

## SCORE Placeholder Sheet for IFW Content

Application Number: 15858668

Document Date: 12/29/2017

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<b>UTILITY PATENT APPLICATION TRANSMITTAL</b>  <i>(Only for new nonprovisional applications under 37 CFR 1.53(b))</i>	Attorney Docket No.	RENA3002/TJM/TL
	First Named Inventor	Gauthier RENARD
	Title	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES...
	Express Mail Label No.	
<b>APPLICATION ELEMENTS</b> <i>See MPEP chapter 600 concerning utility patent application contents.</i>		<b>Commissioner for Patents</b> <b>P.O. Box 1450</b> <b>Alexandria, VA 22313-1450</b>
<b>ACCOMPANYING APPLICATION PAPERS</b>		
1. <input checked="" type="checkbox"/> <b>Fee Transmittal Form</b> (PTO/SB/17 or equivalent) 2. <input type="checkbox"/> <b>Applicant asserts small entity status.</b> See 37 CFR 1.27 3. <input type="checkbox"/> <b>Applicant certifies micro entity status.</b> See 37 CFR 1.29. Applicant must attach form PTO/SB/15A or B or equivalent. 4. <input checked="" type="checkbox"/> <b>Specification</b> [Total Pages <u>38</u> ] Both the claims and abstract must start on a new page. (See MPEP § 608.01(a) for information on the preferred arrangement) 5. <input checked="" type="checkbox"/> <b>Drawing(s)</b> (35 U.S.C. 113) [Total Sheets <u>19</u> ] 6. <b>Inventor's Oath or Declaration</b> [Total Pages _____] (including substitute statements under 37 CFR 1.64 and assignments serving as an oath or declaration under 37 CFR 1.63(e)) a. <input type="checkbox"/> Newly executed (original or copy) b. <input type="checkbox"/> A copy from a prior application (37 CFR 1.63(d)) 7. <input checked="" type="checkbox"/> <b>Application Data Sheet</b> * See note below. See 37 CFR 1.76 (PTO/AIA/14 or equivalent) 8. <b>CD-ROM or CD-R</b> in duplicate, large table, or Computer Program (Appendix) <input type="checkbox"/> Landscape Table on CD 9. <b>Nucleotide and/or Amino Acid Sequence Submission</b> (if applicable, items a. – c. are required) a. <input type="checkbox"/> Computer Readable Form (CRF) b. <input type="checkbox"/> Specification Sequence Listing on: i. <input type="checkbox"/> CD-ROM or CD-R (2 copies); or ii. <input type="checkbox"/> Paper c. <input type="checkbox"/> Statements verifying identity of above copies		10. <input type="checkbox"/> <b>Assignment Papers</b> (cover sheet & document(s)) Name of Assignee _____ 11. <input type="checkbox"/> <b>37 CFR 3.73(c) Statement</b> <input type="checkbox"/> <b>Power of Attorney</b> (when there is an assignee) 12. <input type="checkbox"/> <b>English Translation Document</b> (if applicable) 13. <input type="checkbox"/> <b>Information Disclosure Statement</b> (PTO/SB/08 or PTO-1449) <input type="checkbox"/> Copies of citations attached 14. <input type="checkbox"/> <b>Preliminary Amendment</b> 15. <input type="checkbox"/> <b>Return Receipt Postcard</b> (MPEP § 503) (Should be specifically itemized) 16. <input type="checkbox"/> <b>Certified Copy of Priority Document(s)</b> (if foreign priority is claimed) 17. <input type="checkbox"/> <b>Nonpublication Request</b> Under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent. 18. <input type="checkbox"/> <b>Other:</b> _____ _____ _____ _____
<p><b>*Note:</b> (1) Benefit claims under 37 CFR 1.78 and foreign priority claims under 1.55 <b>must</b> be included in an Application Data Sheet (ADS).  (2) For applications filed under 35 U.S.C. 111, the application must contain an ADS specifying the applicant if the applicant is an assignee, person to whom the inventor is under an obligation to assign, or person who otherwise shows sufficient proprietary interest in the matter. See 37 CFR 1.46(b).</p>		
<b>19. CORRESPONDENCE ADDRESS</b>		
<input checked="" type="checkbox"/> The address associated with Customer Number: <u>23364</u> OR <input type="checkbox"/> Correspondence address below		
Name		
Address		
City	State	Zip Code
Country	Telephone	Email
Signature	/Thomas J. Moore/	Date
Name (Print/Type)	THOMAS J. MOORE	Registration No. (Attorney/Agent)
		December 29, 2017
		28,974

This collection of information is required by 37 CFR 1.53(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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## Privacy Act Statement

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

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether 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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FEE TRANSMITTAL		Complete if known	
		Application Number	
<input type="checkbox"/> Applicant asserts small entity status. See 37 CFR 1.27.		First Named Inventor	Gauthier RENARD
<input type="checkbox"/> 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.		Examiner Name	
		Art Unit	
TOTAL AMOUNT OF PAYMENT	(\$) 1740.00	Practitioner Docket No.	RENA3002/TJM/TL

**METHOD OF PAYMENT** (check all that apply)

Check  Credit Card  Money Order  None  Other (please identify): EFS Web

Deposit Account Deposit Account Number: 02-0200 Deposit Account Name: \_\_\_\_\_

For the above-identified deposit account, the Director is hereby authorized to (check all that apply):

Charge fee(s) indicated below  Charge fee(s) indicated below, **except for the filing fee**

Charge any additional fee(s) or underpayment of fee(s)  Credit any overpayment of fee(s) under 37 CFR 1.16 and 1.17

**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.

**FEE CALCULATION**

**1. BASIC FILING, SEARCH, AND EXAMINATION FEES (U = undiscounted fee; S = small entity fee; M = micro entity fee)**

Application Type	FILING FEES			SEARCH FEES			EXAMINATION FEES			Fees Paid (\$)
	U (\$)	S (\$)	M (\$)	U (\$)	S (\$)	M (\$)	U (\$)	S (\$)	M (\$)	
Utility	280	140*	70	600	300	150	720	360	180	1600.00
Design	180	90	45	120	60	30	460	230	115	
Plant	180	90	45	380	190	95	580	290	145	
Reissue	280	140	70	600	300	150	2,160	1,080	540	
Provisional	260	130	65	0	0	0	0	0	0	

\* The \$140 small entity status filing fee for a utility application is further reduced to \$70 for a small entity status applicant who files the application via EFS-Web.

**2. EXCESS CLAIM FEES**

Fee Description	Undiscounted Fee (\$)	Small Entity Fee (\$)	Micro Entity Fee (\$)
Each claim over 20 (including Reissues)	80	40	20
Each independent claim over 3 (including Reissues)	420	210	105
Multiple dependent claims	780	390	195

**Total Claims** 20 - 20 or HP = \_\_\_\_\_ x \_\_\_\_\_ = \_\_\_\_\_ = \_\_\_\_\_

HP = highest number of total claims paid for, if greater than 20.

**Indep. Claims** 3 - 3 or HP = \_\_\_\_\_ x \_\_\_\_\_ = \_\_\_\_\_ = \_\_\_\_\_

HP = highest number of independent claims paid for, if greater than 3.

**3. APPLICATION SIZE FEE**

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is \$400 (\$200 for small entity) (\$100 for micro entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

**Total Sheets** 57 - 100 = \_\_\_\_\_ / 50 = \_\_\_\_\_ (round up to a whole number) x \_\_\_\_\_ = \_\_\_\_\_

**4. OTHER FEE(S)**

Non-English specification, \$130 fee (no small or micro entity discount) \_\_\_\_\_

**Non-electronic filing fee under 37 CFR 1.16(t) for a utility application, \$400 fee (\$200 small or micro entity)** \_\_\_\_\_

Other (e.g., late filing surcharge): Late Declaration surcharge \_\_\_\_\_ 140.00

SUBMITTED BY			
Signature	/Thomas J. Moore/	Registration No. (Attorney/Agent) <u>28974</u>	Telephone <u>703-683-0500</u>
Name (Print/Type)	THOMAS J. MOORE		Date <u>December 29, 2017</u>

This collection of information is required by 37 CFR 1.136. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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

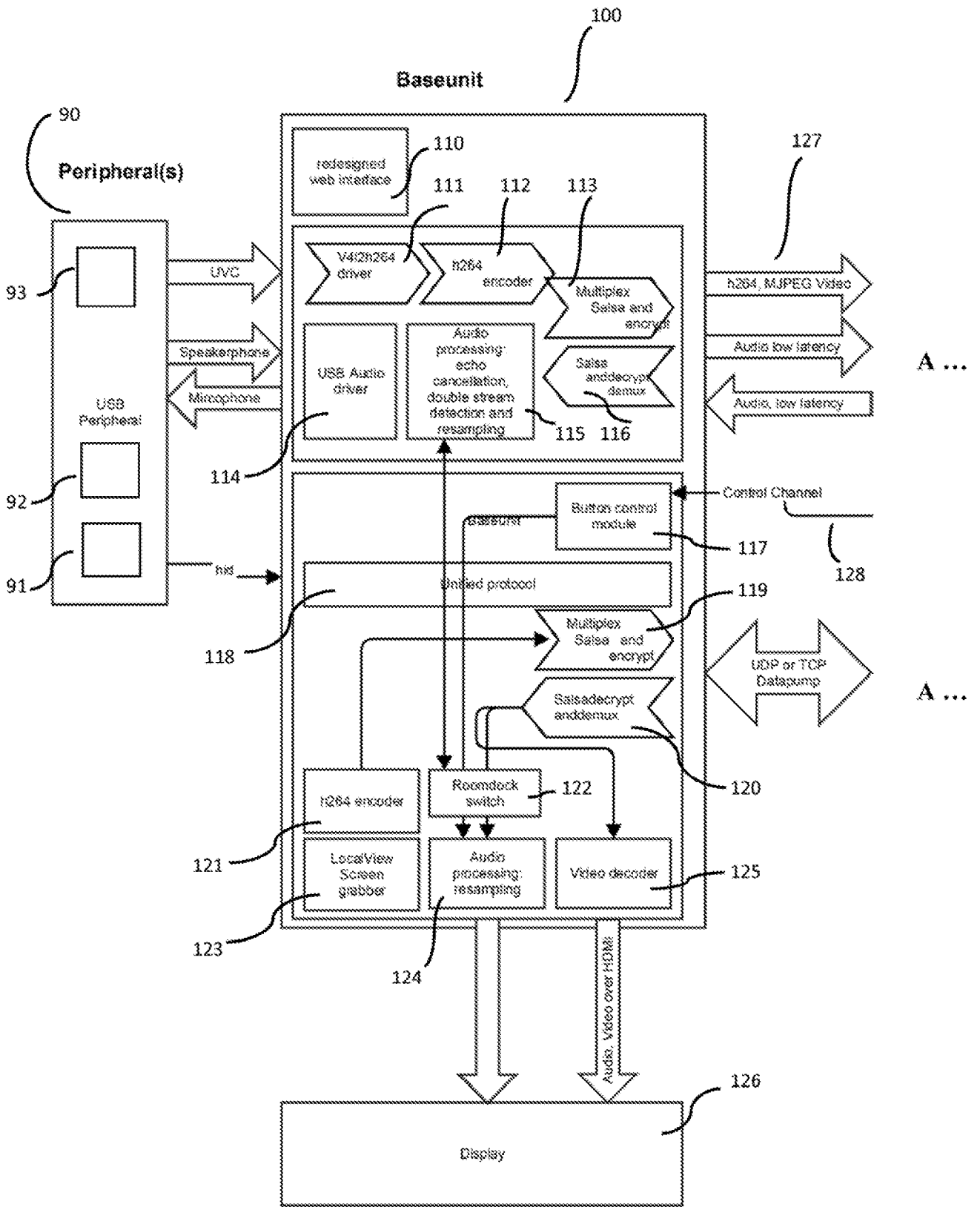


Fig. 1A

Fig. 1

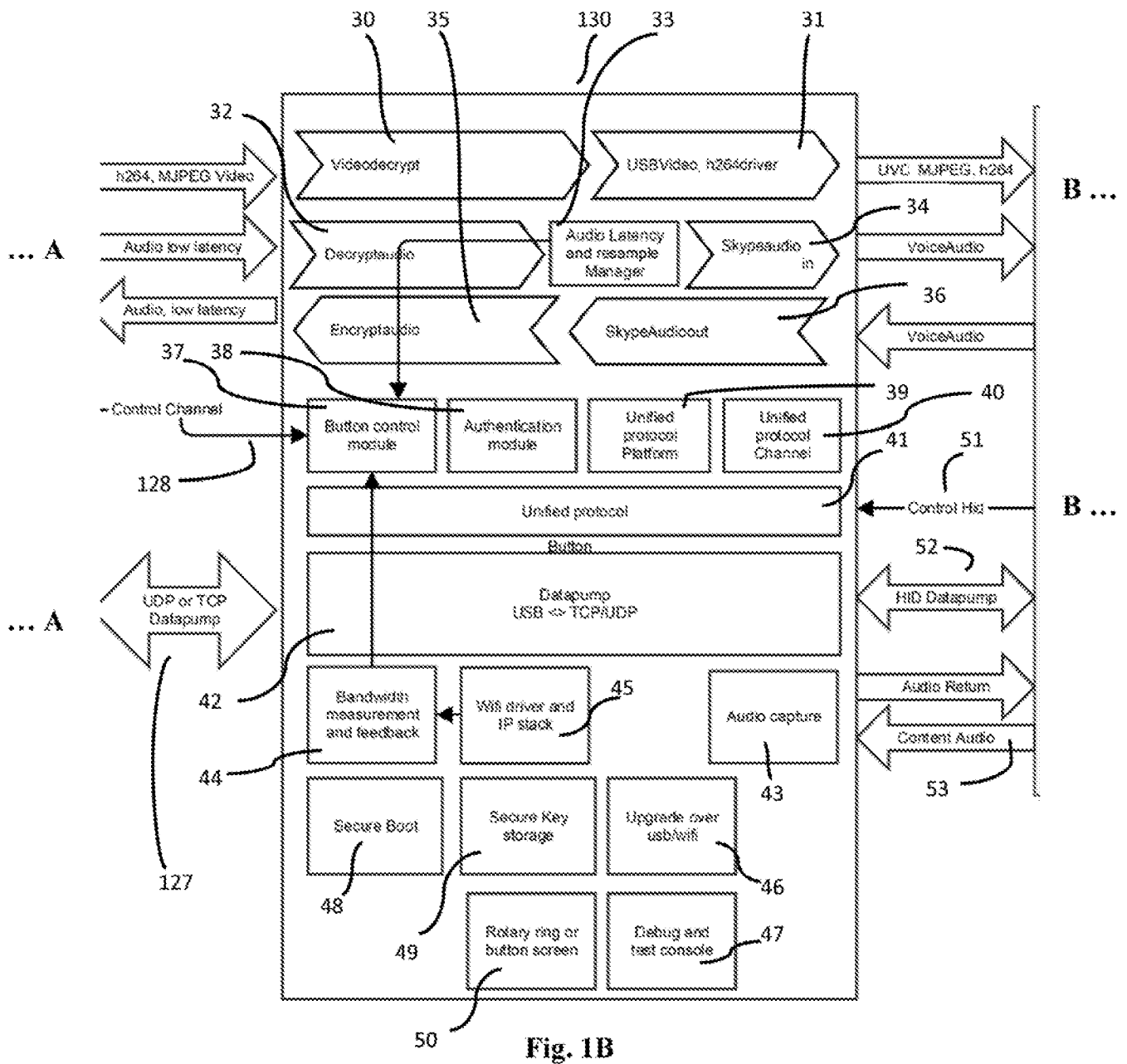


Fig. 1B

Fig. 1 continued

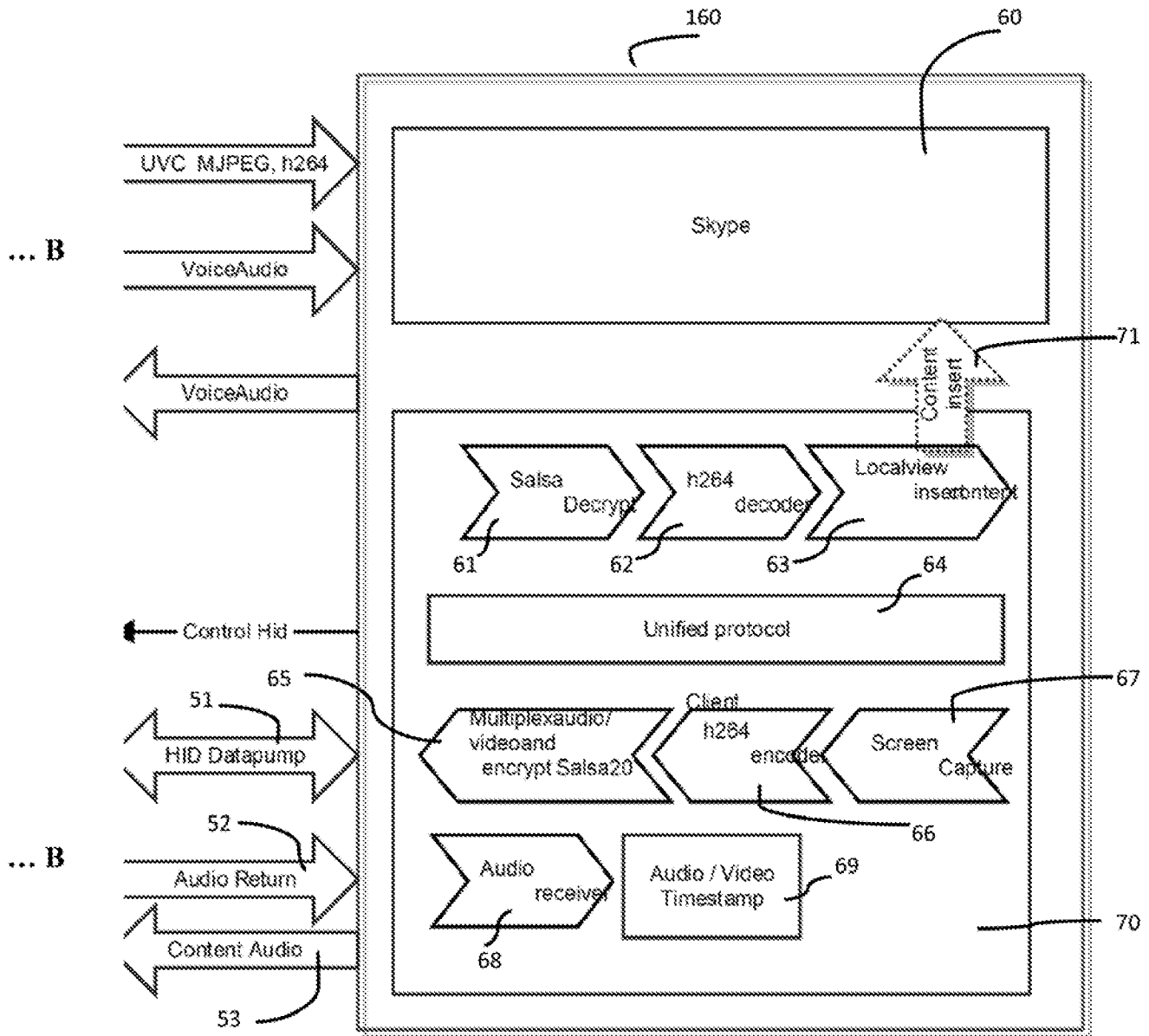
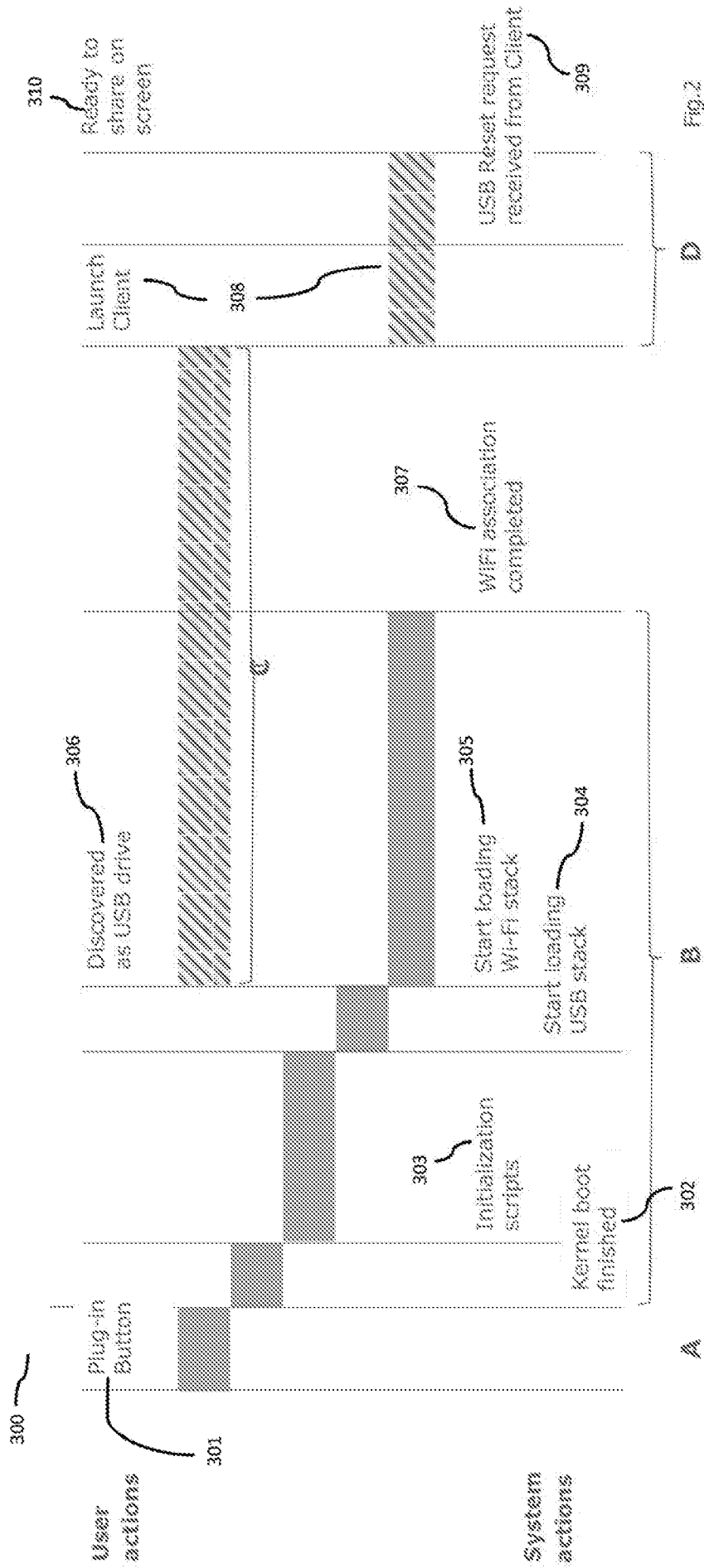


Fig. 1C

Fig. 1 continued





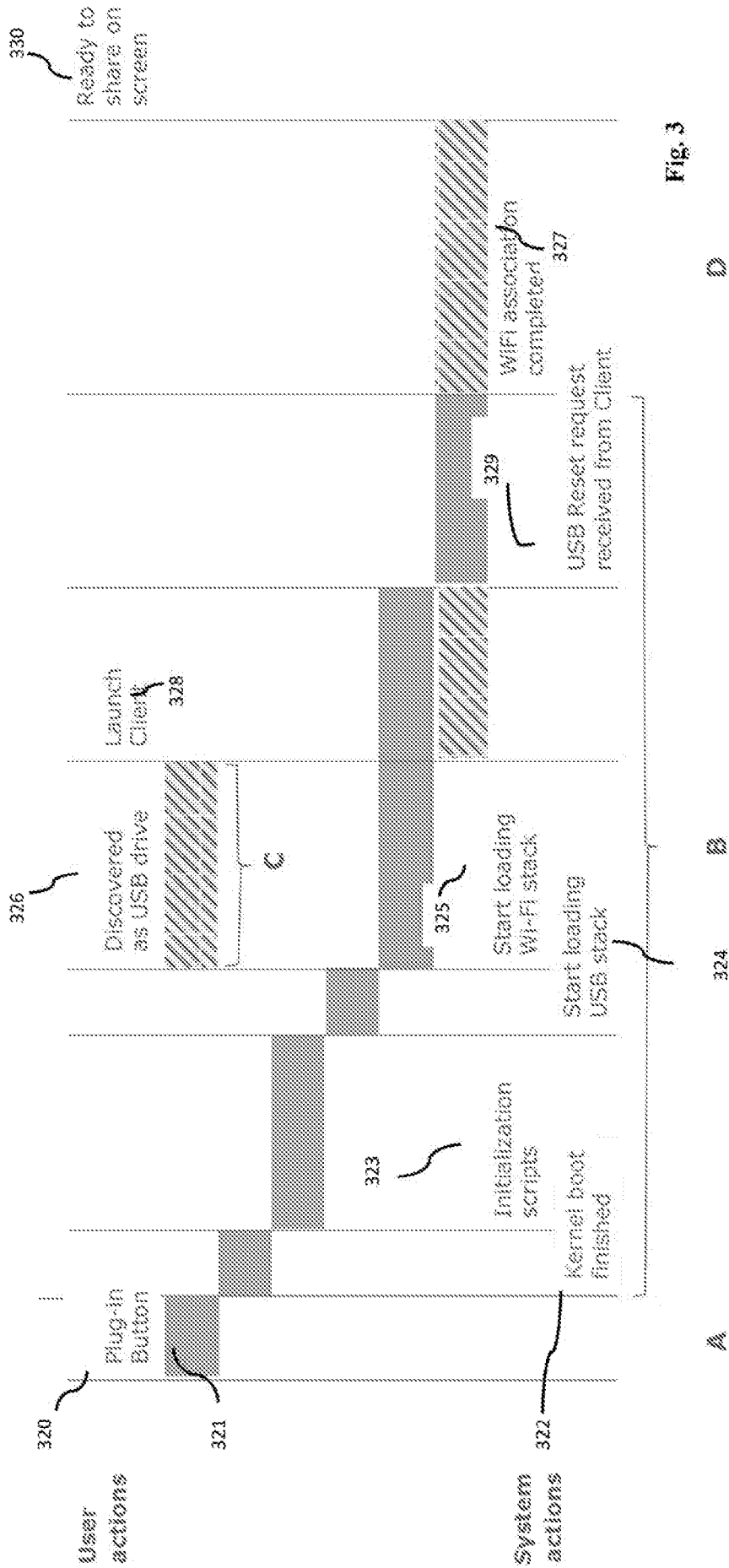


Fig. 3

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

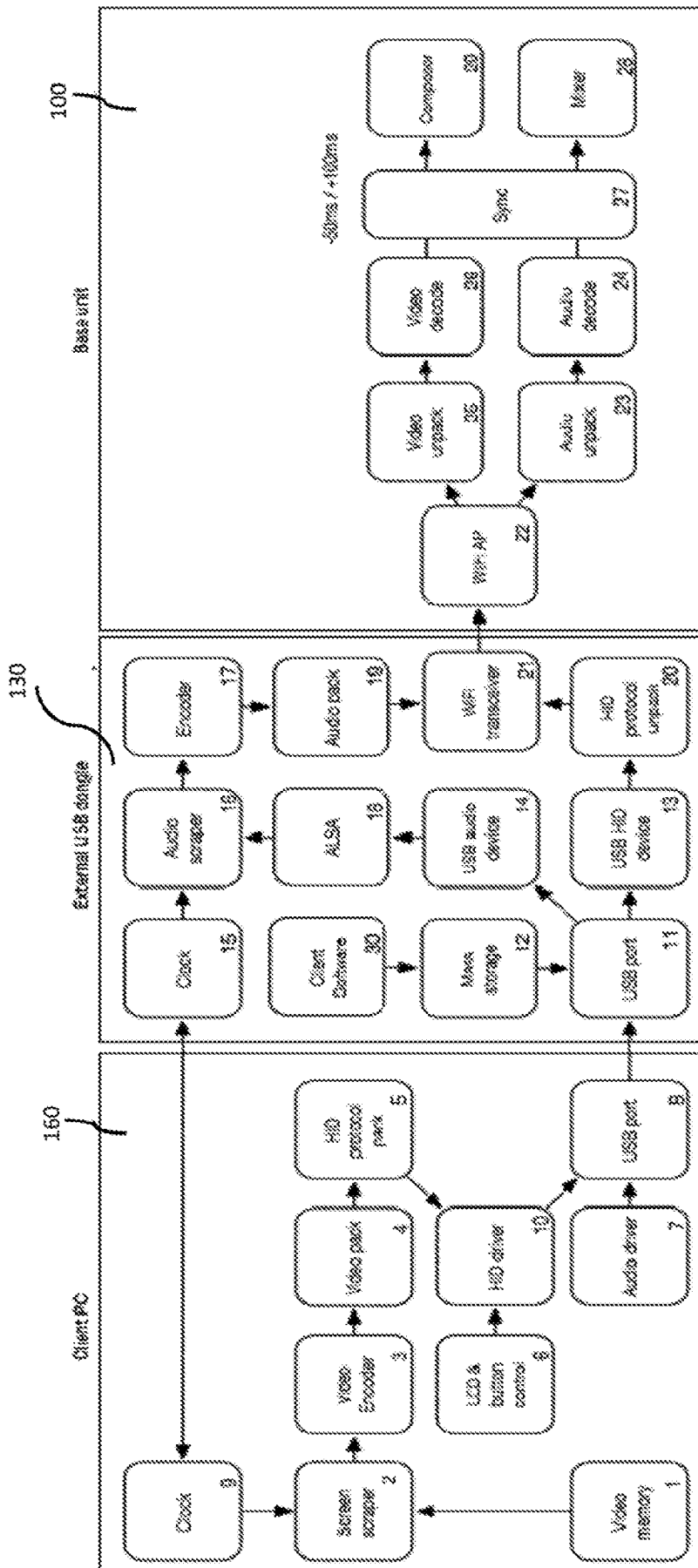


Fig. 4

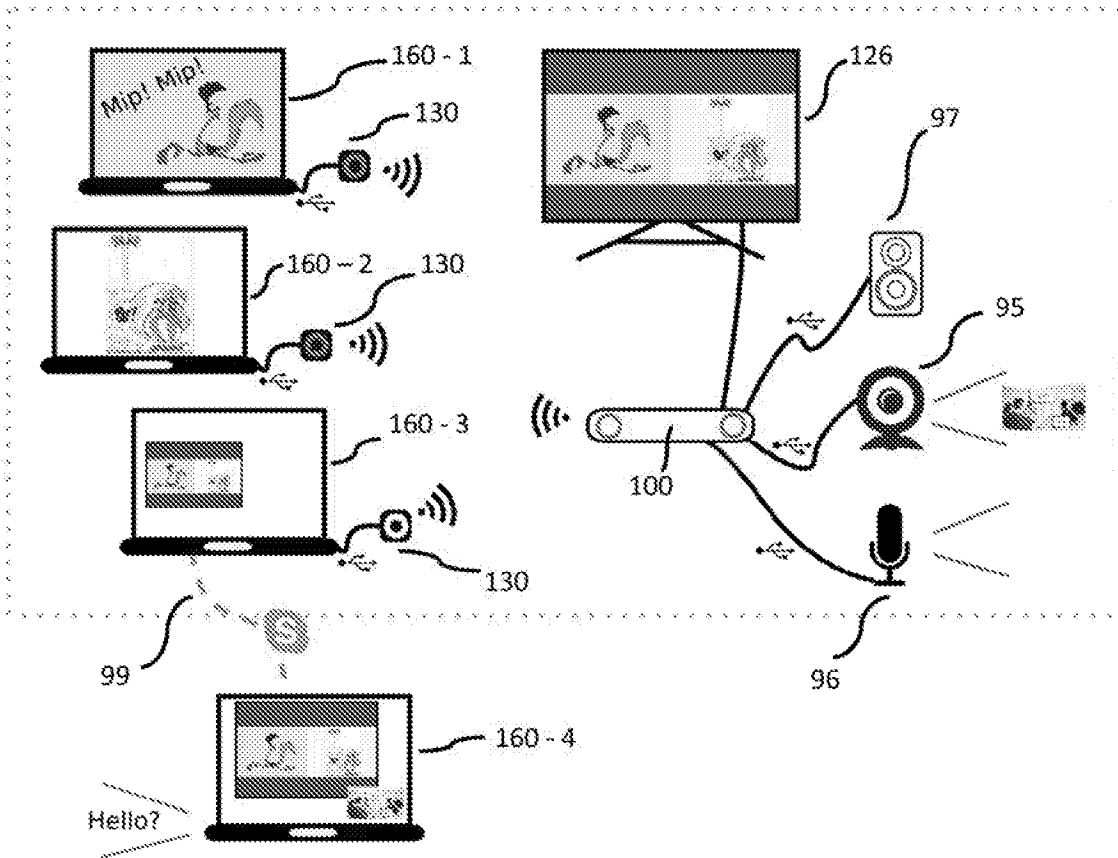


Fig. 5

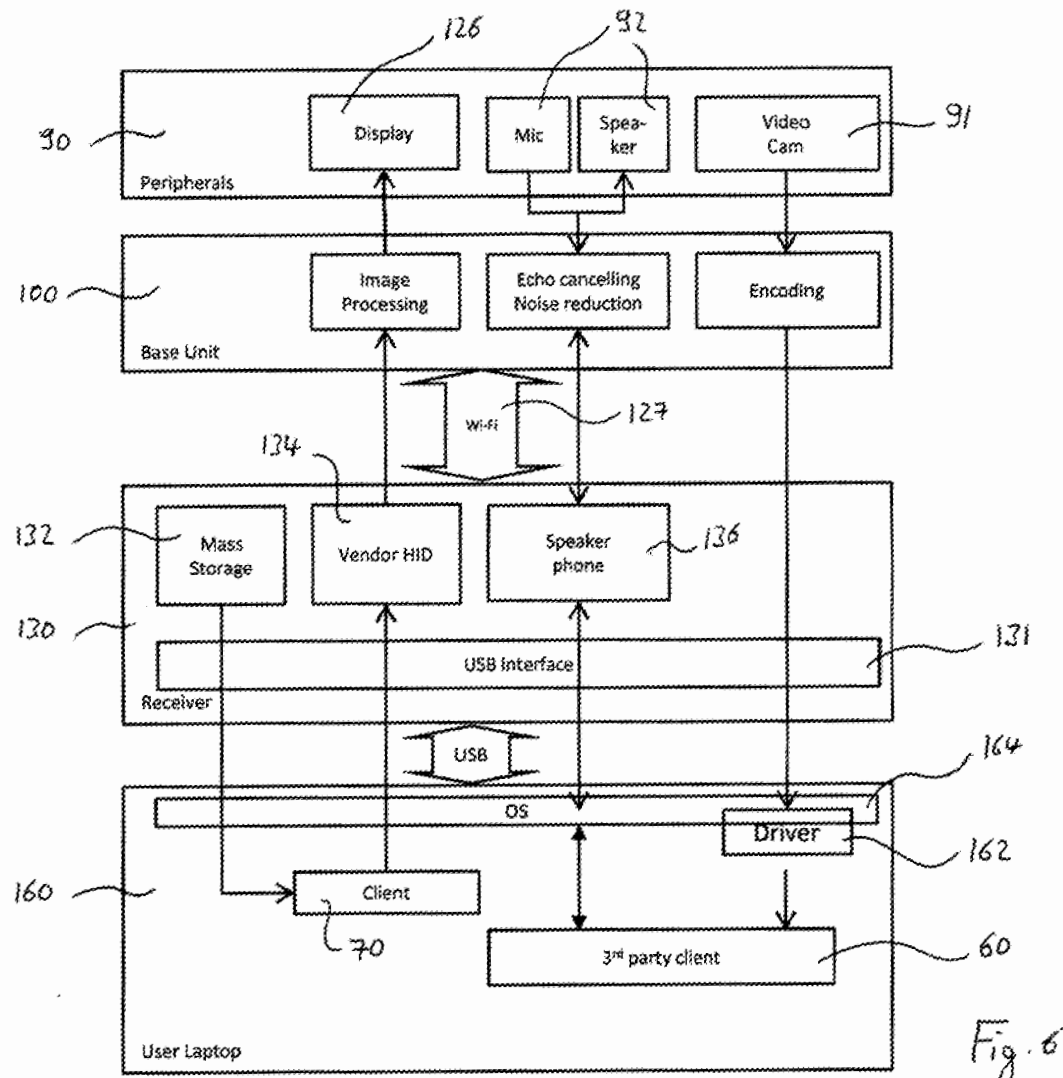
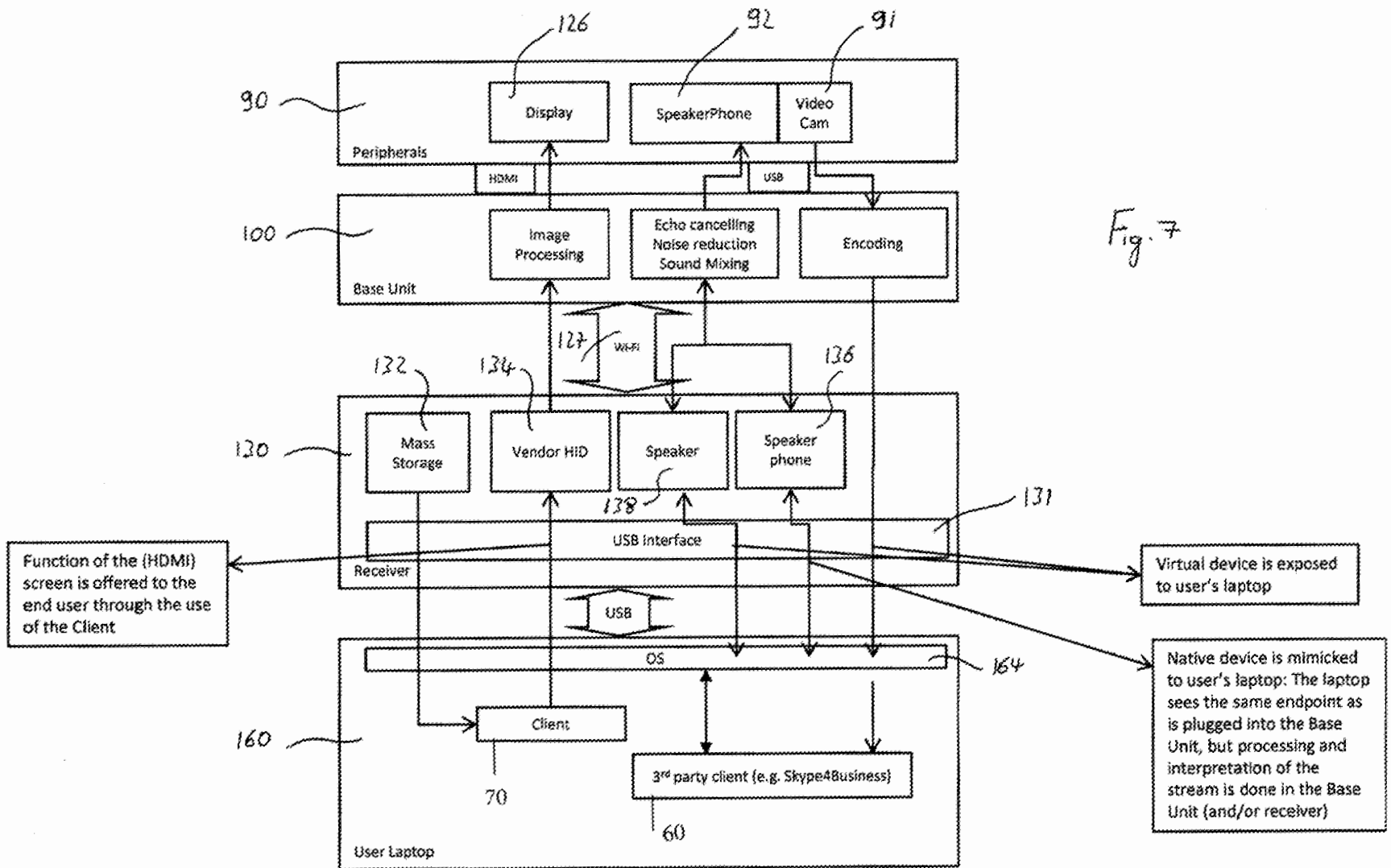


Fig. 6



Function of the (HDMI) screen is offered to the end user through the use of the Client

Virtual device is exposed to user's laptop

Native device is mimicked to user's laptop: The laptop sees the same endpoint as is plugged into the Base Unit, but processing and interpretation of the stream is done in the Base Unit (and/or receiver)

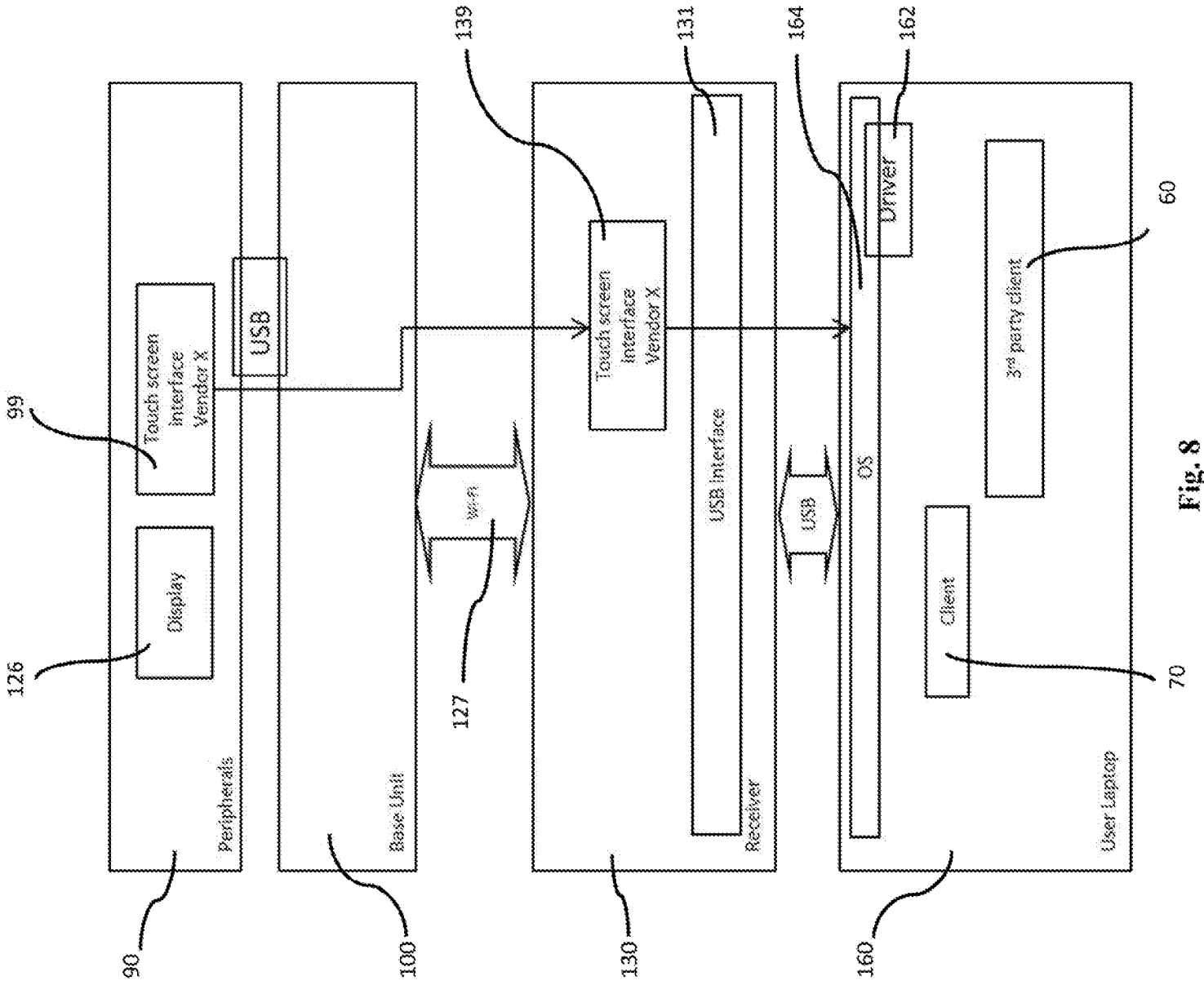
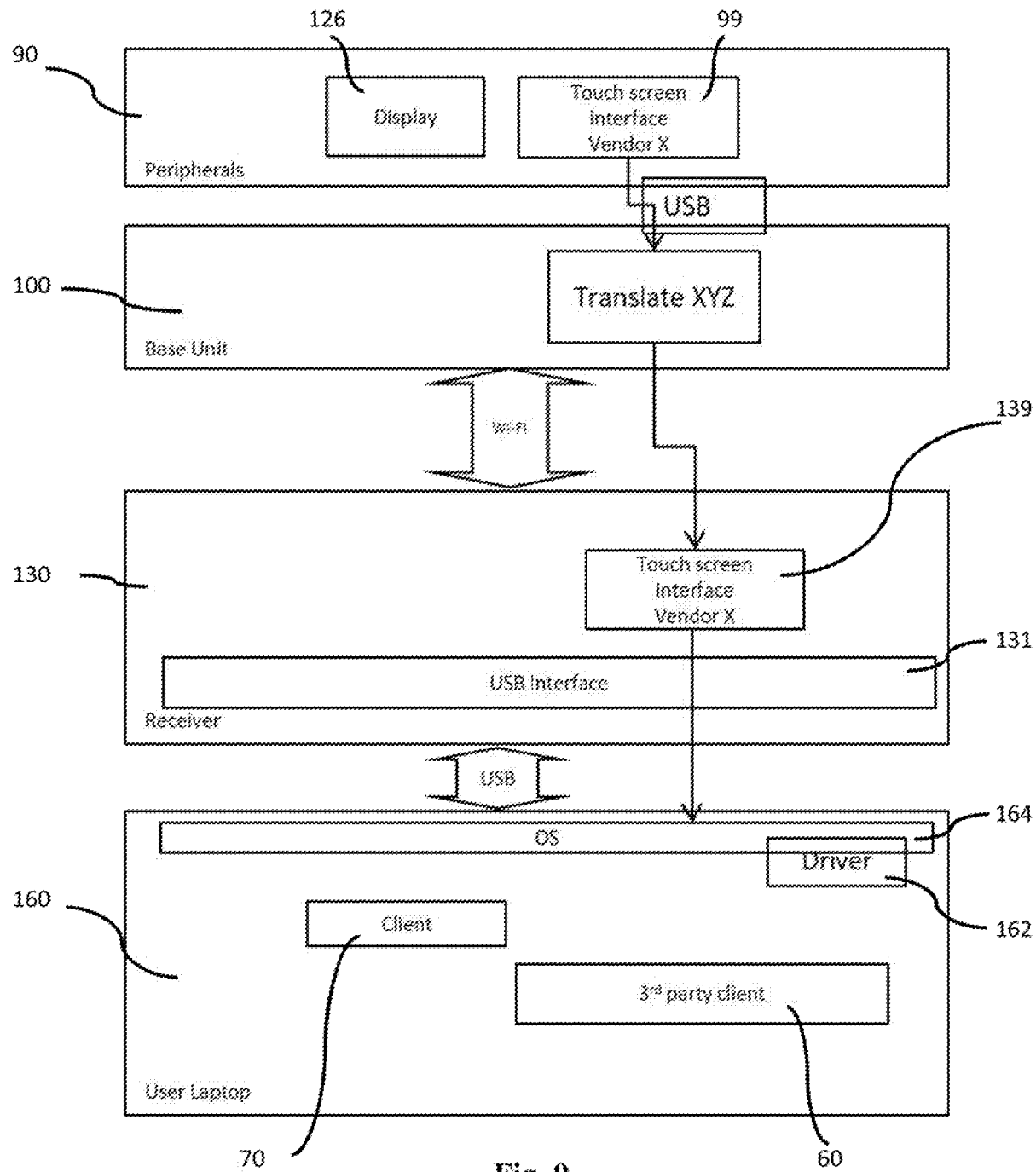
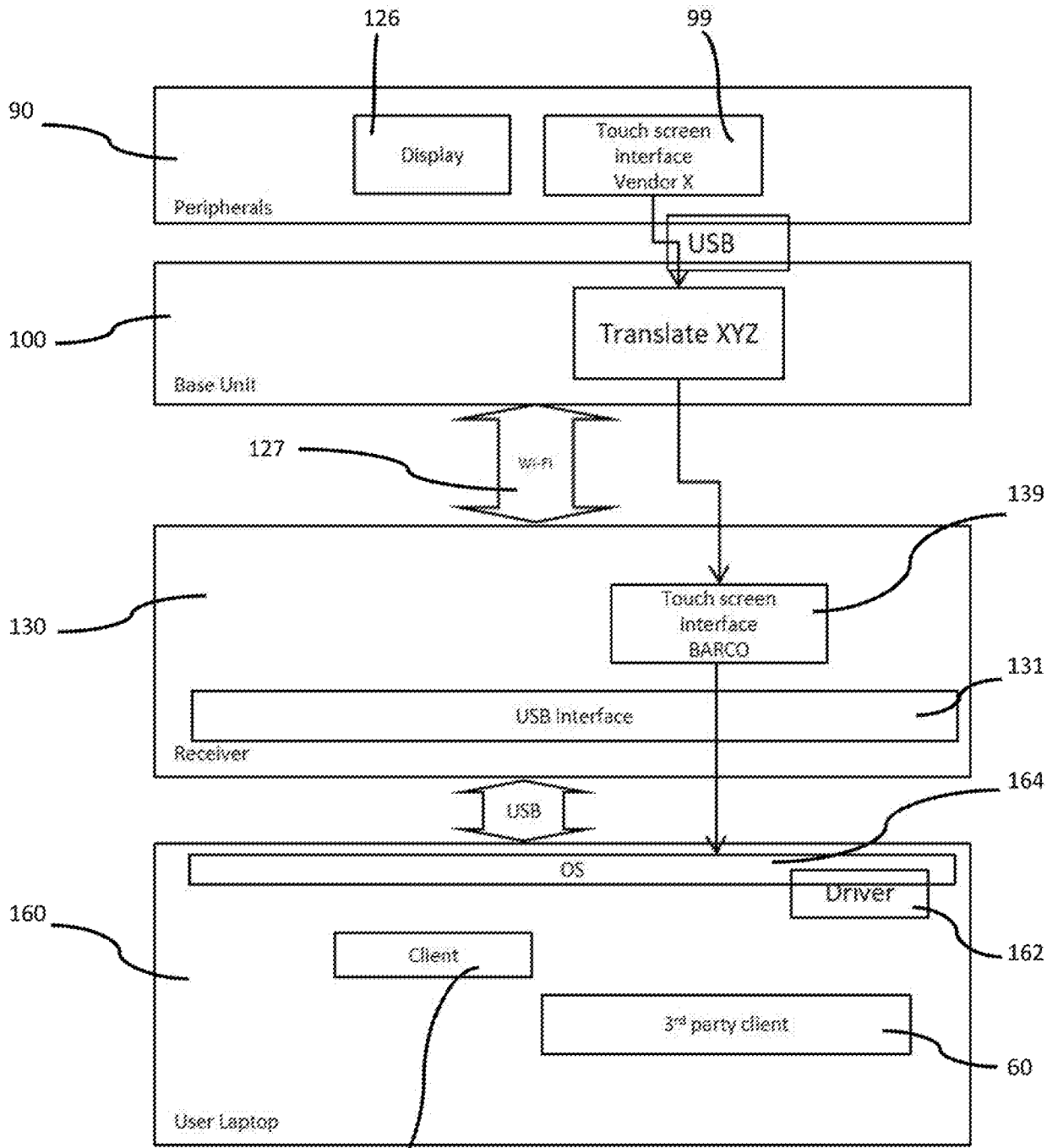


