station 14 are shown in the embodiment in Figs. 1A and 1B as having complementary or similar first and second predetermined sensory settings 12a and 14a, they could be provided with first and second predetermined sensory settings 12a and 14a having different themes, motifs or auras. Thus, while the embodiment described in relation to Figs. 1A and 1B illustrate a first and second set of stations 12 and 14 having a Roman/Italian motif, another set of stations, such as station 12' and station 14' in the embodiment illustrated in Figs. 3A and 3B, may have at least one station having a different predetermined setting. For example, the second station 14' in Fig. 3B provides a setting 14a' which defines a Chinese aura, theme or motif.

[0043] It should also be appreciated that the members 32a-32h, ceiling 34 and associated predetermined sensory setting are provided to be transportable and capable of being assembled at any suitable location, such as an existing rectangular room, suite or conference area having dimensions of at least 20 feet x 20 feet x 9 feet. (6,10m×6,10m×2,74m). While it may be desirable to provide the first and second stations 12 and 14 in the teleconferencing system 10 with substantially the same dimensions, it should be appreciated that they could be provided with differing dimensions, depending on, for example, the number of participants at each station. It should also be appreciated that the second station 14 and other stations described herein would preferably be manufactured and assembled in the same or similar manner as the first station 12. Also, the stations in the teleconference system 10 may be decorated with wall, ceiling and floor coverings to provide, for example, the first predetermined sensory setting 12a without using the preformed or molded modular members 32a-32h described above, although the use of such members may be preferable in this embodiment.

[0044] The teleconferencing system 10 also comprises conferencing means or a conferencing system means for teleconnecting the first and second stations 12 and 14 together to facilitate capturing an image or images at one of said stations and displaying at least a portion of the image or a sub-image at another of the stations such that it becomes generally visually integrated with the predetermined sensory setting at that station, thereby facilitating creating a "video mirror" and a "face-to-face" environment for the participant situated at that station. As shown in Fig. 1a, the conferencing system associated with the first station 12 comprises image sensor means, imager or image sensors for sensing images at the first station 12. For the embodiment shown in Figs. 1A and 2, the image sensor means comprises a plurality of cameras which are operably associated with the rear projection screen 46 of first station 12. In this regard, the plurality of cameras comprise a first camera head 62 and second camera head 64 which are operatively coupled to a first camera control unit 66 and second camera control unit 68, respectively. Notice that the first and second camera control units 66 and 68 are remotely situated from the first and second camera heads 62 and 64. This facilitates permitting the first and second cameras 62 and 64 to be placed directly in the projection path of the rear projection screen 46, without substantially interfering with the video image being projected.

[0045] In the embodiment being described, the first camera head 62 and second camera head 64 are situated approximately 16 inches (40,6cm) above he surface of table 50 which generally corresponds to the eye level of the seated participants situated at table 50. As illustrated in Fig. 2, the first and second cameras 62 and 64 are situated behind the rear projection screen 46 in operative relationship with a pair of 1-1/4 inch (31,8mm) diameter openings 66 and 68, respectively. The first and second cameras 62 and 64 are mounted on a suitable narrow or non-interfering bracket (not shown) such that they can be positioned behind the rear projection screen 46 in operative relationship with openings 66 and 68, respectively. In the embodiment being described, the first and second cameras 62 and 64 are 1-1/4 inch by 1-1/4 inch (31,8×31,8mm) 3-CCD camera heads which generate images having an aspect ratio of about 3:4 and a picture resolution of about 494 x 700 pixels. One suitable 3-CCD camera heads 62 and 64 and associated camera control units 66 and 68 may be Model No.

GP-US502 manufactured by Panasonic Broadcast and Television Systems Company of Japan. It should be appreciated that while the teleconferencing system 10 shown and described in relation to Figs. 1A and 1B show image sensor means comprising a plurality of camera heads 62 and 64 and camera control units 66 and 68 situated at a station, a single camera may be used (as shown and described relative to the embodiment shown in Figs, 4A and 4B) or even multiple cameras could be used depending on such things as the size of the station, the number of participants situated at the station, and/or the aspect ratio of each camera head selected. It should also be appreciated that the camera heads 62 and 64 and associated camera control units 66 and 68 are configured and positioned at the first station 12 to facilitate providing maximum vertical eye contact among participates in the teleconference, while minimally interrupting the substantially life-size video projection on the rear projection screen 46.

[0046] The conferencing means also comprises a first differentiator or differential key generator 70 (Fig. 1A) and a second differentiator or differential key generator 72, respectively. The camera control unit 66 generates an RGB analog signal I-62 which is received by the first differentiator 70, and the camera control unit 68 generates an RGB signal I-64 which is received by the second differentiator 72. The first and second differentiators 70 and 72 provide means for processing the image signals generated by the camera control units 66 and 68 to remove or differentiate any undesired portion of the images corresponding to the signals I-62 and I-64. For example, as described in detail later herein, it is desired in this embodiment to separate the image of the participants situated at the first station 12 from at least a portion of the first predetermined sensory setting 12a, such as the background behind the participants, in order to provide a differential signal VS-1 that has that portion of the first predetermined sensory setting 12A removed. This, in turn, facilitates transmitting the video image of the participants at the first station 12 to the remote second station 14 and also facilitates compositing the image with other images, as described below.

[0047] Suitable differentiators 70 and 72 may comprise the differential key generator shown and described in U.S. Patent No. 4,800,432, issued on January 24, 1989 to Barnett et al. and assigned to The Grass Valley Group, Inc., which is incorporated herein by reference and made a part hereof.

[0048] The differential key generators 70 and 72 convert the I-62 and I-64 signals from RGB analog signals to digital image signals having corresponding images 104 and 106 (Fig. 5A), respectively. The differential key generators 70 and 72 compare the digital image signals to an associated differential reference signals DRS-62 and DRS-64, respectively, which generally corresponds to images 108 and 110 in Fig. 5A. As described in detail later herein, these images 108 and 110 comprise at least a portion of the first predetermined sensory setting 12a such as the background. The differential reference signals DRS-62 and DRS-64 are stored in appropriate storage 74 and 76 (Fig. 1A) associated with the differential key generators 70, 72, respectively. In the embodiment being described, the differential reference signals DRS-62 and DRS-64 comprise a reference frame of a video image grabbed by one or both cameras 62 or 64 situated at the first station 12 from a video sequence of the first predetermined sensory setting 12a of the first station 12 background where no participants, chairs, or other foreground elements are in place.

[0049] In response to the comparison, the first and second differentiators 70 and 72 generate differentiated video signals VS-1 and VS-2 (Fig. 1A), respectively. As illustrated in Fig. 5, the VS-1 and VS-2 signals generally correspond to the individuals situated at the first station 12 when viewed in the direction of arrow A in Fig. 2. As illustrated in the images 112 and 114 (Fig. 5) associated with the VS-1 and VS-2 signals, respectively, notice that the background area shown in images 104 and 106 has been removed and is tagged as a "zero" image area.

[0050] Advantageously, tagging at least a portion of the image represented by the VS-1 signal as "zero" background facilitates compressing the VS-1 and VS-2 signals and providing corresponding compressed CDS-1 and CDS-2 signals, thereby reducing the amount of transmission band width needed. This tagging also facilitates compositing or overlaying another predetermined image to provide a seamless composited image as described in detail below.

[0051] The video signals VS-1 and VS-2 are received by a first compression/decompression means or CODEC 78 and a second compression/decompression means or CODEC 80, respectively. The CODECs 78 and 80 also receive an audio signal AS-A1 and AS-A2 from suitable microphones 82 and 83, respectively, which may be positioned or concealed at an appropriate location in the first station 12, such as underneath or on top of table 50, as illustrated in Fig. 1A. The function of the first and second CODEC 78 and 80 is to compress video and audio signals for transmitting to remote stations, such as the second station 14, and also to decompress compressed video and audio signals received from remote stations. Consequently, the CODECs 78 and 80 are configured with suitable compression and decompression algorithms which are known to those of ordinary skill in the art. The CODEC Model No. Rembrandt II VP available from Compression Labs, Inc. of San Jose, California is suitable for use in the embodiment described herein, but it should be noted that other suitable compression/decompression means may be employed.

[0052] The CODEC 78 receives the video signal VS-1 and audio signal AS-A1, and CODEC 80 receives the video signal VS-2 and audio signal AS-A2. The CODECs 78 and 80, generate digital signals CDS-1 and CDS-2, respectively, in response thereto which are in turn transmitted to remote station 14 via a transmission

network 84.

[0053] The transmission network 84 may be configured as a private network, public circuit switch service, and it may utilize telecommunication and/or satellite technology. In the embodiment being described, the transmission network 84 preferably includes a plurality of T-1 lines (not shown) which are capable of accommodating bit streams having a suitable band width, such as 1.544 megabytes per second.

[0054] The teleconferencing system 10 and conference means associated with the first station 12 also comprises enhancing means for enhancing the resolution of an image or sub-image received from a remote station, such as the second station 14. In the embodiment being described, enhancing means comprises a first line doubler 86 and a second line doubler 88 which are operatively coupled to the first CODEC 78 and second CODEC 80, respectively. In this embodiment, the first and second line doublers 86 and 88 enhance the resolution and picture quality of at least a portion of the image corresponding to video signals VS-3 and VS-4 received from the CODECs 78 and 80, respectively, by about 50-150%. The VS-3 and VS-4 signals correspond to images or sub-images received from remote station (s), such as station 14, as described in detail below. One suitable line doubler is the Model No. LD 100 available from Faroudja Laboratories, Inc. of Sunnyvale, California, but other suitable enhancing means may be provided to provide greater or less enhancement of the images to be displayed. For example, lenses, mirrors, optical pixel interpolation or other electrical means may be employed as desired. It should also be noted that the present invention may be performed without the use of any enhancing means without departing from the scope of the invention.

[0055] The first and second line doublers 86 and 88 generate enhanced video signals which are input into compositing means, compositor or video compositing multiplexer 92 for compositing the enhanced video signals associated with the images or sub-images received from the remote station(s) with one or more predetermined composite signals, such as predetermined composite signal A, corresponding to a predetermined composite image or sub-image which are stored in a suitable storage device 94 associated with the compositor 92. In the embodiment being described, the predetermined composite signal A corresponds to an image of at least a portion of first predetermined sensory setting 12a, such as the background of the first station 12. The video compositing multiplexer 92 composites the signals received from the first and second line doublers 86 and 88 with the predetermined composite signal A and generates a RGB analog composite signal in response thereto. It has been found that Model No. E-Space-1 available from Miranda Technologies, Inc. of Montreal and Quebec, Canada, is one suitable video compositing multiplexer 92.

[0056] The teleconferencing system 10 comprises a projector 96 coupled to the video compositing multiplexer 92 which receives the RGB composite signal and projects a corresponding image 90 (Fig. 1A) corresponding to the composite signal on the rear projection screen 46. The Model No. 3300 available from AMPRO Corporation of Titusville, Florida has been found to be a suitable projector 96. Although the embodiment has been described using projector 96 and rear projection screen 46, other suitable means may be employed for projecting or displaying the composited image. For example, a liquid crystal display (LCD) or other electronic screen may be suitable to display images at a station. This may eliminate the need for the projector 96.

[0057] The projector 96 could be used with an optical system or a plurality of mirrors (not shown), or prisms (not shown) such that the projector can be positioned, for example, to the side or below the rear projection screen 46 or in a manner that permits the projector 96 to project the image towards a mirror (not shown), which causes the image to be projected on the rear projection screen 46.

[0058] As described in detail below, the composite signal and its corresponding image 90 generally comprise a video image of at least a portion of the first predetermined sensory setting 12a combined or composited with a differentiated image, such as an image of the participants from the second station 14 which correspond to the VS-3 and VS-4 (Fig. 1B) signals. Consequently, the resultant image 90 projected on screen 46 at the first station 12 complements or blends with the architectural motif, aura, theme or design defined by the first predetermined sensory setting 12a at the first station 12, such that the projected image 90 appears visually integrated with the first predetermined sensory setting 12a of the first station 12. This, in turn, causes any image of the participants situated at the second station 14 and included in the image 90 to appear to be face-to-face with participants at the first station 12 during the teleconference. The operation of the compositor 92 is described in more detail later herein.

[0059] It should be appreciated that the sub-images or images received from the remote station(s) typically have a resolution on the order of about 352 x 288 pixels and the predetermined composite signal A comprises a resolution on the order of about 1280 x 1024 pixels. Thus, the resultant composite image 90 may comprise, for example, an image of the participants situated at the second station 14 having a first resolution and a background image of the first station 12 having a second resolution, which is higher than the first resolution. This enables compositor 92 to provide a composite image 90 which, when displayed on screen 46, gives the illusion or effect of a "video mirror" to the participants situated at the first station 12.