Fig. 8



**Fig. 9**





12/19

**Fig. 10**

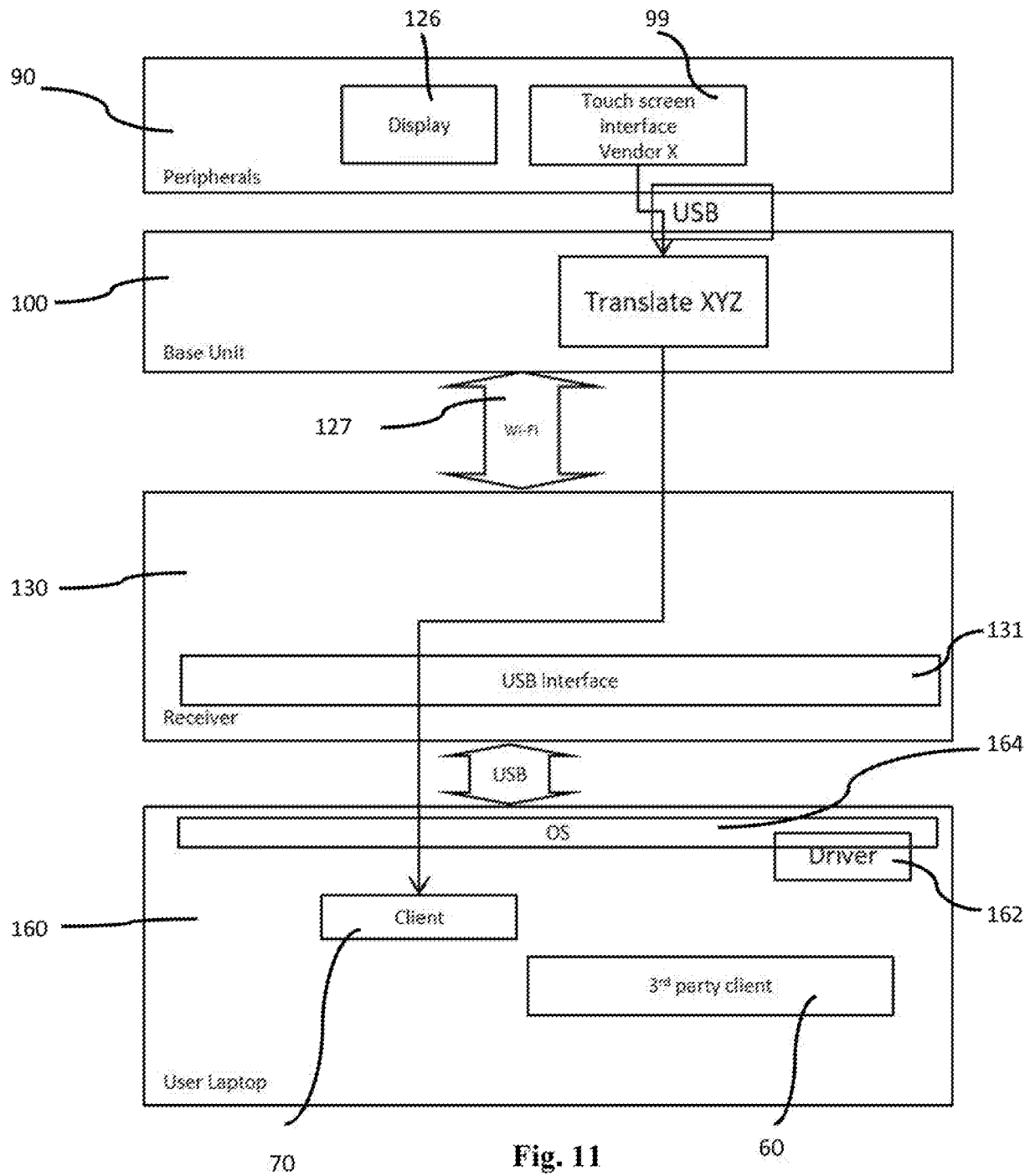


Fig. 11

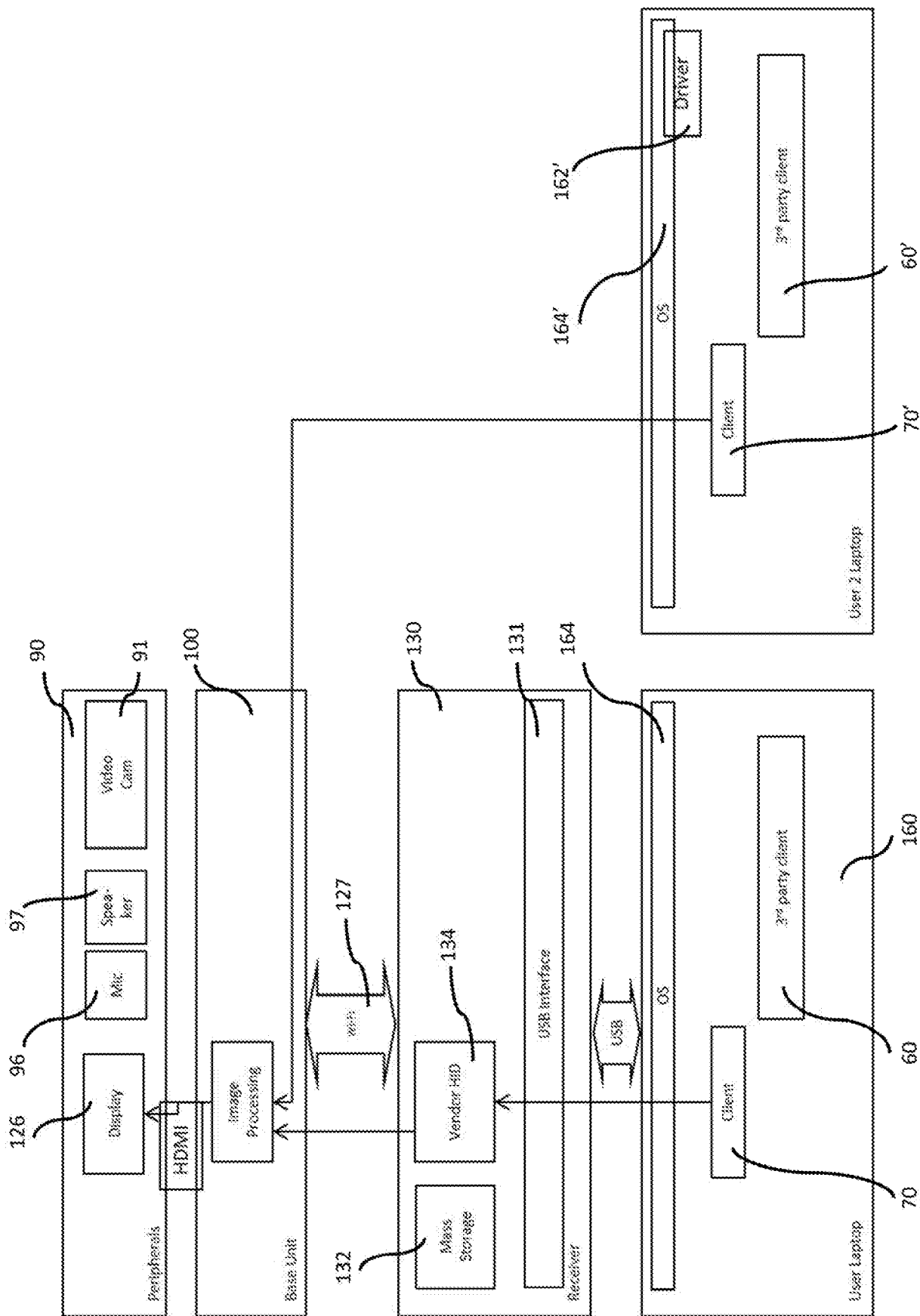


Fig. 12

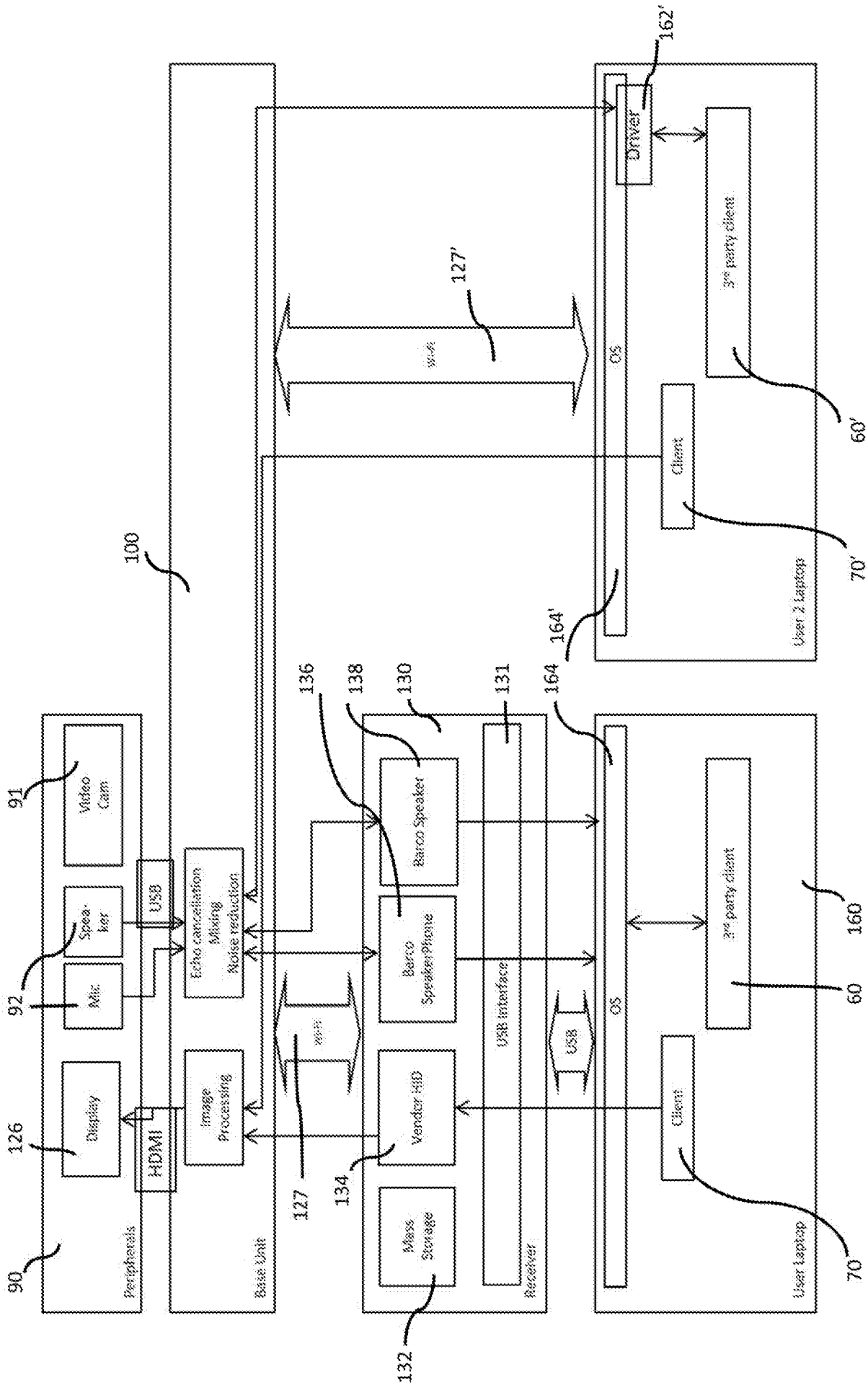


Fig. 13

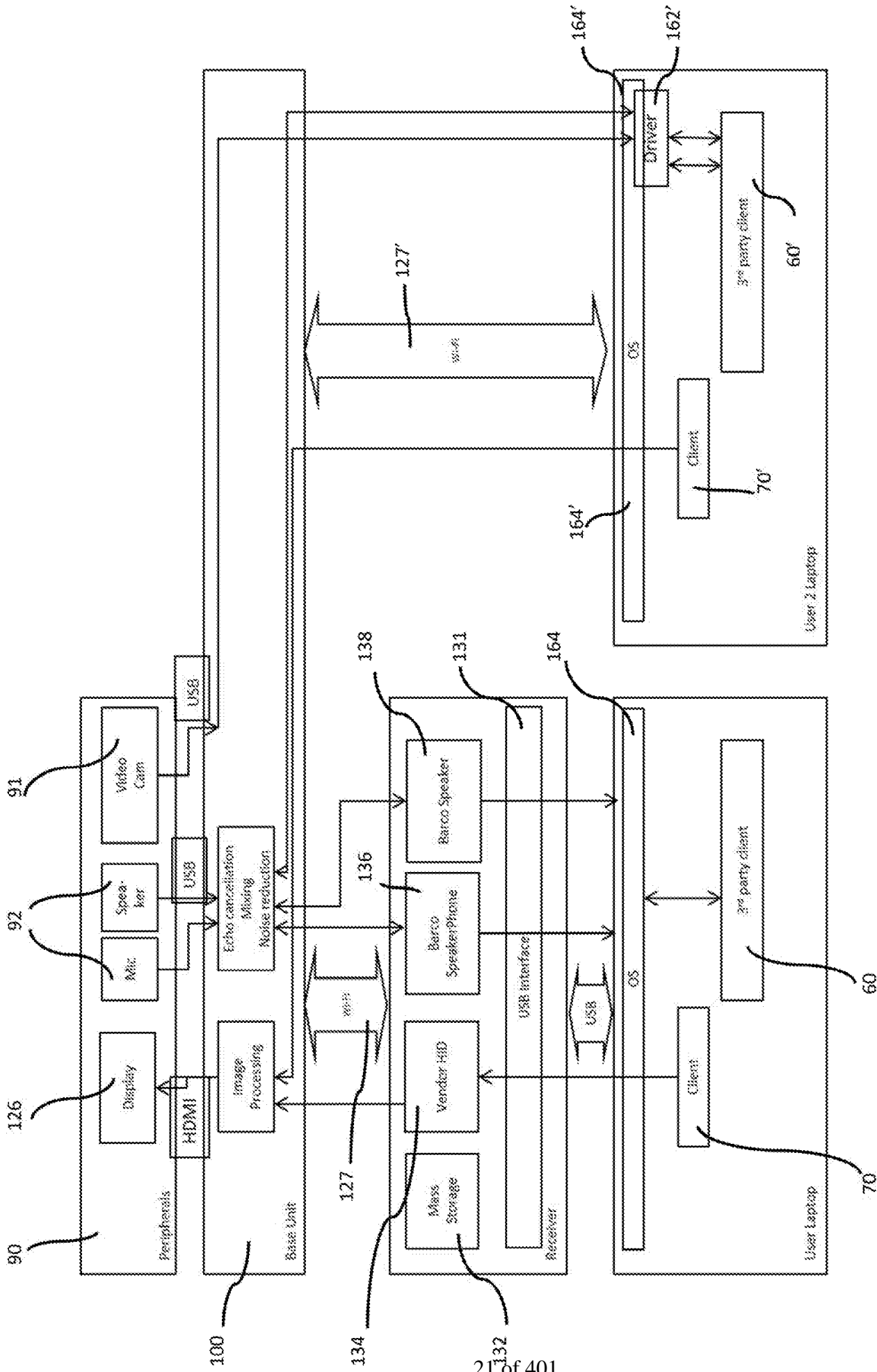


Fig. 14

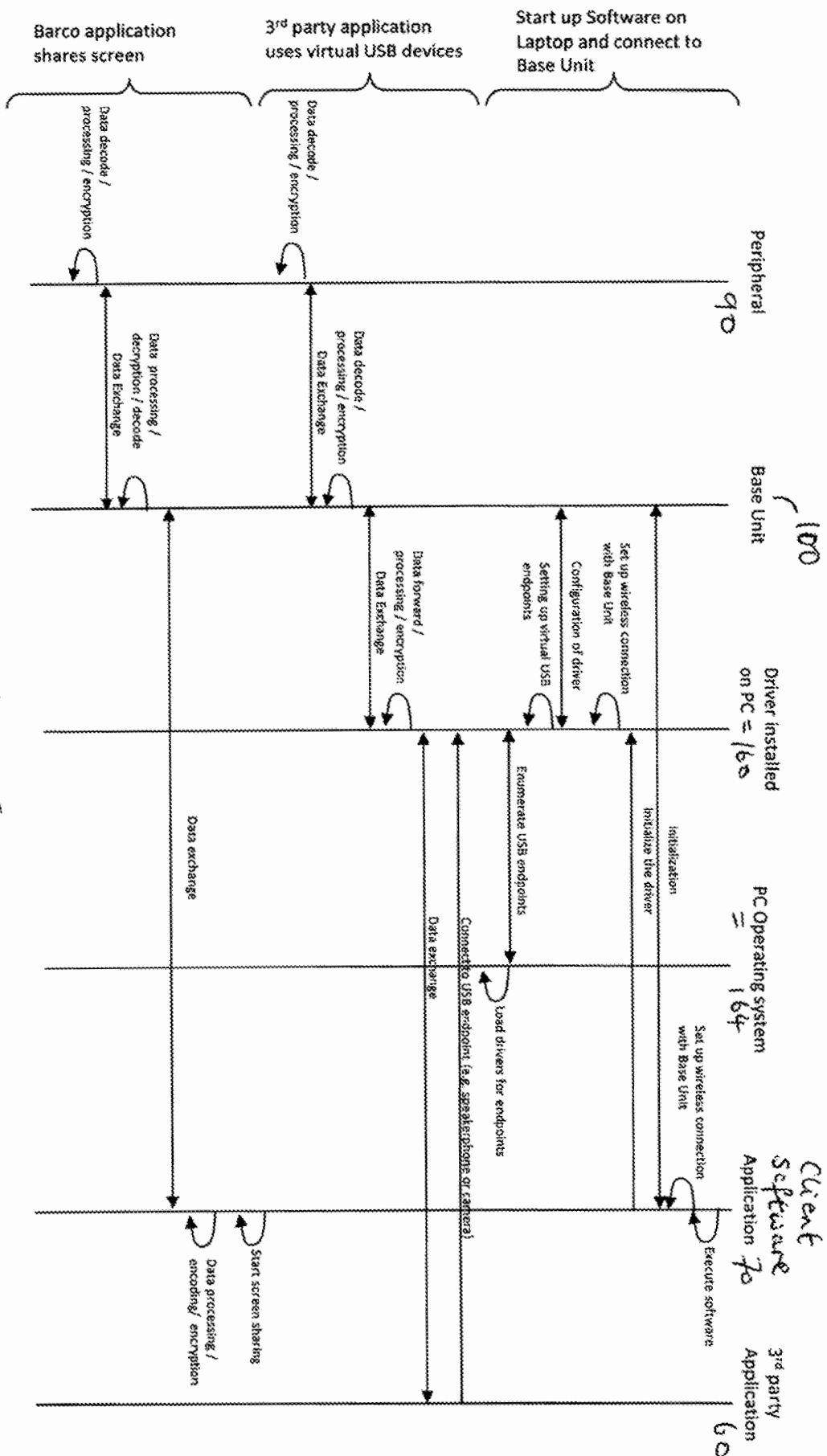


Fig. 15

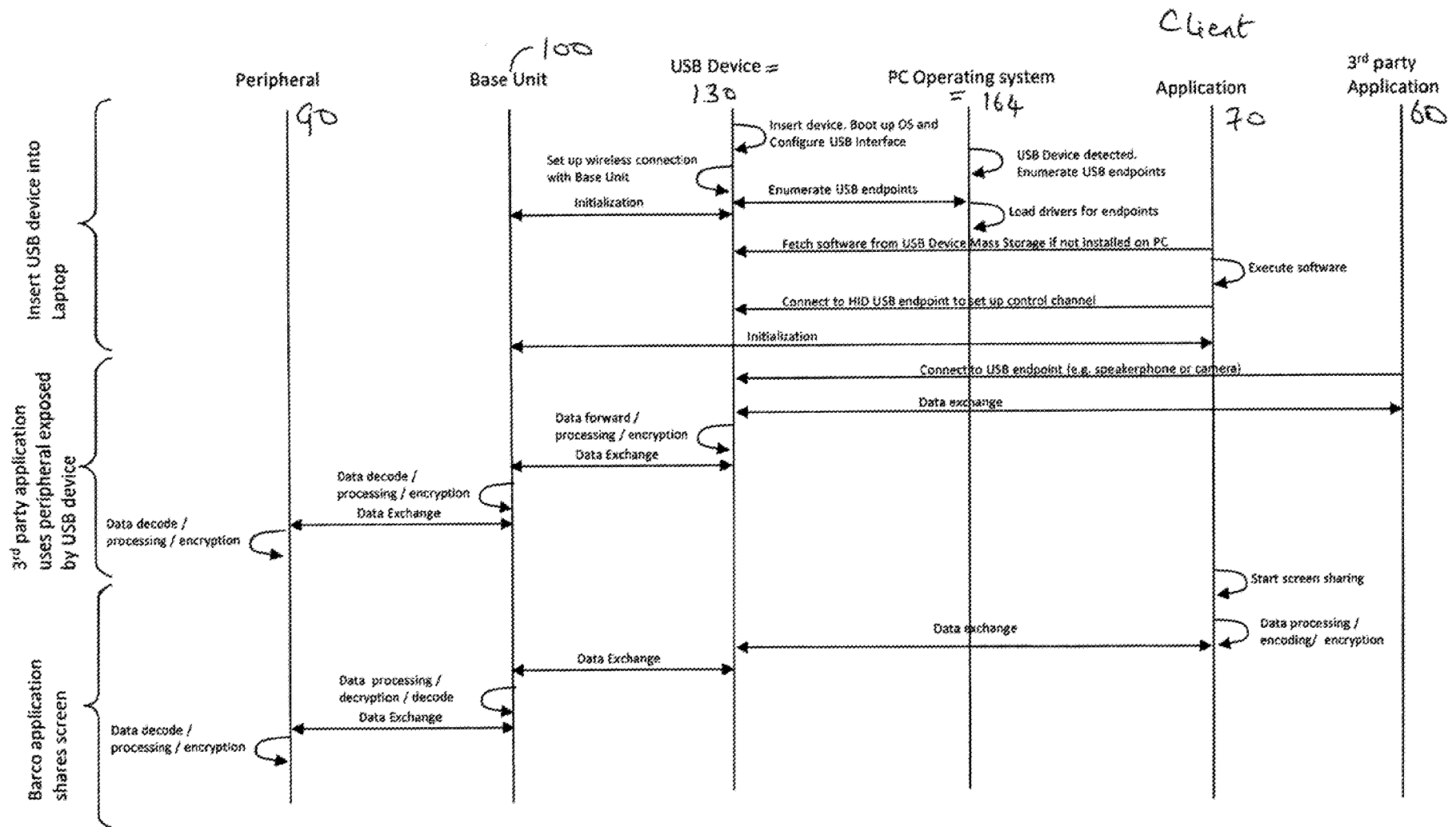


Fig. 16

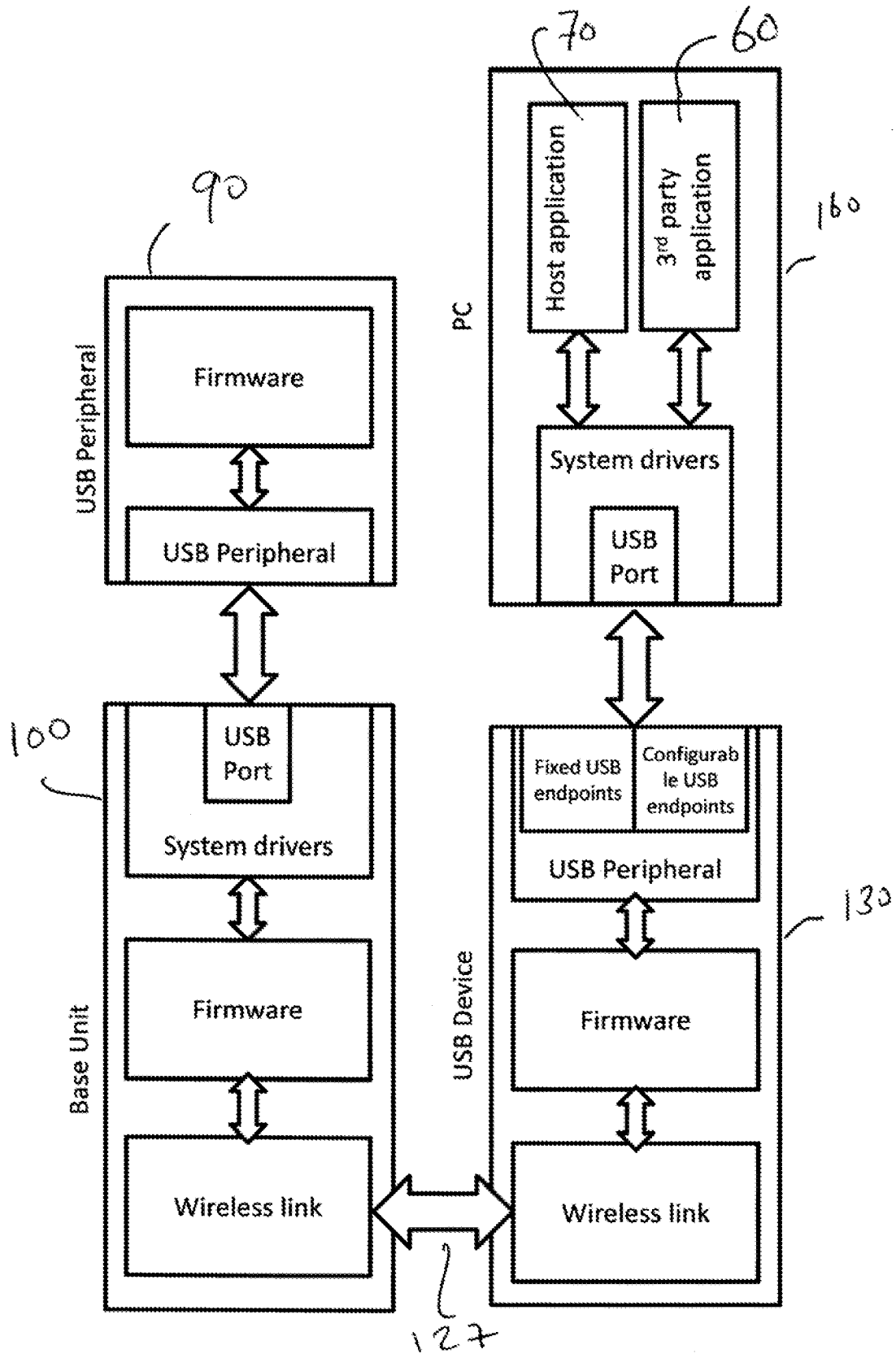


Fig. 17



## **Method and System for making functional devices available to participants of meetings**

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

### **Background of the Invention**

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

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

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

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

### **Summary of the Invention.**

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

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

a first peripheral device being adapted to be coupled to the processing device via a generic communications protocol, the base unit having a transmitter and the first peripheral device having a receiver and at least one fixed or configurable endpoint of the functional device exposed on the first peripheral device;

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

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

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

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

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

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

5

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

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

The system can comprise means for encoding, optionally encrypting the data.

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

20

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

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

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

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

5

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

- 10 The system can be adapted to expose the same type of functional device to the user as is connected to the Base Unit so that a user can use drivers provided by a vendor of the functional device installed on the processing device.

- 15 The system can be adapted such that for a plurality of processing devices communicating with the Base Unit, a functional device connected to the base unit will be exposed to all the plurality of processing devices. The functional device can be exposed natively.

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

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

- 25
- The ability to open a window and view the meeting room content in there.
  - The ability to zoom into the content.
  - The local view can allow the user to start and/or participate in a blackboard or annotation session from his/her own processing device

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

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

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

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

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

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

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

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

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

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

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

In another aspect a peripheral device adapted to be coupled to a processing device via a generic communications protocol is provided, the peripheral device having a receiver and at least one fixed or a configurable endpoint of a functional device exposed on the first peripheral device;

5 the receiver of the first peripheral device being adapted to receive data over the communications network from the functional device and for sending the data to the processing device via the at least one fixed or configurable endpoint using the generic communications protocol for communication between the processing device and the  
10 peripheral device.

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

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

### **Brief Description of the drawings**

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

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

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

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

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

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

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

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

15

Figure 17 shows a further embodiment of the present invention.

### **Definitions**

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

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

30

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

A plug and play device has auto-configuration software by default to make it plug and play. Example: USB devices are made to be plug and play by including the correct auto-configuration software (e.g. host driver, host stack, application software).

5 Autoconfiguration can also refer to a software alone and is not restricted to a physical device.

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

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

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

30

Not require any kind of formal installation onto a computer's permanent storage device to be executed, and can be stored on a removable storage device such as USB flash drive, iPod, memory card, portable hard drive or other portable electronic storage device thus enabling it to be used on multiple computers.



Settings are stored with, and can be preferably carried around with, the software (i.e., they are written to the electronic device such as a USB drive). Settings are not stored to the registry or any other central system database of the computer.

- 5 Leaves a zero (or near-zero) “footprint” on any PC it is run on after being used. i.e., all temporary files/registry settings should be either avoided or at least removed once the program has exited, and files created by the user can be saved directly to the same removable media as the application is stored on.
- 10 A portable application does not leave its files or settings on the host computer on which it runs. For example, the application does not write to the Windows registry or store its configuration files (such as an INI file) in the user's profile; instead, it stores its configuration files in the program's directory. Another requirement, since file paths will often differ on changing computers due to variation in Windows drive letter assignments,
- 15 is the need for applications to store them in a relative format. Preferably, such a program does not require a launcher program to copy necessary settings and files to the host computer when the application starts and move them back to the application's directory when it closes as this may leave a residue on the hard drive in case of power failure.
- 20 “**Electronic meeting systems**” (EMS) need to be distinguished on the one hand from classic groupware, on the other from web conferencing systems. In reality, there is some overlap between minor features of products of the named categories. The main difference from groupware is the intensity of collaboration. EMS should be distinguished from systems with which it is possible to show the contents of an individual computer screen
- 25 on a remote display with multiple users at the same time.
- “**Groupware**” supports collaboration within groups where the individual contributions remain identifiable. In contrast, EMS enables the group to cooperatively produce a result for which the group is responsible as a whole. In a business process, groupware and
- 30 electronic meeting systems complement each other: Groupware supports teams when researching and creating documents in the run up to an EMS session or when implementing the results of such a session.

“**Web conferencing systems**” and “electronic meeting systems” complement each other

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

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

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

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

“**Unified Communications system or tools**” refers to audio or audio visual communications such as provided by “Skype™” or “Skype™ for business”. Such software can take over audio and/or visual data provided from a host processing device. Unified communication tool can be described as a collection of tools to do VOIP, (web) conferencing, shared whiteboarding, message exchange (e.g. chat), file transfer, or presence. Unified Communications system or tools can make use of a protocol- or

standard defined or specific communication session or interaction, such as Voice-Over-Internet-Protocol (“VoIP), text or instant messaging (e.g., AIM, Blauk, eBuddy, Gadu-Gadu, IBM Lotus Sametime, ICQ, iMessage, IMVU, Lync, MXit, Paltalk, Skype, Tencent QQ, Windows Live Messenger™ or MSN Messenger™, Wireclub, Xfire, and  
5 Yahoo! Messenger™ email, Twitter (e.g., tweeting), Digital Service Protocol (DSP), and the like. Unified Communications system or tools can make use of video conferencing cloud service including a video conferencing node to allow one or more users located at the first video conferencing endpoint to communicate with one or more users located at the second video conferencing endpoint in a video conference.

10

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

15

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

20

“**Wireless**” and “**wireless communication network**” can be any network that does not use cable links between nodes, e.g. uses RF, optical or InfraRed for communication purposes, such as IrDA, diffuse infra-red, WLAN, WiMax, WiFi, WiFi Direct, LiFi, ultrasound, ZigBee, or Bluetooth or any other wireless communication network known to the person skilled in the art.

25

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

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

“**Host device**” is a processing device that wants to share using a first peripheral device or dongle.

“**Functional device**” is a second peripheral device connected in some way to a base unit. The system has the ability to expose second peripheral devices connected to the Base Unit to the first peripheral device transparently as if it were attached to the processing device to which the first peripheral device is connected.

“**Endpoints**” can be described as data sources or sinks and are defined for USB Devices which can be physical devices or virtual devices. In the present invention endpoints should be interpreted broadly as data sources or sinks. Hence data can be stored at an endpoint or emitted. An endpoint can act as a kind of buffer can be defined for physical devices or virtual devices. The data stored at an endpoint may either be received from or waiting for being sent to the host such as a USB Host. An endpoint is defined by a number of descriptive fields. For example, an endpoint can be configured to support different transfer types such as four transfer types. These transfer can be as defined in the USB specification, e.g. Control Transfers, Interrupt Transfers, Isochronous Transfers, and Bulk Transfers. The skilled person can use these transfer types as required in the present invention. Within the limits of the hardware, endpoints can be configured using middleware, e.g. USB Middleware. An endpoint can be limited to a certain transfer type. A USB Host's client may send data to an Endpoint 1 for example. Coming from the USB Host, the data will be sent to the OUT Endpoint 1. The software running will then read the data as soon as it is ready to do so. Returning data has to be written to the IN Endpoint

1, as the software cannot access the USB bus freely as the USB bus is controlled by the USB Host. The data in IN Endpoint 1 stays there until the host sends an IN packet to Endpoint 1 requesting the data.

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

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

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

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

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

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

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

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

5 “A specific device exposes a peripheral device or other device” means that the specific device configures one or more endpoints with specific descriptor fields.

### Detailed Description of the Invention

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

15

20 Embodiments of the present invention allow users, e.g. participants in a meeting room, to make use of at least one functional device, some functional devices or all functional equipment attached to the base unit whereby the at least one functional device has an electronic output such as a digital electronic output and can co-operate with other devices plugged into, coupled, connected or attached in some way to the base unit or is provided by other hardware or software. The at least one functional device can be provided by either plugging in a second peripheral device e.g. a dongle or by a wireless connected second peripheral device or by connecting to the at least one functional device with some software which can be downloaded or pre-installed. The at least one functional device can have an electronic output such as provided by a touch screen, a microphone, a speakerphone, a camera and can function with devices which have an electronic input such as a display or a speaker. Embodiments of the present invention provide the functional device for shared use by participants in a classroom or meeting room.

25

30 The at least one functional device coupled or connected or attached to the base unit, e.g. via a serial connection such as a serial plug-and-play connection e.g. USB or via a wireless connection such as a Near Field Communication (NFC) connection, e.g. a

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

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

30

Embodiments of the present invention comprise a device such as a first peripheral device comprising at least a receiving function and usually a transmitting and receiving function such as a transceiver function. The first peripheral device (being at least a receiver device) can be hardware e.g. having a wireless or wired connection capability, software or a

combination of both that can be connected to the base unit over a wireless connection such as a Wi-Fi, Bluetooth, Wi-Gig, Li-Fi, NFC or similar connection, or a wired link e.g. a USB, Ethernet, etc. connection. This allows the base unit to expose and make available any functional device such as a second peripheral device that is connected to the base unit, to one or more first peripheral devices (e.g. receiver devices) such as to expose and make available simultaneously with a plurality of first peripheral device (e.g. receiver devices) in one of following ways:

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



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

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

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

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

- In one implementation, all second peripheral devices which can be USB devices are mirrored one on one, needing no additional drivers or software to be installed  
 25 on the users' processing devices other than the second peripheral's vendor's drivers. The second peripheral devices can be exposed to the user's processing device either by the hardware of the first peripheral device directly, or by using a software virtual hub on the first peripheral device or on the user's processing device.
- In another implementation, different second peripheral devices (e.g. speakers, microphones,... e.g. with electronic outputs and/or inputs) can be combined and  
 30 connected to the same base unit. Additional functionality such as echo cancellation, translation, encoding/decoding, etc) can be provided in the base unit.

Only one second peripheral needs to be exposed through the first peripheral device to the user's processing device.

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

With reference to Figure 1 group 90 is a microprocessor or FPGA based device comprising one or more peripheral devices 91-93 which can be connected to, e.g. plugged into a base unit 100. The peripheral devices 91-93 may be connected to the base unit 100 by means of standard connections such as serial connection of which Firewire (IEEE-1394), PCI, Mini PCI, PCI Express, Mini PCI Express, PCMCIA, PC Card, Universal

Serial Bus (USB), SDIO cards, HDMI, DisplayPort, Bluetooth etc.

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

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

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

10

- A Web interface 110 which is an interface for the base unit 100 in which one can configure the system
- One or more drivers 111, e.g. two specific drivers for webcam 91 and speakerphone 92 running on the base unit 100 to receive or send data from/to the
- 15 • Additional processing is done in blocks 112, 114, 115 for both audio and webcam encoding, mixing, (de)multiplexing and other processing.
- Data can be encrypted or decrypted in decrypters/encryptors 113, 116 before being sent to the first peripheral device 130 over a wireless link 127.

20

- The control modules 117 in base unit 100, and 37 in the first peripheral device 130 use a control channel 128 between the base unit 100 and the first peripheral device 130 to perform various functions such as keep alive, identification, crypto key exchange etc.

25

- Unified protocol block 118 is a functional block abstracting primary functions of the system: screen sharing and other non-media streaming (e.g. mouse pointer)
- Encryption and decryption modules 119, 120 are provided for the main communication with the first peripheral device 130 and other applications.

30

- A encoder such as H264 encoder 121 provides and local view block 123 (which is a functional device or functional devices as it/they emit a signal from the base unit 100 towards the user processing device 160) are provided to capture the rendered image on the main display 126, encode it and send it back to the first peripheral device 130 and other clients
- Audio processing blocks 124 are provided for audio content.

- Video decoder 125 is provided to decode and render the screen content to the display 126.

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

5 example

- Webcam video coming from webcam 91 of base unit 100 is decrypted in block 30 and exposed to processing device 160 through a USB video endpoint via USB video and drivers such as H264 drivers 31.
- Audio signals from speakerphone 92 connected to the base unit 100 are decrypted  
10 in block 32, processed and exposed as microphone signal from the USB speakerphone endpoint 92.
- Audio signals from processing device 160 coming through a Speakerphone USB endpoint is encrypted in block 35 and sent to the Base Unit 100 via wireless connection 127.
- Control HID (Human Interface Device) 51 is a mirror of additional HID USB  
15 endpoints that the Group 90 and the second peripheral devices 91-93 have exposed to the Base Unit 100.
- A vendor specific HID endpoint indicated as datapump 42 is used for a channel  
20 which can be a high bandwidth data channel between vendor specific software such as software 70 running on processing device 160 and the Base Unit 100 over the first peripheral device 130. Screen video and audio signals for display 126 can be sent over this channel 52. This is preferred compared with doing this over a control HID endpoint in the first peripheral device 130. Also the screen input of display 126 which is captured (block 123) and encoded (block 121) in the Base  
25 Unit 100, is sent to the vendor specific software running on the processing device 160 to allow other users such as a plurality of users or participants in a meeting each of which has got a processing device 160 and optionally a first peripheral device 130 plugged in, to view what is on the display 126 on a display (not shown) on their own processing device 160.
- A number of basic components such as the operating system (OS) and the drivers  
30 to control optical indicators such as an LED ring on the first peripheral device 130, bandwidth measurement module and other the wi-fi modules, update/upgrade modules e.g. over wireless, secure boot module, secure key storage, debug and test module, etc. are provided in blocks 45 to 50.

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

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

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

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

## 5 Connecting a first peripheral device to a user processing device

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

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

Some examples for activation of the actuator which can be used with any of the embodiments of the present invention: Sound activated (hand clap, voice recognition, computer sound, music, ...) Remote controlled via wireless connected device (IR, Bluetooth, WiFi, LiFi...), Light activated, Pressure activated, e.g. depression with a finger

or hand, Touch activated, Proximity ('near-touch' on the actuator or bringing the actuator close to some object, Biometric reader such as Fingerprint reader, Iris scanner, DNA analyser, Keypad, e.g. for entering Keypcode e.g. a password.

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

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As show in Figure 3 if a launcher program is available e.g. stored on the first peripheral device 130 or stored on the processing device 160, or retrievable from a remote location such as a URL on the Internet, or form a LAN server, this can launch the client software in step 328 automatically. Steps 321 to 327 and 329 and 330 are the same as steps 301 to  
20 307 and 309 and 310 of Figure 2.

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

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

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### **Sending data from the processing device to the base unit**

With reference to Figure 4 the audio data on the processing device 160 such as a computer, laptop, smartphone, PDA, tablet etc, the audio is sent over a port using generic drivers such as over a USB port 8 using the standard built- in generic audio driver such as UAC driver 7. On the first peripheral device 130, the audio packets are read from the generic port, e.g. USB port 11 by a dedicated audio device 14. These packets are then processed by any of a mixer a rate converter, an echo canceller, noise canceller or similar. Any of the mixing, rate conversion, echo cancelling, noise cancelling can be executed using an ALSA driver 18. The ALSA driver offers the packets to a dummy audio device 16 such as an audio scraper. In this audio device 16 the audio packets can be time stamped from the clock 15 that can be synchronized with clock 9 of the processing device 31. This information is then encoded in an encoder 17 and packetized in a packetizer 19] before being transferred to the communications network between the first peripheral device 130 and the base unit 100. The network can be a wireless network such as a WiFi or LiFi network. For this purpose a suitable transmitter 21 is provided in the first peripheral device 130. On the base unit 100 the audio information stream is recovered at a suitable communications interface such as the WiFi access point 22. The audio is then unpacked in an unpacker 23, decoded in a decoder 24 before being offered

30



to an audio mixer 28. In order to synchronise the audio and video streams these are both sent to a synchronizer 27 in which the two streams are synchronized and thus keep lip synchronization.

#### 5 **Sending data from the processing device to the base unit**

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

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

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

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

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

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

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

- (standard generic) drivers and the USB port. The first peripheral device 130 will then receive this data via firmware of the first peripheral device 130, where it will process, enhance, encode and/or encrypt the data and send it through the wireless link 127 to the Base Unit 100. The Base Unit 100 will receive the data via
- 5 firmware on the base unit 100, will decrypt, process, decode and/or enhance the data and forward it to the appropriate first peripheral device, which can be connected or attached to the Base Unit 100 through a serial connection such as USB, HDMI or other interface.
- 10 Such a meeting of multiple participants is shown schematically in Figure 6 with four processing devices 160 (160-1, 160-2, 160-3, 160-4) which can be laptops. Three of the processing devices (160-1, 160-2, 160-3) each are connected to a first peripheral device 130, e.g. by inserting in a USB connection. One processing device 160-4 can be the host of a Unified Communication (UC) call such as a Skype call or a Skype for Business call.
- 15 The first peripheral devices of two of the processing devices (160-1, 160-2) have completed connection to a WiFi connection with a base unit 100 and are sharing media to the main screen 126. The processing devices 160-3 and 160-4 are sharing the Unified Communication (UC) call such as the Skype call or a Skype for Business call.
- 20 Connected to the Base Unit 100 is or are any of the following:
- Webcam 91
  - A 4K touch screen 94
  - A camera 95, connected through USB or HDMI
  - A USB speakerphone 92
- 25 • USB microphone 96 and a speaker set 97 (connected through an audio jack, s/pdif, USB, HDMI, etc.)

The host processing device 160-4 has pre-installed UC client software. This software interacts with USB endpoints on the first peripheral device 130 connected to e.g. plugged

30 into the host. This type of client software will use speakerphone USB endpoints as a default audio device (e.g. microphone plus speaker). Embodiments of the present invention are in control of all audio or visual signals emitted from and injected in the processing device 160.

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

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

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

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

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

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

The ability to zoom into the content.

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

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

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

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

- 10 a) to use a generic driver of the OS 164 of the host processing device 160 and endpoints like mass storage or HID endpoints to allow transfer of data using client software running on the host processing device 160 without the host processing device 160 being aware that the final device is a functional device like a camera, touchscreen, microphone, loudspeaker, speakerphone etc. which is connected in or with the base unit 100.
- 15 b) to have an endpoint on the first peripheral device of a functional device connected with or in the base unit 100 which means that the host processing device 160 detects that it is connected to the functional device and interacts with it as if it were such a device.
- 20 c) to have an endpoint on the first peripheral device of a functional device connected with or in the base unit 100 which means that the host processing device 160 detects that it is connected to the functional device but client software needs to have the vendor specific drivers to be able to interact with the functional device.
- 25 d) to have an endpoint on the first peripheral device of a functional device connected with or in the base unit 100 which means that the host processing device 160 detects that it is connected to the functional device but pre-processing is made on the base unit 100 so that the processing device 160 can interact with the functional device. One method is to make a common endpoint on the first peripheral device so that the processing device can work with any functional device for which preprocessing exists in the base unit 100.

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

A generic driver allows the client software 70 to transfer data to and receive data from a

mass storage device 132 on the first peripheral device 130 via a USB interface 131. The client software 70 also has a USB endpoint 134 which can be a USB HID endpoint and if necessary a vendor specific endpoint. This endpoint 134 is the endpoint for the client software 70 for transmitting the data for the display 126 to the base unit 100 where the data can be image processed (blocks 124, 125 of Figure 1) before being transmitted to the group 90 e.g. via an HDMI connection or similar. Thus the HID endpoint 134 makes the HDMI display 126 and its audiovisual signals available to any processing device 160 with a first peripheral device attached thereto, when in a meeting room. However the display 126 is not exposed on the processing device 160, i.e. it is not presented as a display but as an HID endpoint. The videocam 91 can be exposed on the first peripheral device 130 as an endpoint (in a way as described for Figure 1), the video data being encoded e.g. in block 122 of Figure 1. Alternatively, as shown in Figure 6, the video data is encoded in the base unit 100 and is sent via the first peripheral device 130 to a driver 162 of the operating system 164 of the processing device 60 which exposes the encoded data from the videocam 91 on the processing device 160 and makes the video data available to the UC call, e.g. Skype™.

Data from the speakerphone 92 can be processed on the base unit 100 and/or on the first peripheral device 130 and can be mimicked to the processing device 160. The microphone of the speakerphone 92 generates a signal that is transmitted to the processing device 160 via a USB speakerphone endpoint 136 on the first peripheral device whereby any noise reduction or echo cancellation can be carried out in the base unit 100 as described with respect to Figure 1 (block 115). The microphone data is made available to the UC call as the speakerphone endpoint 136 is recognized by the processing device 160 as a speakerphone as if the speakerphone were plugged into the processing device 160. Also the microphone data is made available to all other users who have a processing device 10 with a connected first peripheral device. In this embodiment the speaker of the speakerphone has its USB endpoint 136 on the first peripheral device 130.

Figure 7 shows a similar configuration to that of Figure 6 except there are two USB endpoints 136 and 138 for a speakerphone and a speaker respectively. As previously, the HID endpoint 134 makes the HDMI display 126 available to any processing device 160 with a first peripheral device 130 attached thereto when in a meeting room for providing audiovisual signals to the display 16. However the display 126 is not exposed on the

processing device 160, i.e. it is not presented as a display but as an HID endpoint.

The two endpoints 136, 138 receive audio signals from two different sources. The sound from the UC call can be dealt with as described for Figure 6 via the speakerphone endpoint 136 and processing on the base unit. But if there is additional audio data which is not part of the UC call, this data is sent via the speaker endpoint 138. As there is no second peripheral device in the group 90 which is a standalone speaker, the base unit 100 mixes the audio signals for the speakerphone and the speaker before sending all audio data to the speaker of the speakerphone 92. If there were a separate speaker 97 in group 90, then the base unit 100 could send this audio data to the speaker. The result is that a virtual speaker has been exposed on the processing device 160.

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

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

In the embodiment of Figure 9, there is a group 90, base unit 100, first peripheral device 130 and processing device 160. There are two functional devices connected to or in the base unit 100, namely a display 126 and a touchscreen 99. The touch screen 99 has a touchscreen endpoint 139 in the first peripheral device 130. The processing device 160

recognises this endpoint and can interact with it if the base unit 100 is adapted to translate the co-ordinates of the touch to ones that can be used by the processing device 160, i.e. the OS 164 has the relevant driver 162. This driver can be downloaded if required. This embodiment requires that each processing device 160 in a meeting downloads or has  
5 installed the relevant driver 162 but the translation function of the base unit 100 can reduce the number of different drivers that might be required.

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

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

Figures 12 to 14 relate to embodiments of the present invention in which there are multiple users. First of all each participant in a meeting can make use of any of the



embodiments described in Figures 8 to 11. Thus the present invention provides multiuser solutions.

5 In Figure 12 the processing device 60' has no first peripheral device 130, e.g. none is available. In such a case client software 70' can be adapted to interact directly with base unit 100 over a wireless connection 127' and the client software 70' is adapted to provide any simulations, or translations as required to present the display device 126 to the processing unit 160' and to allow interaction therewith. The client software 70' can be adapted to simulate any of the embodiments described with respect to Figures 1 to 11  
10 without however using a first peripheral device 130. The client software 70' can simulate for example a UB interface of the type used in any of the embodiments of Figures 1 to 11. For the processing device 160, the methods described with respect to any of Figures 1 to 11 can be used.

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

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

In Figure 14 the processing device 60' has no first peripheral device 130, e.g. none is available. In such a case client software 70' can be adapted to interact directly with base unit 100 over a wireless connection 127' and the client software 70' is adapted to provide

any simulations, or translations as required to present the display device 126 to the processing unit 160' and to allow interaction therewith exactly as described with respect to Figure 13. However group 90 has a videocam 91 connected e.g. via a USB connection to the base unit 100. Processing device 160 can make use of any of the embodiments of  
5 Figures 1 to 11. The client software 70' of processing device 160' can be adapted to receive video data directly from the base unit 100.

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

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

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

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

What is claimed is:

1. A system for connecting a processing device to a functional device connected to or in a base unit of a communications network, the processing device having a memory, a display and an operating system, the system comprising :

a first peripheral device being adapted to be coupled to the processing device via a generic communications protocol, the base unit having a transmitter and the first peripheral device having a receiver and at least one fixed or a configurable endpoint of the functional device exposed on the first peripheral device;

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

2. The system of claim 1 wherein the functional device is any one or more of a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a video camera, a webcam.

3. The system of claim 1 wherein the at least one fixed or a configurable endpoint of the functional device exposed on the first peripheral device is one of a human interface device, a mass storage device, a composite device, a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a video camera, or a webcam.

4. The system of claim 1 further comprising means for encoding, optionally encrypting the data.

5. The system of claim 1 wherein the processing device is adapted to host a unified communication between two or more further processing devices.

6. The system of claim 5 wherein the first peripheral device is adapted to present a functional device to the unified communication between two or more processing devices.

7. The system of claim 1 adapted to expose the same type of functional device to the processing device as is connected to the Base Unit further comprising at least one driver for the functional device installed on the processing device.

5 8. The system of claim 1 wherein the functional device is a second peripheral device.

9. The system of claim 1 wherein the functional device is a data capturing device.

10 10. A method for connecting a processing device to a functional device connected to or in a base unit of a communications network, the processing device having a memory, a display and an operating system, the base unit having a transmitter and the first peripheral device having a receiver the method comprising :

15 coupling a first peripheral device being to the processing device via a generic communications protocol, providing at least one fixed or a configurable endpoint of the functional device exposed on the first peripheral device;  
transmitting data from the base unit and receiving the data at the first peripheral device over the communications network from the functional device to the processing device via the at least one fixed or configurable endpoint using the generic communications protocol  
20 for communication between the processing device and the first peripheral device.

11. The method of claim 10 wherein the functional device provides any one or more of a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a video camera, a webcam.

25 12. The method of claim 10 further comprising presenting the at least one fixed or a configurable endpoint of the functional device exposed on the first peripheral device as one of a human interface device, a mass storage device, a composite device, a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a  
30 video camera, or a webcam.

13. The method of claim 10 further comprising encoding, and/or optionally encrypting the data.

14. The method of claim 10 further comprising hosting a unified communication between two or more further processing devices on the processing device.

5 15. The method of claim 14 further comprising the first peripheral device presenting a functional device to the unified communication between two or more processing devices.

16. The method of claim 10 comprising exposing the same type of functional device to the processing device as is connected to the Base Unit and using at least one driver for the  
10 functional device installed on the processing device.

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

20 18. The peripheral device of claim 17 wherein the at least one fixed or a configurable endpoint of the functional device exposed on the first peripheral device is one of a human interface device, a mass storage device, a composite device, a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a video camera,  
25 or a webcam.

19. A computer program product for carrying out any of the method steps of claim 10 when executed on a processor.

30 20. A non-transitory signal storage means storing the computer program product of claim 19.

**Abstract**

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

15

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>				
<b>Filing Date:</b>				
<b>Title of Invention:</b>	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS			
<b>First Named Inventor/Applicant Name:</b>	Gauthier RENARD			
<b>Filer:</b>	Thomas J. Moore/Kaitlyn Miller			
<b>Attorney Docket Number:</b>	RENA3002/TJM/TL			
Filed as Large Entity				
<b>Filing Fees for Utility under 35 USC 111(a)</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
UTILITY APPLICATION FILING	1011	1	280	280
UTILITY SEARCH FEE	1111	1	600	600
UTILITY EXAMINATION FEE	1311	1	720	720
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
LATE FILING FEE FOR OATH OR DECLARATION	1051	1	140	140
<b>Petition:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				
<b>Miscellaneous:</b>				
			<b>Total in USD (\$)</b>	<b>1740</b>



## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	31368735
<b>Application Number:</b>	15858668
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	6421
<b>Title of Invention:</b>	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS
<b>First Named Inventor/Applicant Name:</b>	Gauthier RENARD
<b>Customer Number:</b>	23364
<b>Filer:</b>	Thomas J. Moore/Kaitlyn Miller
<b>Filer Authorized By:</b>	Thomas J. Moore
<b>Attorney Docket Number:</b>	RENA3002/TJM/TL
<b>Receipt Date:</b>	29-DEC-2017
<b>Filing Date:</b>	
<b>Time Stamp:</b>	16:11:43
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	\$1740
RAM confirmation Number	010218INTEFSW00004348020200
Deposit Account	020200
Authorized User	Kaitlyn Miller

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.17 (Patent application and reexamination processing fees)

37 CFR 1.19 (Document supply fees)

**File Listing:**

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	RENA3002_ADS_AIA.pdf	1822909	no	8
			4505181e76ceba462b1f5f0ed2ccb8096ef50ba7		
<b>Warnings:</b>					
<b>Information:</b>					
2	Transmittal of New Application	RENA3002_App_Transmittal.pdf	277221	no	2
			9e349962b7c5d27c7b3d5a0a905cbb3679a91957		
<b>Warnings:</b>					
<b>Information:</b>					
3	Fee Worksheet (SB06)	RENA3002_Fee_Transmittal.pdf	257055	no	2
			febd525d2bb161975ee836c43726519f1385ea85		
<b>Warnings:</b>					
<b>Information:</b>					
4	Drawings-only black and white line drawings	RENA3002_Drawings_filing.pdf	2686234	no	19
			e713cf84839a065239c1775f098387b5b41343dd		
<b>Warnings:</b>					
<b>Information:</b>					
5		RENA3002_Application_filing.pdf	361669	yes	38
			d0b09bb82dd26fa3c4a20f0c768f6609522dc680		
	<b>Multipart Description/PDF files in .zip description</b>				
		<b>Document Description</b>	<b>Start</b>	<b>End</b>	
		Specification	1	34	
		Claims	35	37	
		Abstract	38	38	

<b>Warnings:</b>					
<b>Information:</b>					
6	Fee Worksheet (SB06)	fee-info.pdf	36767	no	2
			b24b458f2ebfde40b201bc09012c66bd00499d3		
<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>				5441855	
<p><b>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.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b>  <b>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.</b></p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b>  <b>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.</b></p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b>  <b>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.</b></p>					

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	RENA3002/TJM/TL
		Application Number	
Title of Invention	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

**Secrecy Order 37 CFR 5.2:**

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

**Inventor Information:**

Inventor	1				Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Gauthier		RENARD		
Residence Information (Select One)    US Residency <input type="radio"/> Non US Residency    Active US Military Service					
City	Oudenaarde	Country of Residence <sup>i</sup>	BE		
Mailing Address of Inventor:					
Address 1	Broekstraat 282 bus 3				
Address 2					
City	Oudenaarde	State/Province			
Postal Code	B-9700	Country <sup>i</sup>	BE		
Inventor	2				Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Johan	Peter Frans	DEGRAEF		
Residence Information (Select One)    US Residency <input checked="" type="radio"/> Non US Residency    Active US Military Service					
City	Gent	Country of Residence <sup>i</sup>	BE		
Mailing Address of Inventor:					
Address 1	Twaalfkameren 45				
Address 2					
City	Gent	State/Province			
Postal Code	B-9000	Country <sup>i</sup>	BE		
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the <b>Add</b> button.					
					Add

**Correspondence Information:**

<b>Application Data Sheet 37 CFR 1.76</b>	Attorney Docket Number	RENA3002/TJM/TL
	Application Number	
Title of Invention	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS	

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

An Address is being provided for the correspondence information of this application.

Customer Number	23364		
Email Address	mail@baconthomas.com	<input type="button" value="Add Email"/>	<input type="button" value="Remove Email"/>

### Application Information:

Title of the Invention	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS		
Attorney Docket Number	RENA3002/TJM/TL	Small Entity Status Claimed	<input type="checkbox"/>
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	19	Suggested Figure for Publication (if any)	

### Filing By Reference:

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

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

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

### Publication Information:

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

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

### Representative Information:

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

Please Select One:	<input checked="" type="radio"/> Customer Number	US Patent Practitioner	<input type="radio"/> Limited Recognition (37 CFR 11.9)
Customer Number	23364		

<b>Application Data Sheet 37 CFR 1.76</b>	Attorney Docket Number	RENA3002/TJM/TL
	Application Number	
Title of Invention	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS	

### Domestic Benefit/National Stage Information:

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

When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	<input type="text"/>	<input type="button" value="Remove"/>
Application Number	Continuity Type	Prior Application Number
<input type="text"/>	<input type="text"/>	<input type="text"/>
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the <b>Add</b> button.		<input type="button" value="Add"/>

### Foreign Priority Information:

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

Application Number	Country <sup>i</sup>	Filing Date (YYYY-MM-DD)	Access Code <sup>i</sup> (if applicable)
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Additional Foreign Priority Data may be generated within this form by selecting the <b>Add</b> button.			<input type="button" value="Add"/>

### 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.

<b>Application Data Sheet 37 CFR 1.76</b>	Attorney Docket Number	RENA3002/TJM/TL
	Application Number	
Title of Invention	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS	

## Authorization or Opt-Out of Authorization to Permit Access:

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

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

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

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

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

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

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

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

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

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

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

<b>Application Data Sheet 37 CFR 1.76</b>	Attorney Docket Number	RENA3002/TJM/TL
	Application Number	
Title of Invention	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS	

## Applicant Information:

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

<b>Applicant</b>	1	<input type="button" value="Remove"/>
<p>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.</p>		
<input type="button" value="Clear"/>		
<input checked="" type="radio"/> 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:		
<div style="border: 1px solid black; height: 20px; width: 100%;"></div>		
Name of the Deceased or Legally Incapacitated Inventor: <input type="text"/>		
If the Applicant is an Organization check here. <input checked="" type="checkbox"/>		
Organization Name	BARCO NV	
<b>Mailing Address Information For Applicant:</b>		
Address 1	President Kennedypark 35	
Address 2		
City	Kortrijk	State/Province
Country	BE	Postal Code
Phone Number		Fax Number
Email Address		
Additional Applicant Data may be generated within this form by selecting the Add button. <input type="button" value="Add"/>		

## Assignee Information including Non-Applicant Assignee Information:

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



Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

<b>Application Data Sheet 37 CFR 1.76</b>	Attorney Docket Number	RENA3002/TJM/TL
	Application Number	
Title of Invention	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS	

<b>Assignee</b>	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.			
<input type="button" value="Remove"/>			
If the Assignee or Non-Applicant Assignee is an Organization check here. <input checked="" type="checkbox"/>			
Organization Name	BARCO NV		
<b>Mailing Address Information For Assignee including Non-Applicant Assignee:</b>			
Address 1	President Kennedypark 35		
Address 2			
City	Kortrijk	State/Province	
Country <sup>i</sup>	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. <input type="button" value="Add"/>			

**Signature:**

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

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

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

<b>Signature</b>	/Thomas J. Moore/		Date (YYYY-MM-DD)	2017-12-29	
First Name	THOMAS	Last Name	MOORE	Registration Number	28974
Additional Signature may be generated within this form by selecting the Add button. <input type="button" value="Add"/>					

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

<b>Application Data Sheet 37 CFR 1.76</b>	Attorney Docket Number	RENA3002/TJM/TL
	Application Number	
Title of Invention	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS	

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

## Privacy Act Statement

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

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

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent 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.

**PATENT APPLICATION FEE DETERMINATION RECORD**

Substitute for Form PTO-875

Application or Docket Number  
15/858,668

**APPLICATION AS FILED - PART I**

(Column 1) (Column 2)

FOR	NUMBER FILED	NUMBER EXTRA
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A
TOTAL CLAIMS (37 CFR 1.16(j))	20	minus 20 = *
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3	minus 3 = *
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).	
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))		

**SMALL ENTITY**

RATE(\$)	FEE(\$)
N/A	
N/A	
N/A	
TOTAL	

**OR OTHER THAN SMALL ENTITY**

RATE(\$)	FEE(\$)
N/A	300
N/A	660
N/A	760
x 100 =	0.00
x 460 =	0.00
	0.00
	0.00
TOTAL	1720

\* If the difference in column 1 is less than zero, enter "0" in column 2.

**APPLICATION AS AMENDED - PART II**

(Column 1) (Column 2) (Column 3)

AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total (37 CFR 1.16(i))	*	Minus	**	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=
	Application Size Fee (37 CFR 1.16(s))				
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					

**SMALL ENTITY**

RATE(\$)	ADDITIONAL FEE(\$)
x =	
x =	
TOTAL ADD'L FEE	

**OR OTHER THAN SMALL ENTITY**

RATE(\$)	ADDITIONAL FEE(\$)
x =	
x =	
TOTAL ADD'L FEE	

(Column 1) (Column 2) (Column 3)

AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total (37 CFR 1.16(i))	*	Minus	**	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=
	Application Size Fee (37 CFR 1.16(s))				
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					

**SMALL ENTITY**

RATE(\$)	ADDITIONAL FEE(\$)
x =	
x =	
TOTAL ADD'L FEE	

**OR OTHER THAN SMALL ENTITY**

RATE(\$)	ADDITIONAL FEE(\$)
x =	
x =	
TOTAL ADD'L FEE	

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Table with 7 columns: APPLICATION NUMBER, FILING or 371(c) DATE, GRP ART UNIT, FIL FEE REC'D, ATTY. DOCKET NO, TOT CLAIMS, IND CLAIMS. Row 1: 15/858,668, 12/29/2017, 2673, 1740, RENA3002/TJM/TL, 20, 3

CONFIRMATION NO. 6421

FILING RECEIPT

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



Date Mailed: 01/25/2018

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)

Gauthier RENARD, Oudenaarde, BELGIUM;
Johan Peter Frans DEGRAEF, Gent, BELGIUM;

Applicant(s)

BARCO NV, Kortrijk, BELGIUM;

Assignment For Published Patent Application

BARCO NV, Kortrijk, BELGIUM

Power of Attorney: None

Domestic Applications for which benefit is claimed - None.

A proper domestic benefit claim must be provided in an Application Data Sheet in order to constitute a claim for domestic benefit. See 37 CFR 1.76 and 1.78.

Foreign Applications for which priority is claimed (You may be eligible to benefit from the Patent Prosecution Highway program at the USPTO. Please see http://www.uspto.gov for more information.) - None.

Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

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Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

**If Required, Foreign Filing License Granted:** 01/24/2018

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/858,668**

**Projected Publication Date:** 07/04/2019

**Non-Publication Request:** No

**Early Publication Request:** No

**Title**

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

**Preliminary Class**

358

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

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Table with 4 columns: APPLICATION NUMBER (15/858,668), FILING OR 371(C) DATE (12/29/2017), FIRST NAMED APPLICANT (Gauthier RENARD), ATTY. DOCKET NO./TITLE (RENA3002/TJM/TL)

CONFIRMATION NO. 6421

INFORMAL NOTICE



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625 SLATERS LANE
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ALEXANDRIA, VA 22314-1176

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- A properly executed inventor's oath or declaration has not been received for the following inventor(s):
Gauthier RENARD
Johan Peter Frans DEGRAEF

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/afessehaye/



<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	15858668
	Filing Date	2017-12-29
	First Named Inventor	Gauthier RENARD
	Art Unit	TBA
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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		15858668
	Filing Date		2017-12-29
	First Named Inventor	Gauthier RENARD	
	Art Unit		TBA
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	Attorney Docket Number		RENA3002/TJM/TL

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**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number		15858668
Filing Date		2017-12-29
First Named Inventor	Gauthier RENARD	
Art Unit	TBA	
Examiner Name	TBA	
Attorney Docket Number	RENA3002/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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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)	2018-03-28
Name/Print	THOMAS J. MOORE	Registration Number	28974

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- (51) International Patent Classification:  
H04N 7/15 (2006.01)
- (21) International Application Number:  
PCT/EP2012/068167
- (22) International Filing Date:  
14 September 2012 (14.09.2012)
- (25) Filing Language: English
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- (30) Priority Data:  
61/534,592 14 September 2011 (14.09.2011) US  
13/270,659 11 October 2011 (11.10.2011) US  
61/635,234 18 April 2012 (18.04.2012) US
- (71) Applicant (for all designated States except US): BARCO N.V. [BE/BE]; Pres. Kennedypark 35, B-Kortrijk 8500 (BE).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): BEEL, Koen Simon Herman [BE/BE]; Gemete 19, B-9080 Lochristi (BE).

- NIR, Yoav [BE/BE]; Lentedreef 21, B-8930 Rekkem (BE). LOUWET, Filip Josephine Johan [BE/BE]; Nieuwstraat 20, B-9910 Knesselare (BE). COEN, Guy [BE/BE]; Louis Camustraaf 25, B-9300 Aalst (BE).
- (74) Agent: MICHALSKI HÜTTERMANN & PARTNER; PATENTANWÄLTE, Neuer Zollhof 2, 40221 Düsseldorf (DE).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

[Continued on next page]

(54) Title: ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS

WO 2013/037980 A2

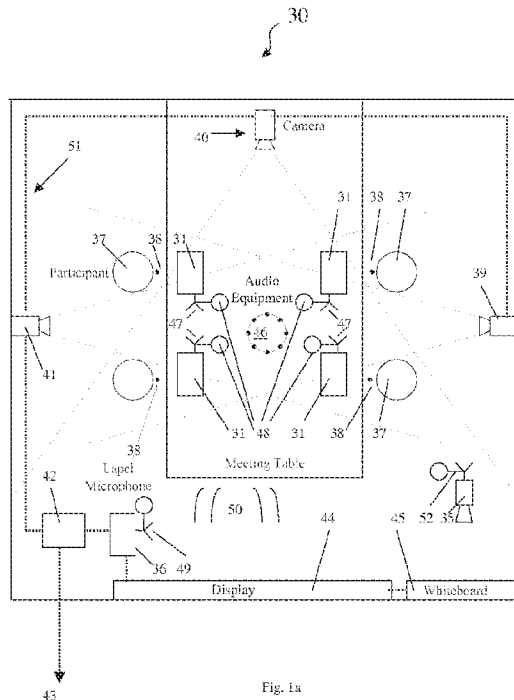


Fig. 1a

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



(84) **Designated States** (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK,

SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**

— without international search report and to be republished upon receipt of that report (Rule 48.2(g))

## ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS

The present invention relates to electronic tools for meetings with audio including methods or devices for providing connection to a communications network, to  
5 networks or methods of operating the network, methods or devices for use in displaying media content with audio as well as software for performing any of these methods.

### Technical background

10

#### Tools for collaboration

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

20

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

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

Collaborative workspaces in corporate networks and on the Internet offer geographically distributed collaborators a virtual repository for documents related to a

project or a meeting. Electronic meeting support systems, such as interactive network-connect whiteboard and videoconferencing appliances, are available for the benefit of those who share the same room as well as those who are in remote locations.

- 5 The AMIDA Final Public Report describes the overall methodology behind the development of meeting support technologies. It reports that numerous studies confirm that meetings dominate the way people work. Namely, according to a study conducted by MCI Worldcom in 2003 a business person participates in 60 meetings per month. People meet in groups for a multitude of reasons. They interact in numerous
- 10 predictable and unpredictable ways and the results of their interactions are as varied as the people who participate and the projects on which they are collaborating or communicating. Studies of business processes also reveal that approximately 80% of the “workload” associated with a project or process happens in preparation for a meeting. In other words, many people view the “live” meeting as a milestone or
- 15 deadline by which they can pace and measure their productivity and that of their colleagues. Unfortunately, for many information managers, being in perpetual meetings has reduced their ability to prepare adequately for the next meeting, perpetuating a vicious and negative cycle.
- 20 However, Marc Al-Hames et al. report in “Audio-Visual Processing in Meetings: Seven Questions and Current AMI Answers”, that although large parts of working days are consumed by meetings and conferences, unfortunately a lot of them are neither efficient, nor especially successful. They report a study in which people were asked to select emotion terms that they thought would be frequently experienced in a
- 25 meeting. The top answer – mentioned from more than two third of the participants – was “boring”; furthermore nearly one third mentioned “annoyed” as a frequently perceived emotion.

The conclusion is that despite the plethora of electronic aids to meetings, fundamental

30 problems in handling meetings have not been solved. In fact organising and conducting meetings in a business context involves a large number of factors.

Participation



A lack of efficiency of meetings is addressed in the article "Mood indicators on electronic meeting tools" IBM, IP.com number: IPCOM000011711D, Publication Date: March 12, 2003. This article addresses the issue that the lack of direct feedback makes meetings clumsy, inefficient and often unproductive. It proposes a "mood indicator" as well as an "I want to ask a question" indicator which allow the presenter to choose an appropriate moment to pause, change track or field a question. It is argued that interrupting a presenter in full flow can be awkward; however, sometimes it is difficult to get an opportunity to ask a question or make a comment when many different people are trying to make their voices heard. In a similar vein, US6966035 suggests displaying a "murmur frame" for a participant to express a view. To increase user participation, US 2010/0087139 discloses a system for sending a selection to another computer, and US 2006/0095376 discloses a system for secure voting. Commenting, voting or selecting requires that a central authority provides the information that is to be selected or commented or voted on. Hence, these proposals still leave a central figure such as the presenter in a dominating position and the other members of the meeting are largely an audience with limited selection or voting or participation rights.

A further problem with meetings is that someone is usually late or has to leave early. With the person arriving late one has to decide if the meeting is interrupted and a summary of the proceedings so far is given. For the person leaving early (often a senior person), subsequent discussions can go missing. If there is a notes taker, this provides a personal summary of the meeting – but not an objective one.

Presents systems do not provide an optimal solution.

#### Legal and security issues

A legal requirement of a meeting is that presentations, comments and submissions need to be completely reproducible – in some circumstances, e.g. in a share holders' meeting, the events in the meeting should be subject to total recall. Computer-supported collaborative work technologies, particularly those which capture human verbal and non-verbal communications (audio and video interaction) in addition to text and graphics generated during a meeting, promise to have a long term impact on how

people will prepare for and behave during and following meetings. In addition, connecting to a network brings the danger of virus, malware or spyware transfer in either direction, and there is danger of copying of confidential information.

## 5 Practical Difficulties

### Scalability and ease of use

There are even more fundamental problems with using electronic tools in meetings. If two persons want to make two presentations then usually either both presentations must be placed on one machine or there is a need to swap between the presenters' machines. To bring the display content of a computer to a projector, the most common ways are to use a cable that connects the display adapter of the graphics card to the video input of the projector [method 1] or to use a software that captures the display contents and sends it over a wired or wireless network to a remote base unit connected to the projector [method 2]. This is often called "remote desktop" and is mostly used for remote administration or remote IT assistance purposes.

Less common but also practiced methods are to use a special device connected to the display adapter of the graphics card, that captures, encodes and streams the display content over a wired or wireless network [method 3].

Method 1 has several practical problems and disadvantages. In meetings where people want to contribute content from their own computers, e.g. to project images on a display, typically a video cable such as a VGA cable is used to connect each PC one at a time to the projector. This is not only not scalable but also can be and often is quite a cumbersome process that typically wastes valuable meeting time and takes the dynamism out of the meeting. Connection can be made more difficult and time consuming for example if the computer has to be rebooted for it to detect the projector or when the format of the PC differs from the format of the projector. In addition changing format can leave the computer with a new format that is not compatible with its own screen so that on reboot of the PC alone, nothing is displayed on the computer screen. Without a visible screen image the necessary re-configuration can be difficult. These issues are aggravated by a number of elements:

- The use of many different video adapters, such as VGA, DVI, DP, HDMI, ...
  - Reach depends on cable length: too long leaves a tangled cable “salad” in the meeting room, too short reduces flexibility, often necessitating people to move around in the meeting room when they want to present something.
- 5
- Cable connection is either point to point or requires tedious and extensive cabling and the use of complex and expensive video switches.
  - It is often difficult and time consuming to find the right display resolution and refresh rate that both the computer and the display or projector support.

10 Method 2 also has many drawbacks. If the connection is made to a corporate LAN there is a danger of virus, malware or spyware transfer in either direction, there is danger of copying of confidential information, and there is the difficulty of making the connection, e.g. entry of a user code and password, as well the administration of such passwords and user codes.

15

The advantage of method 3 is that the computer does not need to use its own processing power to bring the display content in a form that is easily transported over a network. This advantage becomes less relevant as computers grow in processing power. A drawback of method 3 is that the same problems often encountered with

20 method 1 of connecting to the display adapter remain. Another drawback is that the special device referred to requires significant processing power, which means that this device will consume much power, be relatively big and certainly be relatively expensive.

25 An alternative method in the making today is to use the well known USB interface of the computer for extracting the display content of the computer. US 2009/0198839 discloses such a pluggable cable arrangement. US 2011/0115689 discloses a similar USB solution for wireless connection to a projector. Accordingly connecting a projector to a computer using the standard USB port might become commonplace with

30 time. However, this usually requires special drivers and even special hardware. Connecting a projector to a computer using the standard USB port hence might become commonplace – but even when that happens there will be a mix of new and legacy machines for several years.

### Firewalls

Additional problems can occur with firewalls. Typically a visitor to a meeting will bring a computer such as a laptop that is set up for a different corporate networking environment and hence has different or incompatible networking settings. The setting  
5 up of a firewall can be complicated and if this is not done correctly, telecommunication software that has to pass through a firewall may be blocked. In order to solve problems associated with firewalls it may be necessary to open ports or identify or even add programs in an exception list. If, besides a network (hardware)  
10 firewall and an operating system firewall, there is any software based third-party firewall like ZoneAlarm, CA Internet Security Suite or McAfee Firewall, then it is necessary to follow that software developer's documentation to place programs on a safe list or adding exceptions to the firewall rules. Such activity is beyond the usual user. Fussing with computer settings, or having to call for IT support wastes valuable  
15 meeting time and takes the dynamism out of the meeting.

### Audio

Software based systems for presentations typically rely on specific software drivers to be installed on the client PC. An example of this is Soundflower on Apple Mac OS/X.  
20 In case the built-in generic audio driver is used, it is hard to guarantee that the audio will work on any given hardware, considering the large variety of sound cards in PC's.

### Conclusion

The following problems remain for holding a face-to-face meeting using advanced  
25 electronic tools at the present time:

- Complexity of the networking infrastructure.
- High demands on technical expertise of users in current systems that are supposed to be designed to support everyday use by the non-expert user.
- Barriers to the use of complicated technology in meetings.
- 30 - Great variety of possible collaborative software solutions – none of which seems to solve the fundamental problems of holding successful meetings.
- Meetings being boring or annoying for members of the meeting.
- Complexity of firewalls and other security measures employed in corporate

networks.

- Lack of, or restriction of participation by members of a meeting.
  - Time taken to prepare presentations for meetings.
  - Need to record events in the proper time sequence at meetings without
- 5       burdening a meeting more than necessary.
- Lack of standards for audio
  - Need to install proprietary drivers for audio
  - Large number of different, non-standardised sound cards in use

Although some tools solve some of these problems effectively, no electronic meeting  
10    tool solves all of them.

#### Summary of the invention

An object of the present invention is to provide network solutions including electronic  
tools with audio for meetings as well as devices for providing connection to a  
15    communications network, to methods of operating the network, methods of displaying  
media content with audio as well as software for performing any of these methods or  
for implementing such systems.

In one aspect the present invention relates to a method for capturing audio for use in  
20    presentation systems e.g. at meetings. A wireless network may be used to connect a  
processing device such as a laptop, personal computer, PDA, smartphone etc to a  
display device, e.g. via a projector. The present invention addresses the problems  
caused by the many different audio cards in use for commercial PC's, a lack of a  
standard way for capturing audio that works on all PC platforms (Windows, Mac,  
25    Linux, Android) and the need for synchronization of the captured audio with the  
captured video to provide lip synchronization.

The present invention provides in embodiments a method and a system for connecting  
a processing device, e.g. a digital processing device such as a laptop, smartphone,  
30    PDA, computer, tablet and suchlike 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 and/or

system are adapted for:

- a) coupling a peripheral device to the processing device, the peripheral device having a transceiver;
- 5 b) setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;
- c) coupling the processing device to a communications network via the peripheral device;
- d) routing audio data between the processing device and the communication network
- 10 via the means for communication, wherein the generic communication protocol is used for transferring the audio data between the processing device and the peripheral device.

In particular the method and/or system can be adapted for:

- 15 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
- 20 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
- 25 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.

In an embodiment audio data is captured through a virtual sound card interface added

30 as a logical device over the physical interface provided in the peripheral device. On the processing device only a generic sound driver such as a USB sound driver is required which is generally standard on any modern processing devices such as a PC (UAC1 or UAC2).

In an aspect the present invention provides an electronic meeting tool for communicating arbitrary media content from users at a meeting comprising:  
a node configuration means adapted to operate a display node of a communications  
5 network, the display node being coupled to a first display, the node configuration means being adapted to receive user selected arbitrary media content and to control display of the user selected arbitrary media content on the first display; and  
at least one peripheral device adapted to communicate the user selected arbitrary media content via the communications network, wherein the peripheral device is a  
10 connection unit comprising:

- (a) a connector adapted to couple to a port of a processing device having a second display, a memory and an operating system; and
- (b) a transmitter for communicating with the communications network,

15 a program adapted to be loaded onto the processing device and to run on the operating system of the processing device, said program being adapted to obtain user selected arbitrary media content, said program leaving a zero footprint on termination, and an input device to allow the user to carry out a user action that triggers transfer of said  
20 user selected arbitrary media content to said transmitter through said port.

Obtaining user selected arbitrary media content is preferably not obtained by application sharing but by the process of screen scrapping. Although software packages that provide screen scraping require installation on the target device, or at  
25 least require the installation of dedicated and/or custom drivers, embodiments of the present invention use software stored on the peripheral device which allows screen scraping when run on the processing device but leaves a zero footprint when terminated. Embodiments of the present invention can screen scrape full HD videos at  
30 20fps without requiring any installation of a program on the processing device nor requiring configuring the processing device such as a PC that they run on for the connectivity to the network hence meeting "zero footprint" operational requirements.

The program adapted to be loaded onto the processing device and to run on the

operating system of the processing device and being adapted to obtain user selected arbitrary media content can be stored on the peripheral device. The transmitter can be a wireless transmitter or transceiver. The peripheral device can be a plug-and-play device. The program can adapted to screen scrape content of the second display.

5

The input device can be physical actuator coupled to the peripheral device. The physical actuator preferably has a surface area of between 100 and 14,400 square mm. Alternatively, the input device can be a key displayed on the second display. The key displayed on the second display can be one not screen scraped by the program.

10

On the peripheral device a mass storage device is provided that stores the software to be run on the processing device. The mass storage device can be logically closed once the software has been read and loaded and is running from RAM in the processing device. Also provided on the peripheral device is a further device such as an HID (human interface device) to capture user input and provide user feedback. In embodiments of the present invention, the peripheral device contains multiple internal logical devices that are combined:

15

An HID (human interface device) used for capturing user input (e.g. following a user action such as pressing or activating a button) and providing user feedback, e.g. by an optical indicator such as a light ring around the button e.g. an LED ring, for streaming the screen scraped video content to the network and hence to a base unit and a display,

20

A mass storage device used to store the application, and optionally

An audio device that acts as a virtual sound card to a client PC over USB, using a generic driver such as a UAC1 or UAC2 device driver.

25

Embodiments of the present invention are not limited to application sharing but make use of screen scraping which is able to capture all material in a neutral manner rather than being limited by proprietary applications. Further the screen scraper application is zero footprint on termination rather than being fully installed on the processing device. Embodiments of the present invention can provide arbitrary "full content" to the meeting room and participants can display in real-time,

30

The real-time content is shown on a central display rather than being broadcast to



individual participants or archived.

Embodiments of the present invention "auto compose" arbitrary user data on a central display or screen so that full real-time content that is provided by multiple meeting participants who intentionally share this content in order to make the meeting more effective and efficient,

Embodiments of the present invention implement a principle of "democratic screen sharing", in which the meeting participants decide themselves on a peer-to-peer basis which content to share when and where. In particular in some embodiments a participant can obtain unilateral access to the display device, i.e. without agreement of other participants. Peer-to-peer data sharing differs from systems in which the content to be displayed is determined by a presenter or meeting director. The user determines where his content is routed to and can do so without any software configuration on the user processing device.

In another aspect the present invention provides a method for connecting a processing device to a communications network, the processing device having a memory, a display and an operating system with at least one pre-installed generic driver providing a generic communications protocol for communication between processing device and a standard class of peripheral devices, the method comprising the steps of:

a) coupling a peripheral device to the processing device, the peripheral device having a transceiver;

b) setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;

c) coupling the processing device to a communications network via the peripheral device;

d) routing screen scraped data between the processing device and the communication network via the means for communication, wherein the generic communication protocol is used for transferring the screen scraped data between the processing device and the peripheral device.

The routing of the screen scraped data can be to a defined network node such as a display node without user entry of configuration details. Thus the routing can be

dedicated to a specific network node such as a display node, base station etc. This is achieved by pairing of the peripheral device to the relevant node before the communication starts.

5 In accordance with embodiments of the present invention users start an application from the peripheral device such as a USB dongle, thus making the connection in a 3 step process: (1) connect, e.g. plug in the peripheral device to the processing device, (2) start the screen scraping application, (3) perform a user action such as click on a button on the peripheral device to go allow content to be displayed on the central  
10 screen or display. To achieve step 2 Autorun or AutoPlay can be used with some Windows operating systems, but there are many different variants based on the OS version and which patches have been installed. Furthermore, this mechanism is generally considered a security hazard, which is why most IT departments will disable Autorun/AutoPlay. Other OS providers have disabled this function, e.g. Apple  
15 removed a similar functionality entirely from its OS/X since Snow Leopard.

In an embodiment of the present invention a very small service - also called daemon on some OS's -- is provided that requires installation on the processing device such as a laptop. This service is pre-installed on the processing device. The installation is  
20 required only once on every processing device such as a laptop. The role of this is to provide a permanently running service which continuously monitors if a peripheral device according to the present invention has been offered up for connection to the processing device. When such a peripheral device is connected, the service will detect this and start the client application software residing in the mass storage area of the  
25 peripheral device. Once the service is installed, connectivity with the peripheral device becomes a 2 step process: connect, e.g. plug in the peripheral device to the processing device, (2) perform a user action such as click on a button on the peripheral device to allow content to be displayed on the central screen or display. The application loaded from the processing device still leaves a zero footprint on termination

30

Step b) can comprise presenting the peripheral device to the processing device as a human interface device (e.g. a USB HID) and wherein the pre-installed generic driver is a human interface device driver (e.g. USB HID driver).

Alternatively or additionally step b) can comprise presenting the peripheral device to the processing device as a mass storage device and wherein the pre-installed generic driver is a mass storage device driver.

5

Alternatively, or additionally step b) comprises presenting the peripheral device to the processing device as a composite device (e.g. USB composite device) and wherein pre-installed generic drivers drive different device interfaces independently.

10 A client application can be stored on the peripheral device which when run on the processing device obtains the screen scraped data. Such a client application can be a portable application and can leave a zero footprint on termination.

In another aspect the present invention provides a peripheral device for providing  
15 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,  
20 said executable software code comprising:

a first software code portion for setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;

25 a second software code portion for connecting the processing device to a communications network via the peripheral device, the peripheral device having a transceiver;

a third software code portion for screen scraping data from the processing device; and  
a fourth software code for routing screen scraped data between the processing device and the communications network over the means for communication; wherein the first  
30 software code portion is adapted to use the generic communication protocol for transferring the screen scraped data between the processing device and the peripheral device.

The first software code portion can be adapted to present the peripheral device to the processing device as a human interface device and wherein the pre-installed generic driver is a human interface device driver. The first software code portion can be adapted to present the peripheral device to the processing device as a mass storage device and wherein the pre-installed generic driver is a mass storage device driver.  
5 The first software code portion can be adapted to present the peripheral device to the processing device as a composite device and wherein pre-installed generic drivers drive different device interfaces independently.

10 The executable software code can comprise fifth code for providing a means for connecting to the communications network including a base node. The third code can comprise means for capturing video frame buffers of the processing device.

The executable software code can comprise sixth code for providing a means for encoding, compressing and optionally encrypting the screen scraped data and sending the screen scraped data the communication network. The executable software code can comprise seventh code for providing a means for handling the peripheral device. The executable software code can comprise eighth code for providing means for initiating connection to the base node. The executable software code can comprise ninth code  
20 for receiving inputs from an input device on the peripheral device. The executable software code can comprise tenth code for providing a means for sending state changes to the visual indicator on the peripheral device. The executable software code can comprise eleventh code for providing a means for presenting to the user a GUI. The executable software code can comprise twelfth code for presenting a GUI for  
25 administration of the said executable software code when executed as a portable application. The executable software code can comprise thirteenth code for providing a means for displaying and activating a key on the display of the client processing device for allowing a user to input the start the transfer of data from the processing device to the base node.

30

In another aspect the present invention provides a peripheral device for providing communication connectivity to a processing device which is provided with memory, a display and an operating system with at least one pre-installed generic driver providing

a generic communication protocol for communication between the processing device and a standard class of peripheral devices, the peripheral device comprising a memory in which executable software code is stored for execution on the processing device, said executable software code comprising:

5 a first software code portion for setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;

a second software code portion for connecting the processing device to a communications network via the peripheral device, the peripheral device having a

10 transceiver; and

a third processing software code for routing data between the processing device and the communications network over the means for communication; wherein the first software code portion is adapted to use the generic communication protocol for transferring the data between the processing device and the peripheral device, and

15 an input device coupled to the peripheral device, the input device being adapted to react to a user action to trigger the transfer of the data from the processing device to the peripheral device.

The first software code portion can be adapted to present the peripheral device to the

20 processing device as a human interface device and wherein the pre-installed generic driver is a human interface device driver. The first software code portion can be adapted to present the peripheral device to the processing device as a mass storage device and wherein the pre-installed generic driver is a mass storage device driver.

The first software code portion can be adapted to present the peripheral device to the

25 processing device as a composite device and wherein pre-installed generic drivers drive different device interfaces independently.

The input device is preferably a physical actuator coupled to the peripheral device. The physical actuator preferably has a surface area of between 100 and 14,400 square

30 mm. The input device can be for example a key for display on the display. The executable software code can comprise fourth code for providing a means for connecting to the communications network including a base node. The executable software code can comprise fifth code for providing a means for capturing video frame

buffers of the processing device. The executable software code can comprise sixth code for providing a means for encoding, compressing and optionally encrypting the video frames and sending them over a secure link to the base node. The executable software code can comprise seventh code for providing a means for handling the peripheral device. The executable software code can comprise eighth code for providing a means for initiating connection to the base node. The executable software code can comprises ninth code for receive inputs from an input device on the peripheral device. The executable software code can comprise tenth code for providing a means for sending state changes to the visual indicator on the peripheral device. The executable software code can comprise eleventh code for providing a means for presenting the user a GUI. The executable software code can comprise twelfth code for presenting GUI for administration of the executable software code when executed as a portable application. The executable software code can comprise thirteenth code for providing a means for displaying and activating a key on the display of the processing device for allowing a user input to start the transfer of data from the processing device to the base node.

In another aspect of the invention a peripheral device is provided for providing communication connectivity to a processing device which is provided with memory, a display and an operating system with at least one pre-installed generic driver providing a generic communication protocol for communication between the processing device and a standard class of peripheral devices, the peripheral device comprising a memory in which executable software code is stored for execution on the processing device, said executable software code comprising:

- 25 a first software code portion for setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;
- a second software code portion for connecting the processing device to a communications network via the peripheral device, the peripheral device having a
- 30 transceiver;
- a third software code portion for receiving media content from the network and for displaying the media content on the display in accordance with a set of rules; wherein the first software code portion is adapted to use the generic communication protocol

for transferring the media content between the peripheral device and the processing device.

The executable software code can comprise fourth code for providing a means for  
5 correctly configuring a receiver as an access point. The executable software code can  
comprise fifth code for providing a means for listening for output of connection units  
trying to connect on a specific port. The executable software code can comprise sixth  
code for providing a means for a GUI for administration purposes. The executable  
software code can comprise seventh code for providing a means for publishing its  
10 presence over the network using the zeroconf protocol. The executable software code  
can comprise eighth code for providing a means for accepting and installing software  
updates. The executable software code can comprise ninth code for providing a means  
for providing facilities for pairing of connection units to the processing device. The  
executable software code can comprise tenth code for providing a means for auto-  
15 composing of different incoming arbitrary media streams and rendering of composited  
image on display. The executable software code can comprise eleventh code for  
providing a means for receiving, decrypting and decoding incoming arbitrary media  
content. The executable software code can comprise twelfth code for scaling of  
incoming arbitrary media streams. The executable software code can comprise  
20 thirteenth code for providing a means for displaying incoming arbitrary media content  
in accordance with a set of rules.

The present invention also provides a method for communicating arbitrary media  
content from users at a meeting comprising:

25 operating a display node of a communications network, the display node being  
coupled to a first display, to receive user selected arbitrary media content and to  
control display of the user selected arbitrary media content on the first display; and  
connecting a peripheral device to a port of a processing device and communicating the  
user selected arbitrary media content via the communications network,  
30 loading a program onto the processing device and running the program on the  
operating system of the processing device to obtain user selected arbitrary media  
content, said program leaving a zero footprint on termination, and  
triggering transfer of said user selected arbitrary media content to said transmitter

through said port after a user action on an input device.

The present invention also provides a peripheral device comprising:

a base

- 5 a connector for connection to a plug and play port of a host processing device,  
a flexible connection between the base and the connector for transferring data signals  
and power,  
an actuator on the base for actuating a signal and for transferring the signal to the  
connector for transfer to the port, wherein the base has electronics comprising  
10 permanent storage for storing a portable application, a processing engine, a transceiver  
and a visual indicator.

The present invention also provides a method for providing communication  
connectivity from a processing device,

- 15 setting up a communications network between a base node of the communications  
network and a peripheral device coupled to the processing device;  
transferring media content between the processing device and the peripheral device,  
transmitting the media content from the peripheral device to the communications  
network,  
20 receiving media content from the communications network at the base node and  
displaying the media content on a display in accordance with a set of rules.

Any of the above software code stored on a non-transitory storage medium.

## 25 Definitions

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



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

5

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

10

A plug and play device has auto-configuration software by default to make it plug and play. Example: USB devices are made to be plug and play by including the correct auto-configuration software (e.g. host driver, host stack, application software).

Autoconfiguration can also refer to a software alone and is not restricted to a physical device.

15

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

20

A "portable application" (portable app), sometimes also called standalone, is a computer software program designed to run without installation on the target machine. This type of application is stored on a removable storage device such as a CD, USB flash drive, flash card, or floppy disk – storing its program files, configuration information and data on the storage medium alone. It is a program that can be stored on an electronic device such as a USB flash drive, iPod, memory card, portable hard drive or other portable electronic device and runs on a computer or other processing device coupled to the electronic device without making permanent configuration

25

30

changes to the host computer. All such programs have a zero-footprint, meaning all temporary files, registry entries, and any other changes to the machine exist only while the program is running.

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

Not require any kind of formal installation onto a computer's permanent storage device to be executed, and can be stored on a removable storage device such as USB flash drive, iPod, memory card, portable hard drive or other portable electronic storage  
10 device thus enabling it to be used on multiple computers.

Settings are stored with, and can be preferably carried around with, the software (i.e., they are written to the electronic device such as a USB drive). Settings are not stored to the registry or any other central system database of the computer.

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

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

30

"Electronic meeting systems" (EMS) need to be distinguished on the one hand from classic groupware, on the other from web conferencing systems. In reality, there is some overlap between minor features of products of the named categories. The main

difference from groupware is the intensity of collaboration. EMS should be distinguished from systems with which it is possible to show the contents of an individual computer screen on a remote display with multiple users at the same time.

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

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

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

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

same time.

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

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

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

20 “Wireless” and “wireless communication network” can be any network that does not use cable links between nodes, e.g. uses RF, optical or InfraRed for communication purposes, such as IrDA, diffuse infra-red, WLAN, WiMax, WiFi, WiFi Direct, Bluetooth or any other wireless communication network known to the person skilled in the art such as optical networks like LiFi.

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

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

#### Brief Descriptions of the drawings

Fig. 1a shows a meeting room that can be used with embodiments of the present invention. Fig. 1b shows a combination of a client processing device, a connection unit, a base node and a display in accordance with an embodiment of the present invention.

Fig 2 shows a screen display in accordance with an embodiment of the present invention.

Figs. 3 to 5 show a base node and a peripheral device and a client processing device in accordance with embodiments of the present invention.

Fig 6 shows a display in accordance with an embodiment of the present invention.

Fig. 7 shows a peripheral device in accordance with an embodiment of the present invention.

Fig. 8 shows a client processing device in accordance with an embodiment of the present invention.

Fig. 9 shows a further client processing device in accordance with an embodiment of the present invention.

Fig. 10 shows an embodiment of a peripheral device in accordance with an embodiment of the present invention.

Fig. 11 is a schematic representation of a communications system for presentations in which audio has been integrated in accordance with an embodiment of the present invention.

### Detailed Description of the Embodiments of the present Invention

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

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

Moreover, the terms top, bottom, over, under and the like in the description and the claims are used for descriptive purposes and not necessarily for describing relative  
15 positions. The terms so used are interchangeable under appropriate circumstances and the embodiments of the invention described herein can operate in other orientations than described or illustrated herein.

The term "comprising", used in the claims, should not be interpreted as being  
20 restricted to the means listed thereafter; it does not exclude other elements or steps. It needs to be interpreted as specifying the presence of the stated features, integers, steps or components as referred to, but does not preclude the presence or addition of one or more other features, integers, steps or components, or groups thereof. Thus, the scope of the expression "a device comprising means A and B" should not be limited to  
25 devices consisting only of components A and B. It means that with respect to the present invention, the only relevant components of the device are A and B.

Similarly, it is to be noticed that the term "coupled", also used in the description or claims, should not be interpreted as being restricted to direct connections only. Thus,  
30 the scope of the expression "a device A coupled to a device B" should not be limited to devices or systems wherein an output of device A is directly connected to an input of device B. It means that there exists a path between an output of A and an input of B which may be a path including other devices or means.

Elements or parts of the described devices may comprise logic encoded in media for performing any kind of information processing. Logic may comprise software encoded in a disk or other computer-readable medium and/or instructions encoded in an  
5 application specific integrated circuit (ASIC), field programmable gate array (FPGA), or other processor or hardware.

References to software can encompass any type of programs in any language executable directly or indirectly by a processor.

10

References to logic, hardware, processor or circuitry can encompass any kind of logic or analog circuitry, integrated to any degree, and not limited to general purpose processors, digital signal processors, ASICs, FPGAs, discrete components or transistor logic gates and so on.

15

Embodiments of the present invention provide solutions to three major problems with meetings:

a) the time taken to prepare for a meeting. This is mainly achieved by allowing “on-the-fly” presentation of any displayable information. This information does not  
20 have to be linked into any particular presentation software, nor to be compatible with any such presentation software,

b) the time taken to conduct the meeting using electronic meeting tools. This is achieved by reducing the time to connect computers to the display or projection  
25 system.

c) the time taken to reflect and review and document the meeting afterwards. This is achieved by providing the possibility of recording the course of the meeting in the same time sequence that it was carried out as well as be able to store all data presented and who presented it.

30

Fig. 1a is a schematic representation of a generic meeting room 30 with a meeting table that can be used with embodiments of the present invention. Participants 37 having some form of processing device 31 such as a laptop computer, a tablet, a PDA

etc. Each of the processing devices 31 can be a host device and has a first connection unit 47 to which it is coupled. The first connection unit 47 provides access to a network 50 which in this case is a wireless network, but could be a wired network. Each connection unit 47 may be coupled to an input device 48 which will be described in more detail later. A user 37 will typically at a distance from the processing device 37 which is ergonomically satisfactory. This ergonomic boundary is typically an area of about 1000 sq cm to 4000 sq cm. This ergonomic boundary will typically have the user as one side of the boundary and the comfortable reach of the arms will determine an area on the left and right of the processing device which falls within the ergonomic boundary and the far edge of the boundary of the processing device (normally delimited by a display screen) will determine the other side of the ergonomic boundary. The area defined by the ergonomic boundary will overlap or include the processing device 31 itself. The processing device will also have an outer physical boundary. The input device 48 is preferably arranged to operate outside the boundary of the processing device 31 but within the ergonomic boundary. Preferably the input device is arranged to function when it is flat on the table. The input device preferably has a size of activation area of between 1 and 144 square cm.

Preferably the network 50 is a local area network, i.e. preferably local to the meeting room for security reasons but the network 50 may have access to other local or wide area networks such as 51 or to a larger corporate network or the internet 43, for example via a router 42. Another node of the network 50 is the base or display node 36. This node 36 may optionally be a wireless access point. The base node 36 may also be a processing device or host computer and may be coupled to a second connection unit 49 that provides access to the network 50 thus linking all of the processing devices 31, 36 together. The connection unit may have an input device as described above. Alternatively, network connections installed on the base node 36 can be used. Audio equipment 46 may be provided, e.g. a telephone that allows other members of the meeting to call in from remote destinations.

30

The display node 36 is coupled to and adapted to allow display of media on some kind of display 44. The display node is in embodiments of the present invention a base node of the communications network 50. The display 44 may be a projector and/or screen,



the projector being coupled to the base node 36. A whiteboard 45 can optionally be provided that can be optionally coupled to the display 44 and/or the base node 36, e.g. when the whiteboard can record electronically what is written on it. Optionally, a camera 35 may be provided to record the entries on the whiteboard 45. The camera 35  
5 may have a third connection unit 52 for connecting the camera 35 to the network 50 so that the data from the whiteboard can be recorded and stored or transmitted to other networks via router 42. The connection unit 52 may have an input device 53 as described above for the connection unit 47.

10 Optional equipment can be cameras 39, 40, 41 for recording the progress of the meeting. These cameras can be linked by a network 51, e.g. a cable network to the router 42 and/or the base node 36. Another optional item is a microphone or microphones 38 that can be used to transfer audio, e.g. to the processing devices 31 and to loud speakers (not shown) attached to the base node 36 or part of the display  
15 44.

Any or all of the outputs of the processing devices 31, the cameras, the whiteboard, etc. can be recorded and stored digitally, e.g. in node 36 or elsewhere to provide a complete record with correct time sequence.

20 Summarising the above, the present invention provides an electronic meeting tool for communicating arbitrary media content between different users 37 (with their own processing devices 31, e.g. PC, mobile phone, or tablet) and one display or projector or multiple displays or projectors 44 in the meeting room 30.

25 Referring to Figs. 1a and 1b embodiments of the present invention comprise a base or display node 36 being a processing device, e.g. a host computer adapted to receive user selected arbitrary media content, the base node 36 being coupled to a central display 44 which can be a fixed format display and/or a projector or similar. The arbitrary media content can be provided from any of the user processing devices 31.  
30 The base node 36 can be adapted to display the received user selected arbitrary media content in accordance with a set of rules, e.g. FIFO, automatically, on request or approval, forced to display, in accordance with a priority etc. Optionally the base node

36 is adapted to force display of the received user selected arbitrary media content, i.e. to allow participation in the meeting by an individual user displaying own selected content on display 44 independently of the person who is nominally responsible for giving a presentation or chairing the meeting. Forcing the display can also be  
5 considered as a rule. The meeting tool can also be adapted to allow a priority setting. This means that a user can set a priority setting for the media to be displayed. A priority of "1" for example can be interpreted by the base node as a forced display, a priority "2" can be interpreted by the base node as display as soon as possible, priority "3" can be interpreted by the base node as place in queue and display as the time  
10 comes etc. Setting and using priorities for display are also considered to be working to rules. To execute the rules, the base node 36 may have a decision module. The base node 36 may be a host computer having a processing engine such as a microprocessor and a memory. Preferably, the base node 36 is adapted to treat media content passed to the base node 36 from any or all of the connection units 47 in an equal manner. The  
15 base node 36 may be adapted to auto compose the media content on the central display 44 connected to it, e.g. from one or more processing devices 31.

An independent aspect of the present invention is at least one connection unit 47, (optionally 49 for receiving or optionally connection unit 52) adapted to communicate  
20 the user selected arbitrary media content to said base node 36. Preferably the connection units 47 and/or optionally 49 or optionally connection unit 52 are physical plug-and-play devices. An example of a connection unit is shown schematically in Fig. 10.

25 The connection unit 47 be may integrated into a user processing device 31, e.g. as an internal peripheral device or may preferably be an external peripheral device comprising a connector adapted to couple to a port of a user processing device 31. The processing device 31 may have a client display, a processing engine such as a microprocessor, a memory and an operating system. The optional connection unit 49  
30 may be integrated into the base node 36, e.g. as an internal peripheral device or may be an external peripheral device comprising a connector adapted to couple to a port of the base node 36. The connection unit 49 may be fully integrated into the base node 36, e.g. is an internal network interface of the base node 36. The base node 36 may have a

processing engine such as a microprocessor, a memory and an operating system.

The user processing devices 31, the connection units 47, (optionally 49 or optionally connection unit 52) and the base node 36 co-operate to form a communication network  
5 50 for linking between at least one of the plurality of processing devices 31, 36 and 35 and the central display device 44. The communication network 50 is adapted to receive arbitrary media content from at least one of the plurality of processing devices 31 and to transmit the arbitrary media content of at least one of the plurality of  
10 processing devices to the central display device 44.

10 An independent aspect of the present invention is a portable application 60 adapted to be loaded onto a client processing device 31 and to be run on the operating system of the client processing device 31. The portable application 60 runs as a process on the client processing device 31 that is adapted to deliver an arbitrary media content from  
15 the client processing device 31 to the communication network 50 in response to a user action applied to an input device 48, the process leaving a zero footprint on termination on the client processing device 31. Optionally the portable application 60 is stored on each connection unit 47 and optionally 49. Preferably the portable application 60 is adapted to “screen scrape” content of the client display of the client  
20 processing device 31. Optionally the portable application 60 when run on a processing device 31 is adapted to “screen scrape” content of the client display of this client processing device 31 and to transmit it via a connection unit 47. Optionally the portable application 60 when run on the processing device is adapted to “screen scrape” content of the client display of the client processing device 31 and to transmit  
25 it via a network interface of the processing device 31, for example if the connection unit 47 has no transmitter or this is not functioning.

The connection unit 47 for communicating with said base node 36 has a network interface e.g. comprising a transmitter 62. The transmitter 62 is preferably a  
30 transceiver. Optionally the transmitter/receiver can be a wireless transmitter/receiver.

The base node 36 for communicating with the connection unit 47 has a receiver 63 which can be included in the connection unit 49 or integrated into the base node 36.

The receiver is preferably a transceiver. Optionally the transmitter/receiver can be a wireless transmitter/receiver.

5 The input device 48 allows a user interaction with the connection unit 47. Preferably the input device 48 is physical actuator coupled to the connection unit 47. The user action applied to the input device 48 generates a signal that can trigger transfer of data from the processing device 31 (to which the connection unit 47 is coupled) to the network 50. Preferably the input device 48 has an activating surface that is between 100 and 14,400 square mm. Optionally, the input device 48 can be a key displayed on 10 the client display 1 of a client processing device 31. This key can be activated, e.g. by use of a pointing device such as a mouse trigger transfer of data from the processing device 31 to the network 50.

The connection unit 47 is preferably provided with a visual indicator 61, e.g. for 15 allowing user feedback from the connection unit 47 of the status of any activity.

The system also can include a server program 64 adapted to be loaded onto the base node 36, said program 64 being adapted to receive arbitrary media content from one or a plurality of client processing devices 31 through said connection units 47, (optionally 20 49 or 52), and to show this plurality of arbitrary media content streams on one or a plurality of displays 44. The server program 64 may be adapted to allow display in accordance with one or more rules, e.g. FIFO, automatically, on request, forced, in accordance with a priority etc. To execute the rules, the server program 64 may have a decision module.

25

Preferably, the server program 64 is adapted to treat media content passed to it from any or all of the connection units 47 or 52 in an equal manner. The server program 64 may be adapted to auto compose the media content on the central display 44.

30 The server program 64 may be a portable application adapted to be loaded onto the base node 36 and to be run on the operating system of the base node 36. The portable application 64 runs a process on the base node 36 that is adapted to display an arbitrary media content received from the client processing device 31 via the

communication network 50, the process leaving a zero footprint on the base node 36 on termination. Optionally the portable application 64 is stored on each connection unit 49 and optionally 47 and can be installed therefrom.

5 The system may also include a central display device 44 and optionally a whiteboard 45 or other display means such as a printer. The display 44 being adapted to receive user selected arbitrary media content, and may be adapted to allow display of the received user selected arbitrary media content in accordance with one or more rules, e.g. FIFO, automatic, forced, on request or approval, in accordance with a priority etc.

10

Optionally, one of the connection units 47 can be adapted to be a master connection unit. Such a master connection unit may be adapted to instruct the base node when media content from a client processing device 31 may be displayed or which of the processing devices may be allowed to send content for display.

15

In embodiments of the present invention, at least one portable application is used, e.g. for the client software on a client processing device 31 or optionally on the base node 36. In these embodiments, one of the pre-installed generic drivers of the operating system on the relevant computer device 31, 36 is exploited for setting up  
20 communication from the computer device 31, 36 to the network 50 via the connection unit 47, (optionally 49). The generic driver is used in connection with the connection unit 47, (optionally 49) operating as a peripheral device but the use can go beyond that of the standard class of peripheral devices for which the generic driver is intended. In some embodiments the connection unit 47, (optionally 49) operated as a peripheral  
25 device communicates with the relevant processing device 31, 36 by using a generic communication protocol provided by the pre-installed generic driver. Pre-installed USB drivers are examples. Preferably the setting up of the communication of network 50 using connection unit 47, (optionally 49) does not alter or affect the networking capability of the relevant processing device 31, 36. For example, if a browser is started  
30 on the client processing device 31, this browser can use the standard network interfaces on the processing device 31. This means that transfer of data via the connection unit 47 (optionally 49) is independent of transfer of data over the network interfaces of processing device 31 or 36. This has the advantage that each user can

carry out processing such as searching on the internet to gather data independently of the transfer of data to be displayed during a meeting, or receive emails etc.

5 The use of a portable application has the advantage that any modification to settings in the register or generally in the operating system can be avoided, so that upon any form of termination, e.g. disconnecting the electronic device, system crash, no trace is left. This is generally termed "zero footprint".

10 The present invention has the advantage of scalability. It can provide a display system for use by a plurality of users in meetings. Every user in the meeting thus can have a client processing device 31 for coupling to a connection unit 47. A first user action connects the client processing device 31 to the base node 36, e.g. by inserting a connection unit 47 into the relevant interface connector on the processing device 31, e.g. a USB interface. A second user action comprising activating a button or key on  
15 the input device (e.g. by depressing it) then starts the process of transmitting arbitrary media content from the client processing device 31 to the base node 36. This process preferably includes screen scraping data from the processing device. Using screen scraping avoids special programs being installed on the base node 36 to carry out graphical commands sent from the processing device 31. When the base node 36  
20 receives the plurality of arbitrary media content, it can allow auto composition of this media content on the central display connected to it.

25 The present invention will now be described further with reference to certain more specific embodiments.

With reference to Fig. 2, the base node software (6) running on a base node 36 can be adapted to display on the central display a splash screen (21) showing its readiness to receive arbitrary media content over its receiver. This splash screen (21) can also show instructions on how to use the system, as well as the configuration parameters (see  
30 later) to reach the base node 36. These configuration parameters are also shown in a transparent canvas at the bottom of the central display (22).

A client processing device 31 that wants to have its arbitrary media content displayed

on the central display connected to the base node 36 is connected to a connection unit 47. The portable application 60 will be executed on the client processing device 31 as a host device. A first user interaction creates a connection between the portable application 60 and the base node 36 using the transmitter in the connection unit 47 and the receiver in the base node 36. The first user interaction can be the connection of the unit 47 to the client processing device 31. A second user interaction, this time on the input device 48, activates screen scraping by the portable application of the arbitrary media content from the client processing device display, which is then sent over the connector unit 47 to the base node.

10

The base node 36 receives the plurality of arbitrary media content coming from one or more connection units 47, and auto composes this media content for rendering on the central display.

15 The visual indicator 61 on the connection unit 47 indicates to the user and to other participants in the meeting that media content is being sent by that connection unit 47 to the base node 36 for display.

Repeating the second user interaction on the input device 48 of a connection unit 47 decouples the media content from that connection unit 47 from the base node 36. The base node 36 removes that media content from the composed image on the central display and recomposes the remaining content on the central display.

The content on the central display/projector is auto arranged as shown in figure 2. When user 1 adds content, his/her display will be scaled to fill the available central display canvas as much as possible, but without affecting the aspect ratio. When user 2 adds in, his content is added to the side of the first image. When user 3 adds his content, the arrangement is, for example, triangle wise. Adding user 4, the image becomes a 2 by 2 tiling, which is the maximum available. When an additional user attempts to add content, he will be blocked. When a user initiates action to remove his/her content, his/her media content is removed from the central display and one moves backward in the composition sequence shown in figure 2.

30

### Base node software

The base node software has one or more of the following features:

- First code for providing a means or a method step for correctly configuring the receiver of the base node.
- 5 - Second code for providing a means or a method step for listening for output of connection units trying to connect on a specific port.
- Optionally, third code for providing a means or a method step for a GUI for administration purposes, offered for example over a web interface.
- Optionally, fourth code for providing a means or a method step for publishing  
10 its presence over the network using the zeroconf protocol.
- Optionally, fifth code for providing a means or a method step for accepting and installing software updates of the base node as well as for the portable application software for the connection units.
- Sixth code for providing a means or a method step for providing facilities for  
15 pairing of connection units to the base node.
- Seventh code for providing a means or a method step for auto-composing of different incoming arbitrary media streams and rendering of composited image on display or projector screen.
- Eighth code for providing a means or a method step for receiving, decrypting  
20 and decoding incoming arbitrary media content.
- Optionally ninth code for providing a means or a method step for scaling of incoming arbitrary media streams
- Optionally tenth code for providing a means for displaying incoming arbitrary media content in accordance with a set of one or more rules.

25

Any of the above code may be stored on a non-transitory machine readable storage medium such as an optical disk, a magnetic disk, magnetic tape, solid state memory, USB mass storage device etc.