[0060] The teleconferencing system 10 also includes audio means comprising a plurality of speakers 100 and 102 (Figs. 1A and 2) which, in turn, receive audio signals AS-B1 and AS-B2 from CODECs 78 and 80, respective-

ly. It should be appreciated that the audio signal AS-B1 and AS-B2 generally correspond to the audio associated with the sound (e.g., voices, music and the like) associated with the remote station(s), such as second station 14.

[0061] It should also be appreciated that the rear projection screen 46 and projector 96 are configured and selected to enable the teleconferencing system 10 to project the composited image 90 (Fig.1A) at a predetermined scale, such as substantially full scale. In this regard, the compositor 92 comprises a scaler 95 which is integral therewith for scaling the composited signal associated with the composited image 90 to a desired or predetermined scale, such as substantially full scale.

[0062] Referring now to Fig. 1B, the second station 14 comprises similar components as the first station and such like components are labelled with the same reference numeral as their corresponding component in the first station 12, except that the components associated with the second station 14 have a "-1" designator added thereto. Such components operate and function in substantially the same manner as described above with regard to the first station 12 with the following being some differences. The differential reference signals DRS-3 and DRS-4 (Fig. 5) associated with the second station 14 generally correspond to an image or sub-image of at least a portion of the second predetermined sensory setting 14a, such as the background 98-1, of the second station 14. Such sub-image or image may include at least a portion of the background 98-1 without any participants, chairs or other foreground subjects situated in the second station 14. Also, like the predetermined composite signal A stored in the storage 94 associated with the first station 10, a predetermined composite signal B may be stored in the storage 94-1 associated with the compositor 92-1 second station 14. The predetermined composite signal B may correspond to an image or sub-image of at least a portion of the second predetermined sensory setting 14a of the second station 14. Such sub-image or image may include, for example, an image of the walls 32a-1 to 32h-1 and conference area 18 or background of the second station 14. Notice that in the embodiment shown in Figs. 1A and 1B, the second station 14 has a second predetermined sensory setting 14a which mirrors or is complementary to the first predetermined sensory setting 12a. As described above, however, the first and second predetermined sensory settings 12a and 14a may be different.

[0063] A method of operating the teleconferencing system 10 will now be described in relation to Figs. 6A-6D. The modular components, such as members 32a to 32h and ceiling 34 for first station 10, decorations and the like, are configured, assembled and decorated (block 99 in Fig. 6A) at a desired location to provide a conference station comprising a predetermined sensory setting defining a predetermined theme, motif or aura. As mentioned earlier herein, the theme, motif or aura may be complementary (as shown in Figs. 1A and 1B) or they can be completely different, as shown in Figs. 3A and 3B (described below). For ease of illustration, it will be assumed that the stations are assembled and decorated as shown and described relative to the embodiment in Figs. 1A and 1B.

[0064] Once the modular stations 12 and 14 are assembled and decorated, it may be desired (decision point 101 in Fig. 6A) to use differentiator (e.g., differentiator 72 in Fig. 1A). As discussed herein relative to the embodiments shown in Figs. 4A and 4B, it may not always be desired to generate a differential reference image, thereby making it unnecessary to generate the differential reference signal. If differentiation is desired, then the camera heads 62 or 64 generate at least one video image (block 103) of at least a portion of the first predetermined sensory setting 12A at the first station 12. The differentiators 72 and 74 grab or capture at least one differential reference image or sub-image from those images and generate (block 107) the differential reference signals DRS-62 and DRS-64, respectively. These signals are stored in suitable storage 74 and 76 for use by the differentiators 70 and 72, respectively. Likewise, cameras 62-1 and 64-1 at the second station 14 generate video images of at least a portion of the second predetermined setting 14a at the second station 14. The differentiators 70-1 and 72-1 grab or capture at least one differential reference image or sub-image from those images and generate differential reference signals (not shown) corresponding thereto. These signals are then stored (block 109) in suitable storage 74-1 and 76-1 for use by differential key generators 70-1 and 72-1, respectively.

[0065] As mentioned above, it is preferred that the differential reference signals DRS-62 and DRS-64 comprise an image of at least a portion of the first predetermined sensory setting 12a, such as an image of the first station 12 without any participants, chairs or other subjects which are not stationary during the teleconference. Likewise, it is preferred that the differential reference signals associated with the differentiators 70-1 and 72-1 comprise at least a portion of the second predetermined sensory setting 14a at the second station 14, such as an image of the background 98-1 without the participants, chairs and other subjects which are not stationary during the teleconference.

[0066] If differentiation of signals is not selected or at the end of the differentiation process, it may be desired to generate a composite image (decision point 97) for one or more of the stations. As discussed below, however, this may not always be required to achieve certain advantages of the invention. Such predetermined composite image would preferably include a substantial portion of the first predetermined sensory setting 12a, including the background and/or conference area 16 of the first station 12. If compositing is desired, then the predetermined composite signal A is generated (block 111 in Fig. 6B). The corresponding predetermined composite signal A may then be stored in suitable storage

94. In the same manner, the predetermined composite image at the second station 14 and corresponding predetermined composite signal B may be generated and stored as predetermined composite signal B in suitable storage 94-1. In the embodiment being described, the predetermined composite image associated with the second station 14 includes an image of at least a portion of the second predetermined sensory setting 14a, including the background 98-1.

[0067] In the embodiment being described, the predetermined composite signals A and B are generated by a suitable still camera (not shown) to provide a still image (not shown) of the station 12 or 14 being photographed. The still image would subsequently be scanned and digitized for storage by a suitable scanner (not shown). The still camera and scanner would preferably be capable of generating images having a resolution on the order of about 1280 x 1024 pixels. Thus, if compositing is performed, the resultant composite image (such as image 90 in Fig. 1A) may comprise an image having a high resolution background, for example, combined with a comparatively lower resolution image of the remote station participants. This, in turn, facilitates enhancing the "video mirror" effect wherein a mimic or replication of a common architectural technique of mirroring a wall of a given room which makes the overall room appear to be extended beyond its actual wall line.

[0068] Once the stations 12 and 14 are configured and the differential reference signals and predetermined composite signals A and B are generated and stored, the first and second suites 12 and 14 may then be teleconnected (block 113) or connected by satellite or other suitable means via the transmission network 84.

[0069] Next, one or more participants may be situated at the first and second stations 12 and 14. As illustrated in Fig. 2, notice that the participants seated at the first station 12 are situated a predetermined distance B from a participant's side 46a of the rear projection screen 46. The predetermined distance B generally corresponds to a preferred or optimum focal distance at which optimum imaging by cameras 62 and 64 may be performed. In the embodiment being described, it has been found that the predetermined distance should be about 5 feet, 6 inches (1,67m). The participants are situated at the second station 14 in a similar manner and the face-to-face teleconference may then begin.

[0070] For ease of illustration, the imaging and display of first station 12 participants at the second station 14 will be described. The first and second cameras 62 and 64 capture (block 117 in Fig. 6B) live images of the participants situated at the first station 12 and generate corresponding RGB analog signals I-62 and I-64 which are received by the differential key generators 70 and 72, respectively. If differentiation was selected (decision point 147 in Fig. 6C), processing continues at block 119 otherwise it proceeds at block 123. The differential key generators 70 and 72 generate (block 121 in Fig. 6C) the digital differential signal VS-1 and VS-2, respectively, after comparing (block 119 in Fig. 6C) the I-62 and I-64 signals received from cameras 62 and 64 to their respective differential reference signals DRS 62 and DRS-64 which are received from storages 74 and 76.

[0071] The differential signals VS-1 and VS-2 are then received by CODECs 78 and 80 which also receive the audio signals AS-A1 and AS-A2 which correspond to the audio, including sounds, music and voices, associated with the first station 12. The CODECs 78 and 80 digitize the audio signals AS-A1 and AS-A2, combine the audio signals with their respective video signal VS-1 or VS-2, and generate (block 123) the compressed CDS-1 and CDS-2 signals in response thereto. The CDS-1 and CDS-2 signals are then transmitted (block 125) to the second station 14 via the transmission network 84 (Fig. 1B).

[0072] The CDS-1 and CDS-2 signals are received and decompressed (block 127 in Fig. 6C) by CODECs 78-1 and 80-1, respectively, associated with the second station 14 to provide decompressed VS-1 and VS-2 signals. The CODECs 78-1 and 80-1 also decompress the audio signals AS-A1 and AS-A2 received from the first station 10 which are transmitted to speakers 100-1 and 102-1, respectively, at the second station 14.

[0073] Substantially simultaneously with the broadcasting of the audio signals at the second station 14, CODECs 78-1 and 80-1 decompress the CDS-1 and CDS-2 signals to provide VS-1 and VS-2 signals. The decompressed video signals VS-1 and VS-2 are then received by line doublers 86-1 and 88-1. If it is desired to enhance the signals (decision point 129), then the line doublers 86-1 and 88-1 process or manipulate the signals (block 131) in order to enhance the resolution of the image corresponding to those signals. After the signals VS-1 and VS-2 are processed, it may be desired to composite (decision point 133 in Fig. 6D) those signals with one or more other signals. In this illustration, for example, the video compositor 92-1 composites images (block 135) corresponding to those signals with at least one predetermined composite image, such as image 122 (Fig. 5B) corresponding to the predetermined composite signal B provided from storage 94-1 (Fig. 1B) to provide a composite signal. As mentioned above, the composite signal generally corresponds to the composited image 91-1 to be displayed on the rear projection screen 46-1 at the second station 14.

[0074] The compositor 92-1 may (decision point 137, block 139 in Fig. 6D) scale the composited image to a desired scale, such as full scale, using scaler 95-1. Thereafter, the compositor 95-1 transmits a corresponding RGB analog signal to projector 96-1 which displays (block 141) the scaled, composited image on the rear projection screen 46-1 (Fig. 1B).

[0075] The teleconference may then be continued or terminated as desired (decision point 143, block 145).

[0076] Because the composited image is substantially full scale when projected and includes a high resolution image of at least a portion of the second predeter-

mined sensory setting 14a, the image appears to blend or become visually integrated with the second predetermined sensory setting 14a. This, in turn, gives the participants situated at the second station 14 the perception that the first station participants are present or face-to-face with them in the second station 14.

[0077] In the same or similar manner, images and signals relative to the second station 14 images are captured, processed and displayed at the first station 12. So that images of the participants at the second station 14 are displayed at the first station 12 such that they appear to have a face-to-face presence at the first station 12. Thus, images of the second station 14 participants may be differentiated and composited such that, when they are displayed at the first station 12, the image completes or provides "the other half" of the first station 12 and becomes generally visually integrated therewith. Although not required, it may be desirable to enhance the face-to-face presence by providing, for example, first and second predetermined sensory settings 12a and 14a which define a dining environment wherein food or meals may be served. For example, the face-to-face presence may be further enhanced if the participants at both stations 12 and 14 order food and drinks from identical menus. Also, trained maitre-de and/or waiters may be used to actively promote the perception of a face-to-face dinner using a scripted dialog and interaction with remote participants, maitre-de and/or waiters.

[0078] Once the teleconferencing is terminated, the stations 12 and 14 may be used by the same or different participants without the need to reconstruct or reassemble the stations.

[0079] Figs. 5A and 5B provide a visual illustration of the images corresponding to some of the signals described above utilizing the method and embodiment described above. In this regard, images 104 and 106 generally correspond to the actual images captured by the first and second cameras 62 and 64, respectively. As described above, associated image signals I-62 and I-64 are transmitted to the differential key generators 70 and 72, respectively. The differential key generators 70 and 72 compare the images 104 and 106 to the images 108 and 110 associated with the differential reference signals DRS-62 and DRS-64 which are received from storages 74 and 76, respectively, and which were previously generated by cameras 62 and 64 from an identical fixed camera position.

[0080] As illustrated in Fig. 5A, the differential key generators 70 and 72 generate differential signals VS-1 and VS-2 which have corresponding images 112 and 114. Notice that these images 112 and 114 comprise an image of the participants which are situated at the first station 12 with the background area having been removed or tagged as a "zero" area. As described herein, this "zero" area becomes "filled-in" with the desired or predetermined composite image which may include, for example, an image of at least a portion of the predetermined setting or background of the second station 14. It has been found that removing a portion of the image, such as the background, by tagging it as zero, in the manner described herein, facilitates compressing the signals VS-1 and VS-2 and reducing the amount of bandwidth needed to transmit the images over transmission network 84 and between the first and second stations 12 and 14.