30 Portable application for the client processing device

The portable application comprises an algorithm for screen scraping. Screen scraping algorithms include VNC and RDP or similar. The algorithm may include a



combination of algorithms such as VNC and RDP that are optimized for different content, e.g. static text or video. The portable application has one or more of the following features:

- 5 - Eleventh code for providing a means or a method step for connecting to a network including the base node.
- Twelfth code for providing a means or a method step for capturing video frame buffers of the client processing device, i.e. computer (C), also called screen scraping.
- 10 - Thirteenth code for providing a means or a method step for encoding, compressing and optionally encrypting these video frames and sending them over a secure link to the base node. Only changed areas such as rectangles or triangles of the screen (or other suitable geometrical shapes) need to be transferred, and different types of rectangles or triangles are encoded in different ways (e.g. RLE, JPEG, ...) to optimise performance.
- 15 - Fourteenth code for providing a means or a method step for handling the connection unit.
- Fifteenth code for providing a means or a method step for initiating connection to base node.
- Sixteenth code for receive inputs from the input device on the connection unit.
- 20 - Seventeenth code for providing a means or a method step for sending state changes to the visual indicator on the connection unit.
- Optionally, eighteenth code for providing a means or a method step for presenting the user a GUI (18).
- Optionally, nineteenth code for presenting GUI for administration of the portable application.
- 25 - Optionally, twentieth code for providing a means or a method step for displaying and activating a key on the display of the client processing device for allowing a user input to start the transfer of data from the client device to the base node.

30

Any of the above code may be stored on a non-transitory machine readable storage medium such as an optical disk, a magnetic disk, magnetic tape, solid state memory, nand Flash etc.

In this embodiment the portable application stored on the connection unit, and is executed in an execution context on the client processing device. The portable application does not need to be copied to or installed on the computer. It can be executed directly from the connection unit. It will only be copied temporarily into an execution context on the client processing device. There are also no changes in configuration required or settings in the client processing device. This means that nothing will remain on the client processing device when the connection unit is removed. It also implies that the portable application will run on client processing devices where the user does not have the necessary access rights to install software.

The portable application is designed in such a way that

- No specific drivers need to be installed on the client processing device.
- Pre-installed drivers are used, e.g. for classes of peripheral devices.
- It is independent from vendor specific graphics hardware.
- It runs on at least one and preferably on a variety of different client processing devices, including Windows, Mac OS/X, Linux, Android, iOS and many others.

## Advantages

The present application has one or more of the following advantages:

- No need for a master role in the meeting
- Standard plug and play connectivity of connection units to base node
- Simple and well known user actions are employed
- Own networking facilities of client processing devices not blocked
- No configuration changes on the client processing device
- Input devices are easily accessible; e.g. large size
- Program updates of portable application and server program can be performed locally
- Portable applications are used, no installation, multi-platform, no vendor specifics
- Particular implementation of screen scraping done by portable application

- avoids vendor specific graphics devices
  - Standard drivers are used so no drivers have to be installed
  - No configuration changes on the client processing devices
  - Zero footprint applications on client processing devices – nothing to clear up or  
5 adjust or reset
  - Own networking facilities of client processing devices not blocked
  - No configuration changes on the user computers
  - Low virus, malware and spyware risk
- 10 The portable application may be stored on a non-transitory machine readable storage medium such as an optical disk, a magnetic disk, magnetic tape, solid state memory, nand Flash etc.

#### Second Embodiment

15

In the second embodiment, referring to Figs. 2 to 5, the base node is a separate physical processing device called base unit (B), comprising permanent storage, memory, a processing engine, a wireless access point (4), a plug and play interface such as a USB port (11), a graphics display output adapter (5) like  
20 VGA/DP/DVI/HDMI, and optionally an audio output adapter (27). An input device having an actuator such as a button 13 and a visual indicator 14 are optional.

The connection unit is a physical device in the form of an external peripheral device (shown in the drawings as a “dongle” D) comprising permanent storage storing the  
25 portable application (7) and configuration parameters (12), memory, a processing engine (e.g. CPU, FPGA), a wireless transmitter such as WiFi (3) or other wireless transmitters such as LiFi, a plug and play interface such as a USB interface (2), a button as input device (9), an LED ring as visual indicator (10). The portable application is stored on the peripheral device (7).

30

The client processing device is host device, for example a computer or laptop comprising a display, a plug and play interface such as a USB port (2), memory, and a processing engine such as a microprocessor.

The system thus comprises

- 5 - an external peripheral device (D) that has a plug and play interface such as a USB interface (2) on one end and a communications interface such as a wireless interface configured as client (3) on the other end.
- a base unit (B) that has a communications interface such as a wireless interface configured as access point on one end (4) and a video card adapter (5) like VGA, DVI, DP or HDMI on the other end.
- 10 - a portable application (7) stored on the peripheral device (D) but executed on the client processing device (C)
- a base node software (6) stored and executed on the base unit (B)

The external peripheral device (D) also preferably has any one or any combination of:

- 15 - a large button as actuator for the input device (9) allowing user interaction with the peripheral device. The button preferably has an actuation surface area of between 100 and 14,400 square mm.
- visual indication such as a LED (10) allowing user feedback from the peripheral device. The user feedback can be in the form of a light ring.

20

An advantage of embodiments of the present invention is to provide data transfer to the peripheral device via a peripheral interface such as a USB interface on any processing device such as a computer in a manner that is largely operating system independent and without leaving a footprint (Zero-Footprint). Installation of drivers and/or applications onto such a processing device as a computer is not necessary  
25 wherever pre-installed generic drivers are present. Administrator rights on the processing device such as a computer are preferably not necessary. To avoid the need for administrator rights, embodiments of the present invention use other peripheral device pre-installed drivers such as USB class drivers supported without any extra  
30 installation. Embodiments of the present invention route at least screen scraped data presented by client software running on the processing device for transfer to a communications network via a peripheral device such as a USB device. This bypasses any network interface of the processing device C (and hence many firewalls) but only

for the specific client software. Other applications are not affected and can make use of the standard network interfaces, i.e. packets from/to the TCP/IP stack are transferred to a network device as normal. The client software is launched from the peripheral device such as a USB composite device or storage device as a portable  
5 application, which can avoid that any traces are left on the host OS.

#### Basic usage scenario of the second embodiment

The base node software (6) displays on the projector a splash screen -- (21) in figure 5  
10 - showing its readiness to receive arbitrary media content over its receiver (4). This splash screen (21) also shows instructions on how to use the system, as well as the configuration parameters (see later) to reach the base node. These configuration parameters can also be shown in a transparent canvas at the bottom of the central display (22).

15

To avoid user interaction for the configuration of the connection between peripheral device and base unit, a pairing process is used. This pairing process provides the peripheral device, i.e. the connection unit with networks parameters needed to set up the local network. As an example, the peripheral device can be briefly plugged into the  
20 USB port (11) of the base unit (B). The base unit then optionally does a software validity check, optionally does a software update of the portable application stored on the peripheral device, and writes the connection parameters on the peripheral device (D) required for the peripheral device and base unit to find each other to the permanent storage (8). For example, when using WiFi, this would be the SSID, WEP/WPA2 keys and IP address of the base unit's receiver, as well as the port number used by the base  
25 node software although not all of this data is necessarily exchanged.

A client processing device that wants to have its arbitrary media content displayed on the central display connected to the base node (5) connects a peripheral device (D) to  
30 its USB port via (2). The peripheral device presents itself to the computer over interface (2) as a composite device comprising a mass storage device and a keypad. This has the major advantage that no specific driver is required, since all these devices are natively supported in every personal computer system that has a USB port. If

autorun is enabled, then the computer will automatically execute the client software (7) stored in mass storage (8) on the peripheral device. The first user interaction mentioned in the general case is then just the connection of the peripheral device to the USB port. If security measures disabled auto-run, the user needs to explore the mass storage on the mass storage of the peripheral device and start the portable application manually.

The portable application will use the wireless, e.g. WiFi or LiFi interface of the peripheral device (3) to connect to the correct base node. To know the right base unit to connect to, the configuration parameters needed to make this connection are stored in the database (12) on the mass storage device (8) during the pairing process described earlier.

Once the connection is made, the peripheral device goes into connected mode. This means that there is now at least one channel from the peripheral device to the base unit. The content is not shown yet. The LED (10) on the peripheral device now turns white to give a visual indication of this new state.

When the user at the computer (C) wants to show her content, she presses the button (9). When the button was previously in state "connected" (see figure 6), it will check the state of the base unit (P). If the base unit is not in state "full", the peripheral device will send the screen scraped arbitrary media content to the base unit (B), which will add the media content to the composition on the central display. The peripheral device LED (10) now turns red to indicate "showing" state (figure 6).

The button (9) acts as a toggle. When the user presses the button again, that computer displays content will be removed from the projector. The LED (10) goes back to white.

Use of the auto-run feature is optional if possible and enabled on the computer (C) to start the client software (7) as soon as the peripheral device is plugged in. On Windows for example, this means mounting the peripheral device as a mass storage device and using the autorun.inf file stored on the peripheral device.

In many cases however, this auto-run feature will be disabled for security reasons. In that case, we will, if possible and enabled on the computer (C), use the auto-play feature to show the logo of the connected peripheral device on the desktop of the  
5 computer. The user then needs to double click on that logo to start the client software. If the auto-play feature as described above is also not possible or enabled, the user must browse to the file system of the connected peripheral device and start the application manually. This means double clicking the client.exe file on Windows,  
10 client.app on Mac OS/X or tapping the appropriate application icon on a tablet or any mobile device with touch screen.

Third Embodiment: Portable application stored on standard solid state memory such as a USB stick.

15 In the third embodiment, the portable application is stored on a solid state memory such as a regular USB memory stick (figure 7).

With a solid state memory such as a regular USB memory stick, there is no input device, visual indicator or transmitter of the kinds described above for the connection unit. This  
20 means that the system needs to:

- Use the transmitter/receiver from the client processing device.
- Use as input device a key or button on the client processing device like a physical key on the keyboard, a special mouse press, a button area on a touch screen, a button displayed on the screen to be clicked on with a mouse pointer.
- 25 - Present the visual indicator on the client processing device's display.

The client processing device then looks like figure 8.

This embodiment provides a peripheral interface such as the USB interface on any  
30 processing device acting as a host device such as a computer in a manner that is largely operating system independent. Installation of drivers and/or applications onto such a processing device as a computer is not necessary wherever pre-installed generic drivers are present. Administrator rights on the processing device such as a computer are preferably

not necessary. To avoid the need for administrator rights, this embodiment uses other peripheral device pre-installed drivers such as USB class drivers supported without any extra installation. This embodiment of the present invention routes at least screen scraped data presented by client software running on the processing device for transfer to a communications network via a network connection of the processing device. The client software is launched from the peripheral device such as the USB device as a portable application.

The first user operation then comprises:

- 10     - plugging in the solid state device such as a USB memory stick,
- starting the portable application (if autorun is disabled)
- configuring the transmitter, such as a wired or wireless network interface, on the client processing device to connect to the correct base node, using the configuration parameters (22) shown on the central display
- 15     - triggering the connection of the portable application with the base node, for example by interacting with an element on the GUI (18) of the portable application presented on the display of the client processing device.

Presenting visual feedback on user actions is in this embodiment also done using elements in the GUI of the display of the client operating device.

In this embodiment, the advantage of zero footprint is partly realized by the portable application in the sense that no software is installed on or copied to the client operating device, but there is a configuration change needed to connect the transmitter of the client operating device with the base node, which needs to be undone afterwards.

Optionally, the portable application can make the configuration changes to the transmitter for the user automatically in the background.

30 Advantages lost in this embodiment

- Partial loss of zero footprint nature of portable application
- More complex first user interaction
- More expertise required from user
- GUI needed on client operating device display, which is possibly also shown on



central display

- Need to find free key on client operating device when using physical key for second user action
- Network interface is blocked from other uses by portable application

5

Optionally, the last point can be avoided by using the base unit as a gateway to the network that the client operating device wanted to connect to through its own interface.

Advantages are:

- 10
- tight control of user connectivity to corporate network through settings on the base unit
  - keep network connectivity intact even when transmitter is now also used for display purposes

15 Disadvantage is a higher vulnerability of the system because the display connection is now possible a doorway into the corporate network.

What remains as advantages are

- 20
- the availability of a physical medium to distribute the portable application to users
  - no need to install or copy software to client operating device
  - easy way to maintain software updates on the connection units (here: memory sticks) via the base unit
  - possibility to write configuration data on the connection unit by the base unit, for example in the form of a configuration profile that can be read and used by the
- 25 client operating device

Fourth Embodiment: Software only client installed on the client processing device.

This embodiment is similar to the third embodiment, with as only difference that the software is copied on the client operating device (figure 9). In this case, no plug and play port such as a USB port is required on the client operating device.

30

This embodiment will typically be used for tablet PC's and mobile devices. In that case

- there is often no USB port available

- application distribution is easy and widely accepted through application stores

Fifth embodiment: Base node software OEM'ed to projector or display equipment

- 5 In this embodiment, the base node is not realized as a separate physical box, but integrated into the processing unit inside a display or projector. All other details are as previously described.

Sixth embodiment

10

In this embodiment, the base node is not realized as a separate physical box, but integrated into the codec of a video conferencing equipment. All other details are as previously described.

- 15 Seventh embodiment: Remote meeting participant

In this embodiment, one or multiple client operating devices are not in the direct vicinity of the base node but on a remote location.

- 20 To accommodate this case, the following adaptations are needed:

- further compression and or scaling of the arbitrary media content to allow use of low bandwidth connection
- possibility to communicate connection parameters of the base node to a remote user
- 25 - connectivity of the base node to the WAN network to which the remote user is connected

All other details are as previously described.

- 30 Eighth embodiment: multiple base nodes

In this embodiment, multiple base nodes are used. This can be done for different purposes:

- connectivity of multiple central displays
- extension of real estate of central display

- connectivity of base nodes in different remote locations

This provides the advantage that one can present on multiple base units from a single peripheral device. This is useful for a number of cases:

- 5 - personal peripheral device: user can have a personal peripheral device that is paired with multiple meeting rooms that he regularly uses
  - use in meeting room with multiple base units each controlling a different display in the same meeting room
- 10 The proposal uses a special variant of the peripheral device called a multi base peripheral device. The multi base peripheral device is equipped with a rotating wheel around the circular central "show me" button. This could be a mechanical rotating multi-position switch or something like the touch wheel on the iPod classic.
- 15 The pairing of this multi-base variant of the peripheral device:
- the rotation wheel is put in the position of the corresponding base unit.
  - the peripheral device is paired to the base node in the regular way
  - the configuration parameters are stored in a permanent storage location; every position of the rotating wheel has a corresponding set of connection parameters (e.g. different rows in
- 20 a table) each corresponding with a particular base

The connection of the peripheral device is as follows:

- multi-base peripheral device X is plugged into a PC
  - rotation wheel on peripheral device X is put in position A
- 25 - peripheral device X reads configuration parameters in position A of its internal memory
- peripheral device X connects to base node A
  - base node A indicates connection of multi-base peripheral device X on central display screen
  - rotation wheel on peripheral device X is put in position B
- 30 - peripheral device X reads configuration parameters in position B of its internal memory
- peripheral device X connects to base node B
  - base node B indicates connection of multi-base peripheral device X on screen
  - continue until correct base is selected with rotation wheel
  - click the peripheral device input device e.g. button to show content on central display of

base node

- rotating the wheel always first clicks away content from the base of the last position

Ninth embodiment

5

Fig. 10 shows a peripheral device 47 in accordance with an independent embodiment of the present invention including an input device. This embodiment can be used with any of the embodiments described above.

10 The peripheral device is configured as a connection unit and is a physical device in the form of a connector for a plug and play interface of a user processing device as a host computer such as a USB connection, a flexible data and power connection connected to the connector and a base, the base having an actuator, e.g. a button configured to be an input device with the functions as described above.

15

The base and/or the actuator is preferably large in size, e.g. having a surface area between 100 and 14,400 square mm. The base can be square, rectangular, round, hexagonal, oval, polygonal in shape or any other ergonomically suitable shape. The actuator is preferably round but can be square, rectangular, hexagonal, oval, polygonal in shape etc. there can be  
20 more than one actuator on one base.

The length of the flexible data and power connection, e.g. cable is preferably adapted to place the peripheral device (when in its connected in its operating position), especially the base and the actuator, in the region between the boundary of the connected user processing  
25 device and the ergonomic boundary as defined above. In addition the flexible data and power connection should be adapted so that the base lies flat on the meeting table independent of the orientation of the connector needed to insert the connector into the plug and play interface.

30 The base preferably includes electronics such as having permanent storage for storing the portable application and the network configuration parameters, memory, a processing engine (e.g. CPU, FPGA), a wireless transmitter/receiver such as for WiFi or LiFi, a plug and play interface such as a USB interface, a LED ring or strip as visual indicator. The portable application can be stored on the peripheral device, i.e. in the base. The visual

indicator is for allowing user feedback from the connection unit of the status of any activity.

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

#### Alternative embodiments

20    In the above embodiments, once the connection is made between the connection device and a host computer, the peripheral device goes into connected mode. This means that there is at least one channel from the peripheral device to the base node. In accordance with any of the embodiments of the present invention a plurality of channels can be set up between the connection device and the base node. These channels may be logical channels.

25

Some examples for such a multichannel arrangement may include the first and one or more of the additional channels:

- First channel is for the Scraped image stream (XDS)
- Second channel is for GPU commands (OpenGL, DirectX)
- 30          ○ Third channel is for Mouse pointer coordinates (absolute, relative)
- Fourth channel is for Mouse pointer icons
- Fifth channel is for Image data files (JPEG, PNG, GIF, ...)
- Sixth channel is for Multimedia data files or streams (MPEG2, MPEG4, OGG, H.26x, ...)

- Seventh channel is for Audio data files or streams (MP3, MP4, AAC, WMA, ...)
- Eighth channel is for text or Document data files (DOC, DOCX, PPT, PPTX, ODT, ODS, PDF, ...)
- 5 ○ Ninth channel is for transmission of a priority value 1,2, 3... as described above.

The support of audio, as discussed above when providing a seventh channel, in “screen scrape” like applications is non-trivial. When using devices which comprise a Windows  
10 OS, a large variety of audio devices exist, each offering a separate API. On devices comprising a Mac OS, special drivers like for instance SoundFlower needs to be installed. SoundFlower is a Mac OS X (10.2 and later) system extension that allows applications to pass audio to other applications. Hence such programs do not meet the zero footprint requirements.

15

The present invention provides in embodiments a method and a system for connecting a processing device such as a laptop, smartphone, PDA, computer, tablet and suchlike 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  
20 protocol for communication between processing device and a standard class of peripheral devices. The method and/or system are adapted for:

- a) coupling a peripheral device to the processing device, the peripheral device having a transceiver;
- 25 b) setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;
- c) coupling the processing device to a communications network via the peripheral device;
- d) routing audio data between the processing device and the communication network via the means for communication, wherein the generic communication protocol is used for  
30 transferring the audio data between the processing device and the peripheral device.

In particular the method and/or system can be adapted for:

- 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;

- 5 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.

10

Embodiments of the present invention advantageously use the availability of a plug and play interface such as a USB interface. A USB device is connected to a suitable port on the processing device. For example, on every PC-like platform, there is standard built-in support for a USB audio device. Thus there is a standard generic audio driver available.

- 15 Using this audio interface is thus possible without special driver installation.

On the peripheral device in embodiment of the present invention one can implement a virtual audio device. This peripheral device can present itself as an audio out device to the processing device such as a laptop, PDA, laptop, smartphone, tablet, PC, etc it is  
20 connected to. As soon as the peripheral device is plugged in, the user of the processing device will see an additional audio out interface displayed on the processing device display to which it can stream the audio. Audio configuration advantageously can be done using the standard audio interface GUI on the processing device. The peripheral device can present itself as a USB composite device.

25

The virtual audio device on the peripheral device is preferably adapted to analyse the incoming signal. If no audio is received, the incoming signal is discarded. If audio is received, the peripheral device preferably will initiate an additional TCP/IP socket connection to the base unit and the communications network. The audio can be then  
30 optionally time-stamped synchronous with the video stream for lip synchronization, optionally encoded into for instance Ogg/Vorbis, optionally encrypted using for instance CryptoPP and sent over the TCP/IP link using the RTP/RTCP protocol. If no audio signal is received, then no audio packets will preferably be sent over the network to limit bandwidth usage. The audio channel over TCP/IP is disconnected synchronously with the

video channel.

In an embodiment of the present invention, the base unit is adapted to receive the audio stream packets for instance encoded in RTP and controlled with RTCP over a TCP/IP  
5 socket. It will preferably then decrypt and decode the contained encoded audio stream if required, and deliver the resulting signal to the physical audio device in the base unit. The embedded time stamps can be used to synchronize the audio and video streams.

When audio is present on the client processing device to which the peripheral device is  
10 connected and made available to the USB audio device presented by the peripheral device, then it will be streamed to the base unit. The base unit is notified that the additional multimedia stream presented to it contains audio. This additional meta-information is used in the auto composition engine on the base unit. Without audio, up to four such streams can be handled for example by the base unit simultaneously.

15 Thus, instead of "scraping" the audio like e.g. prior art products do, embodiments of the present invention provide a channel, as described above, which is adapted to capture the audio on the peripheral device using only standard drivers and not requiring any software installation in or on the processing device. The peripheral device preferably acts as a  
20 composite device comprising for instance a (virtual) audio speaker device. However instead of operating like a speaker the audio is channelled over the communications network. The peripheral device can preferably capture the audio stream with a device driver, for instance a built in ALSA UAC1, and stream the audio to the base unit. In addition, to provide lip synchronisation, embodiments of the present invention further  
25 provides a timer or uses a timer present in a processing device that preferably time stamps both the audio and the video stream. This time stamp is encoded in the video frames and passed on in the ALSA communication stream to the peripheral device. The peripheral device then encodes this time stamp into the audio stream (for instance RTP audio stream) that is streamed to the base unit. At the receiving end, the audio and video streams are then  
30 preferably recombined taking into account the time stamp to reach lip synchronization.

A detailed embodiment of the present invention for audio capture will be described with reference to Fig. 11.



In this embodiment a peripheral device 32 as described above is used that can be coupled with a processing device 31 such as a laptop, tablet, smartphone, PDA, personal computer etc. The coupling can be by a plug and play interface such as a USB interface that has generic drivers installed on the processing device. For example the peripheral device 32  
5 can be physically inserted into a USB port on the processing device 31. Commercially available processing devices currently support external USB audio devices through a generic built-in USB audio software driver. In the future any modifications, improvements or replacements of universal interfaces will have an equivalent audio solution. The generic drivers installed on the processing device make the audio available at the port 8 to the  
10 peripheral device 32. For example, port 8 can be a USB port using a standardized interface, e.g. mostly UAC1. On the peripheral device 32 there is a matching port 11. In accordance with this embodiment audio data is captured at this interface 8-11 internally in the peripheral device 32. This data is then optionally re-encoded and streamed to the communications network to which the peripheral device 32 has access. An example is a  
15 wireless communications network such as WiFi or LiFi. The communications network has a base node which can be in the form of a base station or base unit 33. The base unit can be a central base unit for use in meetings. For use in displaying a presentation this base unit is coupled to a display device as described for other embodiments of the present invention. In order to provide lip synchronicity, the audio and video signals captured are provided with a  
20 high resolution time stamp upon packaging. By doing so, the combined audio and video signals can be reconstructed at the receiving end regardless of the paths and delays of the different packets.

For the processing of video data from the processing device 31, a software 2 is executed on  
25 the processing device 31 e.g. a client PC, i.e. a screen scraping software as described in the other embodiments. This software 2 can be stored as a software program 30 in mass storage 12 on the peripheral device 32 as described in the other embodiments. This software program 30 is loaded onto the processing device 31 when it is coupled thereto, either automatically or by user action as described in the other embodiments. When the  
30 software 2 is running on the processing device 31 it is preferred if it leaves zero footprint on termination has been described for other embodiments. That software 30 when executed on the processing device 31 captures the video data that is available on the processing device, e.g. from a presentation or video that is running on the processing device as described in the other embodiments. For example, the software 30 when executed on the

processing device 31, is adapted to screen scrape, e.g. to read one or more video frame buffers 1 from the graphics card in the processing device 31. Generally the processing device 31 will have its own display and hence will have a graphics card or something equivalent with a buffer for storing video data. This read video information is preferably  
5 time stamped with a clock 9, to be able to later synchronize the captured video signal with the related audio signal. The video signal is then encoded in a video encoder 3, packetized in a video packetizer 4, prepared in an HID protocol packetizer 5 for transport over the plug and play interface using a generic driver 10, such as over a USB interface using generic pre-installed drivers, e.g. a generic pre-installed Human Interface Driver (HID).  
10 The audio data is offered on the plug and play port e.g. the USB port 8.

On the peripheral device 32 the video packets are received at the corresponding plug and play port, e.g. the USB port 11, read by the Human Interface Driver (HID) interface handler 13, unpacked to remove HID protocol headers in an unpacker 20 and then  
15 transmitted to the communications network by a transmitter 21. The network can be wireless for example WiFi or LiFi network.

Having been routed over a communications network to the base unit 33, the incoming stream is read from the communications interface such as a WiFi access point 22,  
20 unpacked in an unpacker 25, decoded in a decoder 26 and then inserted into a suitable composition such as an OpenGL based composition in the compositor 29 for display on a central display device.

With reference to the audio data on the processing device 31 such as a client PC, the audio  
25 is sent over a port using generic drivers such as over a USB port 8 using the standard built-in generic audio driver such as UAC driver 7. On the peripheral device 32, the audio packets are read from the generic port, e.g. USB port 11 by a dedicated audio device 14. These packets are then processed by any of a mixer a rate converter, an echo canceller, noise canceller or similar. Any of the mixing, rate conversion, echo cancelling, noise  
30 cancelling can be executed using an ALSA driver 18. The ALSA driver offers the packets to a dummy audio device 16 such as an audio scraper. In this audio device 16 the audio packets can be time stamped from the clock 15 that can be synchronized with clock 9 of the processing device 31. This information is then encoded in an encoder 17 and packetized in a packetizer 19]before being transferred to the communications network. The

network can be a wireless network such as a WiFi or LiFi network. For this purpose a suitable transmitter 21 is provided in the peripheral device 32. On the base unit 33 the audio information stream is recovered at a suitable communications interface such as the WiFi access point 22. The audio is then unpacked in an unpacker 23, decoded in a decoder 5 24 before being offered to an audio mixer 28. In order to synchronise the audio and video streams these are both sent to a synchronizer 27 in which the two streams are synchronized and thus keep lip synchronization.

In the above embodiments, a particular method of pairing the peripheral device with the 10 base node has been described. Any of the embodiments of the present invention may include other pairing mechanisms of which some examples are given below.

- Some examples for pairing
  - Plug in the peripheral device, to a generic peripheral device port such as a 15 USB port of the base node or other USB enabled device. Pairing info is transmitted over the generic peripheral interface such as USB.
  - The Signal strength of the wireless channel to the base node is used to identify which base node is to be used
  - The Signal strength of the wireless channel or any other channel. Example 20 is an NFC/RFID transmitter can be provided underneath the meeting room table. Putting the user processing device such as a laptop and the peripheral device plugged in on this table automatically pairs the peripheral device with the base of this meeting room
  - Manual pairing (e.g. by entering IP address, hostname, wireless ID (like 25 SSID on WiFi))

What is claimed is

1. 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  
5 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,  
10 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  
15 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.
2. The method of claim 1 wherein Step b) comprises presenting the peripheral device to  
20 the processing device as a human interface device and wherein the pre-installed generic driver is a human interface device driver.
3. The method of claim 1 wherein Step b) comprises presenting the peripheral device to  
the processing device as a mass storage device and wherein the pre-installed generic driver  
25 is a mass storage device driver.
4. The method of claim 1 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.  
30
5. The method of any of claims 1 to 4 wherein a client application is stored on the peripheral device which when run on the processing device obtains screen scraped data.
6. The method of claim 5 wherein the client application is a portable application.

7. The method of any of the claims 1 to 6 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.

5

8. The method of claim 7 wherein if audio is received, the peripheral device will initiate an additional connection to the base unit through the communications network.

9. The method of any of claims 1 to 8 further comprising time-stamping synchronously with the audio with the data stream.

10

10. The method of claim 9 further comprising encoding, optionally encrypting the audio data.

11. 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.

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12. The system of claim 11 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.

13. The system of claim 11 further comprising means for presenting the peripheral device to the processing device as a mass storage device and wherein the pre-installed generic  
5 driver is a mass storage device driver.

14. The system of claim 11 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.  
10

15. The system of any of claims 11 to 14 wherein a client application is stored on the peripheral device which when run on the processing device obtains screen scraped data.

16. The system of claim 15 wherein the client application is a portable application.  
15

17. The system of any of the claims 11 to 16 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.

18. The system of claim 17 wherein if audio is received, the peripheral device will initiate an additional connection to the base unit through the communications network.  
20

19. The system of any of claims 11 to 18 further comprising time-stamping synchronously with the audio stream with the data stream.  
25

20. The system of claim 19 further comprising means for encoding, optionally encrypting the audio data.

21. An electronic meeting tool for use with the system according to any of the claims 11 to  
30 20 and for communicating arbitrary media content from users at a meeting comprising: a node configuration means adapted to operate a display node of a communications network, the display node being coupled to a first display, the node configuration means being adapted to receive user selected arbitrary media content and to control display of the user selected arbitrary media content on the first display; and

at least one peripheral device adapted to communicate the user selected arbitrary media content via the communications network, wherein the peripheral device is a connection unit comprising:

- 5           (a) a connector adapted to couple to a port of a processing device having a second display, a memory and an operating system; and  
            (b) a transmitter for communicating with the communications network,

10           a program adapted to be loaded onto the processing device and to run on the operating system of the processing device, said program being adapted to obtain user selected arbitrary media content, said program leaving a zero footprint on termination, and an input device to allow the user to carry out a user action that triggers transfer of said user selected arbitrary media content to said transmitter through said port.

15           22. The electronic meeting tool of claim 21 wherein the program is stored on the peripheral device.

23. The electronic meeting tool of claim 21 or 22 wherein the transmitter is a wireless transmitter or transceiver.

20

24. The electronic meeting tool of any of the claims 21 to 23 wherein the peripheral device is a plug-and-play device.

25           25. The electronic meeting tool of any of the claims 21 to 24 wherein the program is adapted to screen scrape content of the second display.

26. The electronic meeting tool of any of the claims 21 to 25 wherein the input device is physical actuator coupled to the peripheral device.

30           27. The electronic meeting tool of claim 26 wherein the physical actuator has a surface area of between 100 and 14,400 square mm.

28. The electronic meeting tool of any of the claims 21 to 27 wherein the input device is a key displayed on the second display.

29. The electronic meeting tool of claim 28 wherein the key displayed on the second display is not screen scraped by the program.
- 5 30. A method for connecting a processing device to a communications network and for use with the system according to any of the claims 11 to 20, the processing device having a memory, a display and an operating system with at least one pre-installed generic driver providing a generic communications protocol for communication between processing device and a standard class of peripheral devices, the method comprising the steps of:
- 10 a) coupling a peripheral device to the processing device, the peripheral device having a transceiver;
- b) setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;
- c) coupling the processing device to a communications network via the peripheral device;
- 15 d) routing screen scraped data between the processing device and the communication network via the means for communication, wherein the generic communication protocol is used for transferring the screen scraped data between the processing device and the peripheral device.
- 20 31. The method of claim 30 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.
32. The method of claim 30 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.
- 25 33. The method of claim 30 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.
- 30 34. The method of any of claims 30 to 33 wherein a client application is stored on the peripheral device which when run on the processing device obtains the screen scraped data.



35. The method of claim 34 wherein the client application is a portable application.

36. A peripheral device for use with the system according to any of the claims 11 to 20 and  
5 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  
10 device, said executable software code comprising:  
a first software code portion for setting up, by means of the pre-installed generic driver of  
the operating system, a means for communication between the peripheral device and the  
processing device;  
a second software code portion for connecting the processing device to a communications  
15 network via the peripheral device, the peripheral device having a transceiver;  
a third software code portion for screen scraping data from the processing device; and  
a fourth software code for routing screen scraped data between the processing device and  
the communications network over the means for communication; wherein the first  
software code portion is adapted to use the generic communication protocol for  
20 transferring the screen scraped data between the processing device and the peripheral  
device.

37. The peripheral device of claim 36, wherein the first software code portion is adapted to  
present the peripheral device to the processing device as a human interface device and  
25 wherein the pre-installed generic driver is a human interface device driver.

38. The peripheral device of claim 36, wherein the first software code portion is adapted to  
present the peripheral device to the processing device as a mass storage device and  
wherein the pre-installed generic driver is a mass storage device driver.

30  
39. The peripheral device of claim 36, wherein the first software code portion is adapted to  
present the peripheral device to the processing device as a composite device and wherein  
pre-installed generic drivers drive different device interfaces independently.

40. The peripheral device of any of the claims 36 to 39 wherein said executable software code comprises fifth code for providing a means for connecting to the communications network including a base node.

5 41. The peripheral device of any of the claims 36 to 40 wherein said executable software code comprises sixth code for providing means for capturing video frame buffers of the processing device.

10 42. The peripheral device of any of the claims 36 to 41 wherein said executable software code comprises seventh code for providing a means for encoding, compressing and optionally encrypting the screen scraped data and sending the screen scraped data the communication network.

15 43. The peripheral device of any of the claims 36 to 41 wherein said executable software code comprises eighth code for providing a means for handling the peripheral device.

44. The peripheral device of any of the claims 40 to 43 wherein said executable software code comprises ninth code for providing means for initiating connection to the base node.

20 45. The peripheral device of any of the claims 36 to 44 wherein said executable software code comprises tenth code for receiving inputs from an input device on the peripheral device.

25 46. The peripheral device of any of the claims 36 to 45 wherein said executable software code comprises eleventh code for providing a means for sending state changes to the visual indicator on the peripheral device.

47. The peripheral device of any of the claims 36 to 46 wherein said executable software code comprises Twelfth code for providing a means for presenting to the user a GUI.

30 48. The peripheral device of any of the claims 36 to 47 wherein said executable software code comprises thirteenth code for presenting a GUI for administration of the said executable software code when executed as a portable application.

49. The peripheral device of any of the claims 36 to 48 wherein said executable software code comprises fourteenth code for providing a means for displaying and activating a key on the display of the client processing device for allowing a user to input the start the transfer of data from the processing device to the base node.

5

50. A peripheral device use with the system according to any of the claims 11 to 20 and 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  
10 device and a standard class of peripheral devices, the peripheral device comprising a memory in which executable software code is stored for execution on the processing device, said executable software code comprising:

a first software code portion for setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the  
15 processing device;

a second software code portion for connecting the processing device to a communications network via the peripheral device, the peripheral device having a transceiver; and

a third processing software code for routing data between the processing device and the communications network over the means for communication; wherein the first software

20 code portion is adapted to use the generic communication protocol for transferring the data between the processing device and the peripheral device, and  
an input device coupled to the peripheral device, the input device being adapted to react to a user action to trigger the transfer of the data from the processing device to the peripheral device.

25

51. The peripheral device of claim 50, wherein the first software code portion is adapted to present the peripheral device to the processing device as a human interface device and wherein the pre-installed generic driver is a human interface device driver.

30 52. The peripheral device of claim 50, wherein the first software code portion is adapted to present the peripheral device to the processing device as a mass storage device and wherein the pre-installed generic driver is a mass storage device driver.

53. The peripheral device of claim 50, wherein the first software code portion is adapted to

present the peripheral device to the processing device as a composite device and wherein pre-installed generic drivers drive different device interfaces independently.

54. The peripheral device of any of the claims 50 to 53 wherein the input device is  
5 physical actuator coupled to the peripheral device.

55. The peripheral device of claim 54 wherein the physical actuator has a surface area of between 100 and 14,400 square mm.

10 56. The peripheral device of any of the claims 50 to 55 wherein the input device is a key for display on the display.

57. The peripheral device of any of the claims 50 to 56 wherein said executable software code comprises fourth code for providing a means for connecting to the communications  
15 network including a base node.

58. The peripheral device of any of the claims 50 to 56 wherein said executable software code comprises fifth code for providing a means for capturing video frame buffers of the  
20 processing device.

59. The peripheral device of claim 58 wherein said executable software code comprises sixth code for providing a means for encoding, compressing and optionally encrypting the video frames and sending them over a secure link to the base node.

25 60. The peripheral device of any of the claims 50 to 59 wherein said executable software code comprises seventh code for providing a means for handling the peripheral device.

61. The peripheral device of claim 59 or 60 wherein said executable software code comprises eighth code for providing a means for initiating connection to the base node.  
30

62. The peripheral device of any of the claims 50 to 61 wherein said executable software code comprises ninth code for receive inputs from an input device on the peripheral device.

63. The peripheral device of any of the claims 50 to 62 wherein said executable software code comprises tenth code for providing a means for sending state changes to the visual indicator on the peripheral device.

5 64. The peripheral device of any of the claims 50 to 63 wherein said executable software code comprises eleventh code for providing a means for presenting the user a GUI.

65. The peripheral device of any of the claims 50 to 64 wherein said executable software code comprises twelfth code for presenting GUI for administration of the executable software code when executed as a portable application.  
10

66. The peripheral device of any of the claims 57 to 65 wherein said executable software code comprises thirteenth code for providing a means for displaying and activating a key on the display of the processing device for allowing a user input to start the transfer of data  
15 from the processing device to the base node.

67. A peripheral device use with the system according to any of the claims 11 to 20 and 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  
20 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  
25 the operating system, a means for communication between the peripheral device and the processing device;

a second software code portion for connecting the processing device to a communications network via the peripheral device, the peripheral device having a transceiver;

a third software code portion for receiving media content from the network and for  
30 displaying the media content on the display in accordance with a set of rules; wherein the first software code portion is adapted to use the generic communication protocol for transferring the media content between the peripheral device and the processing device.

68. The peripheral device of claim 67 wherein said executable software code comprises

fourth code for providing a means for correctly configuring a receiver as an access point.

69. The peripheral device of claim 67 or 68 wherein said executable software code comprises fifth code for providing a means for listening for output of connection units  
5 trying to connect on a specific port.

70. The peripheral device of any of the claims 67 to 69 wherein said executable software code comprises sixth code for providing a means for a GUI for administration purposes.

10 71. The peripheral device of any of the claims 67 to 70 wherein said executable software code comprises seventh code for providing a means for publishing its presence over the network using the zeroconf protocol.

15 72. The peripheral device of any of the claims 67 or 71 wherein said executable software code comprises eighth code for providing a means for accepting and installing software updates.

20 73. The peripheral device of any of the claims 67 or 72 wherein said executable software code comprises ninth code for providing a means for providing facilities for pairing of connection units to the processing device.

25 74. The peripheral device of any of the claims 67 or 73 wherein said executable software code comprises tenth code for providing a means for auto-composing of different incoming arbitrary media streams and rendering of composited image on display.

75. The peripheral device of any of the claims 67 or 74 wherein said executable software code comprises eleventh code for providing a means for receiving, decrypting and decoding incoming arbitrary media content.

30 76. The peripheral device of any of the claims 67 or 75 wherein said executable software code comprises twelfth code for scaling of incoming arbitrary media streams.

77. The peripheral device of any of the claims 67 or 76 wherein said executable software code comprises thirteenth code for providing a means for displaying incoming arbitrary

media content in accordance with a set of rules.

78. A method for use with the system according to any of the claims 11 to 20 and for communicating arbitrary media content from users at a meeting comprising:

- 5 operating a display node of a communications network, the display node being coupled to a first display, to receive user selected arbitrary media content and to control display of the user selected arbitrary media content on the first display; and
- connecting a peripheral device to a port of a processing device and communicating the user selected arbitrary media content via the communications network,
- 10 loading a program onto the processing device and running the program on the operating system of the processing device to obtain user selected arbitrary media content, said program leaving a zero footprint on termination, and
- triggering transfer of said user selected arbitrary media content to said transmitter through said port after a user action on an input device.

15

79. A peripheral device for use with the system according to any of the claims 11 to 20, comprising:

- a base
- a connector for connection to a plug and play port of a host processing device,
- 20 a flexible connection between the base and the connector for transferring data signals and power,
- an actuator on the base for actuating a signal and for transferring the signal to the connector for transfer to the port, wherein the base has electronics comprising permanent storage for storing a portable application, a processing engine, a transceiver and a visual
- 25 indicator.

80. A method for use with the system according to any of the claims 11 to 20 and for providing communication connectivity from a processing device,

- setting up a communications network between a base node of the communications network
- 30 and a peripheral device coupled to the processing device;
- transferring media content between the processing device and the peripheral device,
- transmitting the media content from the peripheral device to the communications network,
- receiving media content from the communications network at the base node and displaying the media content on a display in accordance with a set of rules.

81. Any of the above claims as software code stored on a non-transitory storage medium.



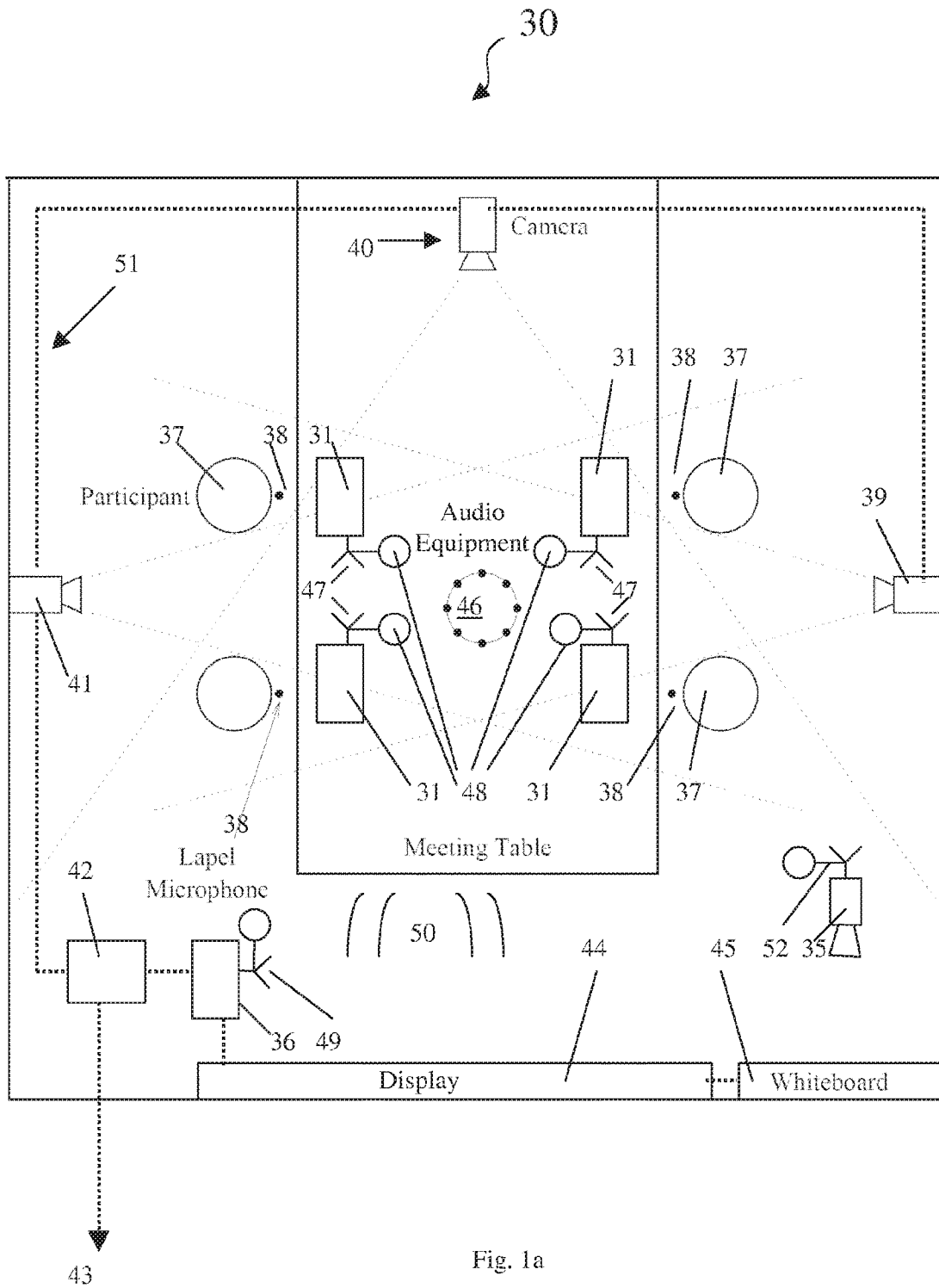


Fig. 1a

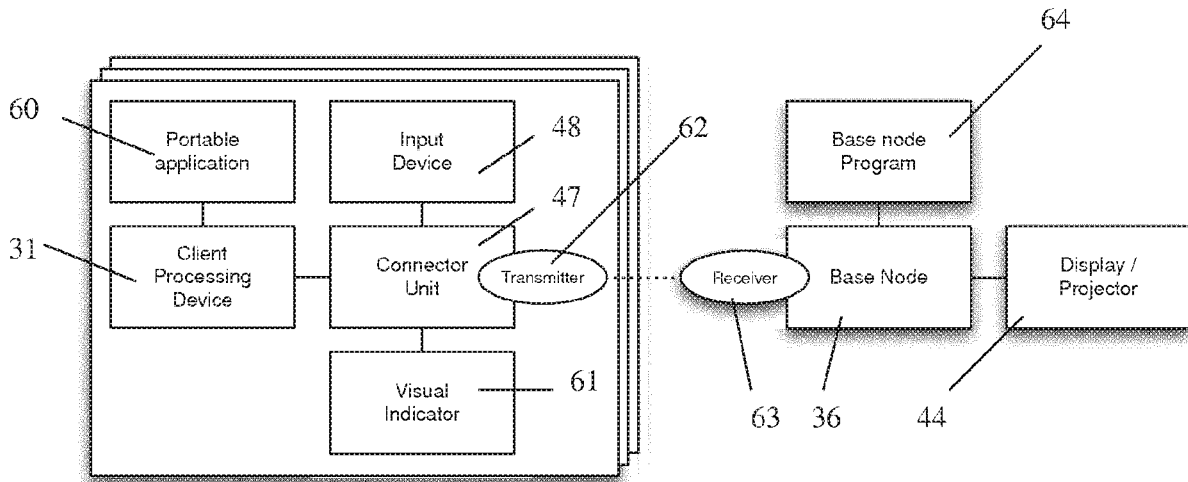


Fig. 1b

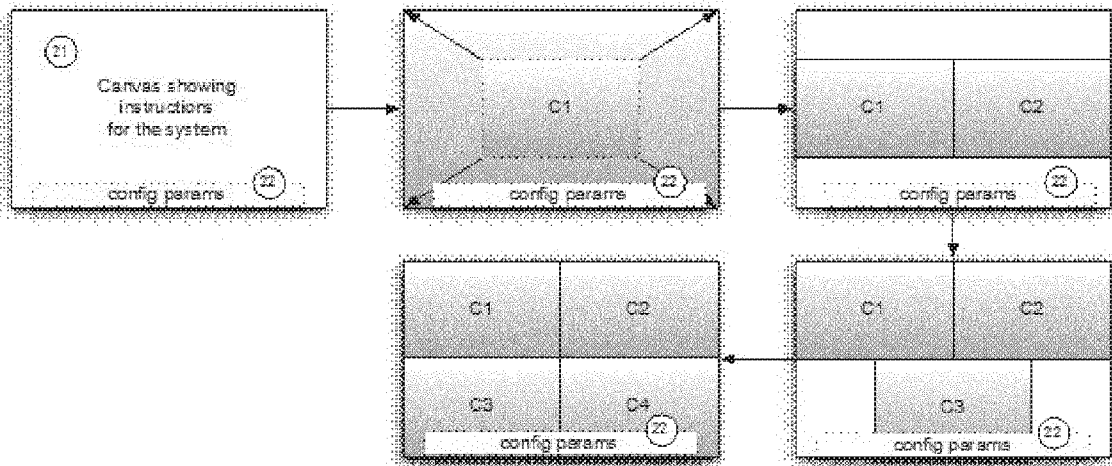


Fig. 2

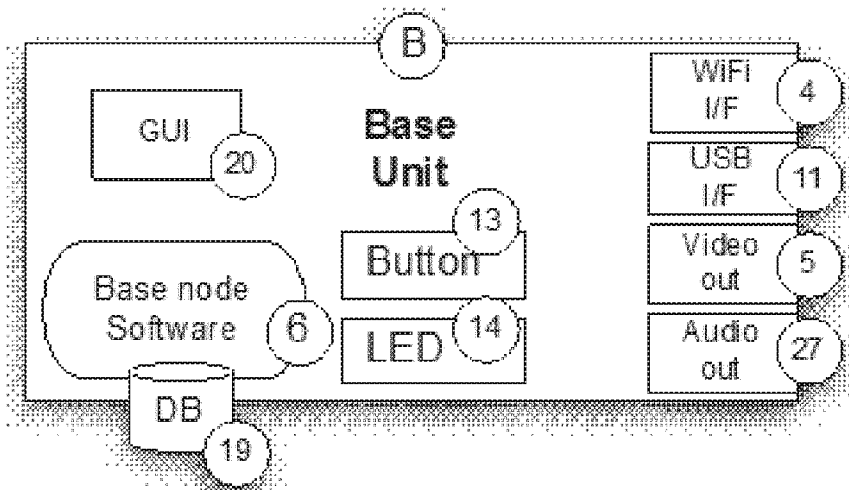


Fig. 3

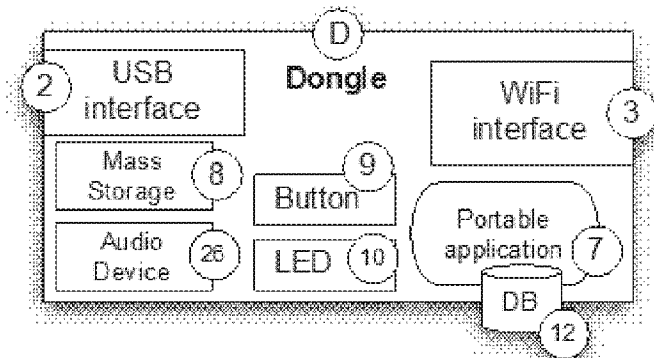


Fig. 4

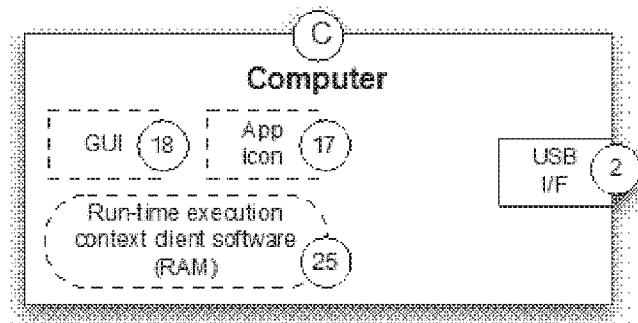


Fig. 5

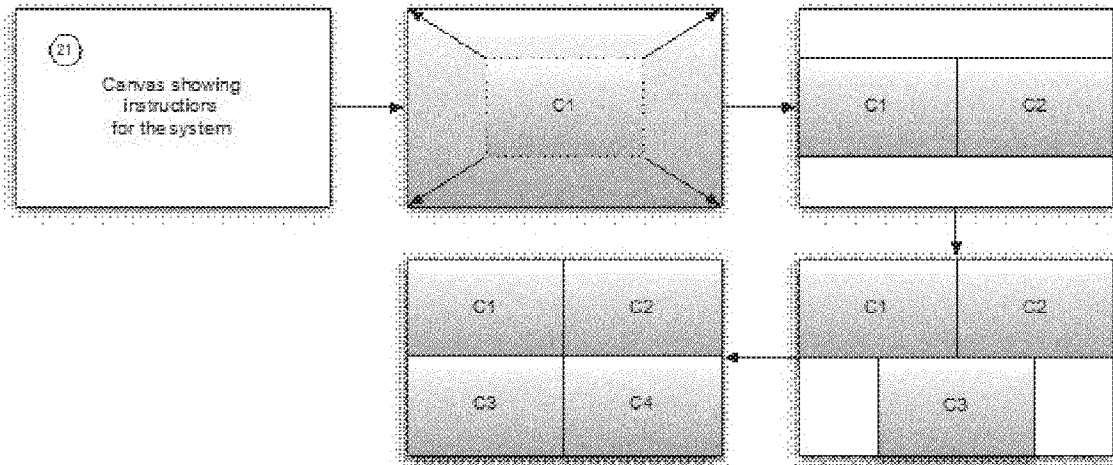


Fig. 6

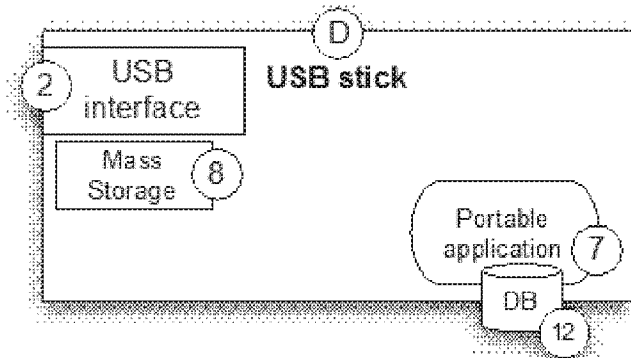


Fig.7

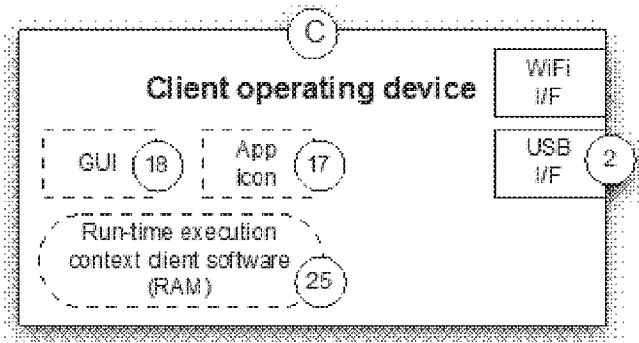


Fig. 8

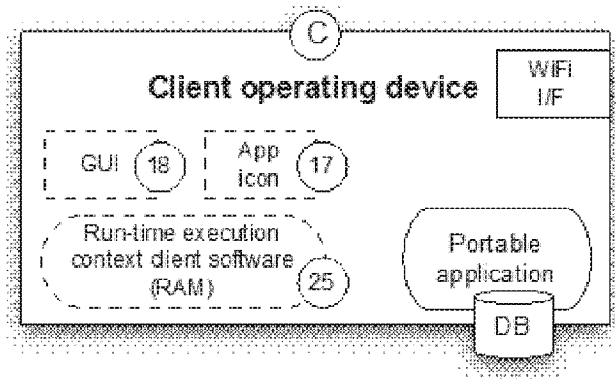


Fig. 9

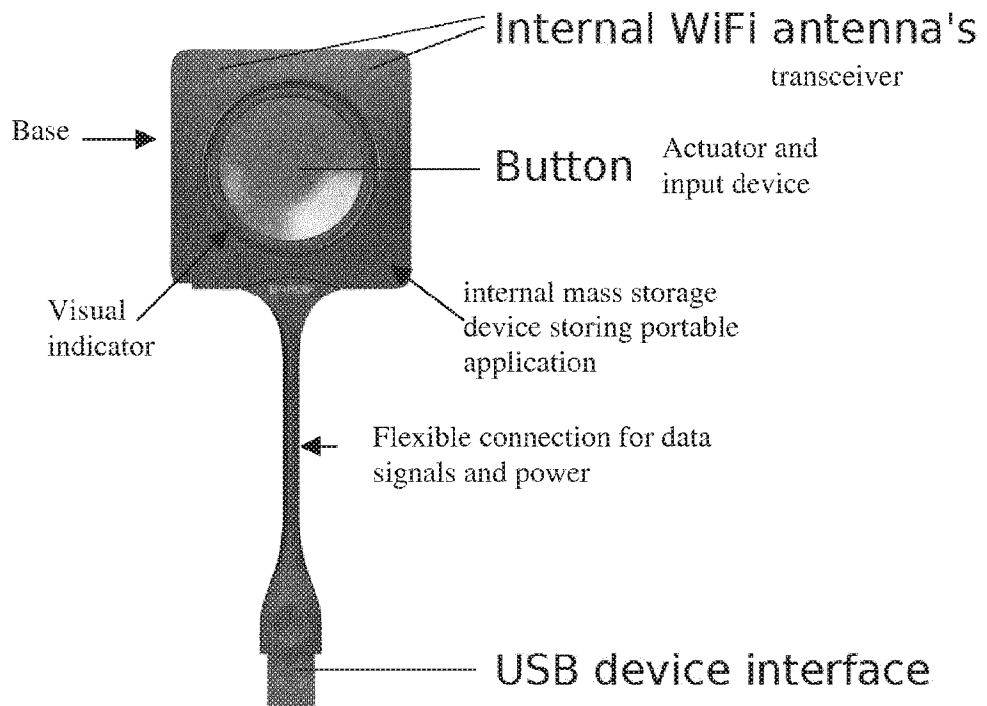


Fig. 10

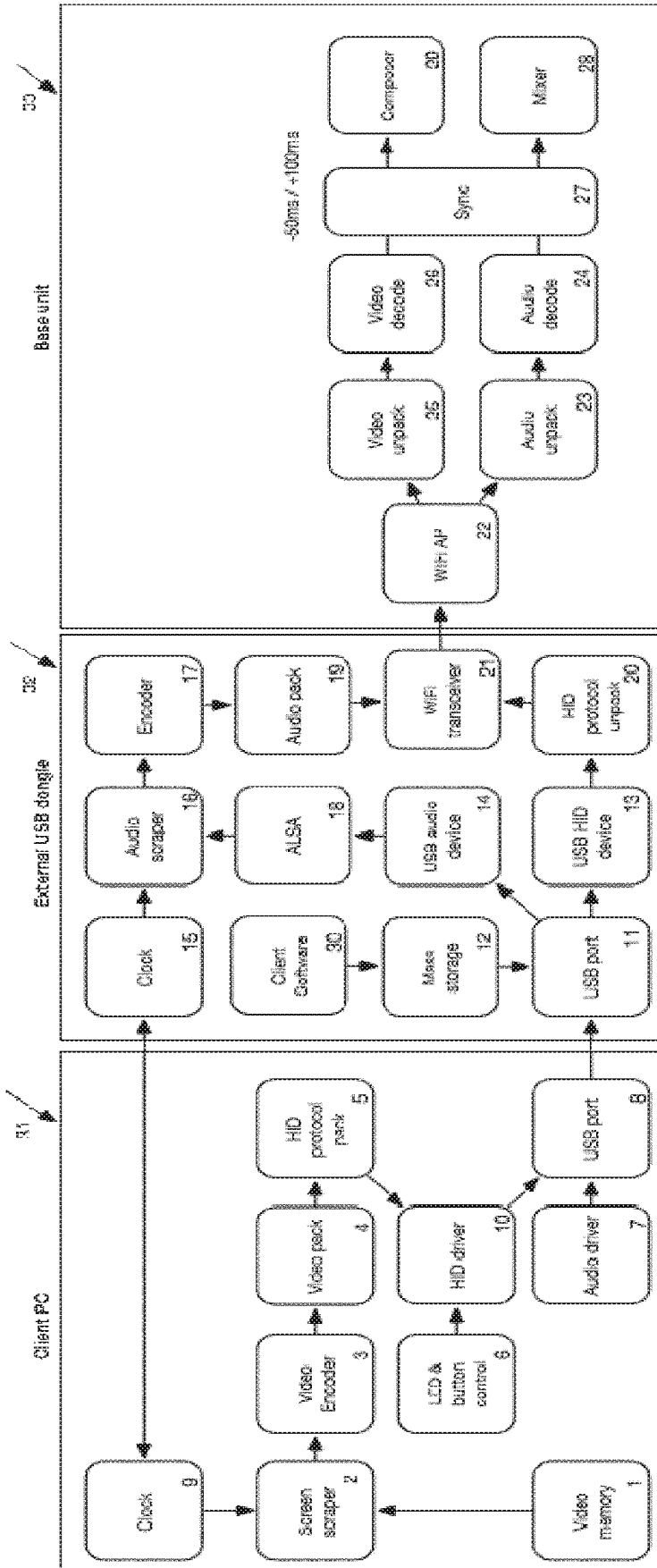


FIG. 11

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	32169917
<b>Application Number:</b>	15858668
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	6421
<b>Title of Invention:</b>	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS
<b>First Named Inventor/Applicant Name:</b>	Gauthier RENARD
<b>Customer Number:</b>	23364
<b>Filer:</b>	Thomas J. Moore
<b>Filer Authorized By:</b>	
<b>Attorney Docket Number:</b>	RENA3002/TJM/TL
<b>Receipt Date:</b>	28-MAR-2018
<b>Filing Date:</b>	29-DEC-2017
<b>Time Stamp:</b>	09:10:32
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### 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)	RENA3002_IDS_SB08_28MAR18.pdf	1034337  9296d529260466e90f74da069eef7c990e6dfac8	no	4

### Warnings:

Information:					
2	Foreign Reference	WO2013037980A2.pdf	8681063	no	74
			b88497c072e1d57f43b466d21dad58e803c ddafo		
Warnings:					
Information:					
Total Files Size (in bytes):				9715400	
<p><b>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.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b>  <b>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.</b></p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b>  <b>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.</b></p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b>  <b>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.</b></p>					



**GENERAL POWER OF ATTORNEY BY APPLICANT**

This power revokes any previous powers of attorney given in the above-identified patent application.

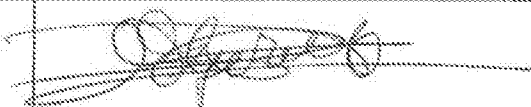
I (we) hereby appoint Practitioners associated with the following Customer Number as my/our attorney, and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A or equivalent):

**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 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).

Signature of Applicant for Patent

Signature			
Name	Peter Gerets	Date	11/02/2017
Title and Company	BARCO NV, VP Technology		

General Power of Attorney  
rev. 05NOV12  
Substitute for PTO/AIA/82B  
Bacon & Thomas, PLLC

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**STATEMENT UNDER 37 CFR 3.73(c)**Applicant/Patent Owner: Gauthier RENARDApplication No./Patent No.: 15858668 Filed/Issue Date: December 29, 2017Titled: METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGSBARCO NV, a corporation

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1.  The assignee of the entire right, title, and interest.
2.  An assignee of less than the entire right, title, and interest (check applicable box):
- The extent (by percentage) of its ownership interest is \_\_\_\_\_%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.
- There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3.  The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4.  The recipient, via a court proceeding or the like (e.g., bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

- A.  An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel \_\_\_\_\_, Frame \_\_\_\_\_, or for which a copy thereof is attached.
- B.  A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: \_\_\_\_\_ To: \_\_\_\_\_

The document was recorded in the United States Patent and Trademark Office at

Reel \_\_\_\_\_, Frame \_\_\_\_\_, or for which a copy thereof is attached.

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The document was recorded in the United States Patent and Trademark Office at

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[Page 1 of 2]

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. 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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**STATEMENT UNDER 37 CFR 3.73(c)**

3. From: \_\_\_\_\_ To: \_\_\_\_\_

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Additional documents in the chain of title are listed on a supplemental sheet(s).

As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Thomas J. MOORE/

July 17, 2018

Signature

Date

THOMAS J. MOORE

28974

Printed or Typed Name

Title or Registration Number

## Privacy Act Statement

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

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

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

## ASSIGNMENT

WHEREAS Addestino Innovation Management cvba, a Belgian corporation headquartered at Leernsesteenweg 176, 9800 Deinze, Belgium hereinafter called "the Transferor", has obtained a part of the worldwide right, title and interest to the invention described in the US patent application US15/858,668 filed on 29 December 2017, hereinafter called "the Invention", by assignment – called Transfer of Patent Rights on 22 December 2017, and/or by operation of law from its employee and co-inventor Johan Peter Frans DEGRAEF, residing at Twaalfkameren 45, 9000 Gent, Belgium;

WHEREAS said Transfer of Patent Rights and/or transfer by operation of law includes the right to claim priority, and all patents, utility models, divisionals, continuations or continuation in part applications or patents to be obtained from the Invention and any applications claiming priority from the Invention including patent applications, patents, utility models, divisionals, continuations or continuation in part applications or patents derived therefrom, hereinafter collectively called "the Patent Rights";

WHEREAS Barco NV, a Belgian corporation headquartered at President Kennedy Park 35, 3500 Kortrijk, Belgium, hereinafter called "the Transferee", has acquired the Transferor's rights under the said Transfer of Patent Rights;

WHEREAS the co-inventor has assigned the worldwide right, title and interest to the Invention via the Transfer of Patent Rights, to the Transferor, who accepted the Transfer of Patent Rights,

WHEREAS the Transferor has transferred all the rights it has obtained under the said Transfer of Patent Rights, including the worldwide right, title and interest to the Invention, to the Transferee, who has accepted the transfer.

WHEREAS the Transferor has instructed Mr. Johan Peter Frans DEGRAEF to promptly provide the Transferee with all pertinent facts and documents relating to the Invention as may be known and accessible to him and to testify as to the same in any proceeding related thereto and to promptly execute and deliver to the Transferee, or the legal representative thereof, any and all papers, instruments or affidavits required to apply for, obtain, maintain and enforce the Patent Rights which may be necessary or desirable to carry out the purposes hereof.

WHEREAS the Transferor has promised to execute and deliver any and all papers, instruments or affidavits required to perfect the Transfer of Patent Rights and to make the Transfer of Patent Rights opposable to third parties in any jurisdiction,

NOW THEREFORE, The Transferor, the co-inventor and the Transferee agree to the following:

- The Transfer of Patent Rights has been done for good and valuable consideration, receipt of which is hereby acknowledged.
- The right to claim priority from said US patent application is governed by the Paris Convention and other applicable international agreements in any subsequent applications pertaining to said INVENTION, including any national, regional, or international applications for patents or utility models.


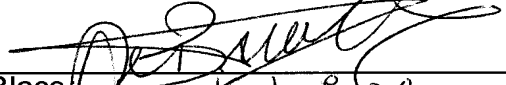
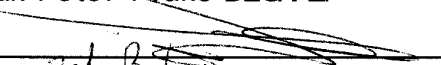
The Transferor and Mr. Johan Peter Frans DEGRAEF hereby agree to execute any documents that legally may be required in connection with the filing, prosecution and maintenance of said application or any other patent application(s) in any country for said Invention, including additional documents that may be required to affirm the rights of Transferee in and to said

Assignment 1/2



Invention, all without further consideration. Transferor and Mr. Johan Peter Frans DEGRAEF also agree, without further consideration and at Transferee's expense, to identify and communicate to Transferee at Transferee's request documents and information concerning the Invention that are within Transferor's and Mr. Johan Peter Frans DEGRAEF's possession or control, and to provide further assurances and testimony on behalf of Transferee that lawfully may be required of Transferor and of Mr. Johan Peter Frans DEGRAEF in respect of the prosecution, maintenance and defense of any patent application or patent encompassed within the terms of this instrument. Transferor's and Mr. Johan Peter Frans DEGRAEF's obligations under this instrument shall extend to Transferor's and Mr. Johan Peter Frans DEGRAEF's heirs, executors, administrators and other legal representatives.

- ALSO, Transferor and Mr. Johan Peter Frans DEGRAEF hereby authorize and request the Commissioner of Patents and/or the Director of the United States Patent and Trademark Office (USPTO) to issue any and all Letters Patent referred to above to Transferee, as the Transferee of the entire right, title and interest in and to the same, for Transferee's sole use and behoof; and for the use and behoof of Transferee's legal representatives and successors, to the full end of the term for which such Letters Patent may be granted, as fully and entirely as the same would have been held by Transferor and Mr. Johan Peter Frans DEGRAEF had this assignment and sale not been made.
- The present Assignment is governed by the laws of BELGIUM. The courts of BELGIUM shall have exclusive jurisdiction over any dispute arising from this agreement.

<p>The Transferors –Addestino Innovation Management cvba and Johan Peter Frans DEGRAEF :</p>	<p>The Transferee – Barco NV:</p>
<p style="text-align: center;"></p> <hr/> <p>Place: <i>Zele, Belgium</i>  Date: <i>19/03/18</i>  Name of Signatory: <i>Stefan Triest</i>  Position: <i>Managing Partner</i></p>	<p style="text-align: center;"></p> <hr/> <p>Place: <i>Kortrijk, Belgium</i>  Date: <i>23/04/18</i>  Name of Signatory: <i>WIM DE BRUYNE</i>  Position: <i>VP meeting experience</i></p>
<p>Johan Peter Frans DEGRAEF</p> <p style="text-align: center;"></p> <hr/> <p>Place: <i>Zele, Belgium</i>  Date: <i>19/03/18</i>  Name of Signatory: <i>Johan Degraef</i>  Position: <i>Consultant</i></p>	<hr/> <p>Place:  Date:  Name of Signatory:  Position:</p>

Assignment 2/2

Application No.: US patent application 15/858,668

Application Date: 29 December 2017

Attorney Docket: RENA3002/TJM/TL

## ASSIGNMENT

WHEREAS, I, the below named inventor, hereinafter referred to as ASSIGNOR, is the or an owner of certain new and useful improvements in the above identified European patent application (with the title "Method and System for making functional devices available to participants of meetings") (hereinafter referred to as the INVENTION).

WHEREAS, BARCO NV

whose post office address is President Kennedy Park 35, 3500 Kortrijk, Belgium,

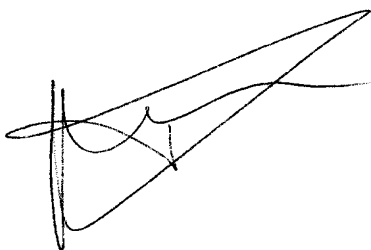
hereinafter referred to as ASSIGNEE, is desirous of acquiring the entire right, title and interest in and to the INVENTION in the United States and any other country;

NOW, THEREFORE, for good and valuable consideration, receipt of which is hereby acknowledged, I, ASSIGNOR, by these presents do sell, assign and transfer unto said ASSIGNEE, the entire right, title, and interest in and to said INVENTION and application for the United States, including any and all letters patents granted on any division or continuation patent applications, continuation in part patent applications and re-issue of said application.

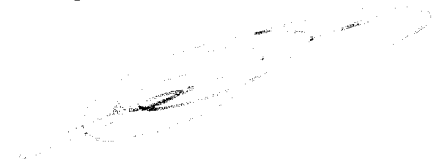
ALSO, ASSIGNOR, by these presents does sell, assign and transfer unto said ASSIGNEE, the entire right, title, and interest in and to said INVENTION in any or all other countries, and the right to claim priority from said United States application under the Paris Convention and other applicable international agreements in any subsequent applications pertaining to said INVENTION, including any national, regional, or international applications for patents, continuation patent applications, continuation in part patent applications, divisional patent applications, and patents derived therefrom or utility models.

ALSO, ASSIGNOR hereby agrees to execute any documents that legally may be required in connection with the filing, prosecution and maintenance of said application or any other patent application(s) in any country for said INVENTION, including additional documents that may be required to affirm the rights of ASSIGNEE in and to said INVENTION, all without further consideration. ASSIGNOR also agrees, without further consideration and at ASSIGNEE's expense, to identify and communicate to ASSIGNEE at ASSIGNEE's request documents and information concerning the INVENTION that are within ASSIGNOR's possession or control, and to provide further assurances and testimony on behalf of ASSIGNEE that lawfully may be required of ASSIGNOR in respect of the prosecution, maintenance and defense of any patent application or patent encompassed within the terms of this instrument. ASSIGNOR's obligations under this instrument shall extend to ASSIGNOR's heirs, executors, administrators and other legal representatives.

ALSO, ASSIGNOR hereby authorizes and requests the Commissioner of Patents and/or the Director of the United States Patent and Trademark Office (USPTO) to issue any and all patents referred to above to ASSIGNEE, as the ASSIGNEE of the entire right, title and interest in and to the same, for ASSIGNEE's sole use and behoof; and for the use and behoof of ASSIGNEE's legal representatives and successors, to the full end of the term for which such Letters Patent may be granted, as fully and entirely as the same would have been held by ASSIGNOR had this assignment and sale not been made.



Assignment Gauthier RENARD 1/2



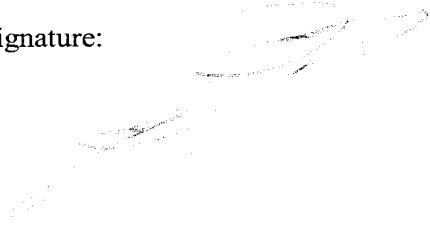
ASSIGNOR authorizes any member of the firm of *Bacon & Thomas, PLLC*, USPTO Customer No. 23364, to insert or complete any information in the assignment portion of this document needed to effect its recordal in the USPTO.

LEGAL NAME OF INVENTOR/ASSIGNOR

Name: Gauthier RENARD

Date: 15/ 03 /2018

Signature:



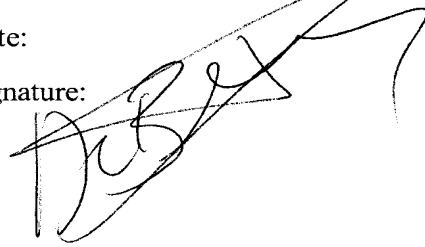
LEGAL NAME OF ASSIGNEE

Name: BARCO NV

Represented by: WIN DE BRUYNE,

Date:

Signature:



Assignment Gauthier RENARD 2/2



## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	33195787
<b>Application Number:</b>	15858668
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	6421
<b>Title of Invention:</b>	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS
<b>First Named Inventor/Applicant Name:</b>	Gauthier RENARD
<b>Customer Number:</b>	23364
<b>Filer:</b>	Thomas J. Moore
<b>Filer Authorized By:</b>	
<b>Attorney Docket Number:</b>	RENA3002/TJM/TL
<b>Receipt Date:</b>	17-JUL-2018
<b>Filing Date:</b>	29-DEC-2017
<b>Time Stamp:</b>	11:23:45
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Oath or Declaration filed	RENA3002_Declarations.pdf	287854  4c92aa86532ca4355ce785e92dc964e11c680d32	no	2

### Warnings:

Information:					
2	Power of Attorney	Barco_General_POA_filing.pdf	163771 67a9f7b51e2d9cddd913f2d0e1e51e4da58f6fc8	no	1
Warnings:					
Information:					
3	Assignee showing of ownership per 37 CFR 3.73	RENA3002_373_Statement.pdf	117401 6f14f3010f91122362272af898493a2abd7ae583	no	3
Warnings:					
Information:					
4	Assignee showing of ownership per 37 CFR 3.73	RENA3002_DEGRAEF_Assignments.pdf	274627 4ee6f402eb4469612abf47e69bcd454697c37bd6	no	2
Warnings:					
Information:					
5	Assignee showing of ownership per 37 CFR 3.73	RENA3002_RENARD_Assignment.pdf	190429 36da5b2e0af83aaa20ab5247a3d3da950819ef45	no	2
Warnings:					
Information:					
<b>Total Files Size (in bytes):</b>			1034082		
<p><b>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.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b>  <b>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.</b></p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b>  <b>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.</b></p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b>  <b>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.</b></p>					

Attorney Ref: RENA3002/TJM/TL

**DECLARATION**

**TITLE OF INVENTION:** METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS


As a below named inventor, I hereby declare that:

This declaration is directed to:

- The accompanying utility or design patent application, or
- United States application or PCT international application number:  
15/858,668 filed on December 29, 2017

1. The above-identified application was made or authorized to be made by me.
2. I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.
3. I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

***By signing this declaration, the inventor(s) confirms that the application, including the claims, has been read and understood and that the inventor is aware of the duty to disclose to the U.S. Patent and Trademark Office all information known to the inventor(s) to be material to patentability as defined in 37 CFR§1.56.***

LEGAL NAME OF INVENTOR			
Name:	Gauthier RENARD	Date:	15/03/2018
Signature:			

Attorney Ref: RENA3002/TJM/TL

**DECLARATION**

**TITLE OF INVENTION:** METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS


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- United States application or PCT international application number:  
15/858,668 filed on December 29, 2017

1. The above-identified application was made or authorized to be made by me.
2. I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.
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LEGAL NAME OF INVENTOR			
Name:	Johan Peter Frans DEGRAEF	Date:	19/03/18
Signature:			



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United States Patent and Trademark Office  
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/858,668	12/29/2017	Gauthier RENARD	RENA3002/TJM/TL

**CONFIRMATION NO. 6421**

**POA ACCEPTANCE LETTER**



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

Date Mailed: 07/20/2018

**NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY**

This is in response to the Power of Attorney filed 07/17/2018.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/sleutchit/



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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO. Includes details for application 15/858,668, inventor Gauthier RENARD, and examiner MISIURA, BRIAN THOMAS.

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



***Notice of Pre-AIA or AIA Status***

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

**Detailed Action**

***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 19 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claim 19 recites “a computer program product for carrying out the method steps of claim 10 when executed on a processor”. However, a computer program product that is not tangibly stored on a non-transitory medium is considered to be directed to non-statutory subject matter. Not until Claim 20 is it positively recited in the claims that the computer program product is stored on a non-transitory medium.

- The Examiner suggests combining the limitations of claims 19 and 20 to positively recite the computer program product embodiment as directed to statutory subject matter. A potential amendment could include:

“A computer program product comprising a non-transitory signal storage means for storing computer program instructions that, when executed on a processor, carry out any of the method steps of claim 10.



### ***Claim Interpretation***

The following is a quotation of 35 U.S.C. 112(f):

(f) Element in Claim for a Combination. – An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

The following is a quotation of pre-AIA 35 U.S.C. 112, sixth paragraph:

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

The claims in this application are given their broadest reasonable interpretation using the plain meaning of the claim language in light of the specification as it would be understood by one of ordinary skill in the art. The broadest reasonable interpretation of a claim element (also commonly referred to as a claim limitation) is limited by the description in the specification when 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, is invoked.

As explained in MPEP § 2181, subsection I, claim limitations that meet the following three-prong test will be interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph:

- (A) the claim limitation uses the term “means” or “step” or a term used as a substitute for “means” that is a generic placeholder (also called a nonce term or a non-structural term having no specific structural meaning) for performing the claimed function;
- (B) the term “means” or “step” or the generic placeholder is modified by functional language, typically, but not always linked by the transition word “for” (e.g., “means for”) or another linking word or phrase, such as “configured to” or “so that”; and
- (C) the term “means” or “step” or the generic placeholder is not modified by sufficient structure, material, or acts for performing the claimed function.

Use of the word “means” (or “step”) in a claim with functional language creates a rebuttable presumption that the claim limitation is to be treated in accordance with 35

U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph. The presumption that the claim limitation is interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, is rebutted when the claim limitation recites sufficient structure, material, or acts to entirely perform the recited function.

Absence of the word “means” (or “step”) in a claim creates a rebuttable presumption that the claim limitation is not to be treated in accordance with 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph. The presumption that the claim limitation is not interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, is rebutted when the claim limitation recites function without reciting sufficient structure, material or acts to entirely perform the recited function.

Claim limitations in this application that use the word “means” (or “step”) are being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, except as otherwise indicated in an Office action. Conversely, claim limitations in this application that do not use the word “means” (or “step”) are not being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, except as otherwise indicated in an Office action.

- Claim 20 recites the term “means”, which is supported by lines 17-21 of the Specification as originally filed.

### ***Claim Rejections - 35 USC § 102***

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

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

A person shall be entitled to a patent unless –

(a)(1) the claimed invention was patented, described in a printed publication, or in public use, on sale or otherwise available to the public before the effective filing date of the claimed invention.

Claim 1-20 are rejected under 35 U.S.C. 102(a)(1) as being anticipated by **Brands** et al. U.S. PGPUB No. 2015/0121466.

Per Claim 1, Brands discloses a system for connecting a processing device (**Paragraph 118, processing device 31**) to a functional device (**Paragraphs 120-121; display 44, whiteboard 45, camera 35, microphones 38**) connected to or in a base unit (**Paragraphs 119-121; base node 36**) of a communications network (**network 50**), the processing device having a memory, a display and an operating system (**Paragraph 118; Devices such as laptop computers and tablet computing devices each have those elements.**), the system comprising: a first peripheral device (**connection units 47**) being adapted to be coupled to the processing device via a generic communications protocol (**Paragraphs 118, 126, 140**), the base unit having a transmitter and the first peripheral device having a receiver (**Paragraphs 129-130**) and at least one fixed or a configurable endpoint of the functional device exposed on the first peripheral device (**Paragraphs 121-123 and 125-128**); the base unit and the first peripheral device being adapted to transmit and receive data respectively over the communications network from the functional device to the processing device via the at least one fixed or configurable endpoint using the generic communications protocol for communication between the processing device and the first peripheral device (**Paragraphs 120-131**).

Per Claim 2, Brands discloses the system of claim 1 wherein the functional device is any one or more of a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a video camera, a webcam (**Paragraphs 120-122**).

Per Claim 3, Brands discloses the system of claim 1 wherein the at least one fixed or a configurable endpoint of the functional device exposed on the first peripheral device is one of a human interface device, a mass storage device, a composite device, a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a video camera, or a webcam (**Paragraphs 120-122**).

Per Claim 4, Brands discloses the system of claim 1 further comprising means for encoding, optionally encrypting the data (**Paragraphs 60, 63, and 256**).

Per Claim 5, Brands discloses the system of claim 1 wherein the processing device is adapted to host a unified communication between two or more further processing devices (**Paragraphs 118, 119, 124**).

Per Claim 6, Brands discloses the system of claim 5 wherein the first peripheral device is adapted to present a functional device to the unified communication between two or more processing devices (**Paragraphs 125, 127**).

Per Claim 7, Brands discloses the system of claim 1 adapted to expose the same type of functional device to the processing device as is connected to the Base Unit further comprising at least one driver for the functional device installed on the processing device (**Paragraphs 138, 269, 274**).

Per Claim 8, Brands discloses the system of claim 1 wherein the functional device is a second peripheral device (**Paragraphs 120-122**).

Per Claim 9, Brands discloses the system of claim 1 wherein the functional device is a data capturing device (**Paragraphs 120-122; Devices such as cameras 35/39-41, whiteboard 45, and/or microphones 38 are all data capturing devices.**).

Per Claims 10-16, please refer to the above rejection of claims 1-7, as the limitations are substantially similar.

Per Claim 17, please refer to the above rejection of claim 1, as the limitations are substantially similar. Specifically, the peripheral device of claim 1, is taught by Brands teachings of connection units 47.

Per Claim 18, Brands discloses the peripheral device of claim 17 wherein the at least one fixed or a configurable endpoint of the functional device exposed on the first peripheral device is one of a human interface device, a mass storage device, a composite device, a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a video camera, or a webcam (Paragraphs 120-122).

Per Claims 19 and 20, Brands discloses the teachings of claim 10 as a computer program product embodiment, including a non-transitory signal storage means (Paragraphs 57-69, 243, 254).

\* \* \* \* \*

Claims 1-3, 5, 6, 8-12, 14, 15, 17, and 18 are also rejected under 35 U.S.C. 102(a)(1) as being anticipated by **Leete, III**, U.S. PGPUB No. 2014/0362161.

Per Claim 1, Leete, III discloses a system for connecting a processing device (**user device 18**) to a functional device (**Paragraph 18, multimedia device(s) 20**) connected to or in a base unit of a communications network (**Paragraph 17, hub 16**), the processing device having a memory, a display and an operating system (**Paragraph 18; Devices such as laptop computers, smartphones, and tablet computing devices each have those elements.**), the system comprising: a first peripheral device being adapted to be coupled to the processing device via a generic communications protocol (**Paragraphs 17, 27, 28, and 30; Figures 2 and 3; remote connection devices 22**), the base unit having a transmitter (**Paragraphs 20-21; radio transceiver 24**) and the first peripheral device having a receiver (**Paragraph 27; radio transceiver 32**) and at least one fixed or a configurable endpoint of the functional device exposed on the first peripheral device (**Paragraph 32, Figure 3; Remote connection device 22, when connected to user device 18, allows user device 18 to select, control, and communication with/via the one or more selected multimedia devices 20.**); the base unit (**hub 16**) and the first peripheral device (**remote connection devices 22**) being adapted to transmit and receive data respectively over the communications

network from the functional device (**multimedia devices 20**) to the processing device (**user device 18**) via the at least one fixed or configurable endpoint using the generic communications protocol for communication between the processing device and the first peripheral device (**Paragraph 32**).

Per Claim 2, Leete, III discloses the system of claim 1 wherein the functional device is any one or more of a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a video camera, a web-camera (**Paragraph 18**).

Per Claim 3, Leete, III discloses the system of claim 1 wherein the at least one fixed or a configurable endpoint of the functional device exposed on the first peripheral device is one of a human interface device, a mass storage device, a composite device, a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a video camera, or a web-camera (**Paragraphs 18 and 32**).

Per Claim 5, Leete, III discloses the system of claim 1 wherein the processing device is adapted to host a unified communication between two or more further processing devices (**Paragraph 31**).

Per Claim 6, Leete, III discloses the system of claim 5 wherein the first peripheral device is adapted to present a functional device to the unified communication between two or more processing devices (**Paragraph 31**).

Per Claim 8, Leete, III discloses the system of claim 1 wherein the functional device is a second peripheral device (**Paragraph 18; multimedia devices 20**).

Per Claim 9, Leete, III discloses the system of claim 1 wherein the functional device is a data capturing device (**Paragraph 18, Multimedia devices 20 can comprise data capturing devices such as a telephony system, VOIP system, camera, electronic white-board, etc.**).

Per Claims 10-12, 14, and 15, please refer to the above rejection of claims 1-3, 5, and 6, respectively, as the limitations are substantially similar.

Per Claim 17, please refer to the above rejection of claim 1, specifically, the limitations discussing the claimed peripheral device (**as taught by the remote connection devices 22 of Leete, III**), as they are substantially similar.

Per Claim 18, please refer to the above rejection of claim 3, as the limitations are substantially similar.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRIAN T MISIURA whose telephone number is (571)272-0889 - (Direct Fax: 571-273-0889). The examiner can normally be reached on M-F: 8-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tim Vo can be reached on (571) 272-36423642. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Brian T Misiura/

Primary Examiner, Art Unit 2185

<b>Notice of References Cited</b>	Application/Control No. 15/858,668	Applicant(s)/Patent Under Reexamination RENARD et al.	
	Examiner BRIAN T MISIURA	Art Unit 2185	Page 1 of 1

**U.S. PATENT DOCUMENTS**

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20150121466-A1	04-2015	Brands; Johannes Willem	H04L63/08	726/4
*	B	US-9722986-B2	08-2017	Brands; Johannes Willem	H04L63/08	1/1
*	C	US-9538138-B2	01-2017	Leete, III; Lawrence F.	H04N7/152	1/1
*	D	US-20140362161-A1	12-2014	Leete, III; Lawrence F.	H04N7/152	348/14.02
*	E	US-9083769-B2	07-2015	Beel; Koen Simon Herman	G06F3/04842	1/1
*	F	US-8896656-B2	11-2014	Epstein; Lewis	H04N5/268	348/14.07
*	G	US-8756348-B2	06-2014	Beel; Koen Simon Herman	H04M3/567	710/20
*	H	US-8316138-B2	11-2012	Chang; Kuo-Lung	G06F3/1462	709/227
*	I	US-20100302130-A1	12-2010	Kikuchi; Yosuke	G06F3/0481	345/1.3
*	J	US-20100115145-A1	05-2010	BANERJEE; SHYMMON	G06F9/4413	710/10
*	K	US-20090198839-A1	08-2009	Banerjee; Shymmon	G06F9/4411	710/10
	L					
	M					

**FOREIGN PATENT DOCUMENTS**


*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

**NON-PATENT DOCUMENTS**

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	Barco - ClickShare Brochure; 20 Pages, Dated November 2018 (Year: 2018)
	V	
	W	
	X	

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.



<b><i>Search Notes</i></b> 	<b>Application/Control No.</b> 15/858,668	<b>Applicant(s)/Patent Under Reexamination</b> RENARD et al.
	<b>Examiner</b> BRIAN T MISIURA	<b>Art Unit</b> 2185

CPC - Searched*		
Symbol	Date	Examiner
H04M3/567	03/25/2019	BTM
H04L65/4038, 403		
H04L12/1813		

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

\* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
IDS Consideration, Inventor, NPL Database, CPC, and EAST Search	03/25/2019	BTM

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

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

PTO/SB/08a (02-18)  
 Approved for use through 11/30/2020. OMB 0651-0031  
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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	15858668
	Filing Date	2017-12-29
	First Named Inventor	Gauthier RENARD
	Art Unit	TBA
	Examiner Name	TBA
	Attorney Docket Number	RENA3002/TJM/TL

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Examiner Initial*	Cite No	Publication Number	Kind Code <sup>1</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	
	1	20020196378	A1	2002-12-26	SLOBODIN ET AL.		

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Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2i</sup>	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>
	1	2013037980	WO	A2	2013-03-21	BARCO N.V.		

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**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number		15858668
Filing Date		2017-12-29
First Named Inventor	Gauthier RENARD	
Art Unit	TBA	
Examiner Name	TBA	
Attorney Docket Number	RENA3002/TJM/TL	

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

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STATEMENT BY APPLICANT**  
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Filing Date	2017-12-29		
First Named Inventor	Gauthier RENARD		
Art Unit	TBA		
Examiner Name	TBA		
Attorney Docket Number	RENA3002/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).

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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.

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Signature	/Thomas J. Moore/	Date (YYYY-MM-DD)	2018-03-28
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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## EAST Search History

## EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S2	1	((("RENARD") near3 ("Gauthier")) OR ((("DEGRAEF") near3 ("Johan")))).INV.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	ON	2019/03/21 06:22
S3	3	"20020196378"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/03/21 06:24
S4	23	"8756348"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/03/21 06:27
S5	12	"2013037980"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/03/21 07:14
S6	5	"20150169477"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/03/21 07:16
S7	2	"20170351621"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/03/21 17:40
S8	1152	barco.as.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/03/22 06:00
S9	348	barco.as. and (microphone or speaker or projector or camera)	US-PGPUB; USPAT; USOCR;	ADJ	ON	2019/03/22 06:02

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S10	4	"2001089156"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/03/22 06:15
S11	13	"6917964"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/03/22 06:16
S12	13	"2010105335"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/03/22 06:16
S13	4	"20100302454"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/03/22 06:18
S14	42	("20020174254"   "20020196378"   "20040125777"   "20040128354"   "20040263636"   "20050015719"   "20050036509"   "20050122392"   "20060031779"   "20060095376"   "20070005809"   "20070033289"   "20070065078"   "20070109410"   "20070244970"   "20090046139"   "20090064302"   "20090092198"   "20090198839"   "20090235170"   "20090247006"   "20090300520"   "20100066806"   "20100087139"   "20100302130"   "20100302454"   "20100332663"   "20110023096"   "20110078716"   "20110115689"   "20110150433"   "20110179182"   "20110180380"   "20120331509"   "20130050254"   "20130054348"   "20130060662"   "20130067121"   "20140082227"   "6966035"   "8316138"   "8346753").PN. OR ("10050800").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/03/22 06:21
S15	6	((("20090064302") or ("20110078716")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/03/22 06:34
S16	0	S8 and functional device	US-PGPUB; USPAT;	ADJ	ON	2019/03/22 06:37

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S17	29	S8 and ((screen\$1 with (share\$1 or sharing)) or lecture or seminar or collaborative or skype)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/03/22 06:41
S18	105	S8 and (encod\$3 or encrypt\$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/03/22 06:52
S19	14	(US-20150169477-\$ or US-20150089395-\$ or US-20100302130-\$ or US-20090198839-\$ or US-20150121466-\$ or US-20150263905-\$).did. or (US-7180475-\$ or US-8756348-\$ or US-8896656-\$ or US-8316138-\$ or US-9722986-\$ or US-9083769-\$).did. or (WO-2013037980-\$).did.	US-PGPUB; USPAT; FPRS	ADJ	ON	2019/03/22 09:33
S20	8	S19 and driver\$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/03/22 09:33
S21	3	("20130067121").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/03/22 09:40
S22	5744	barco not S8	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/03/22 09:51
S23	471	S22 and ((screen\$1 with (share\$1 or sharing)) or lecture or seminar or collaborative or skype or conference or meeting)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/03/22 09:51
S24	52	ClickShare	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	ADJ	ON	2019/03/22 09:53



			IBM_TDB			
S25	47	("20030098819"   "20050078172"   "20050135611"   "20050176416"   "20060160489"   "20060258300"   "20070287498"   "20090156120"   "20090328189"   "20100046455"   "20100115145"   "20100302454"   "20100321402"   "20110090942"   "20110134852"   "20120082069"   "20120083215"   "20120133727"   "20120202426"   "20120278192"   "20120300759"   "20130016079"   "20130029685"   "20130034184"   "20130044695"   "20130050398"   "20130070739"   "20130084796"   "20130094439"   "20150035938"   "7142812"   "7593704"   "7912449"   "7912506"   "7965837"   "8218427"   "8229352"   "8259647"   "8265657"   "8279784"   "8285223"   "8306483"   "8320877"   "8326221"   "8332495"   "8345577"   "8396042").PN. OR ("9538138").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/03/22 10:07
S26	4	LiteShow	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/03/22 10:17
S27	18	(US-20150169477-\$ or US-20150089395-\$ or US-20100302130-\$ or US-20090198839-\$ or US-20150121466-\$ or US-20150263905-\$ or US-20130067121-\$ or US-20100115145-\$ or US-20140362161-\$).did. or (US-7180475-\$ or US-8756348-\$ or US-8896656-\$ or US-8316138-\$ or US-9722986-\$ or US-9083769-\$ or US-9538138-\$).did. or (WO-2013037980-\$).did.	US-PGPUB; USPAT; FPRS	ADJ	ON	2019/03/22 10:26
S28	26660	( (H04M3/567 OR H04L65/4038 OR H04L12/1813 OR H04L65/403).CPC. )	US-PGPUB; USPAT; FPRS	ADJ	ON	2019/03/22 10:28
S29	13006	S28 and (collaborat\$3 or group)	US-PGPUB; USPAT; FPRS	ADJ	ON	2019/03/22 10:29
S30	8618	S29 and (shared or share or sharing)	US-PGPUB; USPAT; FPRS	ADJ	ON	2019/03/22 10:29
S31	11	S27 and (encod\$3 or encrypt\$3)	US-PGPUB; USPAT; FPRS	ADJ	ON	2019/03/22 14:49

**EAST Search History (Interference)**

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	15858668
	Filing Date	2017-12-29
	First Named Inventor	Gauthier RENARD
	Art Unit	2185
	Examiner Name	Brian Thomas Misiura
	Attorney Docket Number	RENA3002/TJM/TL

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	1	20060075100	A1	2006-04-06	Stirbu		
	2	20140148152	A1	2014-05-29	Periyalwar et al.		

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	1	1879143	EP	A2	2008-01-16	Bally Gaming Inc.		
	2	3099009	EP	A1	2016-11-30	Barco N.V.		

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	Attorney Docket Number	RENA3002/TJM/TL

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	1	International Search Report in corresponding PCT Application No. PCT/EP2018/086537, dated April 10, 2019.	
	2	Written Opinion in corresponding PCT Application No. PCT/EP2018/086537, dated April 10, 2019.	

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	Art Unit	2185
	Examiner Name	Brian Thomas Misiura
	Attorney Docket Number	RENA3002/TJM/TL

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A certification statement is not submitted herewith.

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

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2019-04-17
Name/Print	THOMAS LEE	Registration Number	66396

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(54) **Universal game monitoring unit and system**

(57) An embedded user interface incorporated into a gaming device, the gaming device including a gaming processor for controlling the base game. The embedded user interface includes: a player tracking interface and an embedded processor. The player tracking interface includes (or is associated with) a display screen and enables display of a system game to a user, presentation of information to the user, and reception of information from the user. The embedded processor employs an internal operating system and communicates with the gaming processor, enables control of the system game, control of player tracking information, and control of non-gaming information. In one embodiment, the embedded user interface enables control of a system game of which at least a portion of the system game is presented physically external to the embedded user interface. In another embodiment, the embedded user interface enables control of a system gaming indicator that is physically external to the embedded user interface. In still another embodiment, communication between a game processor and an embedded user interface is only enabled through the gaming network and is not direct enabled via a direct connection.

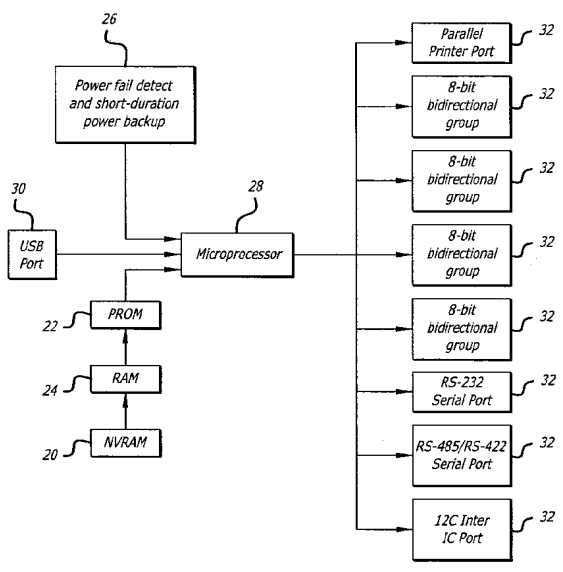


FIG. 1

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**Description**

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10 **CROSS-REFERENCE TO RELATED APPLICATIONS**

**[0002]** This application is a continuation-in-part of U.S. Patent Application Serial No. 10/943,771 filed September 16, 2004, entitled USER INTERFACE SYSTEM AND METHOD FOR A GAMING MACHINE, which is hereby incorporated herein by reference. This application is also a continuation-in-part of U.S. Patent Application Serial No. 09/746,854 filed 15 December 22, 2000, entitled GENERIC DEVICE CONTROLLER UNIT AND METHOD, which is hereby incorporated herein by reference. This application claims priority to U.S. Provisional Patent Application Serial No. 60/714,754 filed September 7, 2005, entitled SYSTEM GAMING APPARATUS AND METHOD, which is hereby incorporated herein by reference.

20 **FIELD OF THE INVENTION**

**[0003]** This invention relates generally to a gaming system, and more particularly, to a system and methodology that integrates an embedded user interface into a gaming machine.

25 **BACKGROUND OF THE INVENTION**

**[0004]** For some time now, there has been a growing need to be able to inexpensively and easily connect a number of arbitrary devices to a computer running a standard operating system such as Microsoft® WINDOWS®. However, connecting devices to a computer running such a complicated operating system presents at least two vexing problems 30 to the system designer.

**[0005]** The first problem involves the matter of physical interconnection, that is, some type of custom device is to be plugged into the computer. General purpose "IBM-compatible" computers have become more and more powerful and less and less expensive with every passing month, but that market is driven by a handful of more or less universal needs, such as a printer, a monitor, a keyboard, a mouse, a modem, and a hard disk. The modem hardware platform is optimized 35 for accommodating these elements.

**[0006]** Meanwhile, the addition of custom equipment generally has meant either building an expansion board designed to specifically interface to that equipment, or buying a general purpose board that could be adapted to that purpose. The least expensive of these options is to add an expansion board by building or buying an industry-standard architecture (ISA) board. However, as time goes on, modem central processing unit (CPU) boards are being built with fewer and 40 fewer ISA slots. Many central processing unit boards these days have only one ISA slot. This forces designers to have to develop much more complicated and expensive Peripheral Component Interface (PCI) boards. A PCI bus provides a high-bandwidth data channel between system board components, such as the CPU, and devices, such as hard disks and video adapters. Another problem experienced today is that most central processing unit boards have a limited number of com ports. This creates a limitation in the number of devices that can be utilized.

45 **[0007]** The second problem facing the system designer that wants to incorporate custom hardware into a WINDOWS® environment is the issue of software development. Operating systems, by definition, are in charge of resource management. To that end, operating systems regard any and all hardware attached to the system as belonging to the operating system. As a result, user access to that hardware is supposed to be mediated by the operating system.

50 **[0008]** WINDOWS® NT, for example, being a secure operating system environment, rigorously enforces that rule. Accordingly, the result of user access to hardware being mediated by the NT operating system is that any effort by an application to access hardware directly is intercepted and disabled by the operating system. Hence, access to hardware can only be achieved through device drivers which are assumed to be trustworthy because they are loaded into the operating system at boot time.

55 **[0009]** Moreover, device driver programming is one of the most difficult software development paradigms in existence. Programming mistakes tend to make the computer crash, often without any indication of what went wrong. Debugging tools are primitive and difficult to use, and are limited in the information they convey. Each compile load-test cycle requires that the target machine be shut down and rebooted, which can take several minutes. Thus, the debugging process is often slow and discouraging work. In addition, many designers avoid performing WINDOWS® driver development. As

a result, it is desirable to remove the need for developers to have to perform such work.

**[0010]** Another major problem experienced when connecting a number of arbitrary devices to a computer running a standard operating system, again, such as Microsoft® WINDOWS®, is the issue of real time device control. Essentially, true real time depends upon the application. A standard WINDOWS® environment, such as WINDOWS® 98 or WINDOWS® 2000, does not actually have true real time device control requirements for resource management by the operating system. The operating system simply performs the ordered functions as soon as it is able, which is usually in a sub-200 millisecond time frame. This time frame is small enough that most people equate this response time to be "real time," but in actuality it is not "true real time."

**[0011]** However, many peripheral devices actually have true real time device control requirements that are more precise than the above-stated time interval. For example, loaves of bread may be traveling down a conveyer belt at a given number of miles per hour. These loaves of bread have to be sprayed by a butter sprayer at precise time intervals as the loaves of bread pass the sprayer. If these true real time device control requirements are not maintained, the butter sprayer will miss the loaves of bread as they pass by the sprayer. Unfortunately, previous attempts to make the standard WINDOWS® operating systems function with true real time device control (such as with layered real time systems or real time kernels), have proved to be undesirably expensive, complicated, and inflexible, requiring more com ports to be added. Further, these ports are slow (typically 9600 baud) and do not address the need to mix high speed data (video) and low speed data (mouse clicks) communications.

**[0012]** Traditionally, gaming machines have been designed for gaming purposes only. In this regard, gaming machines have been constructed only to include gaming functionality. Recently, however, casino owners have become aware that by adding additional features to gaming machines, they may be able to maintain a player's attention to the gaming machines for longer periods of time. This, in turn, leads to the player wagering at the gaming machine for longer periods of time, thereby increasing casino profits.

**[0013]** One technique that has been employed to maintain a player's attention at the gaming machine has been to provide players with access to gambling-related information. By attaching a small electronic display to the gaming device, gambling-related information, as well as news and advertisements can be sent to the player. The gambling-related information may include, for example, information on sports betting and betting options for those sporting events. Additionally, the gambling-related information may also include information such as horse racing and off-track betting. News and advertisements can also maintain a player's attention by providing the player with access to information ranging from show times, to restaurant and hotel specials, and to world events, thus reducing the need and/or desire for the player to leave the gaming machine.

**[0014]** Moreover, it would be desirable to provide the player with interactive access to the above information. This type of interactivity would allow players significantly more flexibility to make use of the above-described information. The gambling-related information could also be utilized by the player in a much more efficient manner. In this regard, greater levels of flexibility and access are likely to make a player remain and gamble at the gaming machine for significantly longer periods of time. Unfortunately, the system components that are currently utilized for displaying and accessing this type of information, such as external keypads and display modules, are extremely limited in the functionality and capabilities that they provide, thus limiting the success of their ability to maintain a player's attention.

**[0015]** As stated above, attempts to distribute gaming-related information and advertisements to players, has typically required additional system components to be attached to the gaming devices separately and apart from the construction of the gaming machine itself. Specifically, these components for accessing and displaying information from gaming machines have been extremely limited in their usefulness because of the lack of capabilities inherent in these components. Such components have generally included a keypad, card reader, and display equipment, such as a 2-line LED display. It would be desirable for these components to be integrated into the gaming device itself, in a more unified fashion to provide substantially greater functionality than that which has been previously available.

**[0016]** Furthermore, the collection data of gaming-related information and the playing habits of individual players can be of significant marketing value to the operators of the gaming devices. This information enables gaming operators to more effectively focus their marketing efforts on customers, through direct mail, contact in the gaming premise, organization of special events targeting better customers, and an array of techniques that are well known to individuals who practice the marketing craft in gaming environments.

**[0017]** Marketing experts typically like to have a wide range of information available regarding the aggregate play habits of customers, as well as the specific habits of each customer. The types of data desired for such marketing purposes include the frequency of play, the duration of play, the amount of money wagered, the amount won, and the types of games played. The collection of such data is accomplished most commonly by the use of "player tracking systems." These computer systems typically identify players through the use of a magnetic stripe card (i.e., a player tracking card) that a player inserts into a card reader attached to the gaming device before beginning play. In such a system, gaming devices are typically fitted with player tracking components that include a magnetic stripe card reader, a display device, and generally several buttons that provide players with at least some ability to communicate with the player tracking system.



[0018] In some systems, a microprocessor (or computer) is located in the gaming device that controls the player tracking devices. An additional responsibility of this microprocessor is to communicate with the gaming machine itself to monitor the play that is occurring. In this manner, the player tracking system identifies the player who is playing by reading the player's magnetically encoded card. The player tracking system is also aware of the game play activity on the gaming machine that the player is playing. The player tracking system computer typically collects all game play data from a network of gaming machines and accumulates it into a large data store in a database system. The accumulation of game play data in the database enables many types of analysis, as well as the formulation of marketing and sales strategies to improve the business operation of the gaming operator.

[0019] An occurrence that assists data collection is that several common communication protocols have emerged that enable ready communication between gaming devices and player tracking systems. Many protocols are well known and are used by a variety of player tracking system suppliers. These protocols are typically available in gaming devices that are installed in gaming venues, especially traditional domestic casinos, and make implementation of player tracking systems a reasonably straight-forward process.

[0020] Sometimes however, problems occur in gaming devices that are not produced primarily for traditional domestic casino use. This may happen for any of a wide variety of reasons. One example of such a potentially problematic system is a "video lottery." A video lottery system is a network that interconnects machines in a variety of physical locations. The controlling computer system collects accounting data from gaming machines in the network and has various other control and monitoring functions. Generally, in such a system, the gaming devices are interconnected to a wide area network and use different software structures and communication mechanisms than those found in mainstream casino based systems. They are often not configured to support communications to traditional player tracking systems. In particular, they may not support or be configured with appropriate protocols. Furthermore, they may not be approved by the appropriate regulatory bodies.

[0021] In this regard, the diversity of games and manufacturers, as well as the cost of regulatory approvals, makes the addition of player tracking capabilities a very time-consuming and expensive process. It is further complicated by the need to coordinate software and installation among what may be a large diversity of manufacturers, each potentially having differing priorities, capabilities, and motivations. Indeed, the costs associated with such player tracking systems can offset the benefits of installing a player tracking system. The problem extends past video lotteries to many types of non-traditional systems, including Bingo-based games (Indian Gaming Regulatory Act Class 2), European "street machines" (also known as Amusement With Prizes), and various types of international systems.

[0022] Player tracking systems have also long been relegated to small displays and fairly generic sound capabilities. Additionally, a wider variety of output (and potentially input) devices are also desirable. Furthermore, promotional and/or system-based games are new and have thus far been limited to video presentations on fairly small screens.

[0023] Accordingly, those skilled in the art have recognized the need for a device controller that has overcome the previous difficulties associated with physical interconnections between hardware, software, and operating systems; software development issues; and promotional game and system game device control.

## SUMMARY OF THE INVENTION

[0024] In accordance with embodiment, an embedded user interface system associated with a gaming machine, wherein the gaming machine includes a gaming screen and a gaming processor. More particularly, the embedded user interface system includes a web content capable display screen, an embedded processor, and a dictionary extension. The web content capable display screen presents information to a user via the display screen. The embedded processor utilizes an internal operating system. The dictionary extension receives an incoming text string, parses the text string to identify a navigation command and pull a uniform resource locator from the text string, loads the uniform resource locator pulled from the text string into a variable, and indirectly navigates the web content capable display screen to the uniform resource locator in the variable. In this manner, the web content capable display screen increases user excitement by providing a richer gaming experience.

[0025] In accordance with another aspect of a preferred embodiment, the incoming data received by the embedded additional user interface are I<sup>2</sup>C messages (or other serial communications). Preferably, the embedded processor communicates with the gaming processor, and/or other connected devices, over an I<sup>2</sup>C bus (or other serial communications bus). The web content capable display screen of the embedded additional user interface is preferably a color graphic touch screen display. Preferably, the embedded processor is at least a 32-bit processor. Further, the internal operating system of an embedded additional user interface is preferably customized to match the specific hardware to which the internal operating system attaches.

[0026] In accordance with another aspect of a preferred embodiment, the embedded processor utilizes cryptographic technology. In one preferred embodiment, a certification process is offered for authentication and non-repudiation of the web content. Preferably, the certification process provides auditability and traceability. Specifically, the certification process provides sufficient security for gaming regulators to allow casino operators to design their own content.