[0081] As mentioned above, the video signals VS-1 and VS-2 are fed into CODECs 78 and 80 which compresses the signals along with audio signal AS-A1 and AS-A2 and generates signals CDS-1 and CDS-2. The CDS-1 and CDS-2 signals are then transmitted, via transmission network 84, to the second station 14 and received by the CODECs 78-1 and 80-1 associated with the second station 14. As-illustrated in Fig. 5B, the CODEC 78-1 and 80-1 decompresses the CDS-1 and CDS-2 signals, respectively, from the first station 12 and feeds them into associated line doublers 86-1 and 88-1. As mentioned earlier herein, the line doublers 86-1 and 88-1 facilitate enhancing the images associated with the video signals to provide enhanced video signals EVS-1 and EVS-2 (Fig. 5B), respectively.

[0082] As stated earlier, the enhanced video signals EVS-1 and EVS-2 are then received by the video compositing multiplexer 92-1 associated with the second station 14 wherein the signals are combined to provide an intermediate composite signal ICS having an associated intermediate composite signal image 120 having an aspect ratio of about 8:3.

[0083] The video compositing multiplexer 92-1 also receives the predetermined composite signal B having a predetermined composite signal B image 122 from storage 94-1. The video compositing multiplexer 92-1 composites or combines the images 120 and 122 to generate the composite signal having an associated or corresponding composite image 124 as shown in Fig. 5B. As stated earlier, the predetermined composite signal B image 122 generally corresponds to at least a portion of the predetermined setting or background of the second station 14 and has an aspect ratio of 16:9.

[0084] Notice that when the predetermined composite signal B image 122 is combined with the intermediate composite signal image 120, the video compositing multiplexer 92-1 causes the "zero" area of the intermediate composite signal image 120 to be "filled in" with the predetermined composite signal B image.

[0085] The composite image 124 may then be scaled to a predetermined size or scale, such as full scale, using scaler 94-1, so that the composite image 124 may be scaled to a substantially full scale or real-life size image as desired. The composite image signal corresponding to the composite image 124 is transmitted to the projector 96-1 and then displayed on the rear projection screen 46-1 at the second station 14. As illustrated in Figs. 1B and 5B, the composite image 124 may be appropriately framed or masked (such as with an archway 125 in Figs. 1B and 5B) when it is projected at the second station 14 to enhance the face-to-face, real time

environment.

[0086] The audio and video signals transmitted between the first and second stations 12 and 14 may be, in this illustration, transmitted over separate T-1 lines (not shown) in the transmission network 84 in order to effect a substantially simultaneous and/or "real time" video conference. Thus, in the illustration shown in Figs. 1A and 1B, the participants may be geographically remotely located, yet the participants situated at the first station 12 will feel as if the second station 14 participants are located face-to-face or present with them at the first station 12, while the participants situated at the second station 14 will feel as if the first station participants are face-to-face or present with them at the second station.

[0087] It should be appreciated that when the predetermined composite signal B and associated predetermined composite signal image 122 is composited with the intermediate composite signal and associated intermediate composite signal image 120, it overlays that signal to provide a seamless composite image 124, which facilitates reducing or eliminating the need to match up the borders or seams of the camera images with any high degree of accuracy. In this regard, it is preferable that cameras 62 and 64 and 62-1 and 64-1 preferably be situated such that they capture an entire participant rather than, for example, half of a participant. Thus, it may be desired to position the participants in a location such that any particular participants will not be in the field of view of more than one camera.

[0088] Advantageously, the invention provides an apparatus and method for providing a video mirror at each station 12 and 14 which facilitates creating a face-to-face and non-interrupted image of any participants in the video conference. Because the image of the participants is differentiated, less transmission bandwidth, computer memory and the like is required. Also, the differentiators and compositors of the present invention enable a user to create a composite image 124 (Fig. 5B) having at least a portion thereof imaged at a greater resolution than the portion which was transmitted over transmission network 84. This facilitates reducing the effect of limitations or transmission restrictions of the transmission network 84 which, in turn, facilitates increasing the quality of images displayed at a station.

[0089] In addition, notice that the composite image 124 (Fig. 5B) may have an aspect ratio which is different from the aspect ratio of the cameras 62 and 64. This enables the system and method of the present invention to utilize cameras which generate images having smaller or even larger aspect ratios. This also enables the system and method to use cameras having standard or common aspect ratios, such as 4:3.

[0090] Figs. 3A and 3B, when taken together, illustrate another embodiment of the invention. The operation and components of the embodiment shown in Figs. 3A and 3B are substantially the same as the operation of components of the embodiment described above relative to Figs. 1A and 1B with the same reference numerals being used for the same components with the addition of single prime (') designator. Consequently this embodiment is similar to the embodiment shown in Figs. 1A and 1B, except that the second predetermined setting 14a' in Fig. 3B and its associated theme, aura or motif is substantially different from the second predetermined setting 14a shown in Fig. 1B. In Fig. 3B, the first predetermined sensory setting 12a' comprises a plurality of decorations 120 defining the Chinese theme, motif or aura. Also, the predetermined composite signal A stored in storage 94-1' and the differential reference signals stored in storages 74-1' and 76-1 would generally correspond to an image of least a portion of that setting 14a'.

[0091] As with the illustration described above relative to Figs. 1A and 1B, the video and audio signals would be processed in substantially the same manner. In general, an image of the participants situated at the first station 12' is composited by compositor 92-1' with a predetermined composite image of at least a portion of the second predetermined sensory setting 14a' of the second station 14' and projected onto the rear projection screen 46-1' at the second station 14'. The first station 12' participants appear to be face-to-face with the second station 14' participants because they have a relatively high resolution video image behind them which complements or becomes integrated with the second predetermined sensory setting 14a'. Thus, as shown in Fig. 3B, the image 91-1' (Fig. 3B) of the ladies at the first station 12' includes a Chinese background which blends or complements the actual predetermined sensory setting 14a'.

[0092] Likewise, when the image of the participants situated at the second station 14' is projected on the rear projection screen 46' at the first station 12', they appear to be in the same room as the participants situated at the first station 12' because the Roman/Italian video background which is seen behind the second station 14' participants generally complements and becomes visually integrated with the actual Roman/Italian theme, motif or aura defined by the first predetermined sensory setting 12' of the first station 12'.

[0093] Figs. 4A and 4B, when taken together, illustrate another embodiment of the invention. The components of the embodiment shown in Figs. 4A and 4B which are substantially identical to the components in the embodiment shown in Figs. 1A and 1B which have the same reference numerals with the addition of a double prime (") designators. As illustrated in Figs. 4A and 4B, two remote modular stations such as stations 12" and 14" may be provided and designed to have first and second predetermined sensory settings 12a" and 14a" which are substantially identical. Thus, as shown in Figs. 4A and 4B, images may be captured in the manner described above at station 12" received by CODECs 78" and 80" and then transmitted, via transmission 84", to associated CODECs 78-1" and 80-1", respectively. The CODECs 78-1" and 80-1" then generate a decom-

pressed signal which may be enhanced by line doublers 86-1" and 88-1", respectively; scaled to an appropriate scale by scaler 95-1"; and then projected by projector 96-1" onto rear projection screen 46-1".

[0094] Notice that the image comprising the second station 14" participants and second predetermined sensory setting 14a" is displayed on screen 46" at the first station 12". Thus, this embodiment does not utilize the differentiating and compositing features of the previous embodiment, but may still achieve a face-to-face conference environment because the second predetermined sensory setting 14a" is configured to be identical to or complementary with the first predetermined sensory setting 12a". In this embodiment, entire images or sub-images of the stations 12 and 14 (including images of both participants and background) are displayed at remote station(s). Because the stations 12" and 14" are assembled, decorated and designed to be complementary or identical, they appear visually integrated to participants situated in the stations 12 and 14. Accordingly, the first and second predetermined sensory settings 12a" and 14a", including the background, are designed and arranged in a geometric fashion such that as cameras 62" and 64" capture images of the participants, they also capture images of the first and second predetermined sensory setting 12a" and 14a", respectively, at the most advantageous perspective for display at the remote station(s). As with prior embodiments, this causes the first station 12" participants to perceive that the second station 14" participants are situated or present with the first station 12" participants at the first station 14". Likewise, the first station 12" participants appear to be face-to-face with the second station 14" participants at the second station 14" when the images associated with the first station 12" are displayed on screen 46-1". Consequently, by providing complementary or identical first and second predetermined sensory settings 12a" and 14a", a face-to-face conference may be created. As with previous embodiments, it may also be desired to differentiate, enhance, composite or scale the images as described with previous embodiments, but this is not required with the embodiment being described.

[0095] Thus, it should be apparent that stations can be provided with predetermined settings which are completely different, yet, by utilizing the apparatus and method of the present invention, the images of the participants in these stations may be projected at remote stations so that they appear to be virtually face-to-face with the remote station participants at or one more remote station.

[0096] Various changes or modifications in the invention described may occur to those skilled in the art without departing from the spirit or scope of the invention. For example, the screen 46 for station 12 has been shown as being integral with a portion of a wall 32h (Figs. 1A and 2A), it could comprise a larger or smaller portion of that wall 32h, or it could be provided as part of one or more other walls, or even as part of the ceiling 34.

[0097] It should also be appreciated that while the embodiments have been shown and described comprising two stations, images from more than two remote stations may be displayed at a station, thereby permitting a teleconference convention among more than two stations.

[0098] Although not shown, one or more of the compositors, such as compositors 12 or 12-1 (Fig. 1A) may comprise a stationary or moving image database (not shown) for providing a plurality of predetermined composite signals which define a particular or desired video background. For example, participants may elect to use the arched background of their proximity, choose an event-related scene, or decide to meet in a setting completely unrelated to their site or station. For example, a station having a Manhattan eatery motif may be provided with a screen configured as a window (not shown). Certain moving video backgrounds of a busy New York avenue may be deposited and displayed on the screen to give the illusion that the participants situated at the station are dining in a popular Manhattan eatery.

[0099] It should also be appreciated that while the embodiments being shown and described herein refer to teleconferencing environments that have predetermined settings and motifs or auras relating to dining, the predetermined settings could define any type of aura, theme or motif which is suitable for video conferencing and in which it is desired to provide a "real-life" or face-to-face presence illusion. For example, the apparatus and method of this invention could be used in a business setting, education setting, seminar setting, home environment, religious setting, celebration setting (such as a birthday, retirement party, holiday or anniversary), or any other suitable setting as desired.

[0100] The above description of the invention is intended to be illustrative and not limiting, and is not intended that the invention be restricted thereto but that it be limited only by the spirit and scope of the appended claims.

Claims

1. A teleconferencing system (10)comprising two or more teleconferencing stations (12; 14) remote from each other, each of said stations being equipped with:

audio devices (82, 100; 83, 102) and video devices including a plurality of cameras (62, 64) for the exchange of audio and video transmissions between said teleconferencing stations;

a screen (46) having a first side and a second side said second side being opposite said first side,for displaying a first image (104) of at least one first remote subject and a second image

(106) of at least one second remote subject, said at least one first subject including a remote participant who is not included in said at least one second subject and said first and second images are not entirely overlaid on top of each other when they are displayed on said screen (46);
a first plurality of furnishings (60) on which participants situated at said teleconferencing station (12) may be seated, and which are situated on said second side of said screen;
said first image and said second images are being displayed on said screen (46) to give any of the participants seated on said first plurality of furnishings the feeling of being in the same room and face-to-face with said remote participant;

characterized in that said plurality of cameras (62, 64) of a first station (12) are situated behind said first side of said screen (46) for capturing a plurality of images at said first station, said plurality of cameras capturing images of different participants situated on said second side of said screen (46), and **in that** said first station (12) further comprises at least one wall 32 (a-h), at least one ceiling (34) and/or a second plurality of furnishings (50) so that, when the first or second images are being displayed on said screen (46) of said first station (12) participants seated at said first station feel as if they are in the same room with said remote participant of participants.

2. The teleconferencing system as recited in claim 1, wherein said second plurality of furnishings (50) in the first station (12) comprises at least one table having one side associated with said screen (46) and configured to cause said participants to be situated a predetermined distance (B) from said screen.

3. The teleconferencing system as recited in claim 1, wherein said screen (46)of the first station (12) comprises at least one aperture (66, 68), said plurality of cameras (62, 64) are capturing said plurality of images through said at least one aperture.

4. The teleconferencing system as recited in claim 1, wherein said first image comprises at least one remote participant which is substantially life-size when shown on said screen (46) of said first station (12).

5. The teleconferencing system as recited in claim 1, wherein said plurality of cameras (62, 64) of said first station (12) are situated directly in a projection path of said screen (46).