[0027] In accordance with another aspect of a preferred embodiment, HTML is the web protocol into which the incoming data is translated in the embedded additional user interface. In another preferred embodiment, DHTML is the web protocol into which the incoming data is translated in the embedded additional user interface. In still another preferred embodiment, XML is the web protocol into which the incoming data is translated in the embedded additional user interface. In yet another preferred embodiment, MACROMEDIA FLASH animation technology is the web protocol into which the incoming data is translated in the embedded additional user interface. In one preferred embodiment, the embedded additional user interface connects to an Ethernet-networked backbone. Further, in one preferred embodiment, the embedded additional user interface connects to a web server through an Ethernet-networked backbone.

[0028] In accordance with another preferred embodiment, an embedded user interface system used in association with a gaming machine also includes a web content capable display screen and an embedded processor, as described above. In this embodiment, the dictionary extension receives an incoming text string, parses the text string, initiates a navigation command in response to information in the parsed text string, and navigates the display screen to a uniform resource locator selected by the dictionary extension.

[0029] In accordance with still another preferred embodiment, an embedded user interface system used in association with a gaming machine includes a web page display screen and an embedded processor, as described above. Preferably, the web page display screen presents information to a user via the display screen. In this embodiment, the web page display screen is divided into a plurality of frames that are each capable of displaying a different uniform resource locator. Further, in this embodiment, the dictionary extension receives an incoming text string, parses the text string, initiates a navigation command in response to information in the parsed text string, and navigates a frame of the display screen to a uniform resource locator selected by the dictionary extension.

[0030] In accordance with yet another preferred embodiment, an embedded user interface system used in association with a gaming machine also includes a web content capable display screen and an embedded processor, as described above. In this embodiment, the dictionary extension receives an incoming text string, parses the text string, and in response to information in the parsed text string, initiates a command that launches a pop-up dialog box over a uniform resource locator presented on the display screen without altering the uniform resource locator presented on the display screen.

[0031] One preferred embodiment is directed towards a gaming machine having a gaming presentation. The gaming machine further includes a user interface having a web page display screen, a processor for controlling game play, and a dictionary extension. In this embodiment, the dictionary extension receives an incoming text string, parses the text string, initiates a navigation command in response to information in the parsed text string, and navigates the display screen to a uniform resource locator selected by the dictionary extension.

[0032] In accordance with another preferred embodiment, the claimed invention is directed towards a method for increasing user excitement relating to a gaming machine by providing a richer gaming experience via an embedded user interface system that is incorporated into the gaming machine. Preferably, the embedded user interface system includes an embedded processor, a web page display screen, and a dictionary extension. The method preferably includes: receiving an incoming text string, parsing the text string to identify a navigation command and pull a uniform resource locator from the text string, loading the uniform resource locator pulled from the text string into a variable, and indirectly navigating the web page display screen to the uniform resource locator in the variable.

[0033] In one embodiment, the web content is protected by digital signature verification using DSA (Digital Signature Algorithm) or RSA (Rivest-Shamir-Adleman) cryptographic technology. In this regard, the content is preferably protected using digital signature verification so that any unauthorized changes are easily identifiable. Of course, other suitable protection techniques may also be used in other embodiments.

[0034] Still further, one preferred embodiment utilizes a Message Authentication Code (MAC), which may be used to verify both the content integrity and the authenticity of a message. A Message Authentication Code can be generated faster than using digital signature verification technology, although it is not as robust. In one preferred embodiment, the authentication technique utilized is a BKEY (electronic key) device. A BKEY is an electronic identifier that is tied to a particular individual.

[0035] Typically, in a preferred embodiment, the data is authenticatable and non-repudiatable, rather than hidden or otherwise obfuscated (encrypted). Non-repudiation is a way to guarantee that the sender of a message cannot later deny having sent the message, and that the recipient cannot deny having received the message.

[0036] In accordance with one preferred embodiment, one or more gaming machine system or embedded additional user interface components (or content) are assigned identification codes. The components are grouped together into a protected group of component bindings using cryptographic security procedures and the identification codes of the components in the bindings group. Accordingly, the bindings prevent falsification or repudiation of content entries with respect to any modifications or replacements of components or content within the bindings group.

[0037] In accordance with another aspect of a preferred embodiment, every content entry must be authenticated by being digitally signed with a Hashed Message Authorization Code that is based on the entry itself and on the individual identification codes of the components and content in the bindings group. In the same manner, every entry that attempts

a replacement of any of the embedded additional user interface components or content must be authenticated by being digitally signed with a Hashed Message Authorization Code that is based on the entry itself and on the individual identification codes of the components and content in the bindings group.

**[0038]** Preferably, the identification codes of the embedded additional user interface components are randomly or pseudo-randomly generated. In accordance with another aspect of the verification system, a Hashed Message Authorization Code key for authenticating access to the component bindings is produced using a SHA-1 hash that is generated using the individual identification codes of the components in the bindings group. Additionally, the embedded additional user interface components are secured within the component bindings using a SHA-1 hash that is generated using the individual identification codes of the components and content in the bindings group.

**[0039]** Other features and advantages of the claimed invention will become apparent from the following detailed description when taken in conjunction with the accompanying drawings, which illustrate by way of example, the features of the claimed invention.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0040]** FIG. 1 illustrates a component diagram of the system architecture of a generic device controller unit system, in accordance with the invention;

**[0041]** FIG. 2 illustrates an operational flow diagram of a generic device controller unit system of the invention configured to interface with a processor and a single peripheral device;

**[0042]** FIG. 3 illustrates an operational flow diagram of a generic device controller unit system of the invention configured to interface with a processor and multiple peripheral devices;

**[0043]** FIG. 4 illustrates an operational flow diagram of a hybrid system of the invention with one generic device controller unit system configured to interface with a processor and a single peripheral device, and a second generic device controller unit system configured to interface with the same processor and various other multiple peripheral devices;

**[0044]** FIG. 5A illustrates a logical data flow diagram from a "light bulb" application to an actual light bulb;

**[0045]** FIG. 5B illustrates a data flow diagram of the top logical transport layer of FIG. 5A, and the logical data flow from an application program interface to a GDCU packet decoder in a second logical transport layer, as well as physical data flow between the top and second layers; and

**[0046]** FIG. 5C illustrates a data flow diagram of the top logical transport layer of FIG. 5A, the second logical transport layer of FIG. 5B with physical data flow between the top and second layers, a logical data flow from USB device drivers to a GDCU USB interface firmware in a third logical transport layer, and a physical data flow from USB host drivers to GDCU USB interface hardware in the bottom physical transport layer, as well as physical data flow between layers.

**[0047]** FIG. 6 illustrates a relational diagram of an embedded additional user interface, constructed in accordance with the claimed invention, utilizing a web page display screen and an embedded processor that receives data messages from a game monitoring unit that are translated into web page content and mapped to the web page display screen;

**[0048]** FIG. 7 illustrates a relational diagram of a prior art gaming system that utilizes a 2x20 VF display and 12-digit keypad;

**[0049]** FIG. 8 illustrates a relational diagram of embedded additional user interface, constructed in accordance with the claimed invention, utilizing a web page display screen and an embedded processor that receives cryptographically certified web page content from a portable computer via a network adapter port;

**[0050]** FIG. 9 illustrates a relational diagram of embedded additional user interface, constructed in accordance with the claimed invention, utilizing a web page display screen and an embedded processor that receives web page content from a back-end server via an Ethernet-networked backbone;

**[0051]** FIG. 10 illustrates a relational diagram of an embedded additional user interface, constructed in accordance with the claimed invention, utilizing a web page display screen and an embedded processor that includes the functionality of a standard gaming processor;

**[0052]** FIG. 11 illustrates an object interaction diagram of embedded additional user interface, constructed in accordance with the claimed invention;

**[0053]** FIG. 12 is a diagram showing the sequence of events that occur when data is sent between the embedded additional user interface and the game monitoring unit; and

**[0054]** FIG. 13 is a diagram showing the sequence of events that occur when a virtual key is pressed on the web page display screen.

**[0055]** FIG. 14 illustrates a universal game monitoring unit that incorporates a display screen and an expanded display device controller that communicates with a game processor, one or more peripheral display devices, and one or more back-end systems;

**[0056]** FIG. 15 illustrates a universal game monitoring unit that enables control of an system game indicator that is physically external to the embedded user interface;

[0057] FIG. 16 is a logical flow diagram showing the gaming process for a system-based game that utilizes an expanded pay presentation controlled by a universal game monitoring unit;

[0058] FIG. 17 illustrates a gaming system that connects gaming devices through networking equipment to a backend computer system that provides control and accounting functions;

5 [0059] FIG. 18 illustrates a traditional gaming system that includes a gaming device networked to an account and control system server, wherein the gaming system does not include a player tracking system or a game monitoring unit (GMU);

[0060] FIG. 19 illustrates a traditional gaming system that includes a gaming device networked to an accounting and control system server and a player tracking system server, wherein the gaming devices use a game monitoring unit to collect accounting and other information from the game main processing unit and to provide player tracking capability;

10 [0061] FIG. 20 illustrates a novel gaming system that includes a gaming device networked to an accounting and control system server and a player tracking system server, wherein the gaming devices include a game monitoring unit and a master processing unit (MPU) that are each independently connected to a gaming network that is in turn independently connected to the accounting and control system server and to the player tracking system server; and

15 [0062] FIG. 21 illustrates the logical independent connections between a game monitoring unit and a player tracking system server, and between a master processing unit and an accounting and control system server, as well as the connection between the accounting and control system server and the player tracking system server via their respective APIs.

20 **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

[0063] A preferred embodiment of a generic device controller unit system and methodology constructed, in accordance with the invention, provides a data and protocol communications interface that facilitates "true real time" interconnection between a processor and any of a variety of non-specific peripheral devices sought to be controlled. Referring now to the drawings, wherein like reference numerals denote like or corresponding parts throughout the drawings and, more particularly to FIGS. 1-2, there is shown one embodiment of a generic device controller unit system 10 constructed in accordance with the invention.

[0064] Briefly stated, the generic device controller unit (GDCU) system 10 includes a generic "true real time" peripheral device controller and a data and protocol communications interface. The device controller unit system 10 is generic, in that the system 10 is capable of connecting a processor 40 to a number of various peripheral devices 50, instead of being designed to interconnect a processor to only a specific peripheral device. The generic device controller unit system 10 connects a processor 40 using a standard non-true real time operating system and peripheral devices 50 in such a manner as to employ true real time peripheral device control. The "true real time" device controller of the system 10 allows a standard non-true real time operating system to implement true real time control of the peripheral devices 50, instead of requiring a special "true real time" kernel or a special "true real time" layered operating system to be utilized with the processor 40. Moreover, the generic device controller unit system 10 interfaces between the processor 40 and the peripheral devices 50 such that the data and protocol communications interface of the system allows the processor to utilize a single type of protocol and associated data in order to communicate via the GDCU system with the peripheral devices which may be utilizing different types of protocol and associated data.

40 [0065] Described now in greater detail, and again referring to FIGS. 1-2, one preferred embodiment generic device controller unit system 10, constructed in accordance with the invention, preferably provides a "true real time" device controller that produces true real time peripheral device control while interfaced with a processor 40 running standard non-true real time software. A preferred embodiment of the invention provides a method of allowing any definition of true real time for any given application, from one millisecond to one nanosecond. In this manner, the system 10 is adaptable to the true real time requirements of any given application. Preferably, the device controller of the system 10 allows the processor 40 (preferably, but not necessarily functioning in a Win32 environment) to employ "true real time" peripheral device control. The generic device controller unit system 10 provides this real time device control to the resource management capabilities of the standard non-true real time operating system. Advantageously, the generic device controller unit system 10 produces true real time peripheral device control without the higher level functionality of the processor 40. This higher processor level functionality, which has previously been required by specific device controller units, is extremely complex and expensive. The invention consequently reduces such complexity and associated expense. Moreover, the invention allows the use of commercially available, off-the-shelf devices from personal computers, consumer electronics, and industrial control businesses, in order to increase the speed of product development and innovation. This allows changes to be introduced both efficiently and rapidly.

55 [0066] Using the data and protocol communications interface of the system 10, the common interface components from all protocols and associated data are integrated into a single "universal" communications stream, which enables conversion from an existing data and protocol communications stream to any other type of data and protocol communications stream. By "universal," it is meant that the data and protocol communications interface of the GDCU system

10 accepts, for example, the USB protocol and associated data from a processor 40 and converts this protocol and data stream into any of I<sup>2</sup>C, RS-232, RS-422/RS-485, parallel printer port, 8-bit bi-directional ports, general purpose digital I/O port interfaces, or any other desired protocol and associated data. Conversely, the data and protocol communications interface of the GDCU system 10 accepts these protocols and data streams, and converts them into the USB protocol and its associated data for use by the processor 40. The data and protocol communications interface of the GDCU system 10 provides such generic data and protocol interface for connecting the processor 40 with any desired process control device 50 to be controlled by the system. Thus, by using the GDCU system 10, in accordance with the invention, any device 50, regardless of its chosen protocol and data, can associate with and interface with the processor 40.

**[0067]** More particularly, modem software applications and devices 50 are comprised of numerous internal electro-mechanical modules which all need to be controlled by and communicate with higher level systems. The GDCU system 10 provides a controller with sufficient additional input/output capability to control any device. The GDCU system 10 contains custom designed system drivers that allow the GDCU system to be a simple controller which includes components that are common to many devices 50, with the device-specific higher intelligence functions carried out by the processor 40. The GDCU system 10 provides input/output functionality while using the host processor 40 as the higher level intelligence in a conventional WINDOWS® operating system environment. The GDCU system 10 is easily modifiable due to its modularity which allows one level to be changed without having to change other levels. For example, encryption and decryption can be added by changing the packet encode and decode layers without having to change the physical transport layers. Similarly, the protocols and associated data can also be simply changed.

**[0068]** As stated above, in a preferred embodiment of the invention, multiple protocols and their associated data can be utilized by a single GDCU system 10. As such, a GDCU system 10 can communicate with multiple devices. The GDCU system 10 allows multiple protocols and functions to be combined into one system, while allowing the GDCU system 10 to always communicate with the processor 40 through a consistent interface. Thus, the processor and operating system are only required to use a single protocol with its associated data to communicate with the GDCU system 10 through the consistent interface. The GDCU system 10 incorporates a unique distributed processing configuration that allows for multiple tasks with arbitrary devices.

**[0069]** Specifically, a preferred embodiment generic device controller system 10 of the invention connects to the processor 40 (sometimes referred to as a master control unit, or a game processor) with associated support hardware. The processor 40 can be any computer, but is preferably a general purpose single board computer including an operating system, software, and associated elements. The single board computer is adapted to plug into an instrument for controlling a process. The preferred operating system is a WINDOWS® NT embedded system image configured to support a protocol, such as USB. Other acceptable operating systems for the processor 40 include, by way of example only, and not by way of limitation: WINDOWS® NT, WINDOWS® 98, WINDOWS® 2000, WINDOWS® CE, LINUX®, QNX®, DOS, VXWorks®, WHISTLER®, and WHISTLER® embedded.

**[0070]** Furthermore, a development station can be used by a developer in order to implement customized solutions on the GDCU system 10. Such a development station is built around the processor 40 and the generic device control unit system 10. The development station provides the hardware and software required to work with these two devices in order to design and realize a sophisticated embedded control system. The development station comes with a number of peripheral and plug-in items. These items include, by way of example only, and not by way of limitation: a floppy drive, IDE CD-ROM and hard drives, AGP video board, keyboard, mouse, PCI 10/100 Ethernet network interface card, and a representative assortment of 32-pin plug-in chips for the MCU board including, but not limited to SRAM, FLASH memory, and M-Systems DiskOnChip®.

**[0071]** In one preferred embodiment of the invention, the generic device controller unit (GDCU) system 10 resolves the hardware interconnect problems that have been experienced in the past by using the industry standard universal serial bus (USB). The universal serial bus was designed by a consortium of major hardware and software manufacturers in order to solve a set of problems that were caused by characteristics and limitations of the "IBM compatible" computer architecture, as it collided with an ever expanding user base of people without specialized technical skills. End users typically want to simply be able to plug in a new device and have it work properly without having to open their computers to install new hardware. The universal serial bus protocol standard was designed to address this need.

**[0072]** The universal serial bus was designed to centralize much of its complexity into the host so that individual devices could be simple and inexpensive. The bus specification allows for each device, as it is plugged in, to tell the USB host what type of device it is, and what device driver should be dynamically loaded so that the device can be used. For these and other reasons, USB is the preferred embodiment physical transport layer for the GDCU system 10. However, it will be appreciated by those skilled in the art that although some USB characteristics are very desirable for GDCU system 10 purposes, the use of the USB protocol standard is desirable, but not necessary. That is, any suitable protocol can be used. The basic generic device controller unit system 10 is independent of any particular physical bus. Accordingly, ATM, Ethernet, CAN, I<sup>2</sup>C, or multi-drop serial communications could also be used with equal effectiveness in alternate preferred embodiments of a generic device controller unit system 10 in accordance with the invention. Moreover, the system can be configured to drive any network protocol, including, by way of example only, and not by

way of limitation: Ethernet, ATM, WAN, Infrared, Serial, and fiber optics.

**[0073]** In a preferred embodiment of the invention, the GDCU system 10 is designed to assist engineers in taking advantage of the universal serial bus technology while saving time and money. Device drivers and USB communications protocols are provided so that an engineer can focus on developing control system applications. Preferably, the GDCU system 10 uses the USB communications protocol to talk to a host computer (e.g., the processor 40) and one or more of the following protocols (listed by way of example only, and not by way of limitation) for communicating with connected devices 50: RS-232 and RS-422/RS-485 serial ports, LPT parallel printer ports, and 32-bit (i.e., four 8-bit) bi-directional digital I/O. Custom designed device drivers and software libraries are also provided. Preferably, the data lines on the GDCU system 10 are configured for I/O using these drivers. Once the data lines are configured, data can be written and its status examined. The application is written with sub-routine calls that direct the GDCU system 10 to turn particular bits on or off and then to examine the state of other bits.

**[0074]** In one preferred embodiment of the invention, the processor 40 runs a WINDOWS® application that translates information into commands for the GDCU system 10. The application uses drivers to communicate with the GDCU system 10 via the processor 40 USB port. In one preferred embodiment of the GDCU system 10 of the invention, the data and protocol communications interface is the communications portion of the system 10 which "talks" to the application in the processor 40 and to the different peripheral devices 50. The data and protocol communications interface of the GDCU system 10 allows a "universal" protocol and associated data to be used when interfacing with various physical devices 50. The data and protocol communications interface of the GDCU system 10 allows multiple events having varying input signals to be interpreted by a single generic device controller unit system 10 which is used to control the various peripheral devices 50.

**[0075]** Specifically, FIG. 1 illustrates the system architecture of one preferred embodiment of the generic device controller unit system 10, in accordance with the invention. In this embodiment, the GDCU system includes a serial EEPROM with non-volatile memory 20, a PROM memory 22, RAM external memory 24, power fail detection and short duration power backup circuitry 26, an on-board processor 28, a watchdog timer (not shown), software resources, a universal serial bus port 30, and numerous input/output capabilities 32. These numerous input/output capabilities 32, include by way of example only, and not by way of limitation: Inter Integrated Circuit (I<sup>2</sup>C) circuitry, RS-232 serial interface circuitry, RS-422/RS-485 serial interface circuitry, 32 general purpose bi-directional I/O lines, and a parallel printer port (and might further include fiber optics, CAN, Ethernet, and ATM).

**[0076]** In the serial EEPROM 20, which provides non-volatile memory, some of the memory is reserved by the GDCU System 10 for its own use (e.g., to store the Device ID code and the serial number), while the remaining memory is available to the user. In one preferred embodiment of the invention, there are at least 512 bytes of non-volatile serial EEPROM memory 20. One preferred embodiment of the invention which requires at least 8K of RAM and NVRAM is satisfied by the Dallas Semiconductor 32K-by-8NVRAM. This memory is powered by a replaceable ten-year lithium battery. Preferably, but not necessarily requiring, there is at least 64K PROM for code and permanent data tables. A 32-pin socket, wired to accept a 27C256 or larger EPROM or FLASH memory, offers 32 kilobytes of program and data table memory. Additionally, there is preferably at least 32K RAM for variables and volatile data storage.

**[0077]** The powerfail detection circuitry 26 includes a large electrolytic capacitor which buffers the incoming unregulated 9V power source (which is isolated through a diode) and acts as a power fail detector. The source side of that diode is monitored by an interrupt circuit. The effective result of this configuration is that, in the event of a power failure, the onboard processor is alerted to the power loss several hundred milliseconds before the voltage on the capacitor drops to the point where processing fails. This is sufficient time to store at least 128 bytes of data in the serial EEPROM 20. Preferably, the short duration power backup circuitry provides at least enough back-up power for 200 milliseconds of normal operation subsequent to a power failure. This provides protection for "real time" data in the event of power problems.

**[0078]** Preferably, the on-board processor is an 8051 industry standard 8-bit processor. In one embodiment this microcontroller is a Philips P80C652. This component is essentially identical to the 8051, except that it incorporates I<sup>2</sup>C circuitry in addition to the standard UART. Nevertheless, any suitable processor may be used, in accordance with the invention. Other suitable processors include industry standard 8-bit processors by Cypress and Microchip.

**[0079]** The watchdog timer resets the on-board processor when the internal program stops behaving properly and is incorporated to enhance overall reliability. The watchdog timer's operation is transparent to the user.

**[0080]** With respect to the software resources, most user applications can be implemented using the built-in features of the GDCU System 10, but some applications may require custom programming of the onboard GDCU System processor 28. In one preferred embodiment, the GDCU System 10 incorporates 64 Kb of PROM 22 memory space, as well as 32 Kb of external RAM 24, for maximum flexibility for custom applications. Custom code development can be accomplished in several different ways, including contracted customer code development to specific user specifications, and merging custom developer's code with original code at compilation time. In one preferred embodiment, the USB port requirements are satisfied by the Philips PDIUSB12, which is a USB interface with a parallel processor access port.

**[0081]** In another aspect of one preferred embodiment, the RS-232 and RS-422/RS-485 serial interface circuitry

receivers are multiplexed to the same Received Data In signal input on the 8051 computer. Thus, only one of these serial ports can be used at any one time. The MAX202 interface chip is available from Maxim. It creates +/- ten volts from the +5V supply in order to deal with RS-232 voltages. The MAX3080 is one of Maxim's parts that matches the industry-standard 75180 pinout for RS-422/485 interfacing. The selection of which of the two interfaces is connected to the 80C652's RXD serial input line is configurable by the processor.

**[0082]** In yet another aspect of one preferred embodiment, the I<sup>2</sup>C port is incorporated in the 80C652. Preferably, there is a four-pin header for interfacing with the I<sup>2</sup>C port. Preferably, the 32 general purpose bi-directional I/O lines are arranged in four groups of eight lines. All eight lines in each group are either inputs or outputs at any one time. By the use of four ALS646 latching transceivers and two 16V8 programmable Logic Devices to address them, 32 I/O signals are established. They can be configured by the processor as inputs or outputs in groups of eight. Thirteen of those I/O lines perform dual duty as the outputs to the parallel printer port. (The four input lines from the parallel printer port go directly to some otherwise-unused pins on the 80C652).

**[0083]** In another aspect of one preferred embodiment, the eight data lines of the Parallel Printer Port share one of the four general-purpose groups. Four additional output lines on a second general-purpose group are also used. Thus, when the parallel port is in use, two of the groups are dedicated to output, with twelve of the sixteen lines committed to the parallel port. Since the five parallel port input lines go directly to the processor chip, the other two general-purpose I/O groups remain uncommitted.

**[0084]** Referring now to the GDCU System 10 interconnects, all USB devices have a hexadecimal USB Vendor ID and Product ID. The USB specification also provides for a 16 bit Binary Coded Decimal (BCD) device ID, which can range from 0000 to 9999. The device ID is used to specify a particular GDCU board in a system where more than one is attached to the USB bus.

**[0085]** As discussed above, in one preferred embodiment of the invention, the GDCU system 10 is a general-purpose eight bit computer with a USB interface port. In short, it preferably has sufficient PROM and RAM memory to be generally useful for any reasonable interface to external equipment. It has the ability to detect that it is about to be shut down and store critical information in its on-board non-volatile serial EEPROM. For controlling and communicating with other devices it has thirty-two general-purpose I/O lines, an I<sup>2</sup>C two-wire interface port, an RS-232 serial port, and a parallel printer port, for a total of sixty-one active I/O signals. The hardware utilized in one preferred embodiment generic device controller unit system 10 of the invention runs applications-specific firmware. The main task of the firmware is to provide proper signals for driving the output devices.

**[0086]** Furthermore, rather than produce unique firmware for every individual device to which the GDCU system 10 may be connected, a generalized protocol is used. This protocol has appropriate commands for configuring the GDCU system 10 (data directions, baud rates, driver enables, and the like) and for transmitting and receiving data. The firmware for the GDCU system 10 implements this protocol. Likewise, matching WINDOWS® or MACINTOSH® device drivers are implemented for relatively low-level communications with the GDCU system 10 from the host computer side. In this fashion, the complicated intelligence needed to interface with any particular device can be kept in the application layers of the host computers that use the GDCU system 10 as a bridge.

**[0087]** Referring now to FIG. 2, a generic device controller unit system 10 is shown which is configured to connect a processor 40 for control of a single peripheral device 50 (the peripheral device having multiple tasks which require processor control). This embodiment of the system 10 of the invention utilizes a less powerful processor (e.g., the 8051 processor) and is designed as an "al a carte" or "per device" type of generic device controller unit system 10. In this respect, this embodiment is a simpler, cheaper, and more flexible embodiment of the system 10 of the invention. It allows for control of one peripheral device 50 without the need for expensive circuitry and functionality which is not required for the task at hand.

**[0088]** Specifically, FIG. 2 shows a gaming assembly (by way of example only) that includes a processor 40 connected to a first GDCU system 60 and three additional GDCU systems 70, 80 and 90, connected to the processor 40 via a hub 100. The first GDCU system 60 interfaces with and controls a hopper device 64, while the three additional GDCU systems 70, 80 and 90, each control buttons 74, lights 84, and a coin mechanism 94, respectively. The buttons 74 and coin mechanism 94 are input devices that send information to the processor 40 for data communication and protocol translation via their respective GDCU systems 70 and 90, (through the hub 100). The processor 40 then processes the incoming data, and returns data as appropriate to the GDCU systems 60 and 80, which communicate and translate this data into commands that are sent to the output devices, specifically the hopper 64 and lights 84. This configuration allows additional devices to be easily added, removed, or swapped out since each device has its own generic device controller unit system.

**[0089]** Referring now to FIG. 3, a generic device controller unit system 60 is shown which is configured to connect to a single processor 40 for control of multiple peripheral devices 50. This embodiment of the system 60, in accordance with the invention, utilizes a more powerful processor (e.g., a Motorola 68332 processor), and, as such, functions as a more powerful version of the generic device controller unit system 60. In this respect, this embodiment of the system 60 of the invention is capable of handling a greater amount of input/output device requirements.

**[0090]** Specifically, FIG. 3 shows an assembly that includes a processor 40 connected to a single GDCU system 60.

The single GDCU system 60 interfaces with and controls a hopper device 64, buttons 74, lights 84, and a coin mechanism 94, as well as having an I<sup>2</sup>C port. In this embodiment, the buttons 74 and coin mechanism 94 are still input devices which send information to the processor 40. However, in this case, both input devices utilize the single GDCU system 60 for data communication and protocol translation with the processor 40. Again, the processor 40 processes the incoming data using the non-true real time operating system, and returns data as appropriate to the GDCU system 60, which then communicates and translates this data into commands which are properly sent to the lights 84 and hopper 64 output devices using the true real time operating system of the GDCU system 10. This configuration allows a single generic device controller unit system 60 to control multiple devices, but still allows for additional devices to be added without requiring the removal and/or modification of the GDCU system 60, hopper device 64, buttons 74, lights 84, or coin mechanism 94.

**[0091]** Lastly, FIG. 4 illustrates a hybrid system 10 of the invention with a processor 40 connecting to a plurality of generic device controller unit systems which are each configured to control a single peripheral device, as shown in FIG. 2, and another generic device controller unit system which is configured to control multiple peripheral devices, as shown in FIG. 3.

**[0092]** Specifically, FIG. 4 shows an assembly that includes a processor 40 connected to a first, more powerful GDCU system 60, and two additional less powerful GDCU systems 110 and 120, connected to the processor 40 via a hub 100. As in FIG. 3, the more powerful GDCU system 60 interfaces with and controls a hopper device 64, buttons 74, lights 84, and a coin mechanism 94, as well as having an I<sup>2</sup>C port. Once again, in this embodiment, the buttons 74 and coin mechanism 94 are still input devices which send information to the processor 40, and utilize the more powerful GDCU system 60 for data communication and protocol translation with the processor. The processor 40 processes the incoming data, and returns data, as appropriate, to the GDCU system 60, which then communicates and translates this data into commands that are properly sent to the lights 84 and hopper 64 (output devices). As can be seen from the figures, this lower portion of FIG. 4 is the same as FIG. 3.

**[0093]** However, in this embodiment of the invention, the processor 40 also returns data as appropriate to the GDCU systems 110 and 120 (via the hub 100), which then communicate and translate instructions from the processor 40 into commands which are properly sent to the additional lights 114 and animatronics 124 (output devices). This configuration allows a single more powerful generic device controller unit system to control multiple devices; allows for additional devices to be added without requiring the removal and/or modification of the GDCU system 60, hopper device 64, buttons 74, lights 84, or coin mechanism 94; and allows for devices with their own generic device controller unit system (e.g. additional lights 114 and animatronics 124) to be easily added, removed, or swapped out since each device has its own generic device controller unit system.

**[0094]** Previously, for device controller unit systems which were device interface specific, conversion of an existing data and protocol interface to a different data and protocol interface (such as from I<sup>2</sup>C to USB) would take substantial development time, effort, and expense, in developing the different code and circuitry required for each process control device. In contrast, the generic device controller unit system 10 of the invention is configured to act as a device-generic, "universal" data and protocol interface.

**[0095]** In this regard, in accordance with the invention, the GDCU system 10 can replace an embedded control system, a multi-tasking operating system, or any other prior art embedded application. The industry has various names for such an embedded control system. Such names, which include MPU (main or master processing unit), all relate to a single central embedded controller. A single central embedded controller is a complicated device that is capable of including the functionality of a GDCU system 10 and a processor 40 for a specific application. A single embedded control system is capable of controlling both peripheral devices 50 (which are controlled by the GDCU system 10), and application software (which is otherwise controlled by the processor 40). These types of single central embedded controllers are typically undesirable due to their lack of interchangeability and expense (due to having to meet both the GDCU system, processor, and real time operating system requirements). The GDCU system 10 can also eliminate the requirement of having an ISA plug-in card for each activity and the need for a real time layered operating system or expensive and "task specific" real time kernel.

**[0096]** The logical operations of the various embodiments of the invention are implemented (1) as a sequence of computer implemented steps or program modules running on a computing system and/or (2) as interconnected machine logic circuits or circuit modules within the computing system. The implementation is a matter of choice dependent on the performance requirements of the computing system implementing the invention. Accordingly, the logical operations making up the embodiments of the invention described herein are referred to variously as operations, structural devices, acts or modules. It will be recognized by one skilled in the art that these operations, structural devices, acts and modules may be implemented in the system 10, in firmware, in special purpose logic, analog circuitry, or any combination thereof without deviating from the spirit and scope of the invention as recited within the claims attached hereto. In other words, in a preferred embodiment generic device controller unit system 10 of the invention, the use of an industry standard physical bus, with various elements supplied by different sources, allows a layered software interface concept to be utilized by the invention.



**[0097]** Referring now to FIGS. 5A, 5B, and 5C to illustrate the above concept, consider the act of controlling a light bulb. In this case, a simple WINDOWS® application employs a single push button. As shown in FIG. 5A, according to this application, when the button is clicked with a mouse, a light bulb is illuminated. There is, of course, no physical connection between the WINDOWS® light bulb application 200 and the light bulb 300, but logically there is a connection. This very top layer of the communications and control structure is depicted as logical data flow from a light bulb application 200 to the actual light bulb 300.

**[0098]** Logically, this represents the desired implementation. The user's application wants to be able to turn the light bulb on and off without worrying about all of the system level requirements that are actually needed in order for this light bulb switching task to be implemented. However, a WINDOWS® application has no way of talking to a light bulb. As shown in FIG. 5B, what the application actually does is talk to an additional layer of software below it. The light bulb application 200 sends a physical data flow down to an application program interface (API) 210 which sends a logical data flow across to a packet decoder 290 which in turn is connected to the actual light bulb 300.

**[0099]** The light bulb software engineer has been told by the overall system designer that his light bulb is connected, for example, to Bit 3 on I/O Port 2 of the GDCU board, and that when the bit is set to High, the bulb will turn on. So when it is time to turn on the light bulb, all the "light bulb" application has to do is call the appropriate API library routine with the instruction "Set Bit 3 on I/O Port 2 to High."

**[0100]** The "light bulb" application 200 neither knows nor cares how the API routine 210 is going to arrange to turn on the bit. The application 200 does not know if the API routine 210 will perform the action itself, send a TCP/IP packet over the internet to a light bulb in Cleveland, or send e-mail to a janitor. The application just sends the request down and expects that the bulb will, indeed, turn on.

**[0101]** Likewise, the API routine 210 doesn't know why the "light bulb" application 200 wants the Bit set to High. What it does know how to do is encode the instruction "Set Bit 3 on I/O Port 2 to High" into a GDCU data packet that it then sends, in the logical sense, over to the matching GDCU data packet decoder 290 that resides in the firmware of the GDCU board. When the GDCU packet decoder 290 receives the packet, it pulls it apart and examines the packet. The packet decoder 290 learns that it is one of the packet types for controlling the digital I/O data bits on the GDCU board, and Sets Bit 3 on I/O Port 2 to High, which causes the light bulb to light.

**[0102]** Once again, this is a logical connection. As shown in FIG. 5C, the API packet encoder routine 210 in the host computer cannot talk directly to the packet decoder 290 in the GDCU firmware. In the actual physical data flow communications path, physical data flows down from the light bulb application 200 to the application program interface (API) 210, down from the API 210 to the USB device driver 220, down from the USB device driver 220 to the USB host drivers 230, from the USB host drivers 230 across to the GDCU USB interface hardware 270, from the GDCU USB interface hardware 270 up to the GDCU USB interface firmware 280, from the GDCU USB interface firmware 280 up to the GDCU packet decoder firmware 290, which is finally connected to the light bulb 300 itself. Thus, two additional levels have been added to the structure.

**[0103]** The bottom layer in the above-described actual communications path is the physical transport layer. In one preferred embodiment GDCU system 10 of the invention, that is the hardware of the universal serial bus. The interfaces on both sides of the bottom layer are supplied by the manufacturers of the USB interface hardware. As mentioned previously, since USB is a more frequently and more widely used protocol, there are numerous chip sets for both host and device side interfaces which adhere to the published USB specifications for physical and electrical interconnections.

**[0104]** On the host side of the connection, there are two logical protocols that have been defined by the USB user's group for USB communications. One is the universal host control interface (UHCI), and the other is the open host control interface (OHCI). In either case, the manufacturer supplies a WINDOWS® device driver which allows the next layer up to communicate with the hardware.

**[0105]** The generic device controller unit system 10 typically has much less computational power available than does the host, and the operating system requirements (if any) are much simpler. The various makers of such chip sets have simple interfaces that allow a calling routine to determine the status of the USB, send a block of data, receive a block of data, and the like.

**[0106]** Returning to the host side, the job of translating between the application level GDCU software routines and the bottom level hardware routines is implemented by the GDCU device driver. This routine is effectively part of the operating system. Operating with trusted kernel level privileges, it can take the GDCU packets from the layer above and send them down to the hardware to be transmitted to the device. Logically, those USB data blocks are transmitted horizontally to the USB interface level of the firmware of the GDCU system 10. The USB interface level has the job of talking to the hardware, accepting the packets, and passing them upwards to the packet decoder.

**[0107]** For simplicity, the communications path has been described (and shown in FIGS. 5A-5C) as a uni-directional flow. In actuality, however, the communications are bi-directional, with the communications path arrows flowing in both directions. The above-described layered structure, although seemingly complex, actually conveys a greater flexibility in design. Each layer can be replaced without affecting the layers below it or above it.

**[0108]** For example, it may be desired to encrypt the GDCU data packets in order to prevent their content from being

ascertained on the bus, or to implement data compression to improve data transmission time. This would only require changing the GDCU application program interface level on the host side, and rewriting the packet decoder level on the device side. Everything else would stay the same.

**[0109]** As an additional example, the physical transport layer could be changed from USB to ATM. Thus, the bottom layer would have to change. On the host side, a different GDCU device driver would have to be supplied, because its interface with the bottom level would be different. However, everything else on the host side would remain the same. Correspondingly, on the device side, the GDCU USB interface firmware that interfaces with the communications hardware would have to be rewritten and changed, because the hardware would change. Again, however, its interface upward would remain the same.

**[0110]** From the point of view of the system designer and application developer, the functionality of the bottom three levels can be ignored. All they need to know is the capabilities of the GDCU system 10, and how to access them. As far as the application developer is concerned, the answer to those questions lie in the interface specifications of the GDCU application program interface software. The layered structure of the GDCU system 10 means that functionality can be changed or augmented by changing the GDCU API software on the host, and the packet decoder level on the device. Such functionality can be altered without paying attention to the transport levels below, and likewise the transport levels can be changed without requiring any alterations to the higher levels. This results in shorter development time and quicker time to market.

**[0111]** Referring now to the software resources, in one preferred embodiment to the invention, a program is provided called GDCUCONFIG, which is used to change the Device ID on a GDCU board. Using GDCUCONFIG, the designer assigns a unique Device ID to each GDCU board. Then, when an application using the GDCU calls the various library routines to perform an I/O request, it specifies the Device ID for the target GDCU board.

**[0112]** With respect to the GDCU System 10 library software, in a preferred embodiment to the invention, the following five files are used to compile and link the library software: ESTGDCU.H - Declarations and definitions; ESTGDCU.LIB - Multithreaded; ESTGDCUL.LIB - Multithreaded DLL; ESTGDCUD.LIB - Debug Multithreaded; and ESTGDCUDL.LIB - Debug Multithreaded DLL. The ESTGDCU.H must be included in the source file. The library selected depends on the choice of code generation.

**[0113]** The GDCU System 10 library routines are as shown generally in the following table:

ROUTINE	FUNCTION
GdcuSetPort Direction	Sets the direction of one of the four 8-bit ports
GdcuSetPortData	Sets the output data on one of the digital I/O ports
GdcuSetAllPortsData	Sets all four data ports in a single call
GdcuGetAllPortsData	Gets the data from the digital I/O ports
GdcuSelectRS232	Sets the serial I/O to RS-232 and established the baud rate
GdcuSelectRS422	Sets the serial I/O to RS-422/RS-485 and establishes the baud rate
GdcuSendSerialData	Puts a block of data into the serial output buffer
GdcuReceiveSerialData	Returns any received serial data
GdcuNvmRead	Reads data from the non-volatile serial EEPROM
GdcuNvmWrite	Writes data to the non-volatile serial EEPROM
GdcuGetFirmwareVersion	Returns the firmware version of the GDCU board
CountOurUsbDevices	Returns a count of GDCU boards and enumerates their symbolic handles (low-level routine)
GetGdcuSerialNumbers	Returns the serial numbers and status of all GDCU boards (low-level routine)
GdcuWrite	Transfers data from the host to the device (low-level host-to-device data transfer)
GdcuRead	Transfers data from the device to the host (low-level device-to-host data transfer)

**[0114]** The following section outlines the usage information for the GDCU System 10 library routines. In one preferred embodiment of the invention, the GDCU System 10 routines include the following: CountOurUsbDevices, GdcuGetAllPortsData, GdcuGetFirmwareVersion, GdcuNvmRead, GdcuNvmWrite, GdcuRead, GdcuReceiveSerialData, GdcuSelectRS232, GdcuSelectRS422, GdcuSendSerialData, GdcuSetAllPortsData, GdcuSetPortData, GdcuSetPortDirection, Gdcu Write, and GetGdcuSerialNumbers.

**[0115]** The GDCU System 10 CountOurUsbDevices routine returns the number of GDCU boards currently attached to the system's USB bus. Each of those devices has a complicated device name which is assigned by the system. Those names are filled into the ppDeviceNames array. This array should be cleared before the first time the CountOurUsbDevices routine is called. If any of the ppDeviceNames pointers are not NULL, this routine attempts to release them with

the C++ delete operator. Subsequent calls to CountOurUsbDevices cause the enumeration to be performed again, thus freeing up the results from any previous calls. It is up to the user to free up the memory represented by those character strings after the final call to CountOurUsbDevices.

**[0116]** The CountOurUsbDevices routine is used internally by other library routines for keeping track of the GDCU boards attached to the system. However, it is not required for normal use. This routine, together with the GetGdcuSerialNumbers routine is provided as a convenience for enumerating all of the boards connected to the system.

**[0117]** In a preferred embodiment of the invention, the GDCU System 10 GdcuGetAllPortsData routine retrieves the data from the digital I/O ports. After specifying the device ID of the target GDCU board (BDC value 0000 through 9999), the size of the pbyData array is initialized (which can be any value 1 through 5). The pbyData array is the array of BYTES to be filled by the routine.

**[0118]** GdcuGetFirmwareVersion routine retrieves the version level of the GDCU firmware. The GdcuNvmRead routine reads to the non-volatile serial EEPROM memory in blocks of sixteen bytes. The routine contains a pointer to the array of bytes to be filled and the available size of the array in bytes.

**[0119]** Further, the GdcuRead routine transfers data from the device to the host. This routine also includes a pointer to the buffer to be filled from the GDCU System 10, as well as arguments for the available size of the buffer and the number of bytes received. The GdcuRead routine is only used when custom code is created for the GDCU firmware. The GdcuRead routine should not be called unless there is information in the GDCU System 10 waiting to be transferred. If the GDCU System 10 receives a read request from the USB host when it does not have data to go out, it responds by sending back a single ASCII question mark character.

**[0120]** The GDCU System 10 library contains the GdcuReceiveSerialData routine which returns any received serial data. This routine also includes a pointer to the array of bytes to be filled, as well as arguments directed towards the available size of the array and the number of bytes received in the array.

**[0121]** The GdcuSelectRS232 routine sets the serial I/O to RS-232 and includes an argument which determines the baud rate to be one of 300, 600, 1200, 2400, 4800, 9600, 19200, or 38400. Any other value causes the circuitry to default to 2400. Although the GDCU System 10 contains circuitry for both RS-232 and RS-422/RS-485 communications, only one of those can be enabled at one time. Calling this routine specifies subsequent RS-232 communications.

**[0122]** In a preferred embodiment of the invention, the GDCU System 10 library also contains the GdcuSelectRS422 routine. This routine sets the serial I/O to RS-422/RS-485 and contains an argument directed towards determining the baud rate to be one of 300, 600, 1200, 2400, 4800, 9600, 19200, or 38400. Once again, any other value causes the circuitry to default to 2400. This routine also contains a OutputOn argument which is used to specify between the TRUE RS-422 mode (the default), and the FALSE RS-485 mode. As discussed above, although the board contains circuitry for both RS-232 and RS-422/RS-485 communications, only one of those can be enabled at one time. Calling this routine specifies subsequent RS-422/RS-485 communications. The difference between RS-422 and RS-485 communications is that the RS-422 is continuously enabled, while RS-485 output drivers are only enabled when the device is transmitting. One preferred embodiment of the invention also contemplates this routine to contain arguments to support automatic switching of the driver to the ON state while transmitting.

**[0123]** The GDCU System 10 library also includes the GdcuSendSerialData routine which puts a block of data into the serial output buffer. This routine contains a pointer to the array of bytes to be transmitted, as well as an argument directed towards the number of bytes to be transmitted. This routine does not return until all of the bytes in the buffer have been transmitted to the GDCU System 10.

**[0124]** Additionally, the GDCU system 10 library further includes the GdcuSetAllPortsData routine which sets all four data ports in a single cell. This routine contains a pointer to four bytes of data to be latched into the four output ports. The pbyData argument must point to a valid array of at least four bytes to avoid possible memory exception errors.

**[0125]** Continuing, the GDCU System 10 library includes the GdcuSetPortData routine. This routine contains arguments which set the following values: GDCU\_PORT\_0: the port on connector J8; GDCU\_PORT\_1: the port on connector J9; GDCU\_PORT\_2: the port on connector J10; and GDCU\_PORT\_3: the port on connector J11. This routine also contains an argument specifying eight bits of data to be latched into the port. It should be noted that data can be latched into a port even when it is set to GDCU\_PORT\_INWARD. When the port direction is subsequently switched to GDCU\_PORT\_OUTWARD, the previously latched data appears on that port at that time.

**[0126]** The GDCU System 10 library also contains the GdcuSetPortDirection routine which sets the direction of one of the four 8-bit ports. This routine contains some of the same arguments as in the GdcuSetPortData routine relating to setting the values of the GDCU ports 0 -3 to the ports on connectors J8 - J11, respectively. The GdcuSetPortDirection routine further contains arguments directed towards the following values. GDCU\_PORT\_INWARD: read the port; and GDCU\_PORT\_OUTWARD: drive the port.

**[0127]** Further, the GDCU System 10 library also contains the GdcuWrite routine which transfers data from the host to the device. This routine contains a pointer to the buffer to be sent to the GDCU, as well as arguments relating to the number of bytes to be sent to the buffer (buffer size), and the number of bytes finally sent (bytes transferred). The GdcuWrite routine is only used when customer code is created for GDCU firmware.

**[0128]** Finally, the GDCU System 10 library also includes the GetGdcuSerialNumbers routine. This routine contains several pointers, the first of which is a pointer to an array of 127 character pointers containing the system-defined names for the GDCU boards on the bus. This array is filled using the CountOurUsbDevices routine. The GetGdcuSerialNumbers routine also contains a point to an array for 127 BOOL variables. On return, this array contains TRUE for each valid DeviceName (FALSE means something is wrong with the board. Either some other routine has a handle to it open at this time, or there has been a surprise disconnect during the last few seconds, and the system has not yet decided that it no longer exists.). The routine also contains a pointer to an array of 127 WORD variables. Each WORD variable gets filled in with the Device ID for each valid GDCU board currently attached to the USB bus. Finally, the GetGdcuSerialNumbers routine also contains a pointer to an array of 127 DWORD variables. Each one of these DWORD variables gets filled in with the binary serial number of each valid GDCU board currently attached to the USB bus. The GetGdcuSerialNumbers routine is used internally by other library routines for keeping track of the GDCU boards attached to the system. It is not required for normal. This routine, together with the CountOurUsbDevices routine is provided as a convenience for enumerating all of the boards connected to the system.

**[0129]** In summary, a preferred embodiment generic device controller unit system includes a generic "true real time" peripheral device controller and a data and protocol communications interface. The system is generic, such that the system is capable of connecting a processor to any number of various peripheral devices, instead of being designed to interconnect a processor only to a specific peripheral device. The system interfaces between a standard non-true real time operating system and peripheral devices in such a manner as to employ true real time peripheral device control, while allowing for bandwidth sharing, data speed differences, and accommodating for various levels of interrupt priority. The device controller of the system allows a standard non-true real time operating system to implement true real time control of peripheral devices. The system interfaces between a processor and peripheral devices such that the data and protocol communications interface of the system allows the processor to utilize a single protocol and associated data in order to communicate with peripheral devices which are utilizing different protocols and associated data.

**[0130]** In a preferred embodiment of the invention, device connection is not limited to a few number of com ports, since the hardware interface of the system allows large numbers of devices to be "daisy-chained" together. The invention eliminates the need to rely on com ports, which are slow (typically 9600 baud) and, further, which do not address the need to mix high speed data (video) and low speed data (mouse clicks) communications, as does a preferred embodiment of the invention. Moreover, a preferred embodiment of the invention allows the use of commercially available, off-the-shelf, devices from the personal computer, consumer electronics, and industrial control businesses, which increases the speed of product development and innovation. In addition, the invention eliminates the need for developers to have to perform undesirable WINDOWS® device driver development work. Finally, the GDCU system 10 of the invention is adaptable to the true real time requirements of each particular application, therefore, allowing virtually any definition of true real time for use in any given application, (e.g. from one millisecond to one nanosecond).

**[0131]** While the generic device controller unit system of the invention has been described with respect to gaming systems and gaming assemblies, it will be appreciated by those of ordinary skill in the art that the generic device controller unit system and methodology can be readily applied in various other non-gaming technological areas. These other non-gaming technical areas include, by way of example only, and not by way of limitation; manufacturing, amusement parks, control systems, security systems, and mechanical assembly production lines.

**[0132]** A preferred embodiment of the embedded additional user interface, constructed in accordance with the invention, is directed towards the integration of an embedded additional user interface into a gaming machine to increase user excitement by providing a richer gaming experience. The embedded additional user interface provides enhanced player satisfaction and excitement, as well as improved gaming device reliability, interactivity, flexibility, security, and accountability. The user interface is sometimes referred to herein as "additional" in that the user interface is separate from the gaming screen (or other gaming presentation). Further, the user interface is sometimes referred to herein as "embedded" in that the user interface includes its own processor in some preferred embodiments of the invention. Additionally, the display screen, which is referred to herein commonly as a web content capable display screen, may also (or alternatively) be an animation capable display screen, a web page display screen, or a multimedia display screen.

**[0133]** Referring now to the drawings, wherein like reference numerals denote like or corresponding parts throughout the drawings and, more particularly to FIGS. 6-10, there is shown one embodiment of an embedded additional user interface 310. Specifically, FIG. 6 shows an embedded additional user interface 310 that includes a web page display screen 320 and an embedded processor 330. The user interface 310 is incorporated into a gaming machine 340 that, in turn, includes a gaming screen 350, (and/or non-screen gaming region 350, e.g., spinning reels or other gaming presentation) gaming processor 360, and a game monitoring unit 365. The embedded processor 330 employs an internal operating system and communicates with the gaming processor 360, preferably via the game monitoring unit 365. The embedded processor 330 reads incoming data, translates the data into a web authoring language, and maps the data to the web page display screen 320. The display screen 320 presents web page information to a user via the display screen, thereby increasing user excitement by providing a richer gaming experience. The game monitoring unit 365 monitors the information that is input through the user interface 310. This provides a dramatic improvement over traditional

system components 370 that have been used as in the past to provide user information. The user interface 310 communicates with the game monitoring unit 365 in the same manner as the previous system components 370 communicated with the game monitoring unit.

5 **[0134]** As shown in FIG. 7, prior art gaming devices typically utilized a single video display screen as a gaming screen 350 for the gaming machine 340, while additional system components 370 were attached or juxtaposed next to the gaming machine. The display may comprise, for example, a 2-line, 20 character VF (Vacuum Fluorescent) display 320. An input device may comprise a 12-digit keypad 371.

10 **[0135]** However, referring again to FIG. 6, in a preferred embodiment of the invention, the system components 370 that were used in prior art systems are replaced with the embedded additional user interface 310 to provide the advanced functionality of a web page display screen 320. Such functionality includes, by way of example only, and not by way of limitation, the ability to display animation, multimedia, and other web-type content. The embedded additional user interface 310 enables presentation of additional information (e.g., enhanced player information) to a player (or potential player) through the web page display screen 320 in an exciting, eye-catching format, while not interfering with the normal gaming processes being displayed on the gaming screen 350. Further, the embedded additional user interface 310 does not interfere with the normal gaming hardware in the gaming machine 340, but rather is easily integrated into a gaming machine 340.

15 **[0136]** In situations involving multiple gaming machine (or gaming component) manufacturers, an embedded additional user interface 310 can be incorporated into a gaming machine (either originally or by retrofitting) without requiring access to the game logic or other gaming systems that might be proprietary and inaccessible with a gaming machine from another gaming manufacturer. Thus, in a preferred embodiment of the invention, the embedded additional user interface 310, which includes a web page display screen 320 for presenting supplementary information to a player, is incorporated into a gaming machine 340 in addition to the standard gaming screen 350 typically found in a gaming machine. The embedded additional user interface 310 may also be incorporated into a gaming machine 340 that utilizes a gaming region (e.g., a reel-spinner) instead of a standard gaming screen 350. This supplemental information may include general gaming information, player specific information, player excitement and interest captivation content, advertising content (targeted or otherwise), and the like. Further, in other preferred embodiments, the embedded additional user interface 310 may have the ability to interact with the game logic of the gaming processor 360, preferably via the game monitoring unit 365, and thus, provide further functionality, such as bonus games, system games, and/or the ability to incorporate awards, promotional offers, or gifts from the web page display screen 320 to the gaming screen 350. Moreover, the web page display screen 320 may display supplemental information in an "attract mode" when there is no game play occurring. Also the gaming processor 360 may use the web page display screen 320 to present casino employees with a web based dialogue to facilitate gaming machine configuration and event investigation activities without disturbing the gaming screen/region 350.

20 **[0137]** In a preferred embodiment of the invention, the embedded additional user interface 310 is used to make casino services more accessible and friendly to casino patrons. In one preferred embodiment, the embedded additional user interface 310 is designed to interface with the hardware configuration of game platforms currently employed in an existing gaming communication systems network, thus decreasing implementation costs for the casino. A standard gaming network interface to the systems network, such as a Mastercom system, includes a multi-drop bus method of communicating to a keypad and display. The Mastercom system is available from Bally Manufacturing, and is described in U.S. Pat. No. 5,429,361 to Raven et al. incorporated herein by reference. One such currently utilized bus is an EPI (Enhanced Player Interface), which uses an industry standard I<sup>2</sup>C bus and signaling.

25 **[0138]** In one preferred embodiment, the embedded additional user interface 310 is used to replace/upgrade an EPI. Preferably, the embedded additional user interface 310 replaces the EPI of the gaming machine in a "plug and play" manner. In other words, the old EPI can be unplugged and the new embedded additional user interface 310 can simply be plugged into the I<sup>2</sup>C bus of the game monitoring unit 365 in the gaming machine 340. The user interface 310 utilizes the currently employed industry standard I<sup>2</sup>C bus and signaling without requiring any further modification. The embedded processor 330 of the embedded additional user interface 310 reads incoming I<sup>2</sup>C data (content), translates the data into a web authoring language (e.g., HTML, DHTML, XML, MACROMEDIA FLASH), and maps the data to the web page display screen 320. In this manner, the previous I<sup>2</sup>C data messages, which were typically presented on a 2-line, 20 character VF display, are automatically transformed by the embedded additional user interface 310 into an attention grabbing, animated (multimedia) web page style format. This results in enhanced player satisfaction and excitement with extremely minimal retrofitting requirements.