15. A method for teleconferencing in a teleconferencing system (10) having two or more teleconferencing stations (12, 14) remote from each other and being equipped with audio devices (82, 100; 83, 102) and video devices including a plurality of cameras (62, 64) for the exchange of audio and video transmissions between said teleconferencing stations, the method comprising, in each of said stations (12, 14), the steps of:

providing a screen (46) having a first side and a second side said second side being opposite said first side, for displaying a first image of a least one first remote subject and a second image of at least one second remote subject; said at least one first remote subject including a participant who is not included in said at least one second remote subject and said images are not entirely overlaid on top of each other when they are displayed on said screen;
providing a first plurality of furnishings (60) on which participants situated at said teleconferencing station (12,14) may be seated and which are to be placed on said second side of said screen (46);
displaying said first image and said second image on said screen (46) to give participants seated on said first plurality of furnishings the feeling of being in the same room and face-to-face with said remote participant; said method being **characterized by** comprising the further steps of:

situating said plurality of cameras (62, 64) of a first station (12) behind said first side of the screen (46) for capturing a plurality of images at said first station (12), said plurality of cameras capturing images of different participants situated on said second side of said screen of said first station (12);
providing at least one wall (32a-h), at least on ceiling (34) and/or a second pluarlity of furnishings (50) in said first station (12), and
displaying on said screen (46)of said first station at least one of said first image (104) or said second image (106) so that participants seated in said first station (12) feel as if they are in the same room with said remote participant or participants.

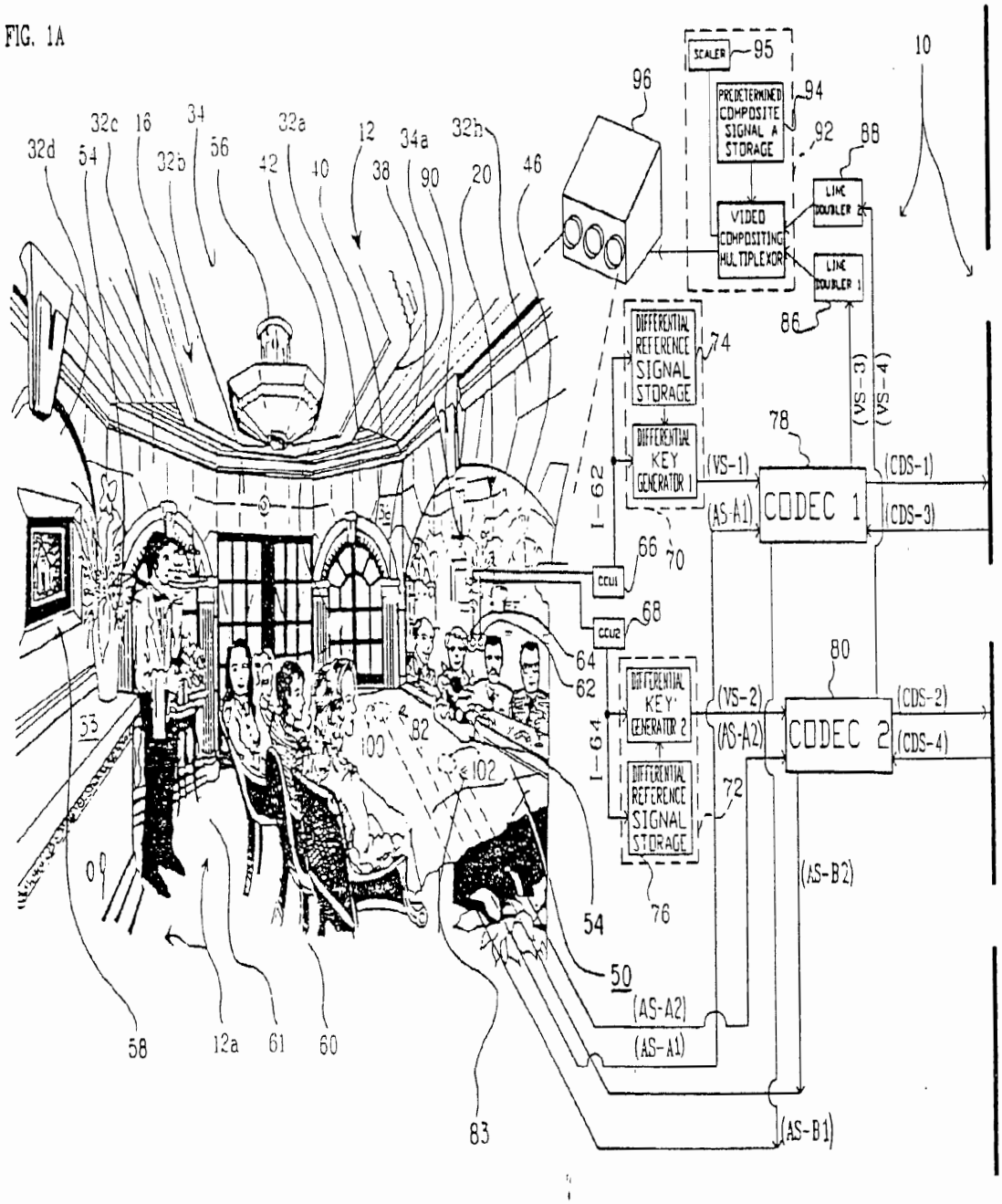
7. The method as recited in claim 6, wherein said step of providing said second plurality of furnishings (50) further comprises the step of providing at least one table having one side associated with said screen (46) and configured to cause said participants to be situated a predetermined distance (B) from said screen.

8. The method as recited in claim 6, wherein said screen (46)of said first station (12) is provided with least one aperture (66, 68) and wherein said plurality of cameras (62, 64) situated behind said screen captures said plurality of images through said at least one aperture.

9. The method as recited in claim 6, wherein either said first image or said second image comprises at least one remote participant in substantially life-size when said first image or said second image, respectively, is shown on said screen (46) of said first station (12).

10. The method as recited in claim 6, wherein said method further comprises the step of situating said plurality of cameras (62, 64) directly in a projection path of said screen (46) of said first station (12).

FIG. 1A



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FIG. 1B

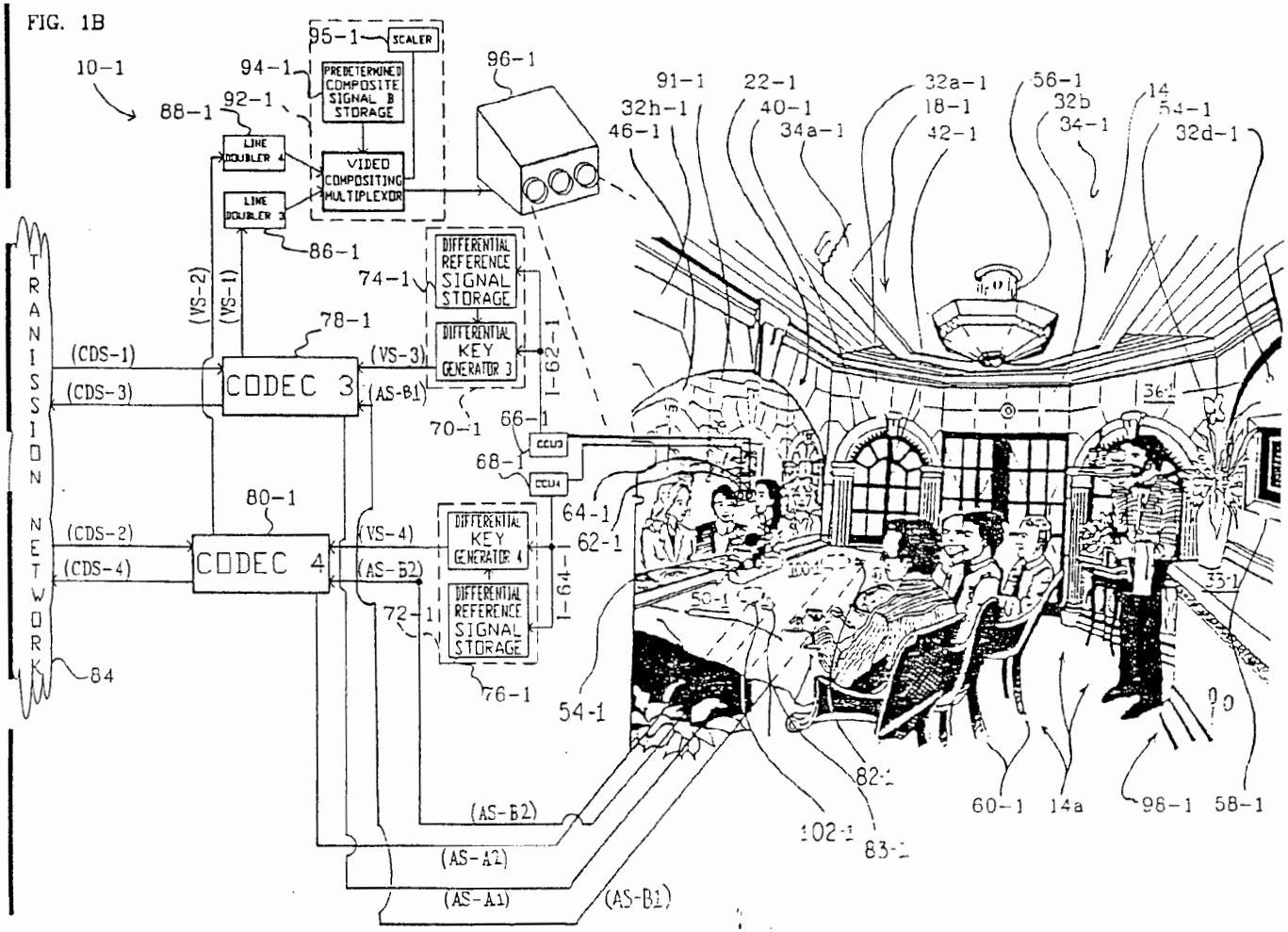

10-1
88-1
92-1
94-1
95-1
SCALER
PREDETERMINED COMPOSITE SIGNAL B STORAGE
VIDEO COMPOSITING MULTIPLEXOR
LINE DOUBLER 4
LINE DOUBLER 3
86-1
96-1
91-1
32h-1
46-1
22-1
40-1
34a-1
32a-1
18-1
42-1
56-1
32b
34-1
14
54-1
32d-1
TRANSMISSION NETWORK
84
(VS-2)
(VS-1)
74-1
DIFFERENTIAL REFERENCE SIGNAL STORAGE
DIFFERENTIAL KEY GENERATOR 3
62-1
78-1
(CDS-1)
(CDS-3)
CODEC 3
(VS-3)
(AS-B1)
70-1
66-1
68-1
CCU3
CCU4
64-1
62-1
80-1
(CDS-2)
(CDS-4)
CODEC 4
(VS-4)
(AS-B2)
DIFFERENTIAL KEY GENERATOR 4
DIFFERENTIAL REFERENCE SIGNAL STORAGE
64-1
72-1
76-1
54-1
(AS-B2)
(AS-A2)
(AS-A1)
(AS-B1)
60-1
14a
98-1
58-1

FIG. 2

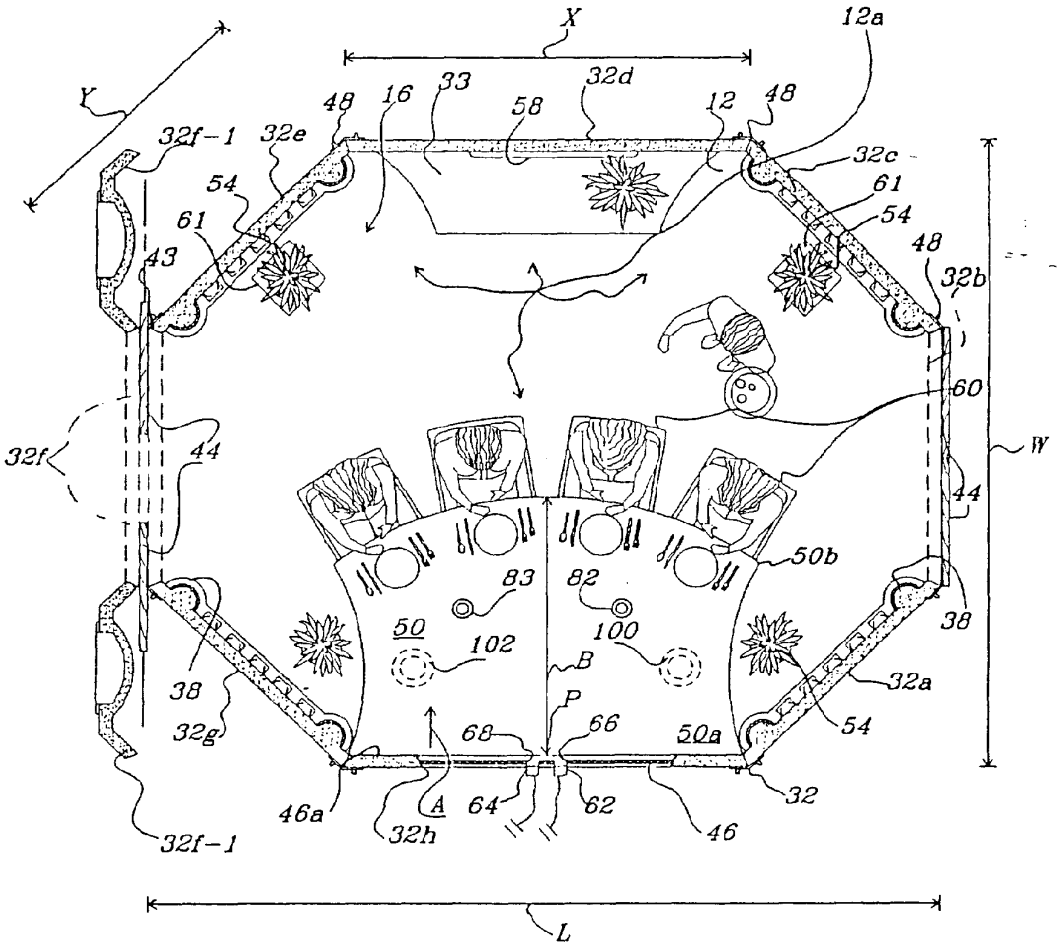
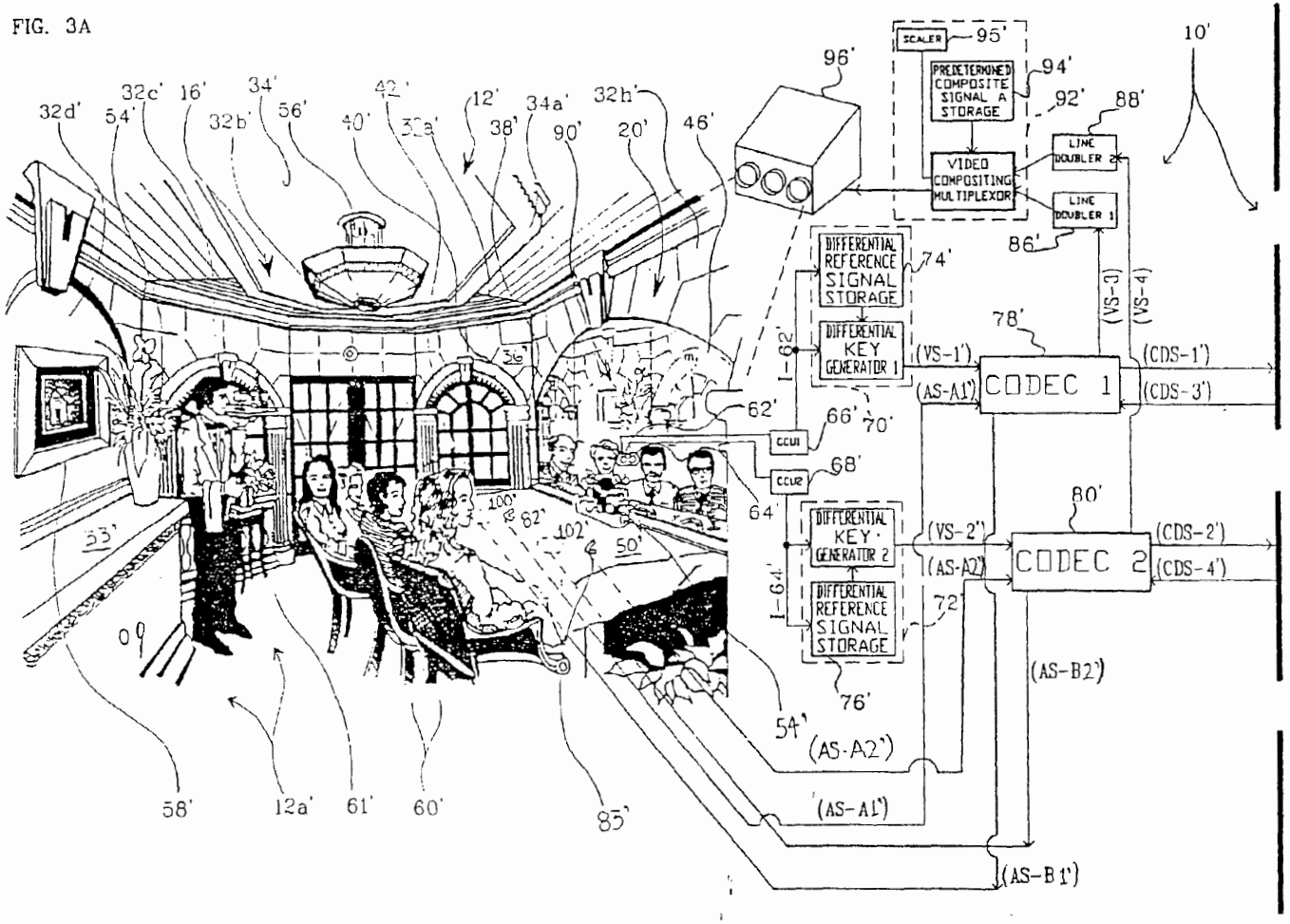

X
12a
Y
48
16
33
58
32d
12
48
32f-1
32e
32c
54
61
61
54
43
48
32b
60
32f
44
W
44
50b
83
82
38
50
102
100
B
38
32a
P
32g
68
66
50a
54
46a
A
64
62
32
32h
46
32f-1
L

FIG. 3A



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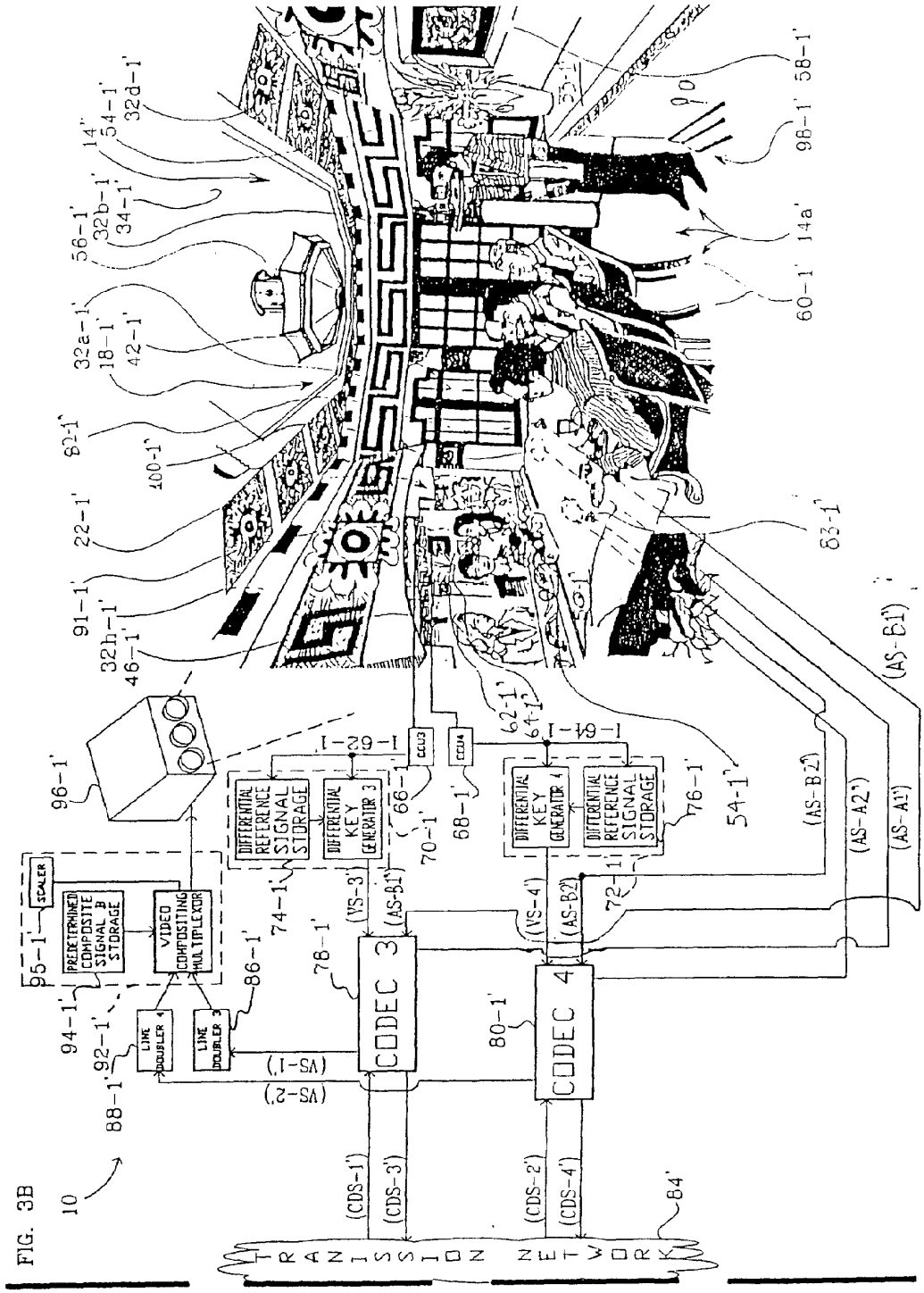
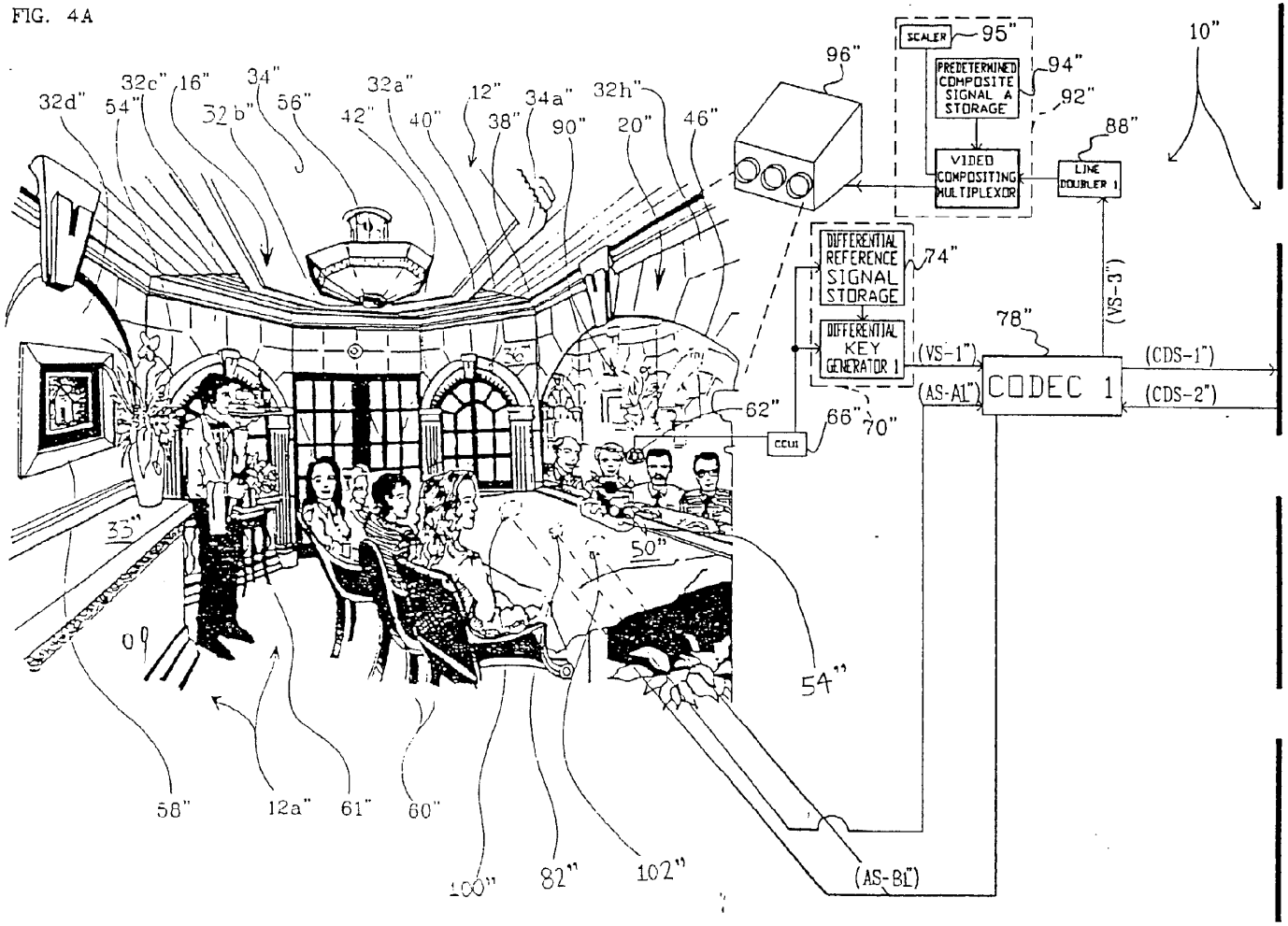