30 **[0139]** Since, in one preferred embodiment, the embedded additional user interface 310 utilizes I<sup>2</sup>C hardware and signaling, this enables the user interface 310 to speak and understand the I<sup>2</sup>C protocol message set, and thus, communicate directly with the gaming processor 360 of the gaming machine 340 (or other similarly networked devices) in the same fashion in which the gaming processor previously communicated with the EPI. Accordingly, in a preferred embodiment of the invention, the functionality of the previously utilized hardware (e.g., the EPI) can be replaced or augmented and thus substantially upgraded with the integration of the embedded additional user interface 310 into the

gaming machine 340. As such, the limitations placed upon the gaming processor 350 by the low function external hardware of such system components 370 (e.g., a keypad and a 2-line, 20 character VF display) may be eliminated.

**[0140]** As stated above, in one preferred embodiment, the incoming data received by the embedded additional user interface 310 is in I<sup>2</sup>C signaling protocol; however, in other preferred embodiments other serial communication protocols (or electronic communication format) may be utilized. Preferably, the embedded processor 330 communicates with the gaming processor 360 via the game monitoring unit 365, and/or other connected devices, over an I<sup>2</sup>C bus (or over another serial communications bus in embodiments that utilize another protocol). The web page display screen 320 of the embedded additional user interface 310 is preferably a color-graphic touch screen display. Preferably, the embedded processor 330 is at least a 32-bit processor. A preferred embodiment utilizes a 32-bit processor because cryptographic techniques, such as SHA-1 (or better) and DSA algorithms, are written and operate natively on a 32-bit system. Additionally, the Microsoft® WINDOWS® environment, which is utilized in some preferred embodiments of the invention, is also 32-bit. Further, the internal operating system of the embedded additional user interface 310 may be adapted or customized to match the specific communication bus hardware used by the devices in the gaming machine 340 to which the internal operating system communicates.

**[0141]** Preferably, the embedded additional user interface 310 is an embedded computer board that, in addition to the embedded processor 330 and the web page display screen 320, further includes a removable COMPACT FLASH® card 375 (or other memory storage device), as shown in FIG. 6, and a network adapter port. Content and feature updates to the embedded additional user interface 310 are accomplished by physically swapping out the COMPACT FLASH® card 375 (or other memory storage device). Thus, in order to retrieve data from the embedded additional user interface 310, the data is accessed by physically removing and reading the COMPACT FLASH® card 375. In other embodiments, as described below, updates may be provided by direct or peer-to-peer downloading over a network.

**[0142]** In one preferred embodiment, the internal operating system utilized by the embedded processor 330 of the embedded additional user interface 310 is WINDOWS® CE version 4.2 (or higher). Preferably, the embedded additional user interface 310 is built upon a PXA255-based board developed by the Kontron Corporation. Additionally, in a preferred embodiment of the embedded additional user interface 310, the browser control for the web page display screen 320 is MICROSOFT® INTERNET EXPLORER®. 6.0 (or higher), which is shipped standard with WINDOWS® CE 4.2, the preferred internal operating system for the embedded processor 330.

**[0143]** A preferred embodiment of the embedded additional user interface 310 also provides a mechanism for inputting system information into, and retrieving system information from, the game machine 340. As stated above, the embedded additional user interface 310 preferably uses industry standard I<sup>2</sup>C hardware and signaling. The I<sup>2</sup>C protocol has multi-master capabilities, i.e., is capable of participating as both a slave and as a master. The embedded additional user interface 310 enables system information (such as information input by a player into a web page display screen 320) to be sent from the game machine 340 to a slot system network (or to another destination location). Likewise, the embedded additional user interface 310 also enables the system information (such as display messages) to be sent from the systems network (or from another source location) to the game machine 340 for viewing by the player through the web page display screen 320.

**[0144]** In a preferred embodiment, information can also be input by a user into the web page display screen 320 of the user interface 310. The web page display screen 320 of the user interface 310 employs a virtual keypad. Further, the user interface 310 uses a keypad dictionary that allows a user to be able to enter a vastly greater amount of information than was previously possible using a 12 digit VF keypad. For example, the virtual key on the touch screen that is displayed by the browser is pressed by a user. This calls the Keypad object by calling its Dispatch interface with a string that identifies which virtual key was pressed. The Keypad object looks up the string in the Dictionary object which has been loaded at initialization time with a set of keys to return when that string is passed to it. When it retrieves this set of zero or more key characters, it passes them to the GMU by calling the interface exposed by the object.

**[0145]** Typically, a network interface (or equivalent system) is used to control the flow of funds used with the gaming machine 340 within a particular casino. By utilizing the embedded additional user interface 310 of the invention, the gaming network interface can be instructed to move funds between player's accounts and gaming devices by merely touching the web page display screen 320. In addition, many other more sophisticated commands and instructions may be provided. Thus, the embedded additional user interface 310 improves the player and casino employee interface to the gaming machine 340, directly at the gaming device itself.

**[0146]** In a preferred embodiment of the invention, the web page display screen 320 of the embedded additional user interface 310 enables a player to be shown player messages in an animated, multimedia, web content style environment. These messages would previously have been displayed in a significantly more mundane format on a separate display device (e.g., a 2-line VF display device). In some preferred embodiments, touch screen buttons in the web page display screen 320 are used by the player to navigate between windows in web page display screen 320 and allow access to system functions such as cashless withdrawal, balance requests, system requests, points redemption, and the like. In other preferred embodiments of the invention, the web page display screen 320 utilizes various other data input techniques commonly known in the art, instead of the touch screen data entry. Thus, implementation of the embedded additional

user interface 310 is an efficient, highly beneficial, and substantial upgrade to a gaming machine 340 that greatly increases the functionality over what was previously possible using an EPI.

**[0147]** In one preferred embodiment, text data messages are translated into web page navigation requests by the embedded processor 330 and then displayed on the web page display screen 320 as shown and discussed with respect to FIGS. 11A and 11B below. Script languages, such as JAVA SCRIPT and VB SCRIPT, are also utilized for some of the web pages. Preferably, the embedded additional user interface 310 emulates the 12-digit keypad and the 2x20 VF display on the web page display screen 320, which has touch screen capabilities. In this embodiment, commands that were previously displayed on the 2x20 VF display are matched to a corresponding URL and a browser is used to render the page on the web page display screen 320. The web pages displayed contain touch-screen keys that effectively emulate hardware keys.

**[0148]** With reference to FIGS. 11A and 11B, in one preferred embodiment of the invention, a dictionary URL approach is used for translating the data messages into web page information. In this manner, data messages are "looked up" in a dictionary data file where they can be redirected to an attractive URL. The embedded processor 330 responds to requests on the I<sup>2</sup>C bus that were intended for the prior art enhanced player interface (EPI) VF display. The web page display screen 320 is not a passive display device like traditional PC monitors, but rather the display screen 320 must respond to commands with text type responses. These requests include initialization requests, status requests, and display requests. With reference to FIG. 12, as each text data message to be displayed is passed into the embedded processor 330, the processor 330 calls a URL Dictionary to look up a URL with which to replace the text data message. Once the substitution is complete, the embedded processor 330 instructs the web page display screen 320 to present (or navigate to) the appropriate web page.

**[0149]** Accordingly, with reference to FIG. 13, a URL Dictionary component is used to map a text string, sent from the embedded processor 330 and intended for the display on the 2x20 VF display, to a URL that can be used to display a much more visually enhanced graphical representation of the same message. Thus, the URL Dictionary component contains a listing of the possible text messages to be supported that could be sent from the embedded processor 330, and a mapping to a set of the desired eye-catching, web content to be displayed on the web page display screen 320. In this event that a message is not in the URL Dictionary, such a message is mapping to a page that substitutes for the 2-line mode.

**[0150]** In the preferred embodiments described above, the embedded processor 330 of the embedded additional user interface 310 reads incoming I<sup>2</sup>C data messages, translates the I<sup>2</sup>C data messages into a web authoring language (e.g., HTML, DHTML, XML, MACROMEDIA FLASH), and maps the newly translated web page data message to the web page display screen 320. Additionally, the embedded additional user interface 310 can also read incoming data messages that are already in a web authoring language (e.g., HTML, DHTML, XML, MACROMEDIA FLASH), and map this web page data to the web page display screen 320. Further, and highly advantageously, a preferred embodiment of the invention also allows casinos that are using the embedded additional user interface 310 to design and use their own content, thereby giving the casinos the ability to decide what the web page presented on the web page display screen 320 of the user interface 310 will look like.

**[0151]** Referring now to FIG. 8, in this preferred embodiment, content may be locally downloaded. Specifically, in one preferred embodiment, the content is updated through a physical USB (or other connection) that is used to download the new content. In one preferred embodiment, the data on the COMPACT FLASH® card 375 can be accessed by connecting a separate computer 378 to the network adapter port of the embedded additional user interface 310. This embodiment allows updating the contents of the operating system, changing the operating system itself, and receiving data from the COMPACT FLASH® card 375. Physical removal of the COMPACT FLASH® card 375 is also still an option for update and inspection of files on the embedded additional user interface 310.

**[0152]** In one preferred embodiment, a portable computer is used to store and publish data content to the COMPACT FLASH® card 375 on the embedded additional user interface 310, as well as to receive data from the COMPACT FLASH® card 375 on the embedded additional user interface. In this embodiment, all content on the embedded additional user interface 310 is authenticated as if it were a gaming machine.

**[0153]** In another preferred embodiment, a network adapter port is run on the embedded computer board of the user interface 310. This embodiment also includes a boot loader. Further, in this embodiment, the portable computer 378 (described above) includes components for use in uploading data to, and downloading data from, the COMPACT FLASH® card 375 on the embedded additional user interface 310. Specifically, the components that run on the portable computer 378 are for moving new data content to the embedded additional user interface 310, and for validation and verification of the data content that is on the embedded additional user interface. Preferably, all data that is used to update the COMPACT FLASH® card 375 moves to or from the embedded additional user interface 310 over the single built in network adapter port on the board.

**[0154]** Prior to the advent of the embedded additional user interface 310 of the invention, gaming regulators would have been unwilling to allow casino operators to design their own content. However, due to the cryptographic technology implemented by the embedded processor 330 in the embedded additional user interface 310, a certification process is

provided by the invention with sufficient security for gaming regulators to allow casino operators to design their own content. Specifically, in one preferred embodiment, the certification process offered ensures authentication and non-repudiation of the casino operator designed web content. Preferably, in the invention the certification process provided further ensures auditability and traceability. Various cryptographic technologies, such as authentication and non-repudiation (described herein below), are utilized in preferred embodiments of the invention, to provide sufficient security for gaming regulators to allow casino operators to design their own content.

**[0155]** In one preferred embodiment, this certification process is used to certify "signed content" (created by the casino owners) in the same manner that a "signed program" is certified. Preferably, PKI (Public Key Infrastructure) is utilized in the certification process. PKI is a system of digital certificates, Certificate Authorities, and other registration authorities that verify authenticity and validity. In one preferred embodiment, a "new tier" or second PKI is created that is rooted in the primary PKI and that leverages the capabilities of the certificate (e.g., a x509 certificate) that allow for limited access. Thus, this preferred embodiment allows the attributes within the certificate are used to provide "levels" of code access and acceptance in the gaming industry.

**[0156]** In one embodiment, the content is protected by digital signature verification using DSA (Digital Signature Algorithm) or RSA (Rivest-Shamir-Adleman) technology. In this regard, the content is preferably protected using digital signature verification so that any unauthorized changes are easily identifiable. A digital signature is the digital equivalent of a handwritten signature in that it binds an individual's identity to a piece of information. A digital signature scheme typically consists of a signature creation algorithm and an associated verification algorithm. The digital signature creation algorithm is used to produce a digital signature. The digital signature verification algorithm is used to verify that a digital signature is authentic (i.e., that it was indeed created by the specified entity). In another embodiment, the content is protected using other suitable technology.

**[0157]** In one preferred embodiment, a Secure Hash Function-1 (SHA-1) is used to compute a 160-bit hash value from the data content or firmware contents. This 160-bit hash value, which is also called an abbreviated bit string, is then processed to create a signature of the game data using a one-way, private signature key technique, called Digital Signature Algorithm (DSA). The DSA uses a private key of a private key/public key pair, and randomly or pseudo-randomly generated integers, to produce a 320-bit signature of the 160-bit hash value of the data content or firmware contents. This signature is stored in the database in addition to the identification number. In other preferred embodiments, higher level Secure Hash Functions are used, such as SHA-256 or SHA-512.

**[0158]** In another preferred embodiment, the invention utilizes a Message Authentication Code (MAC). A Message Authentication Code is a specific type of message digest in which a secret key is included as part of the fingerprint. Whereas a normal digest consists of a hash (data), the MAC consists of a hash (key + data). Thus, a MAC is a bit string that is a function of both data (either plaintext or ciphertext) and a secret key. A Message Authentication Code is attached to data in order to allow data authentication. Further, a MAC may be used to simultaneously verify both the data integrity and the authenticity of a message. Typically, a Message Authentication Code (MAC) is a one-way hash function that takes as input both a symmetric key and some data. A symmetric-key algorithm is an algorithm for cryptography that uses the same cryptographic key to encrypt and decrypt the message.

**[0159]** A Message Authentication Code can be generated faster than using digital signature verification technology; however, a Message Authentication Code is not as robust as digital signature verification technology. Thus, when speed of processing is critical the use of a Message Authentication Code provides an advantage, because it can be created and stored more rapidly than digital signature verification technology.

**[0160]** In one preferred embodiment, the authentication technique utilized is a BKEY (electronic key) device. A BKEY is an electronic identifier that is tied to a particular individual. In this manner, any adding, accessing, or modification of content that is made using a BKEY for authentication is linked to the specific individual to which that BKEY is associated. Accordingly, an audit trail is thereby established for regulators and/or other entities that require this kind of data or system authentication.

**[0161]** Another preferred embodiment of the verification system utilizes "component bindings" for verification using cryptographic security. In component binding, some components come equipped with unalterable serial numbers. Additionally, components such as web content or the game cabinet may also be given another random identification number by the owner. Other components in the system, such as the CMOS memory in the motherboard, the hard drive, and the non-volatile RAM, are also issued random identification numbers. When all or some of these numbers are secured together collectively in a grouping, this protected grouping is referred to as a "binding." Each component of the machine contains its portion of the binding.

**[0162]** In one such preferred embodiment, every critical log entry made to the content is signed with a Hashed Message Authorization Code (HMAC) that is based on the entry itself, and on the individual binding codes. In this manner, the security produced by the bindings ensures that log entries that are made cannot be falsified or repudiated.

**[0163]** After the critical gaming and/or system components are selected, given individual identifiers, and combined into a protected grouping that is secured using the component "bindings," any changes to those components will then be detected, authorized, and logged. For example, content within the binding is digitally signed (SHA-1 or better) using



the key derived from the bindings. This signature is verified whenever an entry is made to a component within the binding. If the signature is wrong, this security violation and the violator are noted, but typically the entry is not prohibited. In other embodiments, the entry may be prohibited as well. Thus, the component binding produces a cryptographic audit trail of the individuals making changes to any of the components within the binding.

5 **[0164]** Moreover, bindings ensure that the critical components of a gaming machine system, or the content utilized therein, that have been selected to be components within the binding have not been swapped or altered in an unauthorized manner. Preferably, bindings use unique identification numbers that are assigned to vital parts of the gaming platform including, by way of example only, and not by way of limitation, the cabinet, motherboard, specific software, non-volatile RAM card, content (data), and hard drive. These identification numbers combine in a cryptographic manner to form a  
10 "binding" that protects and virtually encloses the included components, such that no component within the binding can be modified, removed, or replaced without creating an audit trail and requiring authentication. Thus, for one of these components within the binding to be changed, appropriate authentication is required and a log file entry is made documenting the activity and the identity of the individual making the change. In one preferred embodiment, a specific level of BKEY clearance or classification is required to make specific changes.

15 **[0165]** Referring now to FIG. 9, in one preferred embodiment, the embedded additional user interface 310 connects to an Ethernet-networked backbone 380 instead of a local system network. Currently, casino networks are not Ethernet, but rather are smaller, more simplistic local system networks. Thus, in this Ethernet-networked backbone 380 embodiment, the current system network is replaced by an industry standard Ethernet backbone, such as 10/100 base T Ethernet running over Cat 3, 4, 5, 6, or higher. Thus, a standard 10/100 base T Ethernet card is added to the processor in this  
20 embodiment. Preferably, the network employs TCP/IP, HTTP, and XML messaging or a variant of XML. Nevertheless any suitable protocol may be used.

**[0166]** Further, in another preferred embodiment, the embedded additional user interface 310 connects to a full featured, back end, download configuration server 390 through the above-described Ethernet-networked backbone 380 as shown in FIG. 9. In such an embodiment, the full-featured server 390 can schedule downloads of content (gaming or otherwise) as well as upload information from the gaming machines 340, such as what options the gaming machines  
25 340 currently possess. Accordingly, in a preferred embodiment, the primary use of the server 390 is as data download and data retrieval server. While this server 390 does upload and download web content style information, it is typically not connected to the World Wide Web.

**[0167]** This server 390 must be authenticated (just like a gaming machine) to make the content served to the embedded  
30 additional user interface 310 acceptable to the gaming regulators. Preferably, utilization of the Ethernet-networked backbone 380 and the server 390 provides many system benefits, including but not limited to reliability, maintainability, security, content staging, content testing, deployment procedures, and incident recovery. In one embodiment, deliverables also preferably include content templates and guidelines for casino owners and operators to create their own web content for deployment to the web server. In one embodiment, the web server 390 has its content authenticated in the  
35 same manner as the embedded additional user interface 310 to allow content to be downloaded to the web page display screen 320.

**[0168]** Referring now to FIG. 10, in another preferred embodiment of the invention, the functions previously performed by the gaming monitoring unit 365, as shown in FIGS. 6-9, of the gaming machine 340 are supported by the embedded processor 330 of the embedded additional user interface 310. Otherwise stated, the GMU code is transitioned from the  
40 gaming monitoring unit 365 into the embedded processor 330 in the embedded additional user interface 310. Accordingly, such a configuration removes the need for the gaming monitoring unit 365 in the gaming machine 340. This results in a significant reduction in the amount and complexity of the hardware, as well as completing a phased transition of more traditional style gaming machines into more modernized upgraded gaming machines.

**[0169]** Thus, in such a preferred embodiment, the invention is directed towards an embedded additional user interface 310 that is incorporated into a gaming machine 330, the gaming machine in turn including a gaming screen 350 or other appropriate gaming region (e.g., spinning reels), but does not include a gaming monitoring unit 365. Such an embedded additional user interface 310 still includes a web content capable display screen 320 and an embedded processor 330. Once again, the web content capable display screen 320 presents web information to a user via the display screen. The  
45 embedded processor 330 preferably utilizes an internal operating system. Furthermore, in this embodiment the embedded processor 330 additionally includes standard gaming monitoring unit functionality (GMU code), since it replaces the gaming monitoring unit 365 in the gaming machine 340. As before, the embedded processor 330 reads incoming data, translates the data into a web protocol (web authoring language), if necessary, and maps the data to the web content capable display screen 320.

50 **[0170]** In one embodiment, the embedded additional user interface 310, the messages are flashed (e.g., animation, multimedia, and the like) to the player within the web page display screen 320 while the gaming screen 350 is used for game play. These web page style messages can be set at virtually any desired length, format, or style. A message might display, for example, "Welcome to Harrah's Las Vegas! You have 1200 bonus points. Would you like to make a hotel  
55 or dinner reservation?" Importantly, while a previous utilized EPI would only been capable of scrolling this message in

one-quarter inch (0.25") tall monochrome text, in contrast, the web page display screen 20 would "flash" this message in bright red, white, black, and green animated format, on six inch (6.0") by three inch (3.0") color graphic display. Additionally, in some embodiments, inserting a player identification card into a card reader and/or selecting a player services button activates additional player services functionality.

5 **[0171]** In one exemplary embodiment of the embedded additional user interface 310 that utilizes a card reader (or other identification technique, such as a player ID code) to recognize a particular player, the web page display screen 320 displays an eye-catching, web page-style message to that player, for example, "Welcome, Mr. Smith!" in response to identifying Mr. Smith. Preferably, the web page display screen 320 also has touch screen capabilities that include, by way of example only, and not by way of limitation, "Beverages," "Change," "Services," "Transactions," and "Return to Game." In one embodiment, each of the touch screen icon buttons, when selected, launches a new full screen display within the web page display screen 320 for the player.

10 **[0172]** For example, in one embodiment, when the "Transactions" touch screen icon button is selected, a new screen is activated that includes the web page style message, "Mr. Smith, Account Balance: Bonus Points = 1200, Player Funds = \$150, Available Credit = \$850, Casino Matching Funds Available = \$25," as well as the "Return to Game" icon button. As a further example, when the player selects a "Cashless Withdrawal" button in another embodiment, a new screen is activated that includes a touch screen keypad and flashes the question, "How much do you want?" as well as "Enter," "Clear," and "Back" buttons. Preferably, this interface also includes an "Information" button that, when selected, launches a new screen within the web page display screen 320 that provides answers to frequently asked questions and other useful information. Moreover, the web page display screen 320 preferably also includes a "History" button that, when selected, launches a new screen within the web page display screen 320 that provides a history log of all transactions and other actions performed on that gaming machine 340.

20 **[0173]** In accordance with another preferred embodiment, the invention is directed towards a method for increasing user excitement relating to a gaming machine by providing a richer gaming experience via an embedded additional user interface that is incorporated into the gaming machine. The method preferably includes: receiving a serial data message (e.g., an I<sup>2</sup>C data message) containing enhanced player information over a serial communication bus (e.g., an I<sup>2</sup>C) bus in the embedded additional user interface 310; translating the data message (using the embedded processor 330) into a web authoring language; and mapping the data message to the web page display screen 320, wherein the display screen presents web page information to a user via the display screen.

30 **[0174]** The potential advantages of utilizing the embedded additional user interface 310 of the invention are numerous. These potential advantages include, by way of example only, and not by way of limitation: providing animated and/or multimedia web style content; providing fonts and icons which are larger and more aesthetically appealing; providing special services to players, (e.g., multiple languages, assistance for handicapped individuals); facilitating interactive uses of the web page display screen 320; providing the ability to customize the "look and feel" of the web page display screen 320 for players and casino employees; increased player excitement and participation; and simplified replaceability and/or upgradeability from an EPI or other similar non-web page style components.

35 **[0175]** Generally, player tracking systems have long been limited to small displays and fairly generic sound capabilities. However, it is desirable to incorporate a wide variety of output (and potentially input) devices into a player tracking system. Additionally, promotional system-based games are relatively new, and have thus far been limited to video presentations on fairly small screens. It would be advantageous to produce a device and/or system that would enable a player tracking system and/or a promotional system game to utilize larger gaming presentations or other peripheral devices 440.

40 **[0176]** In this regard, with respect to another aspect of the invention, FIG. 14 illustrates a preferred embodiment of a universal game monitoring unit 410 (which includes both GMU 365 and an iView 310 functionality, and is built upon a GDCU 10 architecture) incorporates a display screen 420 and an UGMU processor 430 (e.g. expanded display device controller) that communicates with a game processor 360 in a gaming machine 340, one or more peripheral display devices 440, and one or more back-end systems 450. In some preferred embodiments, the display screen 420 is an interactive touchscreen that is capable of both displaying and receiving information to and from a player. A preferred embodiment of the universal game monitoring unit 410 (UGMU) enables a system-based iView 310 game to not be limited to game play inside the iView itself, but rather to enable the use of peripheral devices 440 and systems 450 outside of the iView component. In some preferred embodiments, the display screen 420 is not incorporated into the universal game monitoring unit 410, but rather is one another one of the peripheral display devices 440 that are connected to, and associated with, the universal game monitoring unit.

50 **[0177]** In some preferred embodiment, the universal game monitoring unit 410 employs programming and an operating system that enables the UGMU to expand beyond the function of a traditional GMU 365 to include system-game features, including by way of example only, and not by way of limitation: (1) driving a graphic display (e.g., a video screen) for presentation of a game to casino patrons; (2) driving mechanical reels (or other mechanical game presentation components) over an interface, such a USB; or (3) driving other gaming peripheral devices 440 (e.g., coin acceptor, bill acceptor, hopper, printer and the like).

5 [0178] In this regard, a universal game monitoring unit 410 can be used to enable several different kinds of functionality, including by way of example only, and not by way of limitation: (1) an external system game controller (i.e., controls the outcome of an external (to the UGMU/iView) "pay to play" system game), (2) an external system "expanded primary pay indicator" controller (i.e., controls the display of an external "pay to play" system prize), (3) an external "promotional" system prize display controller (i.e., controls the display of an external "promotional" system prize), and (4) a non-game related, system information display controller (i.e., controls the display of external non-game related information).

10 [0179] In one preferred embodiment of the invention, the universal game monitoring unit 410 includes a player tracking system and attention-grabbing color animation that are provided on the traditional small graphics display screen 420. In addition to creating a more compelling presentation, the universal game monitoring unit 410 has the potential sales advantage of necessitating additional hardware to support the deployment of these premium player-tracking systems. Furthermore, many payout indicators and peripheral devices 440 (e.g., wheels, reels, lights, buttons, card readers, and the like) can be connected to the UGMU processor 430 (expanded display device controller) of the universal game monitoring unit 410 at the gaming machine 340 for presentation by the player tracking system of the UGMU 410. Additionally, as described above, in some preferred embodiments, the display screen 420 is actually a peripheral device 15 440 that is connected to, and associated with, the universal game monitoring unit 410 instead of being incorporated into the UGMU itself.

20 [0180] Accordingly, any presentation device or other peripheral devices 440 that can be driven directly or indirectly (using a peripheral controller such as a reel control unit (RCU)) can be controlled by the universal game monitoring unit 410. Specifically, these peripheral devices 440, which are external to the UGMU (and included iView) device 410, that are controllable by the universal game monitoring unit include, by way of example only, and not by way of limitation: reels, wheels, light wheels, lights, meters, sliding indicators, rotating pointers, sound devices, and the like (i.e., anything that can be controlled directly by a player tracking system-based game computer or can be controlled indirectly by a controller attached thereto). In this regard, peripheral devices 440 can be anything used for the display of primary or secondary system-based game outcomes, such as the expanded primary pay indicator shown in FIG. 15.

25 [0181] Referring again to FIG. 15, one peripheral device 440 that is controllable by the UGMU controller 430 of the universal game monitoring unit 410 is a Monte Carlo-style wheel (or other similar wheel display). In this specific, non-limiting example, a Monte Carlo-style wheel controller is attached to the UGMU controller 430 of the universal game monitoring unit 410 using a USB, serial port, or other appropriate interface. Using this configuration, a system-based Monte Carlo reel spinning game can be played on the UGMU display screen 420 (which is now the iView screen), thereby 30 enabling the wheel device to be spun, as needed, to enhance player appeal. By utilizing the universal game monitoring unit 410 in this manner, any popular game (e.g., the Bally Monte Carlo game) can now be made available on any gaming machine 340 in a casino, regardless of the base game and the manufacturer of the base game. This dramatically increases the variety and proliferation of game themes available across a casino floor, as well as breaking down barriers created by competing game manufacturers.

35 [0182] As described above, a peripheral device 440 such as a Monte Carlo-style wheel (or other similar wheel display) can be used (1) as the sole presentation for system-based game outcomes, (2) as a traditional "bonus" device (e.g. Monte Carlo) or (3) as an expanded primary pay indicator for a system-based game. In this regard, FIG. 16 illustrates how a peripheral device 440, such as the shown in FIG. 15, may be implemented as an expanded primary pay indicator. More specifically, FIG. 16 is a logical flow diagram showing the gaming process for a system-based game that utilizes 40 an expanded pay presentation controlled by a universal game monitoring unit 410.

[0183] Referring again to FIG. 14, in another preferred embodiment of the universal game monitoring unit 410, devices can be used for other than system-based game presentation. Otherwise stated, the universal game monitoring unit 410 can be used for any kind of system information presentation (e.g., awarding a mystery bonus by moving a pointer to a dinner, a show, or a room.). Thus, the award does not have to be strictly part of a game, but rather simply be system-based.

45 [0184] Furthermore, in another aspect of a preferred embodiment, the universal game monitoring unit 410 presents different "messages" from the UGMU computer (e.g., messages that are not limited to system-based game outcomes) when the casino wants some information to have a more dramatic effect than that achievable by the traditional small display screen. In one specific, non-limiting example, participation in the game by a "gold" player would illuminate a representation of a candle that was viewable by a slot host. In essence, the universal game monitoring unit 410 is transformed into an extension of a browser. In another example, a player that acquires a certain number of session 50 points turns on a lights, ring a bell, or receives some kind of award.

[0185] In one preferred embodiment, the universal game monitoring unit 410 can be built from a PC-based processing engine combined with a gaming baseboard. Thus, any advantages related to production capacity and/or technology advancements from the PC industry can be leveraged by the universal game monitoring unit 410. Additionally, due to 55 the capabilities of the universal game monitoring unit 410, it is advantageous (but not required) to attach a gaming baseboard to the standard PC processing engine.

[0186] In some embodiments, the gaming baseboard is designed for minimal cost and function then upgraded at a later date to provide higher features and benefits. Preferably, the gaming baseboard is customizable to allow for com-

patibility with older systems and games, while yet providing hardware interfaces for upgrading to newer networking standards such as Ethernet.

**[0187]** In one preferred embodiment, universal game monitoring unit 410 is constructed using an ETX module form factor single board computer, which is available from numerous vendors including Kontron and Axiomtek. This module includes the core processing functions of a PC combined with standard physical size and connector pinouts. Thus, the device gains flexibility in procurement. The ETX module also has a very small physical footprint, which provides advantages for a device such as a universal game monitoring unit 410 which needs to fit into slot machines which are produced by multiple manufacturers. As such, small physical size is advantageous. Moreover, low power consumption and the need for only a single source power voltage are also advantageous.

**[0188]** Additionally, the ETX module is compatible with a broad range of operating systems: proprietary, LINUX®, WINDOWS® CE and WINDOWS® XP, which provides for greater flexibility in programming and deployment. Continuing, since ETX modules share a common footprint and have similar power operating requirements, the task of upgrading from a lower cost ETX module to one of much greater processing power is greatly simplified. Such an upgrade might be necessitated as new features such as system-games are added, which require greater processing power, after basic units have been initially sold into the market.

**[0189]** In one preferred embodiment, universal game monitoring unit 410 can be designed to accommodate legacy connections to user interface components with the proper baseboard design. Such components may include keypad, card reader and two-line display. The universal game monitoring unit 410 may also be configured to connect to VGA, XGA, or better graphics displays, as well as touchscreens over a LVDS cable driven circuit. In this manner, the universal game monitoring unit 410 enables user interface components to be remotely located from the UGMU processing device 420.

**[0190]** In various alternate preferred embodiments, the universal game monitoring unit 410 may be housed in multiple ways, including by way of example only, and not by way of limitation: (1) as a stand-alone device; (2) attached to the user interface equipment, as a video, network, and game processing device (thereby leaving GMU processing to a secondary device); or (3) as both a GMU and gaming device with remote connection capability to the user interface components (i.e., a long cable to the touchscreen and keypad).

**[0191]** Referring now to FIGS. 17-21, another aspect of a preferred embodiment is directed towards a system and method for tracking the game play of customers, as well as providing other marketing and gaming functions on a network of gaming devices that do not have inherent support for player tracking functions. Such an embodiment of the universal game monitoring unit 410 enables the above described functionality to be achieved without making changes in the approved software of the existing gaming devices. This is of material value to the operators of such networks, and is accomplished by using a system-to-system interface that enables more rapid and economical implementation of such a player tracking system than would be possible using more traditional techniques.

**[0192]** In this regard, FIG. 17 shows a gaming system that is well known in the art, which connects gaming devices through networking equipment to backend computer systems that provide control and accounting functions. Specifically, FIG. 18 shows a traditional gaming system that includes a gaming device networked to an accounting and control system server, and in which the gaming system does not include a player tracking system or a game monitoring unit (GMU). However, player tracking systems have since become desirable and relatively common after a time when configurations such as that shown in FIG. 18 were the standard. Therefore, new system configurations were needed that would incorporate player tracking functionality. Accordingly, FIG. 19 illustrates a traditional gaming system that includes a gaming device networked to both an accounting and control system server and a player tracking system server. Continuing, in this configuration the gaming devices use a game monitoring unit to collect accounting and other information from the game main processing unit and to provide player tracking capability.

**[0193]** In this regard, a preferred embodiment of the universal game monitoring unit 410 provides a mechanism for implementing a player tracking system with a wide array of potential marketing and game enhancing features. The universal game monitoring unit 410 can be implemented in any type of environment where a system gathers game play data from gaming devices without requiring any software modifications to the gaming devices themselves. Referring now to FIG. 20, a novel gaming system is illustrated that includes a gaming device networked to an accounting and control system server and a player tracking system server. In this embodiment, the gaming device includes a game monitoring unit and a game processor (e.g., a master processing unit (MPU)) that are each independently connected to a gaming network that is in turn independently connected to the accounting and control system server and to the player tracking system server. In this embodiment, there is not direct connection between the game monitoring unit and a master processing unit. Such a connection would require the software modifications to the gaming devices modifications referenced above.

**[0194]** As shown in FIG. 20, in one preferred embodiment, the universal game monitoring unit uses a separate processing element from the master processing unit (MPU). The peripherals in the gaming device communicate with a central computer system. In this embodiment, the universal game monitoring unit 410 is co-resident in the gaming device with the main processing unit, but is electrically and logically independent of that unit. All necessary exchange of data occurs

via the central computer.

**[0195]** In a traditional casino system, such as the system shown in FIG. 19, a game monitoring unit (e.g., a game monitoring unit (GMU)) or other player tracking device communicates with both a central computer, (such as the Slot Data System, produced by Bally Gaming and Systems) and a game processor. In this traditional configuration, the game processor is resident in the gaming cabinet and the central computer is in a remote location (possibly, but not necessarily in the same building). When a player inserts a player tracking card into the gaming device, a signal is sent to the GMU. The GMU communicates with the game processor (using a communications protocol, (e.g., Slot Accounting System®)) to gather the state of the "meters" that record the activity level of the machine. The meter information is appended to the identification information read from the card and a message containing at least that data is sent to the central system, where it is recorded in a database for future use.

**[0196]** Continuing, in such a traditional configuration, when a user plays games the gaming machine, the main processor updates the "meters" to record changes in the amount of play, amount of wins, and other specific information which may contribute to the characterization of the play. Additionally, the processor may notify the central computer when a threshold is reached or other marketing information is detected. When the user ceases playing, the user typically removes the player tracking card from the machine. This causes a signal to be sent to the game monitoring unit which again determines the updated meter readings for the gaming device and sends a message to the central system that indicates that the player's card has been removed. Additionally, updated meter information is attached. In some embodiments, information on the player's activity during the play session is sent as well as, or alternatively to, the meter information. In this regard, the game play information is generally recorded in the system database and used for an array of marketing functions.

**[0197]** In contrast, in a system configuration that implements a preferred embodiment of the universal game monitoring unit 410 (e.g., FIG. 20), there is no direct communication between the universal game monitoring unit 410 and the game processor, yet equivalent functionality is obtained. Instead, the universal game monitoring unit 410 utilizes the central system, which has access to real-time game play information. Preferably, this information is collected in real-time (i.e., approximately once per play period - about 5 seconds). This data collection rate coincides with the collection rate of "high speed" networks (e.g., Ethernet and the like). Referring now to FIG. 20, in another aspect of a preferred embodiment, a real-time Application Program Interface (API) is utilized that enables a player tracking and marketing server to access game play information. This can be done at a particular machine by querying the central computer, such as an accounting and control system computer.

**[0198]** Generally stated, a preferred embodiment of the universal game monitoring unit 410 is directed towards adapting gaming network that does not have player tracking to include those capabilities without requiring software changes in the individual gaming devices. In one embodiment, as shown in FIG. 17, gaming devices are interconnected via a local communication network. In this embodiment, the network can adopt many methodologies, depending on the designer and installer of the system. It may be one of several forms of serial networks, such as a hub arrangement or, more typically, a multi-drop polled system. Alternatively, the network may be an Ethernet link using Internet Protocol (an IP network). The network is to enables bi-directional communication between a multiplicity of gaming devices and a central computer, either directly, or through the use of a local concentration device. In some embodiments, a local concentration device may take the form of a general purpose computer or a proprietary device developed by a supplier to perform communications functions and, in some cases, ancillary functions, such as encryption, ticket validation, report generation and other operations functions.

**[0199]** The gaming devices are utilized by customers to play many different types of games (e.g., games of chance and/or skill). Their play and winnings are monitored by the game processor in the gaming device, and the information is posted in a timely fashion (e.g., within 10 seconds) to the accounting and control system. That cycle of operation is typical of many systems in operation today. The game machines may play many types of games, including by way of example only, and not by way of limitation: traditional casino style games with mechanical, electro-mechanical or video reels, poker games, video games with bonus modes or bonus devices, bingo-based games, central determination games, or various skill games. Prizes may range from small to progressive games with very large jackpots that accumulate over play from games at many locations.

**[0200]** Referring again to FIG. 20, in a preferred embodiment, a universal game monitoring unit may be installed within, attached to, or in close proximity to the gaming machine. The universal game monitoring unit enables the recording of customer game play at gaming devices in a gaming network. The game play data is used for marketing purposes and also can provide a wide array of game enhancing functions, including by way of example only, and not by way of limitation: advertising, free giveaways, bonus games, promotions, and any other action that requires an interactive point-of-sale experience for the player. The universal game monitoring unit is capable of controlling of array of peripherals devices, including one of many types of player identification devices. These include read magnetic striped card readers, smart card readers, biometric identifiers, radio frequency identification devices (RFID), and any other device that is machine readable and provides an identifying token (which can be associated with a player, either solely, or in combination with other tokens). For example, a fingerprint reader may not have enough precision to uniquely identify a player, but in combination with an account identification obtained by reading a card or manual input, can be used to ensure that a

unique identification is made.

[0201] Referring now to FIG. 21, in a preferred embodiment, the player tracking transaction begins when a customer inserts a player tracking card, or otherwise identifies himself to the universal game monitoring unit. The universal game monitoring unit formulates a message to a player tracking computer that contains the identification of the player who has identified himself. Typically, this identification is in the form of a number (or string) that uniquely identifies an account. The system validates that this is a known account and accesses an API that enables it to communicate with the accounting and control computer. The accounting and control computer accesses its own data storage and retrieves the game play meters for the gaming device which contains the activated universal game monitoring unit. Game play information is then returned through the API to the player tracking computer, which records initial values for the player's play session. Typically, a message is then returned to the universal game monitoring unit, which provides a greeting message to the player, and confirms that their game play is being tracked.

[0202] As the player plays games on the gaming device, the accounting/control computer updates its internal game play information. When the player completes his play session, he indicates to the system that he is concluding his play. Typically, this is done by removing his identification card (or equivalent token), although other means are possible, such as depressing a button. When this occurs, the universal game monitoring unit sends a message to the player tracking computer that provides the player's identification. The player tracking computer again accesses the API to the accounting/control computer and retrieves ending meters for the player's session (or other equivalent data). The player tracking computer then records the player's total play in the player's data record, which may qualify the player for marketing (or other) rewards. This data is then also available to the gaming system operator for use in a wide array of marketing programs.

[0203] Although the invention has been described in language specific to computer structural features, methodological acts, and by computer readable media, it is to be understood that the invention defined in the appended claims is not necessarily limited to the specific structures, acts, or media described. Therefore, the specific structural features, acts and mediums are disclosed as exemplary embodiments implementing the invention.

[0204] Furthermore, the various embodiments described above are provided by way of illustration only and should not be construed to limit the invention. Those skilled in the art will readily recognize various modifications and changes that may be made to the invention without following the example embodiments and applications illustrated and described herein, and without departing from the true spirit and scope of the invention, which is set forth in the following claims.

## Claims

1. An embedded user interface incorporated into a gaming device, the gaming device including a gaming presentation of a base game and a gaming processor for controlling the base game, wherein the gaming processor of the gaming device enables play of the base game without requiring use of the embedded user interface, the embedded user interface comprising:

a player tracking interface including a display screen, wherein the player tracking interface enables display of a system game to a user, wherein the player tracking interface enables presentation of information to the user, and wherein the player tracking interface enables reception of information from the user; and  
an embedded processor, wherein the embedded processor employs an internal operating system and communicates with the gaming processor, wherein the embedded processor enables control of the system game and player tracking information;

wherein the embedded user interface enables control of a system game of which at least a portion of the system game is presented physically external to the display screen; and  
wherein the embedded user interface enables control of a system game indicator that is physically external to the display screen.

2. The embedded user interface of claim 1, wherein at least one of the portion of the system game that is presented physically external to the embedded user interface or the system game indicator that is physically external to the display screen includes: an additional gaming presentation.

3. The embedded user interface of claim 1, wherein at least one of the portion of the system game that is presented physically external to the embedded user interface or the system game indicator that is physically external to the display screen includes: an additional display screen.

4. The embedded user interface of claim 1, wherein at least one of the portion of the system game that is presented

physically external to the embedded user interface or the system game indicator that is physically external to the display screen includes: a wheel.

- 5
5. The embedded user interface of claim 1, wherein at least one of the portion of the system game that is presented physically external to the embedded user interface or the system game indicator that is physically external to the display screen includes: one or more reels.
- 10
6. The embedded user interface of claim 1, wherein at least one of the portion of the system game that is presented physically external to the embedded user interface or the system game indicator that is physically external to the display screen includes: a sound-generating mechanism.
- 15
7. The embedded user interface of claim 1, wherein at least one of the portion of the system game that is presented physically external to the embedded user interface or the system game indicator that is physically external to the display screen includes: one or more lights.
- 20
8. An embedded user interface system incorporated into a gaming device, the gaming device including a gaming presentation of a base game and a gaming processor for controlling the base game, wherein the gaming processor of the gaming device enables play of the base game without requiring use of the embedded user interface system, the embedded user interface system comprising:
- 25
- a player tracking interface including a display screen, wherein the player tracking interface enables display of a system game to a user, wherein the player tracking interface enables presentation of information to the user, and wherein the player tracking interface enables reception of information from the user; and
- 30
- an embedded processor, wherein the embedded processor employs an internal operating system and communicates with the gaming processor, wherein the embedded processor enables control of the system game and player tracking information;
- 35
- wherein the embedded user interface enables control of a system game of which at least a portion of the system game is presented physically external to the display screen; and
- 40
- wherein the embedded user interface enables control of a system game indicator that is physically external to the display screen.
- 45
9. The embedded user interface system of claim 8, wherein at least one of the portion of the system game that is presented physically external to the embedded user interface or the system game indicator that is physically external to the display screen includes: an additional gaming presentation.
- 50
10. The embedded user interface system of claim 8, wherein at least one of the portion of the system game that is presented physically external to the embedded user interface or the system game indicator that is physically external to the display screen includes: an additional display screen.
- 55
11. The embedded user interface system of claim 8, wherein at least one of the portion of the system game that is presented physically external to the embedded user interface or the system game indicator that is physically external to the display screen includes: a wheel.
12. The embedded user interface system of claim 8, wherein at least one of the portion of the system game that is presented physically external to the embedded user interface or the system game indicator that is physically external to the display screen includes: one or more reels.
13. The embedded user interface system of claim 8, wherein at least one of the portion of the system game that is presented physically external to the embedded user interface or the system game indicator that is physically external to the display screen includes: a sound-generating mechanism.
14. The embedded user interface system of claim 8, wherein at least one of the portion of the system game that is presented physically external to the embedded user interface or the system game indicator that is physically external to the display screen includes: one or more lights.
15. An embedded user interface system incorporated into a gaming device, the gaming device including a gaming presentation of a base game and a gaming processor for controlling the base game, wherein the gaming processor

of the gaming device enables play of the base game without requiring use of the embedded user interface system, the embedded user interface system comprising:

5 a player tracking interface including a display screen, wherein the player tracking interface enables display of a system game to a user, wherein the player tracking interface enables presentation of information to the user, and wherein the player tracking interface enables reception of information from the user; and  
an embedded processor, wherein the embedded processor employs an internal operating system and commu-  
nicates with the gaming processor, wherein the embedded processor enables control of the system game and  
10 player tracking information;

wherein the embedded user interface enables control of a system game of which at least a portion of the system game is presented physically external to the display screen.

16. The embedded user interface system of claim 15, wherein the portion of the system game that is presented physically  
15 external to the display screen includes: an additional gaming presentation.

17. The embedded user interface system of claim 15, wherein the portion of the system game that is presented physically external to the display screen includes: an additional display screen.

18. The embedded user interface system of claim 15, wherein the portion of the system game that is presented physically  
20 external to the display screen includes: a wheel.

19. The embedded user interface system of claim 15, wherein the portion of the system game that is presented physically  
25 external to the display screen includes: one or more reels.

20. The embedded user interface system of claim 15, wherein the portion of the system game that is presented physically external to the display screen includes: a sound generating mechanism.

21. The embedded user interface system of claim 15, wherein the portion of the system game that is presented physically  
30 external to the display screen includes: one or more lights.

22. An embedded user interface system incorporated into a gaming device, the gaming device including a gaming presentation of a base game and a gaming processor for controlling the base game, wherein the gaming processor of the gaming device enables play of the base game without requiring use of the embedded user interface system,  
35 the embedded user interface system comprising:

a player tracking interface including a display screen, wherein the player tracking interface enables display of a system game to a user, wherein the player tracking interface enables presentation of information to the user, and wherein the player tracking interface enables reception of information from the user; and  
40 an embedded processor, wherein the embedded processor employs an internal operating system and commu-  
nicates with the gaming processor, wherein the embedded processor enables control of the system game and  
player tracking information;

45 wherein the embedded user interface enables control of a system game indicator that is physically external to the display screen.

23. The embedded user interface system of claim 22, wherein the system game indicator that is physically external to the display screen includes: an additional gaming presentation.

24. The embedded user interface system of claim 22, wherein the system game indicator that is physically external to the display screen includes: an additional display screen.

25. The embedded user interface system of claim 22, wherein the system game indicator that is physically external to the display screen includes: a wheel.  
55

26. The embedded user interface system of claim 22, wherein the system game indicator that is physically external to the display screen includes: one or more reels.



27. The embedded user interface system of claim 22, wherein the system game indicator that is physically external to the display screen includes: a sound-generating mechanism.

5 28. The embedded user interface system of claim 22, wherein the system game indicator that is physically external to the display screen includes: one or more lights.

29. A gaming system comprising:

10 a player tracking system server connected to a network, wherein the player tracking system server includes an application program interface;

an accounting and control system server connected to the network, wherein the player tracking system server includes an application program interface through which communication with the accounting and control system server is enabled via the application program interface of the player tracking system server;

15 one or more gaming devices connected to the network, wherein each gaming device includes a gaming presentation of a base game and a master processing unit for controlling the base game, and wherein the master processing unit enables communication with the accounting and control system server; and

an embedded user interface incorporated into each gaming device, wherein the embedded user interface enables communication with the player tracking system server, each embedded user interface comprising:

20 a player tracking interface including a display screen, wherein the player tracking interface enables display of a system game to a user, wherein the player tracking interface enables presentation of information to the user, and wherein the player tracking interface enables reception of information from the user; and

25 an embedded processor, wherein the embedded processor employs an internal operating system and communicates with the gaming processor, wherein the embedded processor enables control of the system game and player tracking information;

wherein communication between a master processing unit of a gaming device and an embedded user interface incorporated into said gaming device is only enabled through the network and is not direct enabled via a direct connection.