TRANSMISSION NETWORK
CODEC 3
CODEC 4
DIFFERENTIAL REFERENCE SIGNAL STORAGE
DIFFERENTIAL KEY GENERATOR 3
DIFFERENTIAL KEY GENERATOR 4
VIDEO COMPOSITING MULTIPLEXOR
PREDETERMINED COMPOSITE SIGNAL B STORAGE
SCALER
LINE DOUBLER
(CDS-1')
(CDS-2')
(CDS-3')
(CDS-4')
(VS-1')
(VS-2')
(VS-3')
(VS-4')
(AS-A1')
(AS-A2')
(AS-B1')
(AS-B2')
10
14"
14a'
18-1'
22-1'
32a-1'
32b-1'
32d-1'
32h-1'
34-1'
42-1'
46-1'
54-1'
56-1'
58-1'
60-1'
62-1'
63-1'
64-1'
66-1'
68-1'
70-1'
72-1'
74-1'
76-1'
78-1'
80-1'
84'
86-1'
88-1'
91-1'
92-1'
94-1'
95-1'
96-1'
98-1'
400-1'

FIG. 3B

FIG. 4A



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FIG. 4B

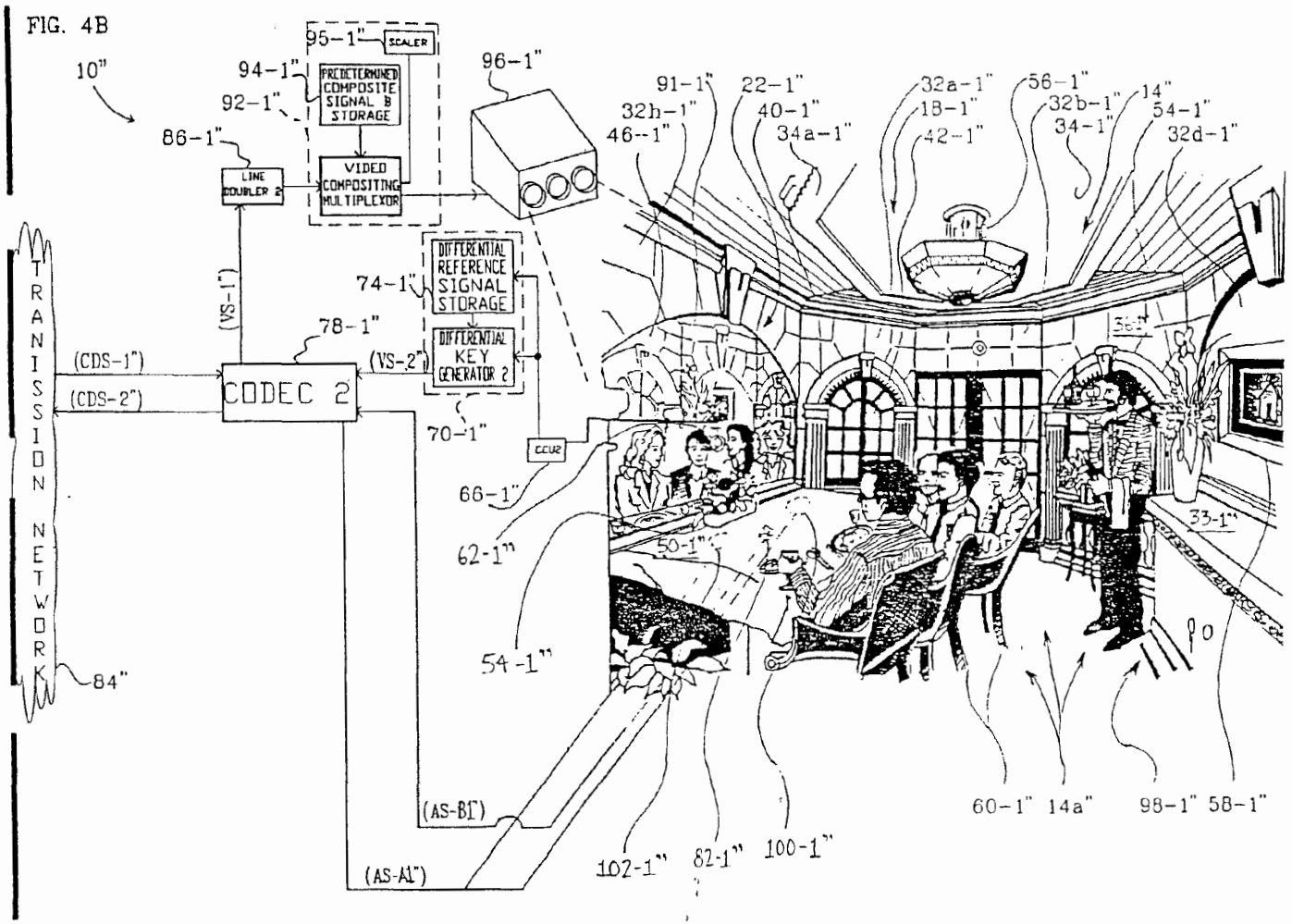

10"
95-1"
SCALER
94-1"
PREDETERMINED COMPOSITE SIGNAL B STORAGE
92-1"
86-1"
LINE DOUBLER 2
VIDEO COMPOSITING MULTIPLEXOR
96-1"
91-1"
32h-1"
46--1"
22-1"
40-1"
34a-1"
32a-1"
18-1"
42-1"
56-1"
32b-1"
34-1"
14"
54-1"
32d-1"
DIFFERENTIAL REFERENCE SIGNAL STORAGE
74-1"
DIFFERENTIAL KEY GENERATOR 2
(VS-1")
78-1"
(VS-2")
(CDS-1")
(CDS-2")
CODEC 2
70-1"
CCU2
66-1"
62-1"
54-1"
TRANISSION NETWORK
84"
(AS-B1")
(AS-A1")
102-1"
82-1"
100-1"
60-1"
14a"
98-1"
58-1"
50-1"
33-1"

FIG. 5A

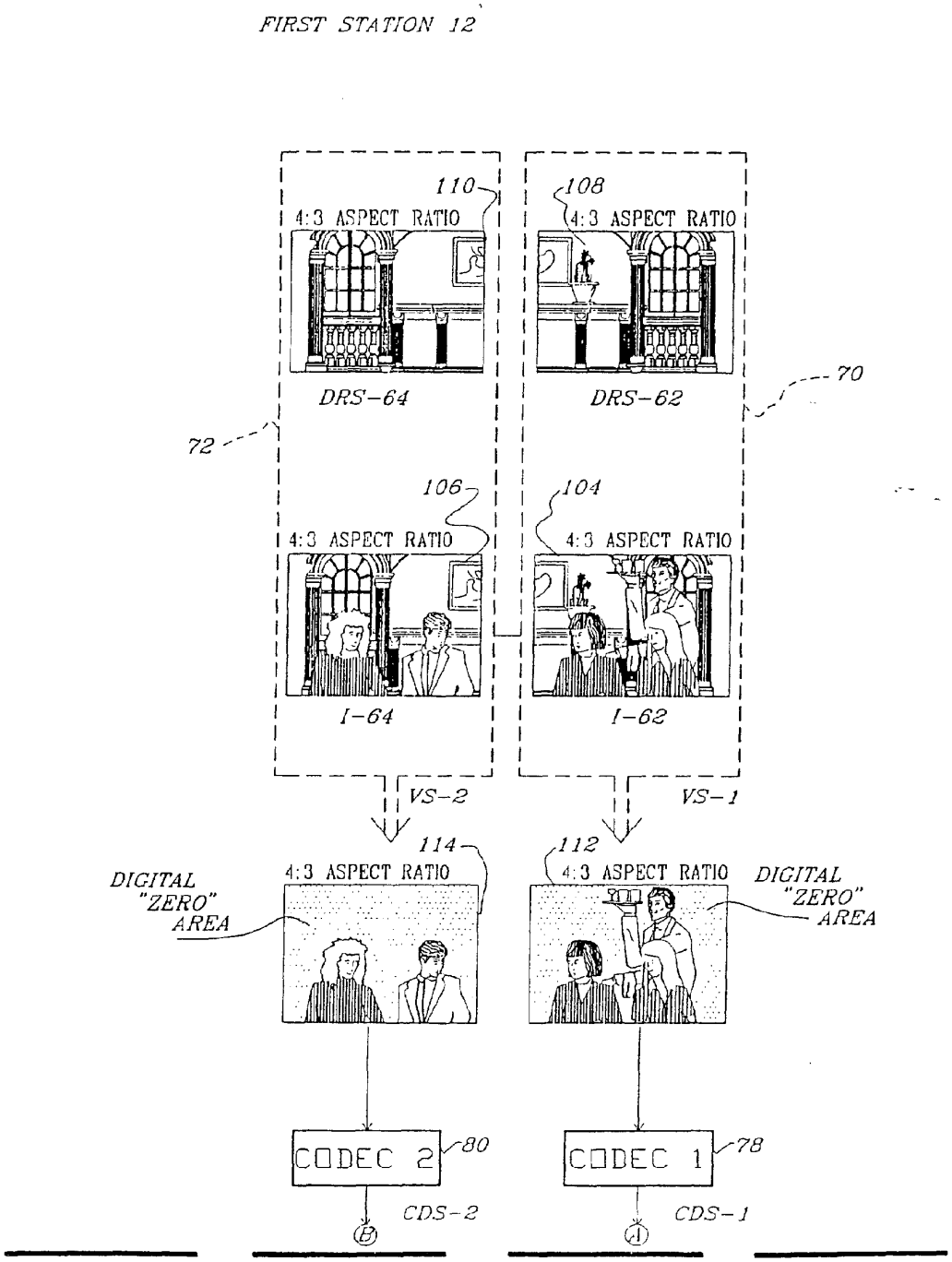

FIRST STATION 12
110
4:3 ASPECT RATIO
108
4:3 ASPECT RATIO
DRS-64
DRS-62
70
72
106
4:3 ASPECT RATIO
104
4:3 ASPECT RATIO
I-64
I-62
VS-2
VS-1
114
4:3 ASPECT RATIO
112
4:3 ASPECT RATIO
DIGITAL "ZERO" AREA
DIGITAL "ZERO" AREA
CODEC 2
80
CODEC 1
78
CDS-2
CDS-1
B
A

FIG. 5B
SECOND STATION 14

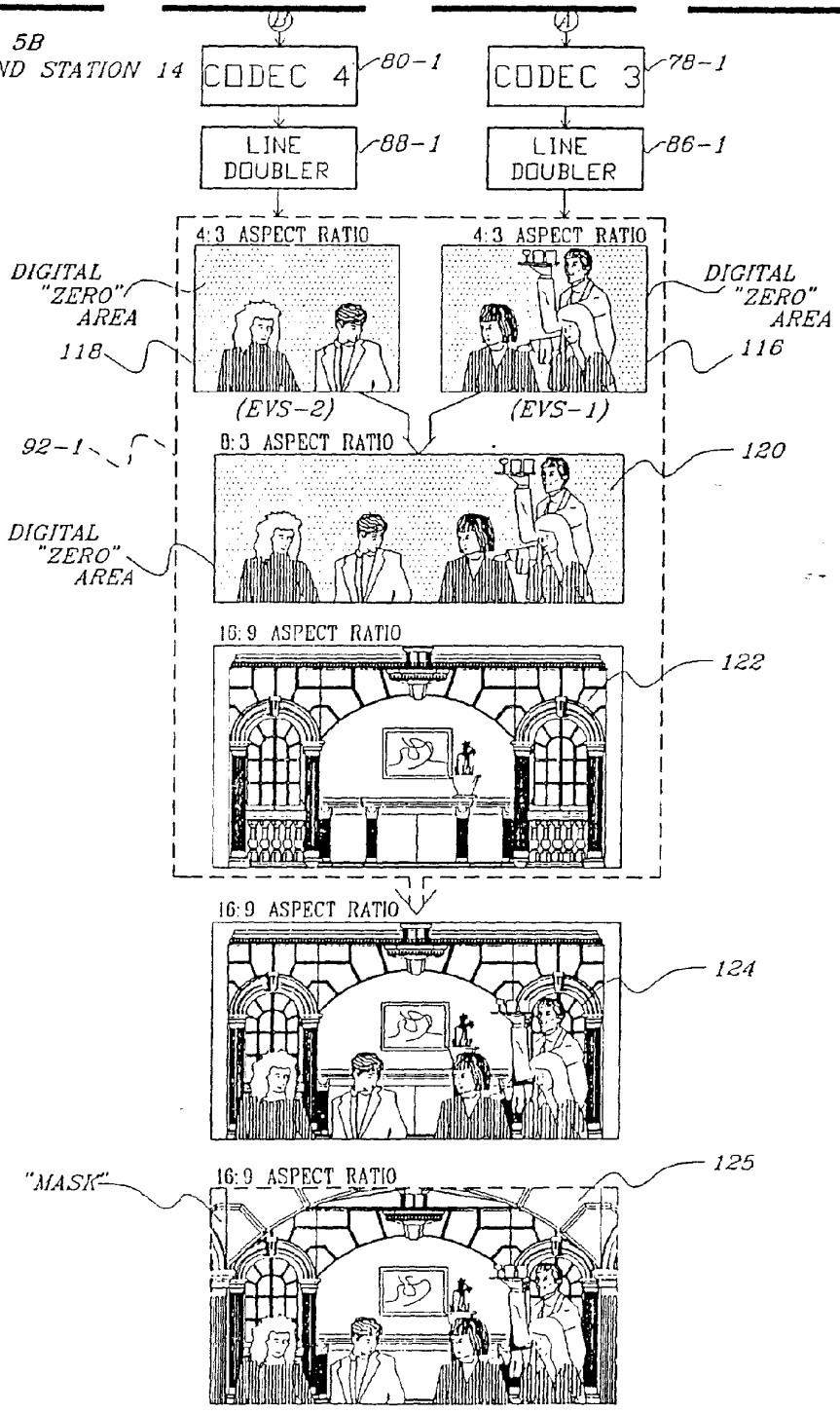
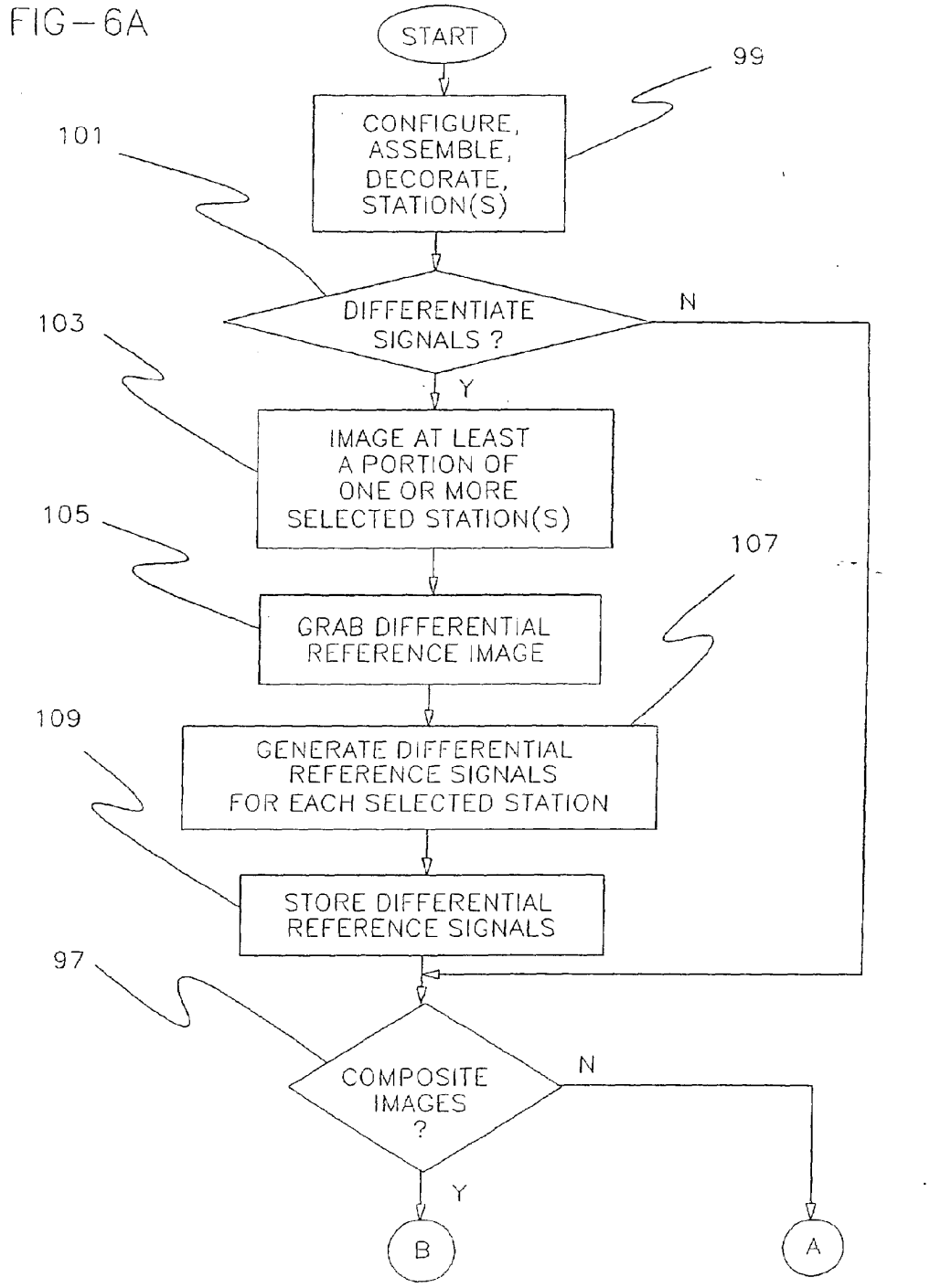


FIG-6A


START
99
CONFIGURE, ASSEMBLE, DECORATE, STATION(S)
101
DIFFERENTIATE SIGNALS ?
N
103
Y
IMAGE AT LEAST A PORTION OF ONE OR MORE SELECTED STATION(S)
105
107
GRAB DIFFERENTIAL REFERENCE IMAGE
109
GENERATE DIFFERENTIAL REFERENCE SIGNALS FOR EACH SELECTED STATION
STORE DIFFERENTIAL REFERENCE SIGNALS
97
COMPOSITE IMAGES ?
N
Y
B
A

FIG–6B

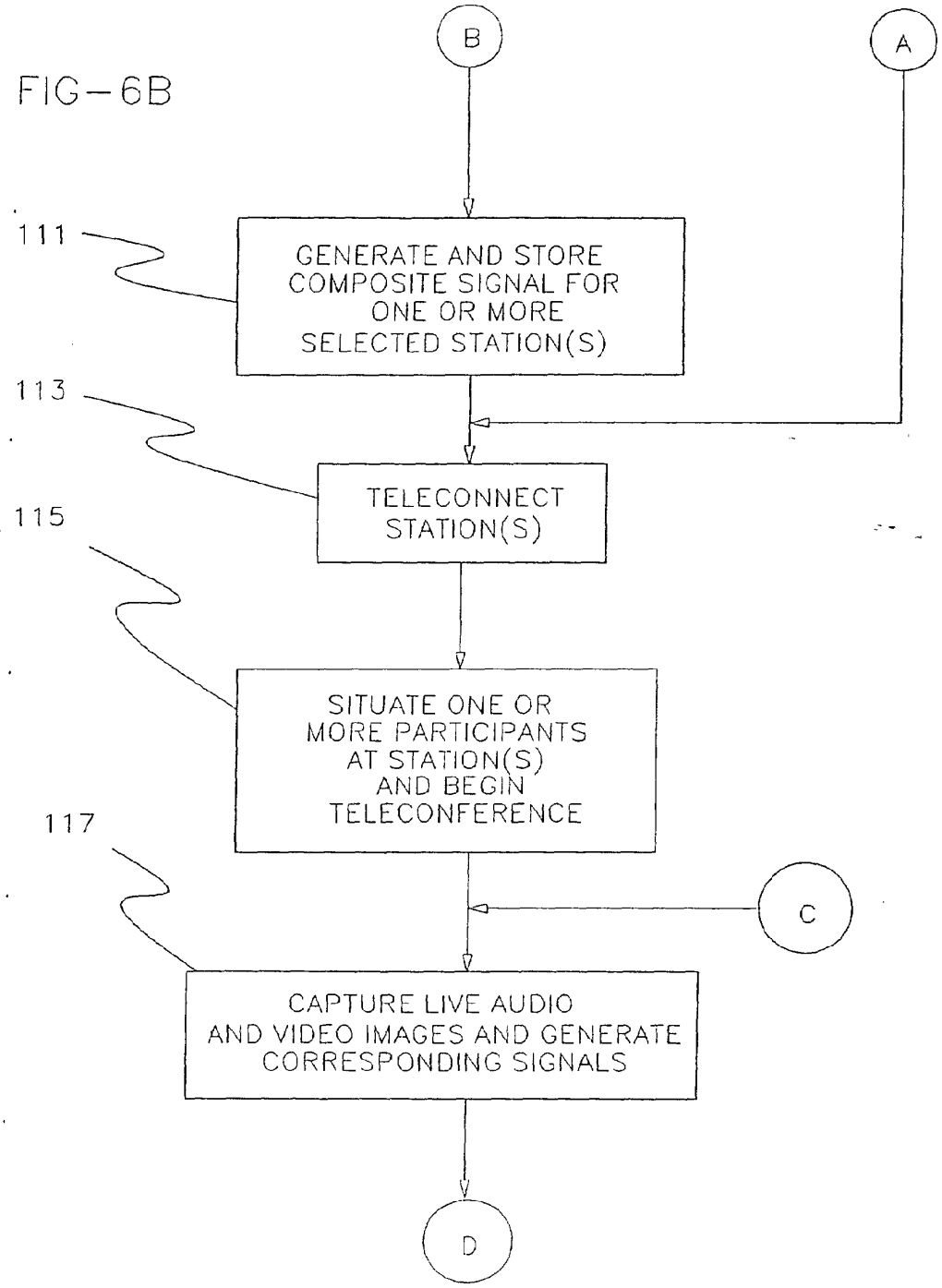

B
A
111
GENERATE AND STORE COMPOSITE SIGNAL FOR ONE OR MORE SELECTED STATION(S)
113
TELECONNECT STATION(S)
115
SITUATE ONE OR MORE PARTICIPANTS AT STATION(S) AND BEGIN TELECONFERENCE
117
C
CAPTURE LIVE AUDIO AND VIDEO IMAGES AND GENERATE CORRESPONDING SIGNALS
D

FIG-6C

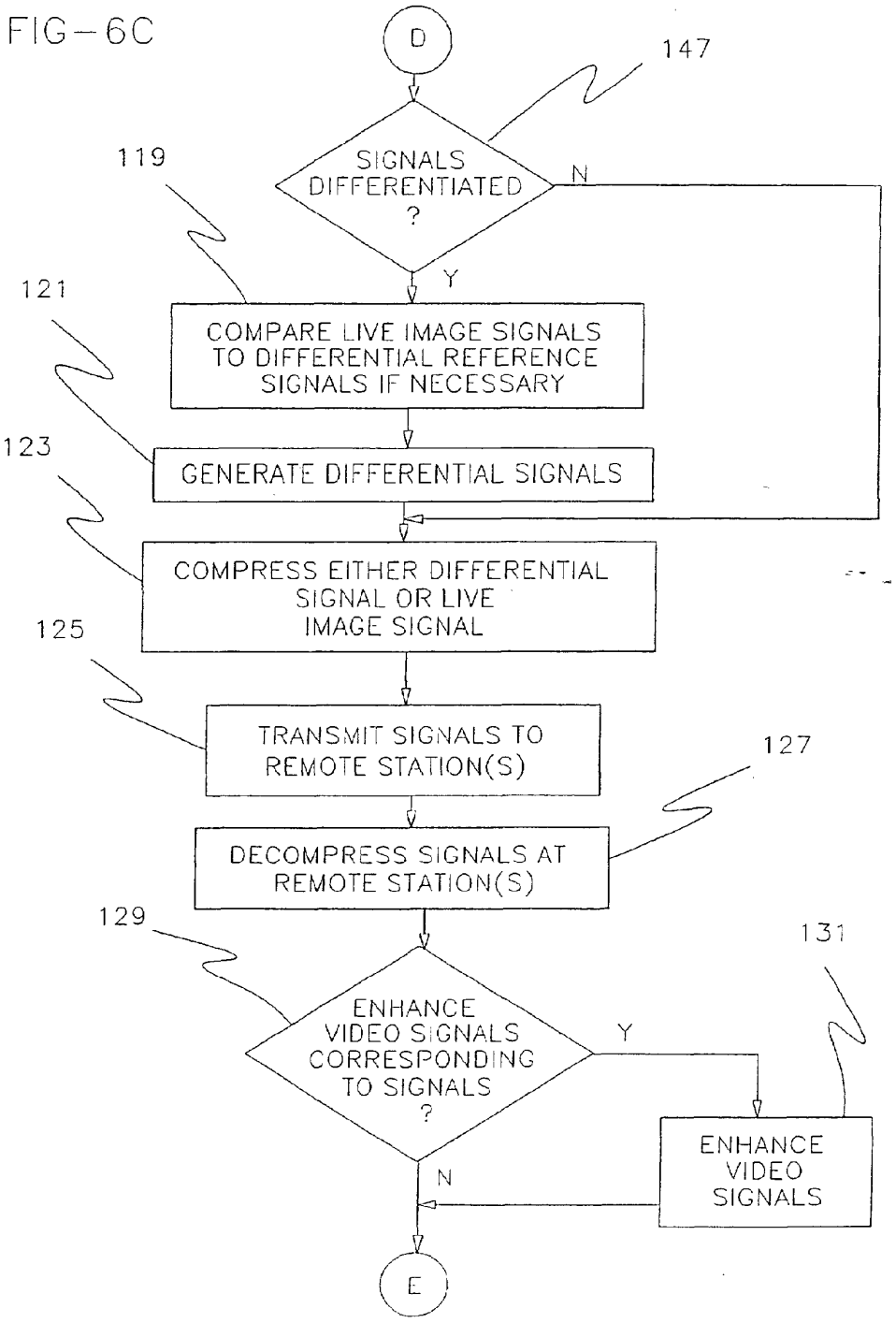
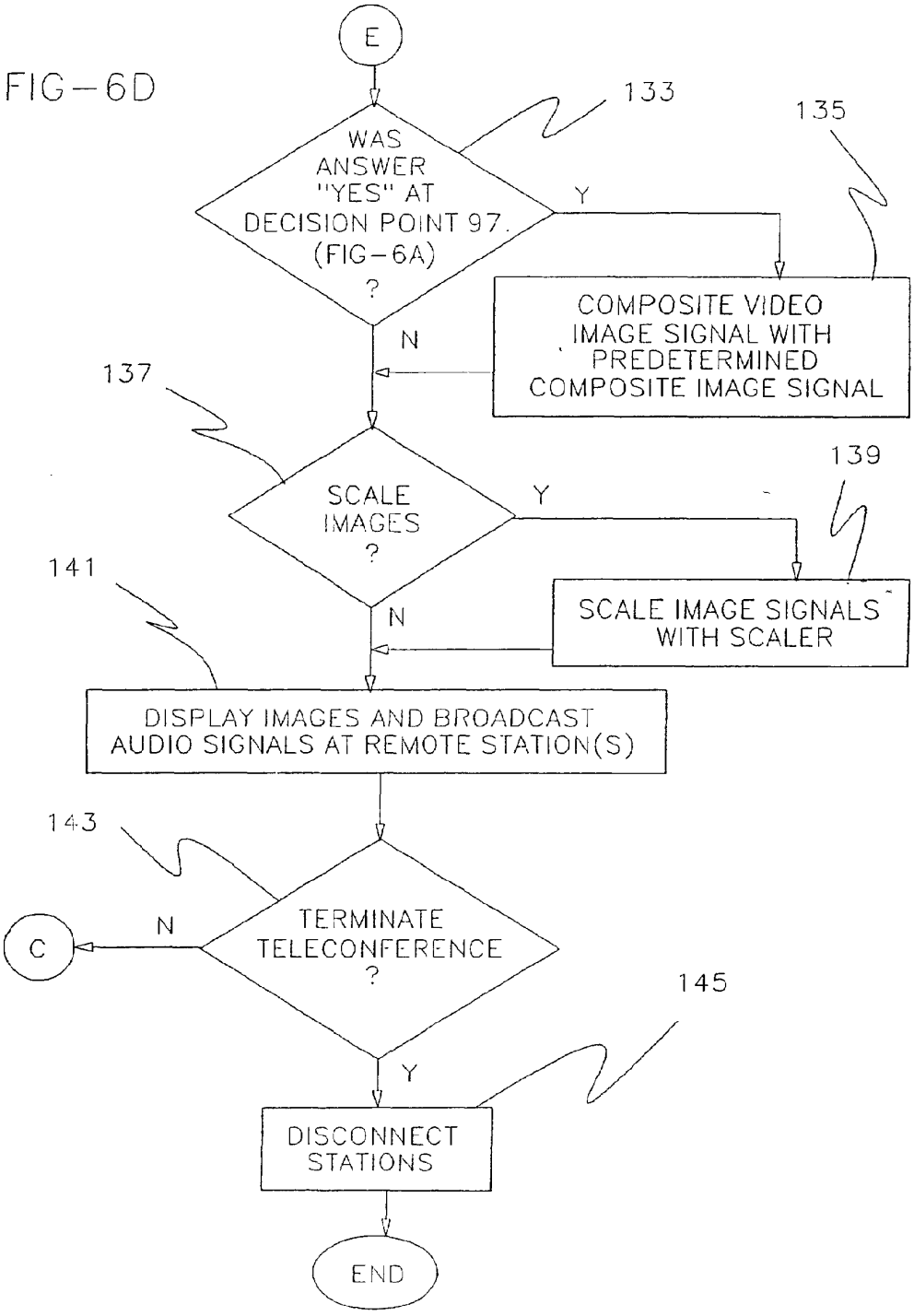

D
147
SIGNALS DIFFERENTIATED ?
N
Y
119
121
COMPARE LIVE IMAGE SIGNALS TO DIFFERENTIAL REFERENCE SIGNALS IF NECESSARY
123
GENERATE DIFFERENTIAL SIGNALS
COMPRESS EITHER DIFFERENTIAL SIGNAL OR LIVE IMAGE SIGNAL
125
TRANSMIT SIGNALS TO REMOTE STATION(S)
127
DECOMPRESS SIGNALS AT REMOTE STATION(S)
129
131
ENHANCE VIDEO SIGNALS CORRESPONDING TO SIGNALS ?
Y
N
ENHANCE VIDEO SIGNALS
E

FIG-6D


E
133
135
WAS ANSWER "YES" AT DECISION POINT 97. (FIG-6A) ?
Y
N
COMPOSITE VIDEO IMAGE SIGNAL WITH PREDETERMINED COMPOSITE IMAGE SIGNAL
137
139
SCALE IMAGES ?
Y
N
SCALE IMAGE SIGNALS WITH SCALER
141
DISPLAY IMAGES AND BROADCAST AUDIO SIGNALS AT REMOTE STATION(S)
143
TERMINATE TELECONFERENCE ?
N
C
Y
145
DISCONNECT STATIONS
END

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 01 12 8723

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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A	* the whole document *	2-5,7-10	
Y	US 5 187 571 A (BRAUN DAVID A ET AL) 16 February 1993 (1993-02-16)	1,6	
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A	PATENT ABSTRACTS OF JAPAN vol. 017, no. 393 (E-1402), 22 July 1993 (1993-07-22) & JP 05 068246 A (NIPPON TELEGR & TELEPH CORP), 19 March 1993 (1993-03-19) * abstract *	1-10	
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			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	16 January 2002	Greve, M

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
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& : member of the same patent family, corresponding document

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 01 12 8723

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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(54) Token passing arrangement for a conference call bridge arrangement

(57) A user terminal (10) using an internet protocol using session initiation protocol to interconnect a number of user terminals (11-13) in a conference call. A conference bridge (30) or user terminal (10) detects speech of one of the user terminals (203). A "babble" timer is started (207). The speaker is allowed to continuously speak until silence is detected (217) or until the "babble" timer timers out (211).

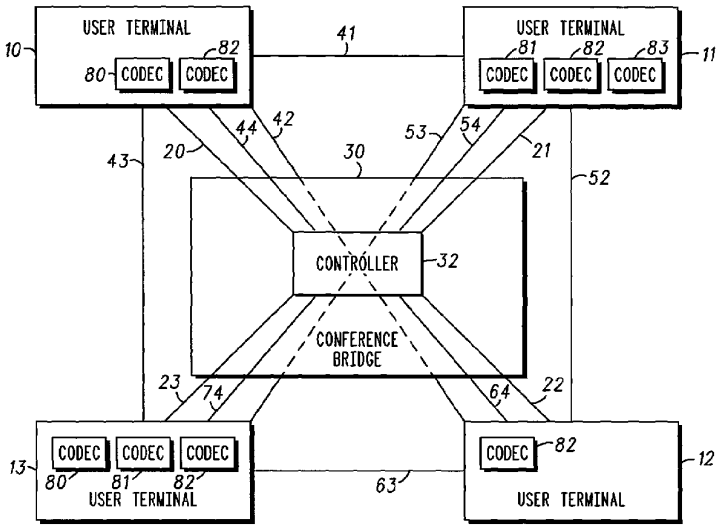


FIG. 1

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Description

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] The present application is related to copending U.S. Patent Application Serial No. 09/819,020 being assigned to the same assignee as the present invention.

Background of the Invention

[0002] The present invention pertains to teleconferencing arrangements and more particularly to conference call bridges in a voice over internet protocol environment.

[0003] Special telephony functions are provided by telephone operating companies or by teleconference facilitator companies. These companies provide the special service of teleconference facilitating by interconnecting three or more conference users in one common telephone call. As a result, each of the users is able to talk and to hear each of the other users. The number of total teleconference users may be quite high. In the internet protocol environment, bandwidths are typically very large compared to basic voice telephony. Voice data becomes almost incidental to the large packets of data carried on the internet. Therefore, voice over internet protocol (VoIP) enables the internet system to carry telephone traffic which typically requires far less data to be exchanged via the internet than does data packages of information.

[0004] Telephone operating companies or teleconference facilitator companies typically implement a teleconference arrangement by a conference bridge. This conference bridge includes a bank of varied codecs, converters, mixers and vocoders. Each particular user has a codec in his teleconference terminal and must be connected with a similar codec at the conference bridge arrangement in the teleconference facilitator's equipment. The conference users may have different and varied codecs, therefore the conference bridge must be capable of serving many different kinds of codec interfaces.

[0005] In typical conference calling arrangements, "long winded" speakers may monopolize the conference call. In other situations one of the conference callers may be speaking from a noisy environment. In such situations that speaker will monopolize the conference since the conference bridge will perceive that speaker as never going silent (stop talking) due to the high level of noise.

[0006] Also, quick detection of silence avoids the real time problems and computing power required to detect silence in conventional conference arrangements.

[0007] What is needed is a token passing arrangement for avoiding a monopolizing speaker or a noisy environment in a conference call bridge in a voice over internet protocol environment.

Brief Description of the Drawing

[0008] FIG. 1 is a block diagram of a conference call bridge arrangement using voice over internet protocol in accordance with the present invention.

[0009] FIGS. 2 and 3 are a flow chart of a call origination and set up in accordance with the present invention.

[0010] FIG. 4 is a flow chart of the token passing arrangement in accordance with the present invention.

[0011] FIG. 5 is a block diagram of the conference bridge in accordance with the present invention.

Description of the Preferred Embodiment

[0012] In providing the present invention, session internet protocol (SIP) is used. SIP provides terminal capability negotiations and invitation to multicast conferences. Further, SIP provides the necessary protocol mechanisms so that the user terminals and any proxy servers can provide the following services: user location, user capabilities, terminal capability negotiation, and invitations to multicast conference.

[0013] FIG. 1 depicts a block diagram of a conference bridge arrangement according to the present invention. User terminals 10, 11, 12 and 13 are shown with data transfer interconnections 20, 21, 22 and 23 respectively connecting user terminals 10-13 to the controller 32 of conference bridge 30. Conference bridge 30 may be a voice packet switched bridge. These data transfer interconnections 20-23 are termed bearer traffic (voice data) interconnections. Similarly, each of the user terminals 10-13 are interconnected to the conference bridge 30 via signaling or control interconnections 44, 54, 64 and 74 respectively.

[0014] In conventional bridge arrangements, all signaling would be controlled by the conference bridge 30 via the signaling leads 44, 54, 64 and 74. As can be seen from FIG. 1, each of the user terminals (teleconference terminals) 10-13 has a different set of codecs 80-83 associated with the user terminal. The conventional conference bridge would be required to convert the data flow from each of the codecs 80-83; mix the information and separately vocode four different codecs before retransmitting the information for the conference call back to each of the user terminals 10-13. Such arrangement requires great processing power within the conference bridge. In an implementation of such a conference bridge, multiple signal processors (DSP) would be required at conference bridge 30 to perform these various functions.

[0015] In the present invention, each use of terminal is also interconnected via a session initiation protocol (SIP) connection to each of the other user terminals in the conference. That is, for example, user terminal 10 is interconnected to user terminal 11 via interconnection 41; to user terminal 12 via interconnection 42, which is shown in a dashed line in part to indicate that there is