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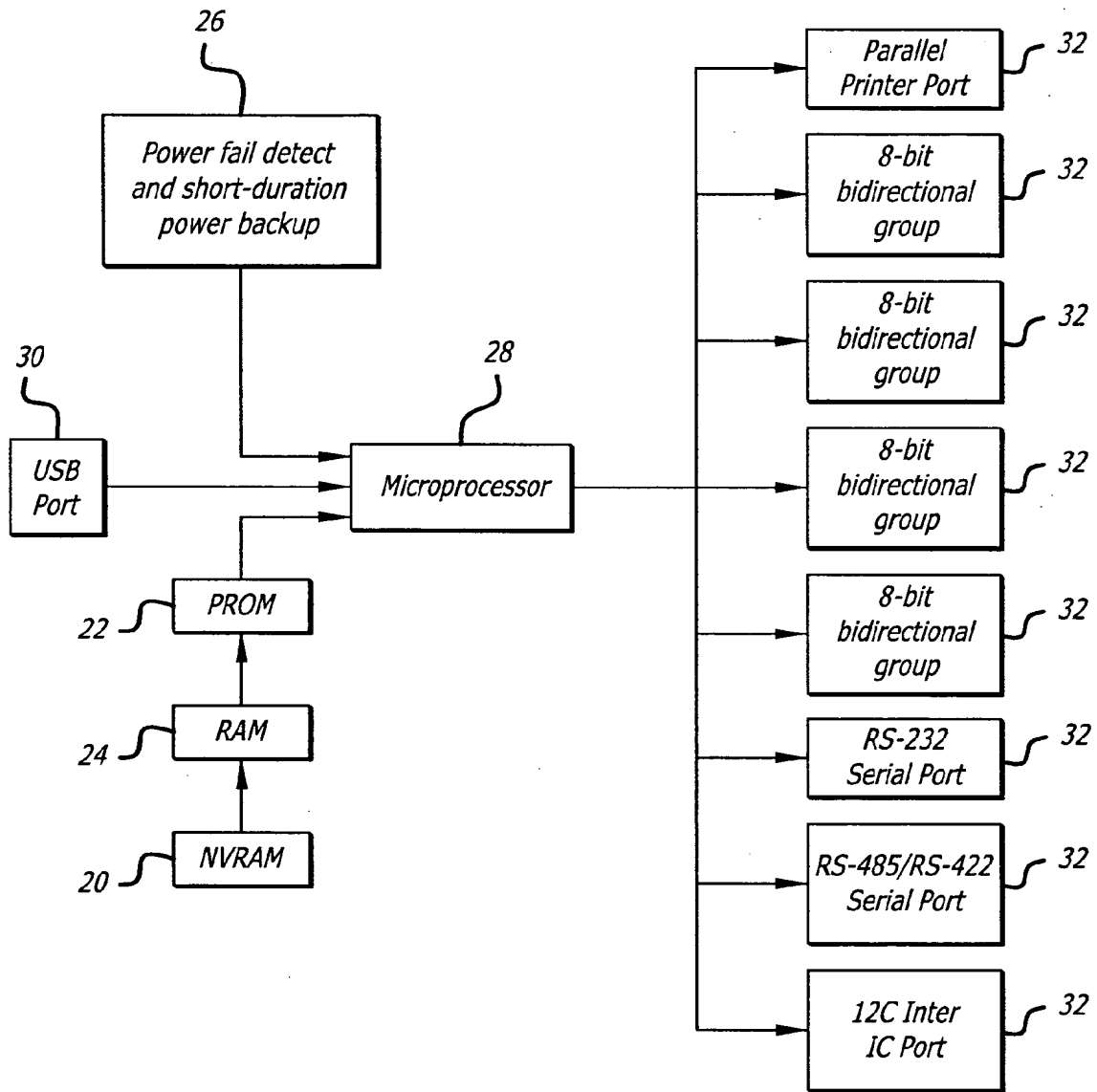


FIG. 1

FIG. 2

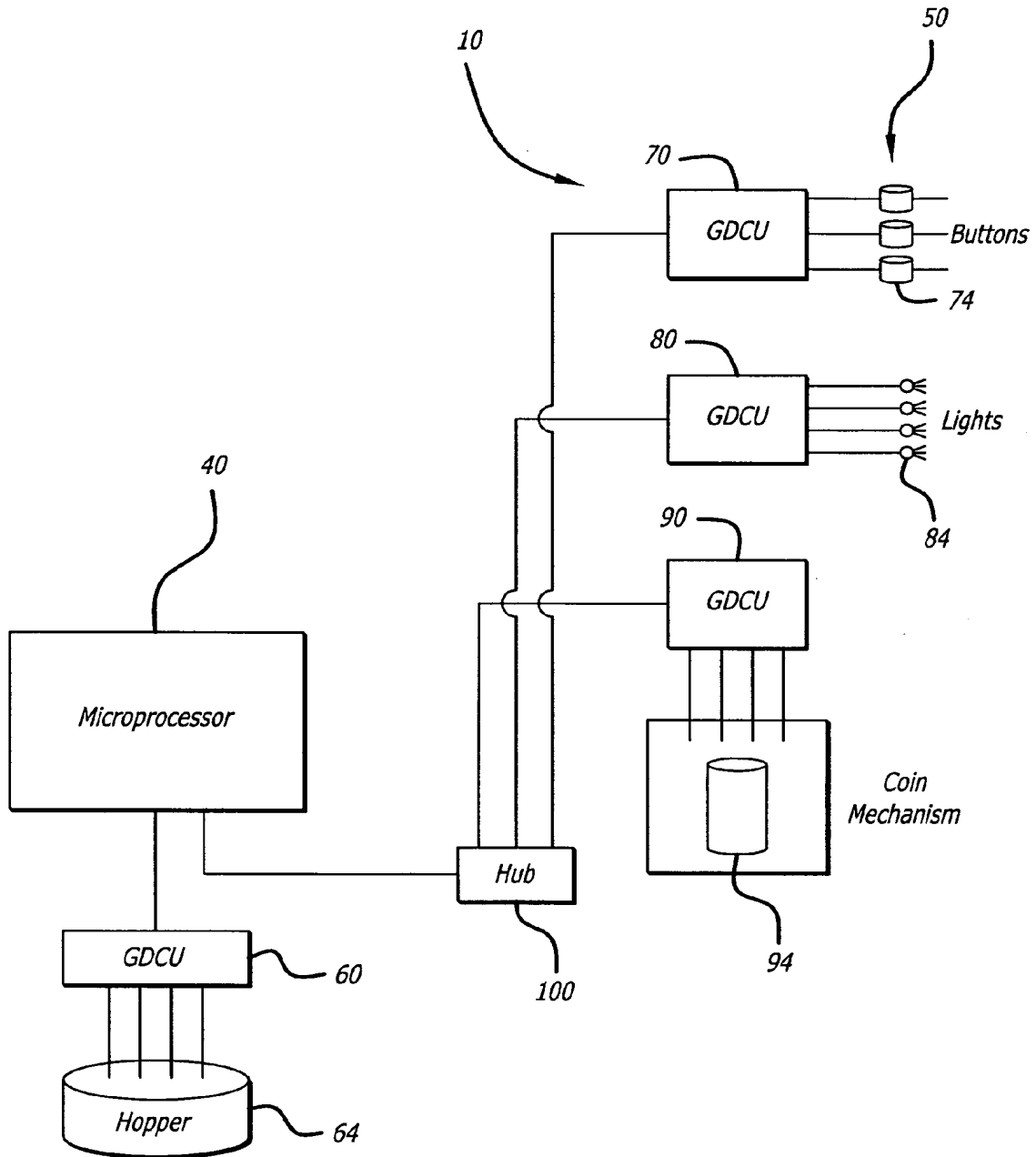


FIG. 3

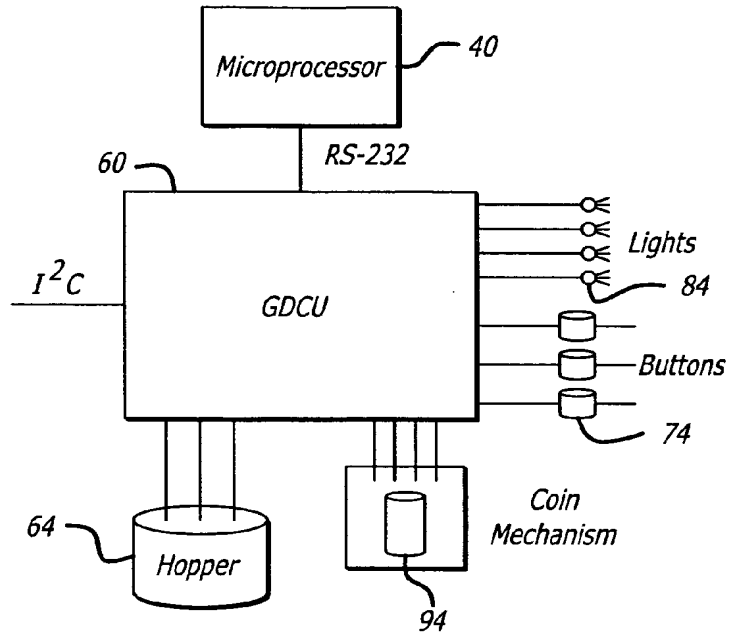
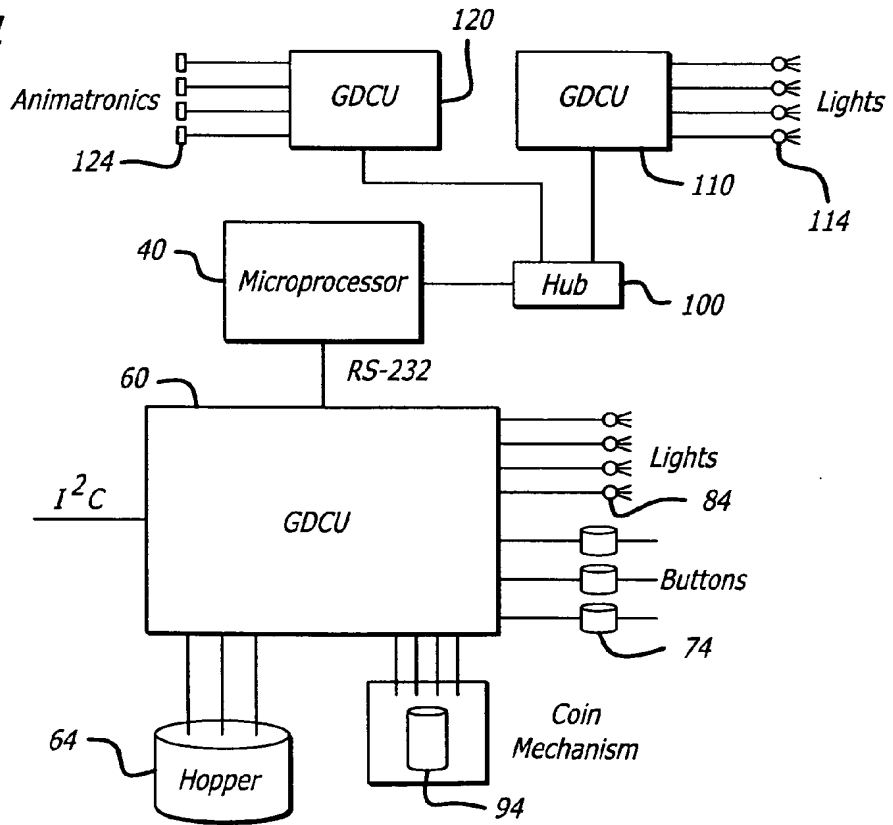


FIG. 4



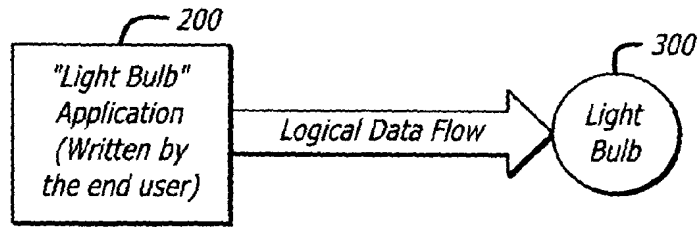


FIG. 5A

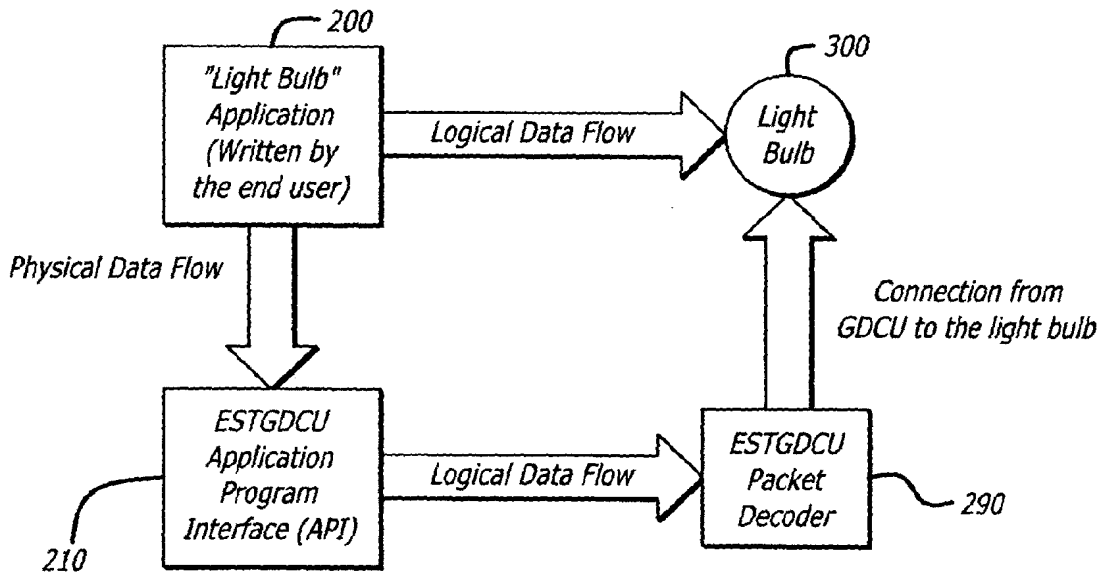


FIG. 5B

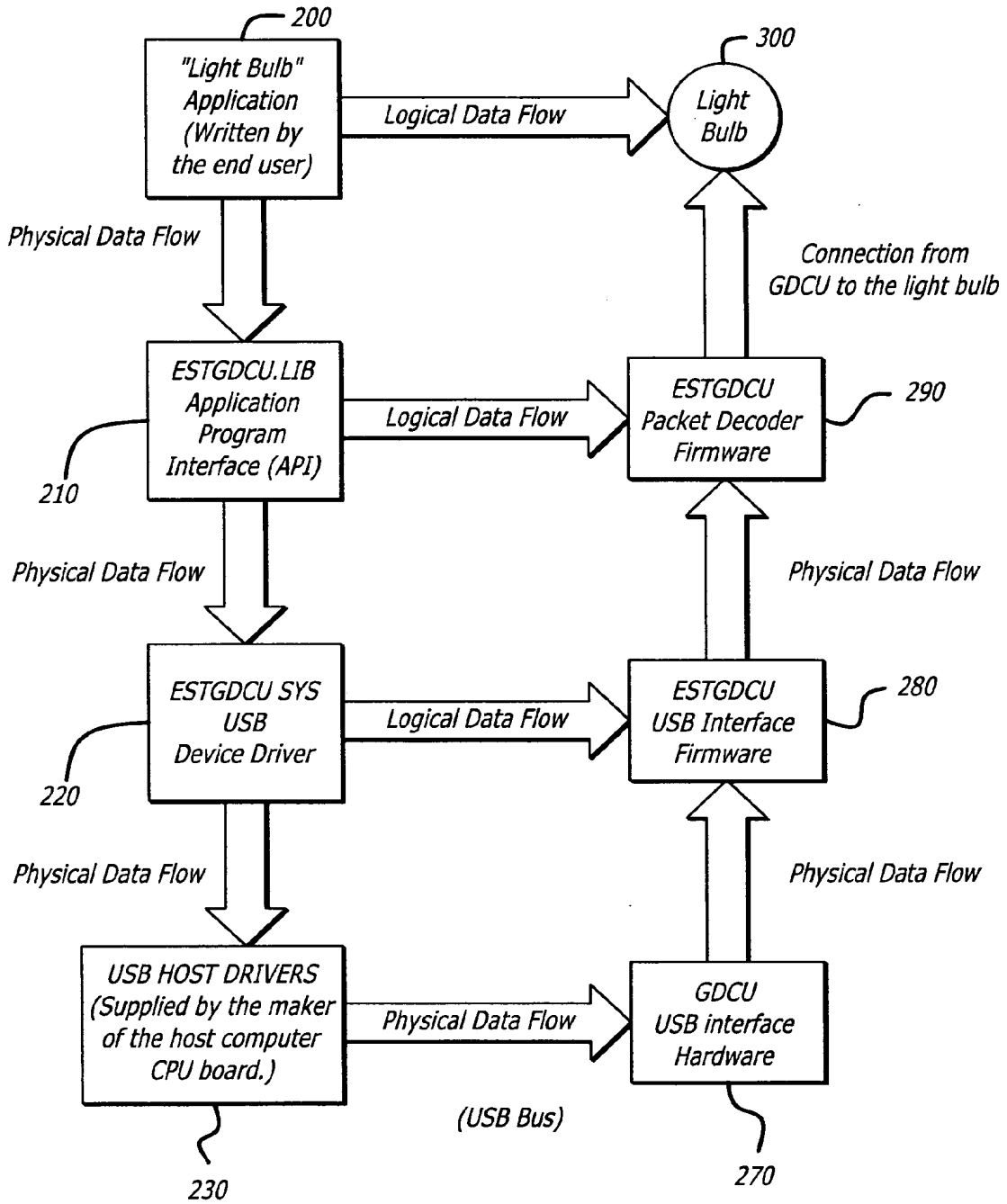


FIG. 5C

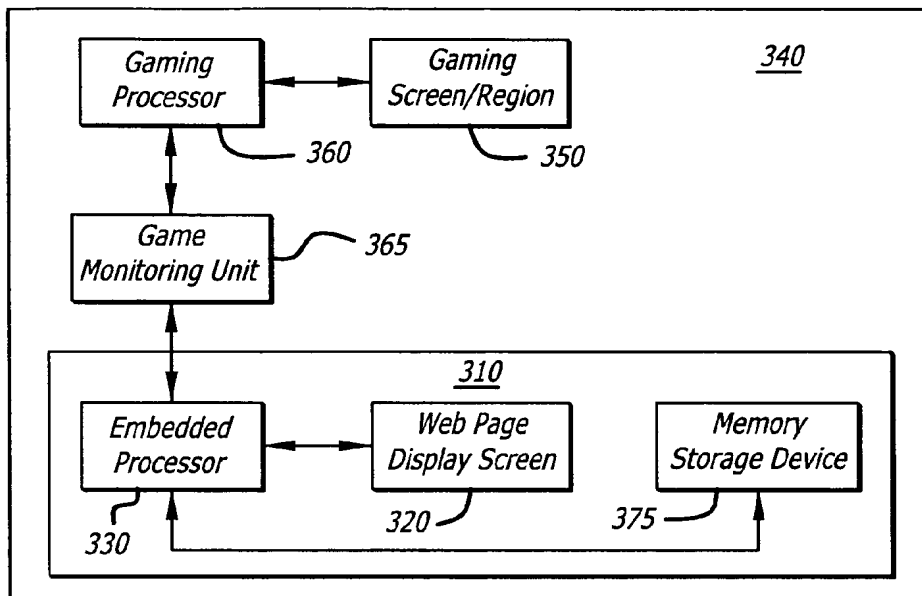


FIG. 6

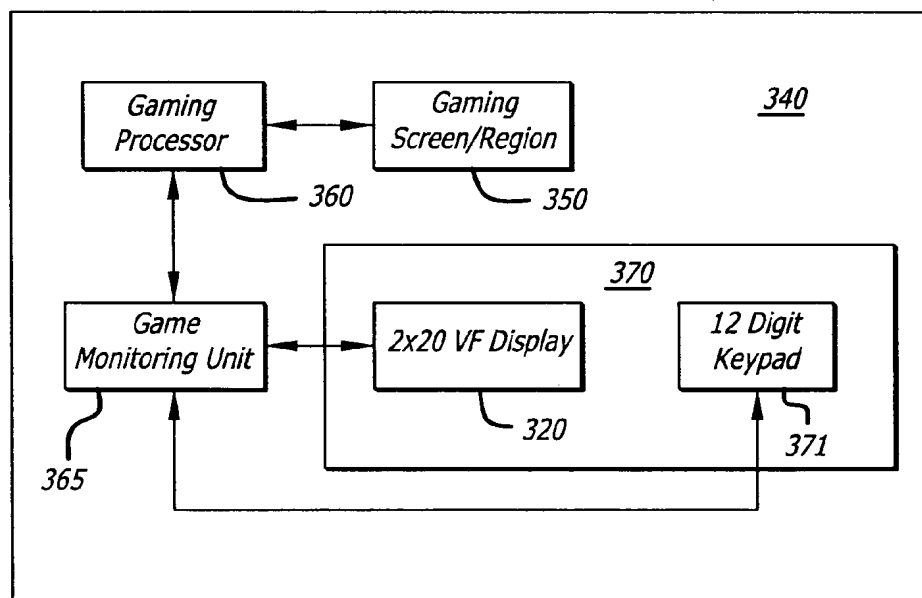


FIG. 7

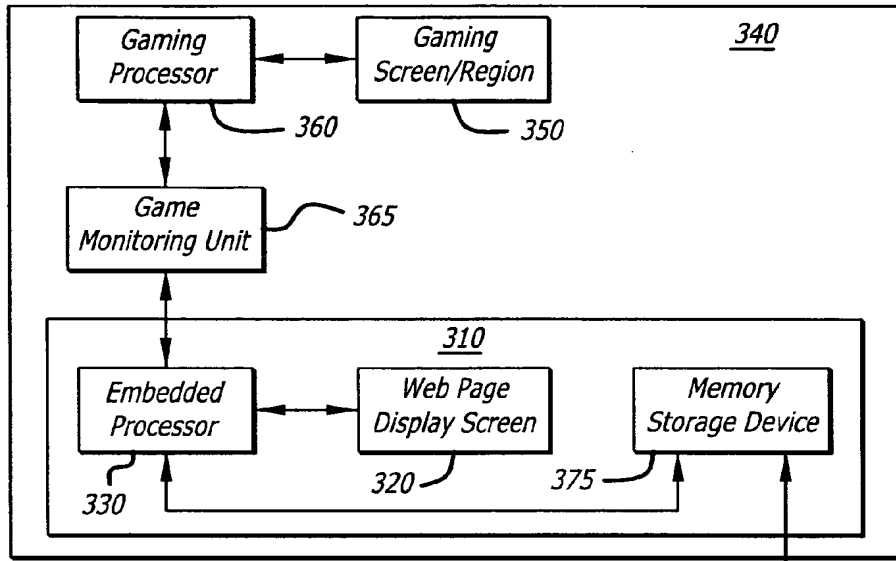


FIG. 8

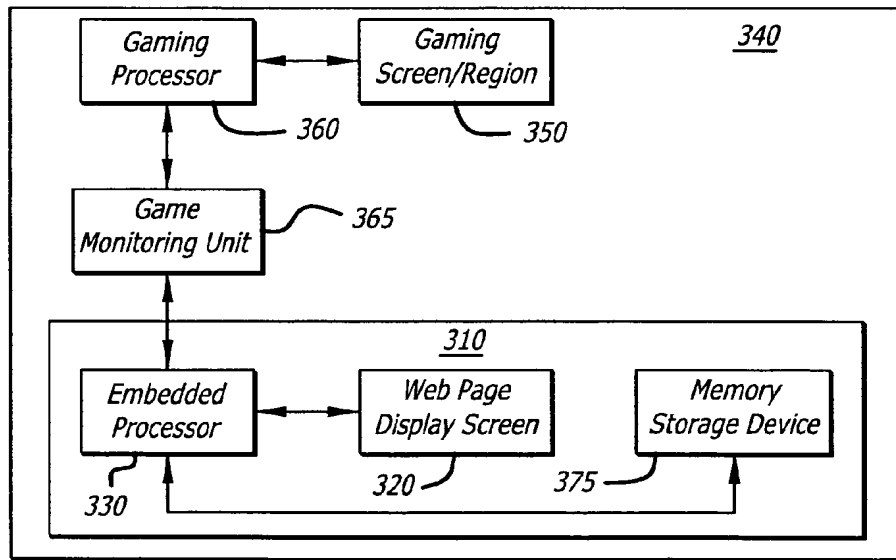
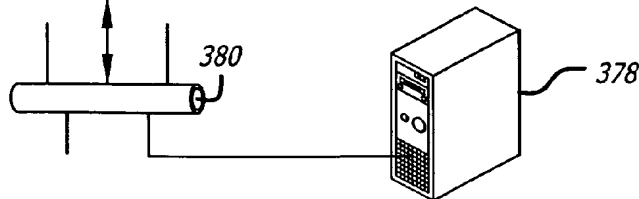


FIG. 9





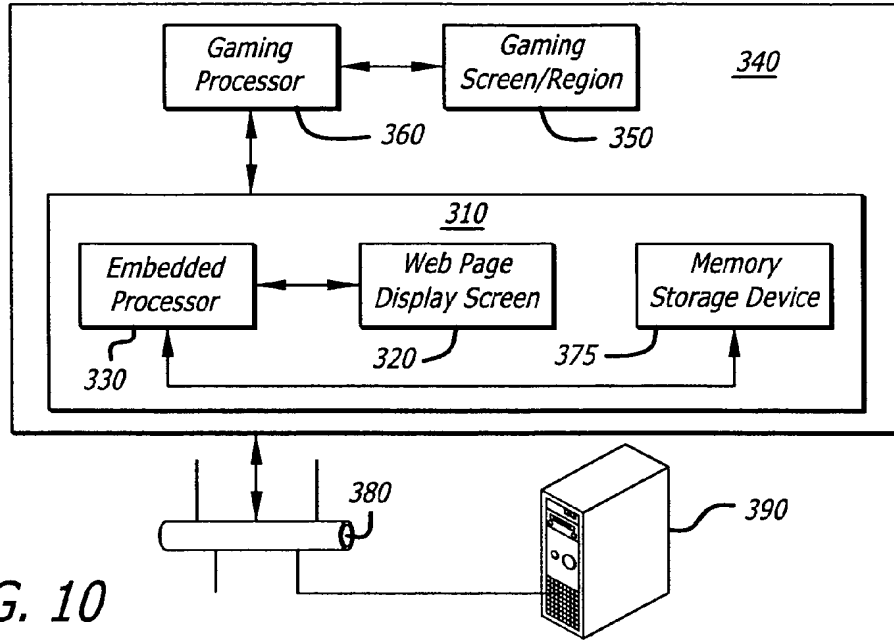


FIG. 10

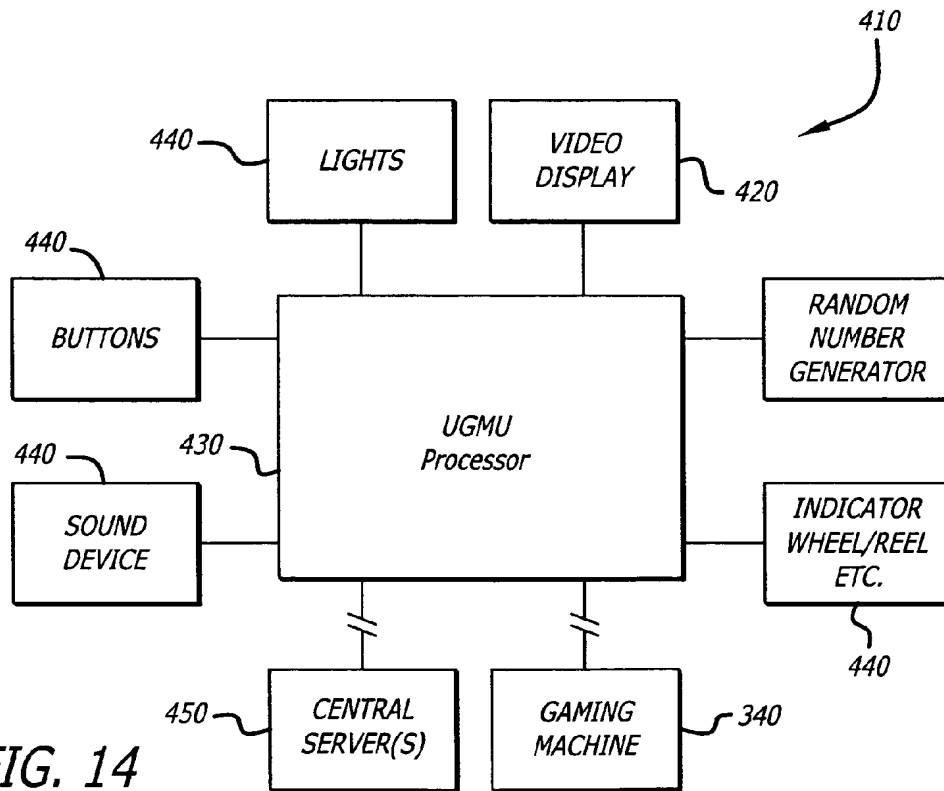


FIG. 14

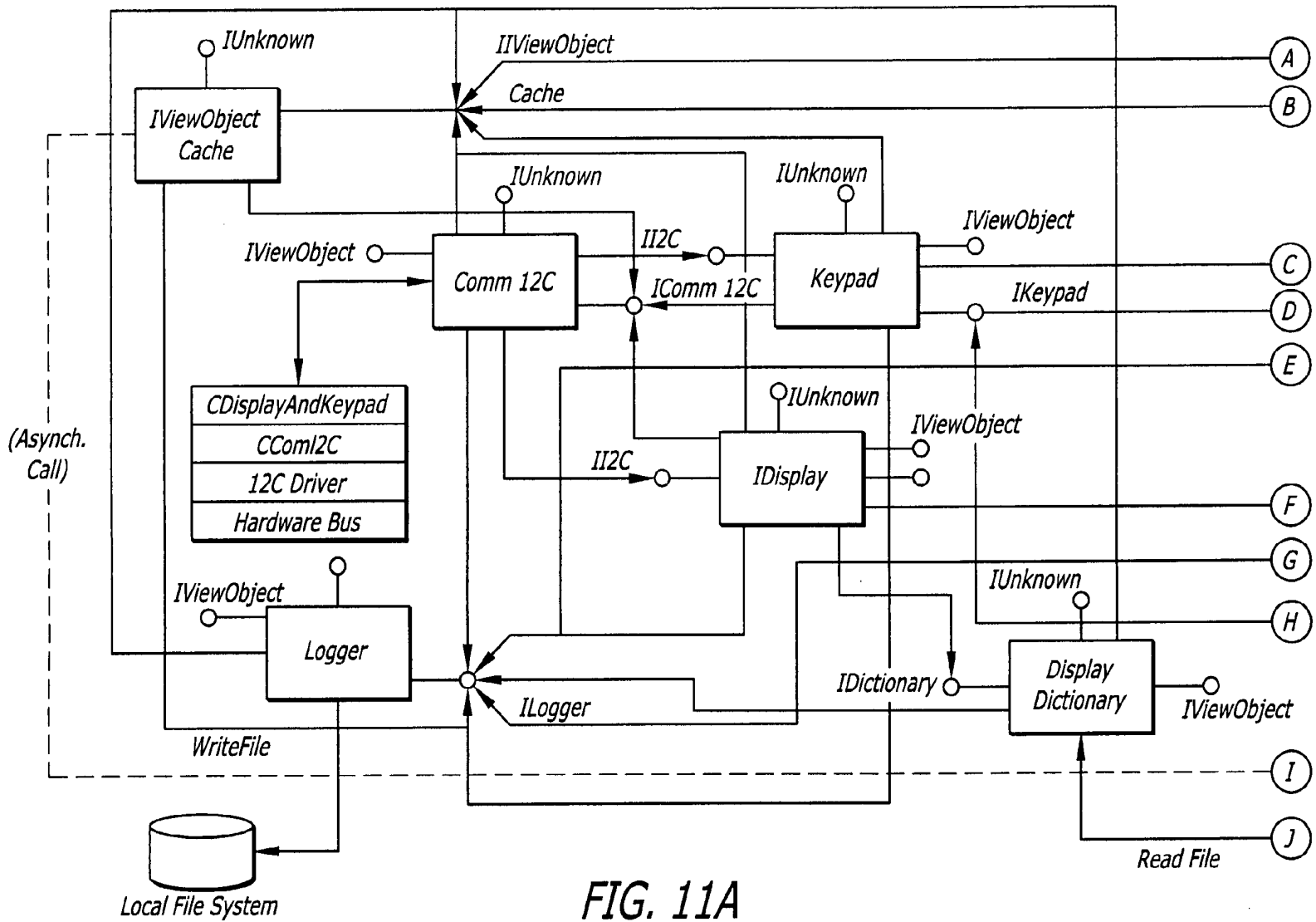


FIG. 11A

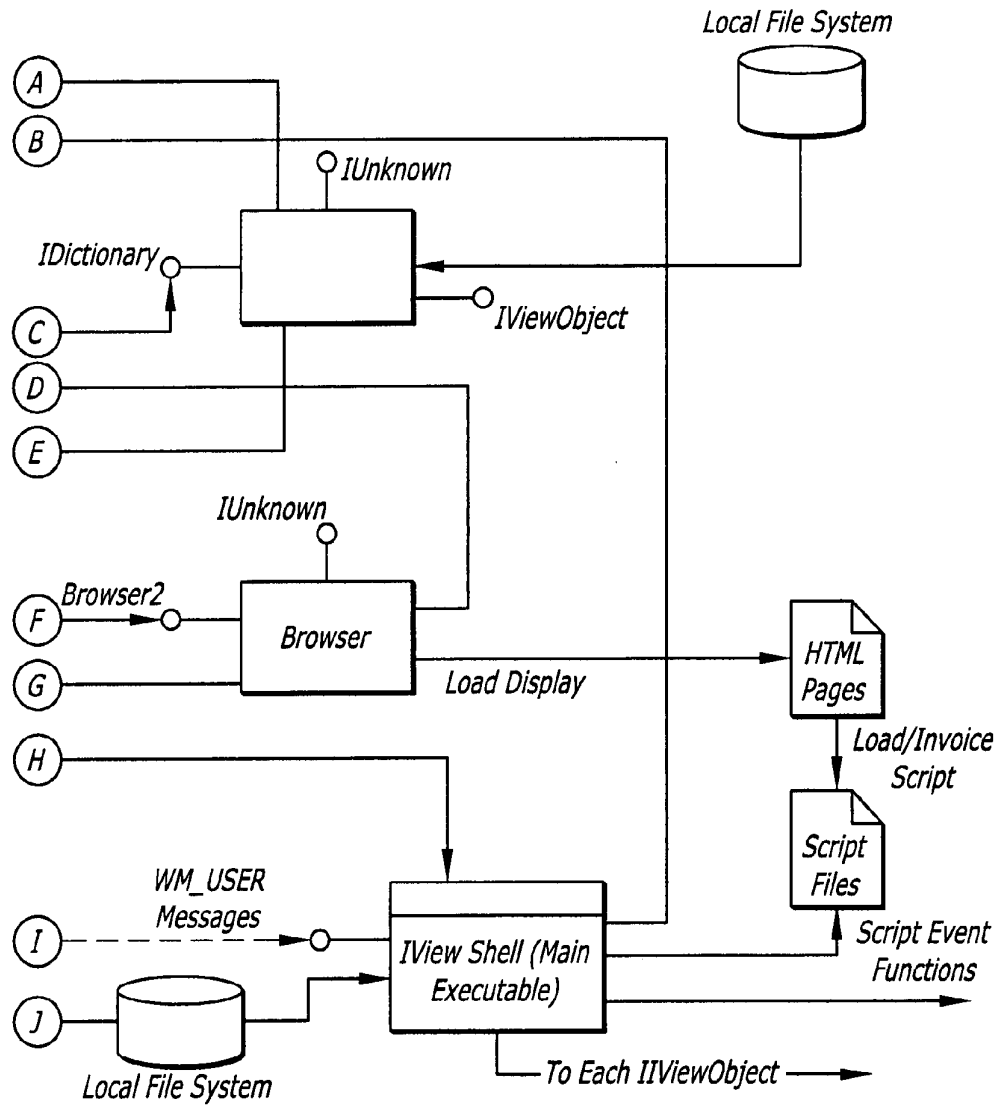


FIG. 11B

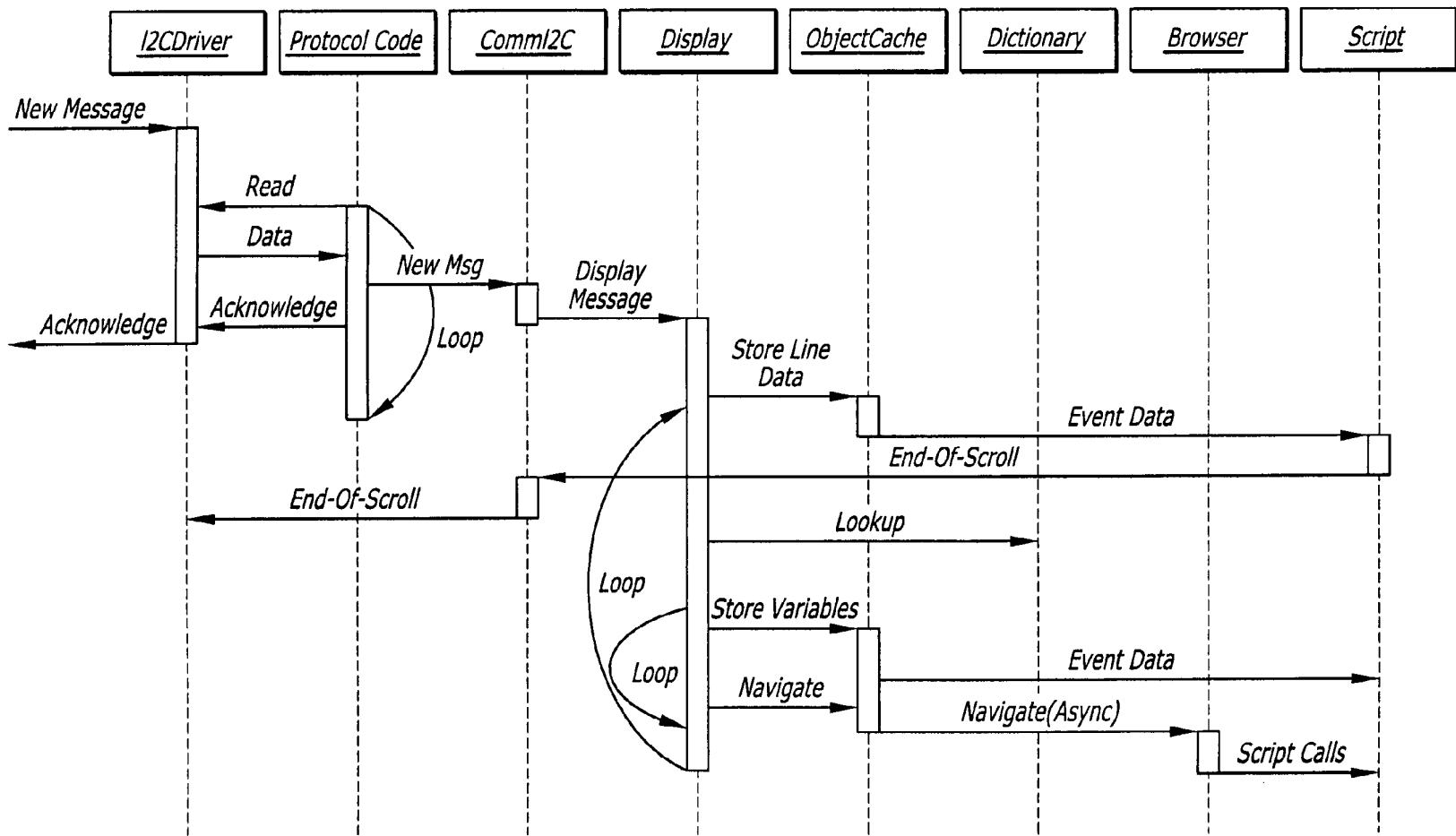


FIG. 12

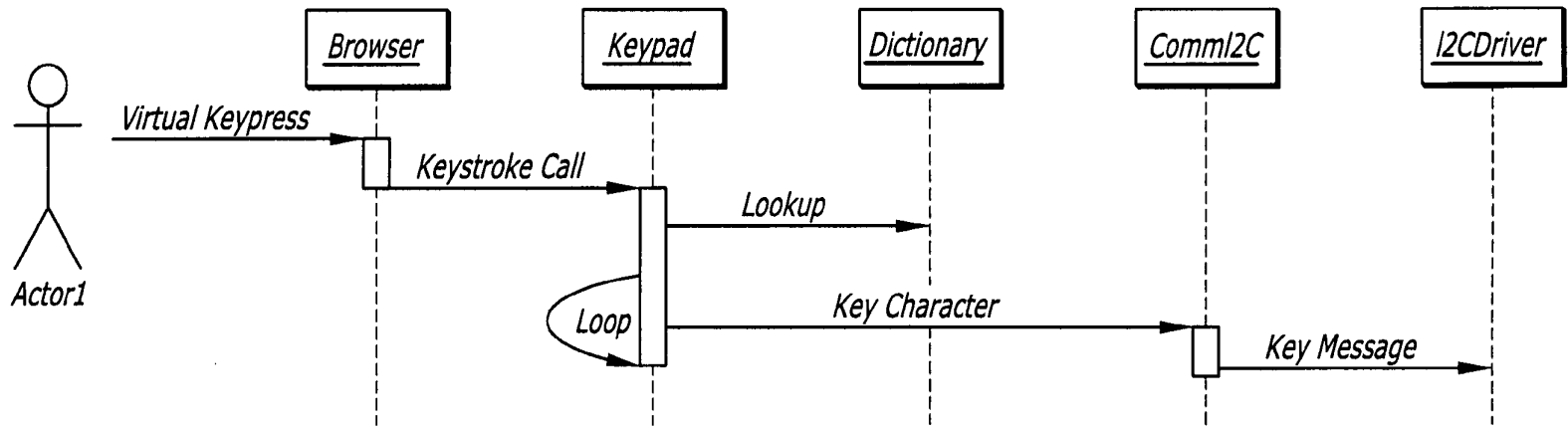


FIG. 13



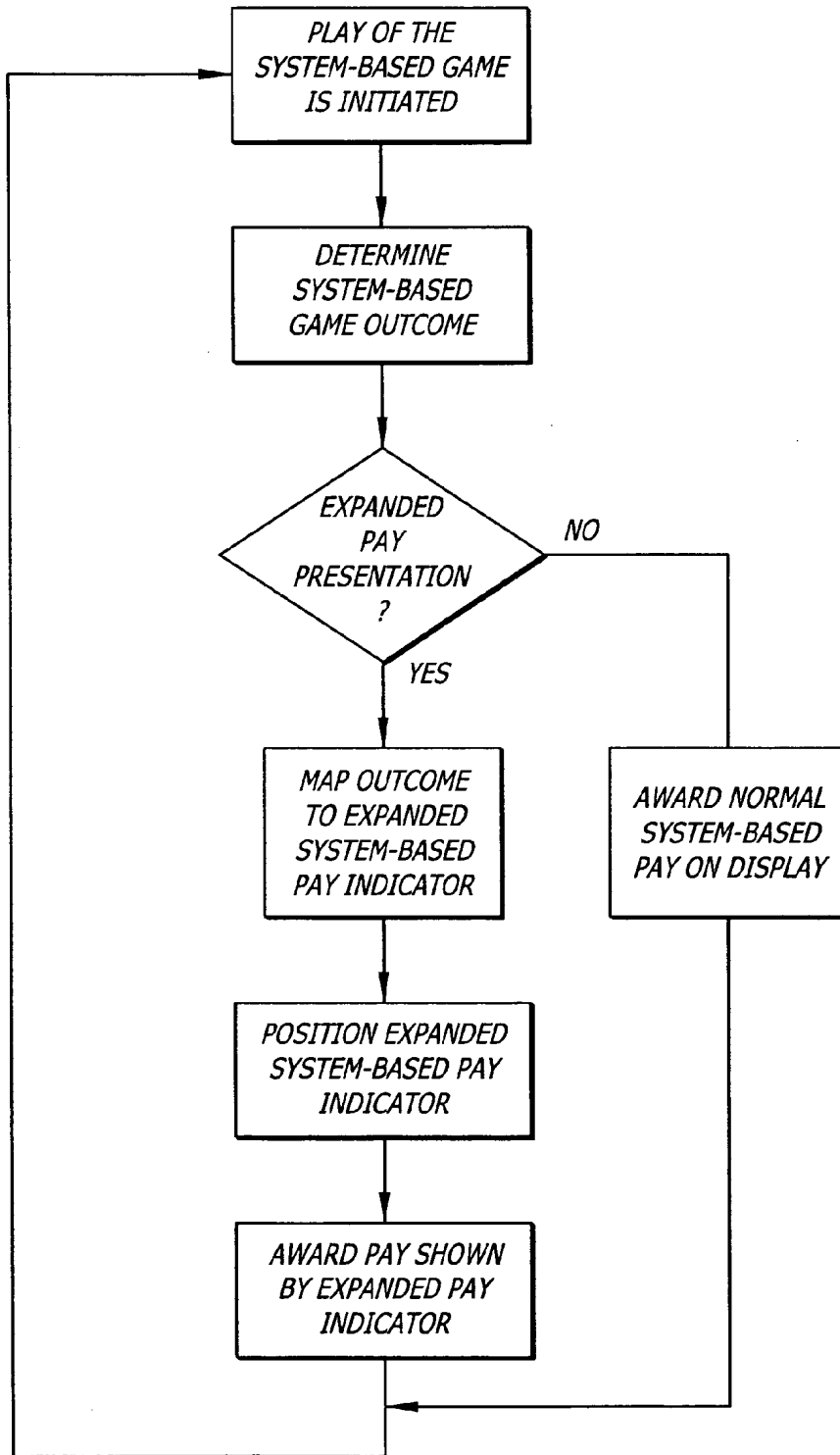


FIG. 16

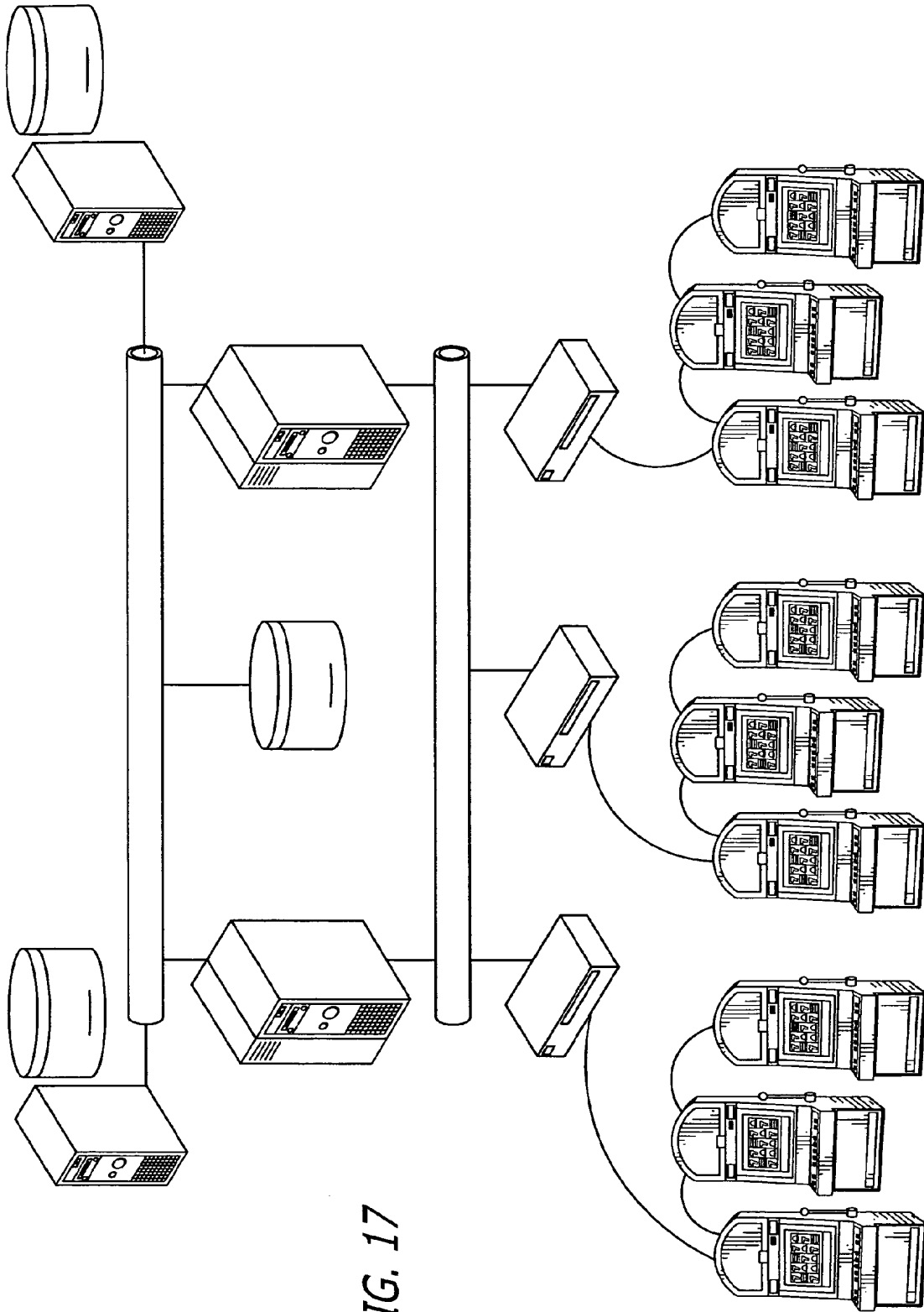


FIG. 17



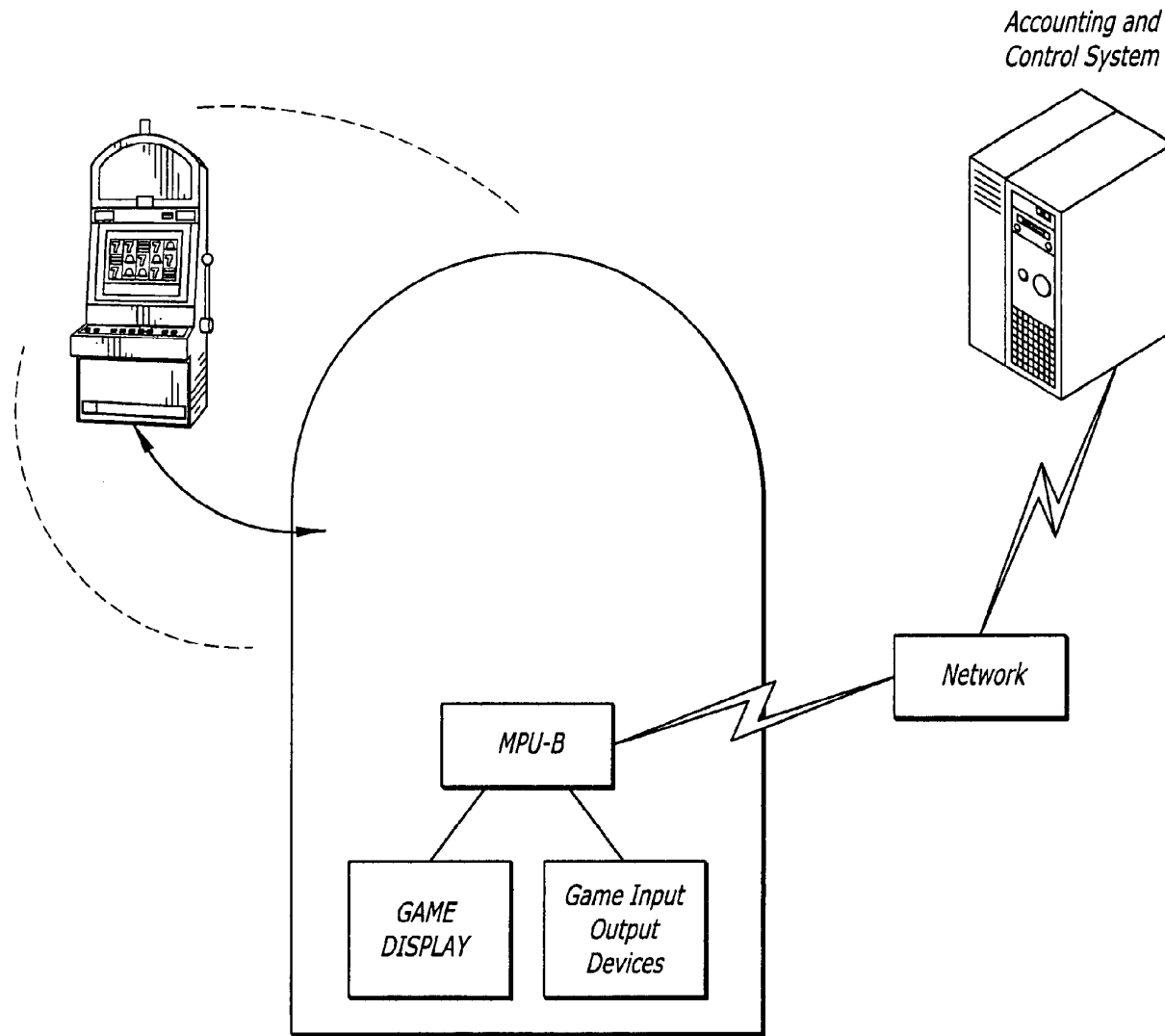


FIG. 18

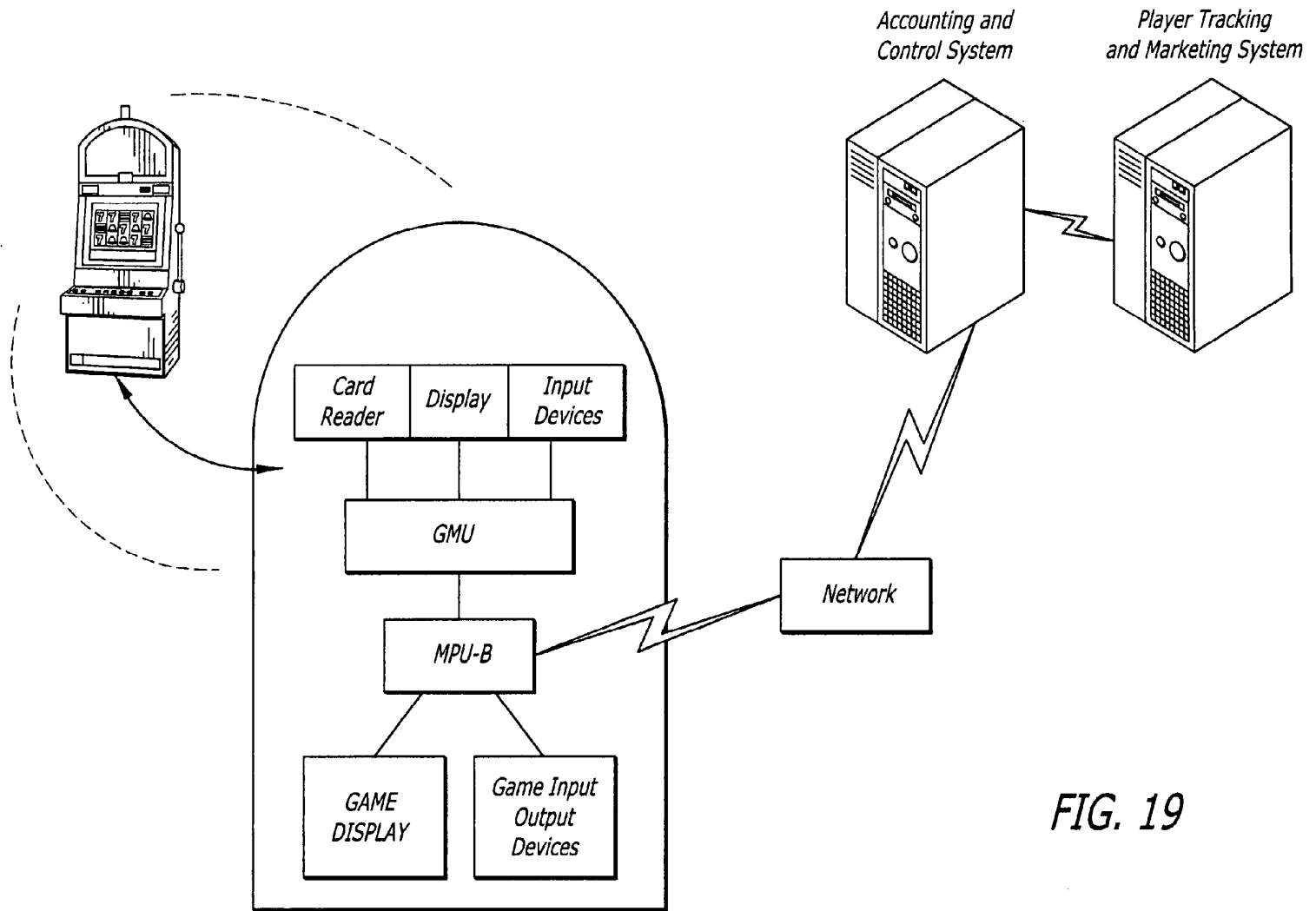
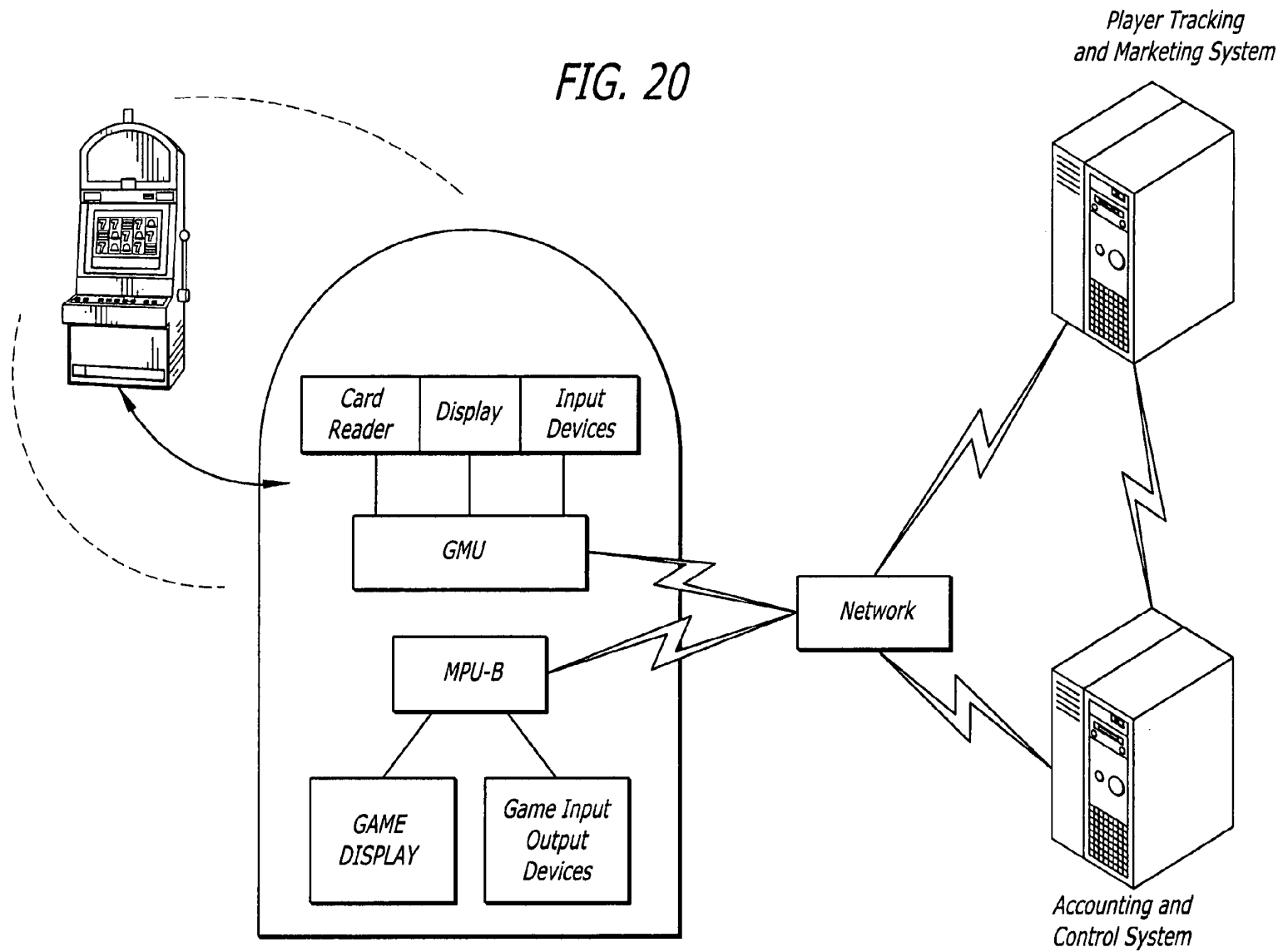


FIG. 19

FIG. 20



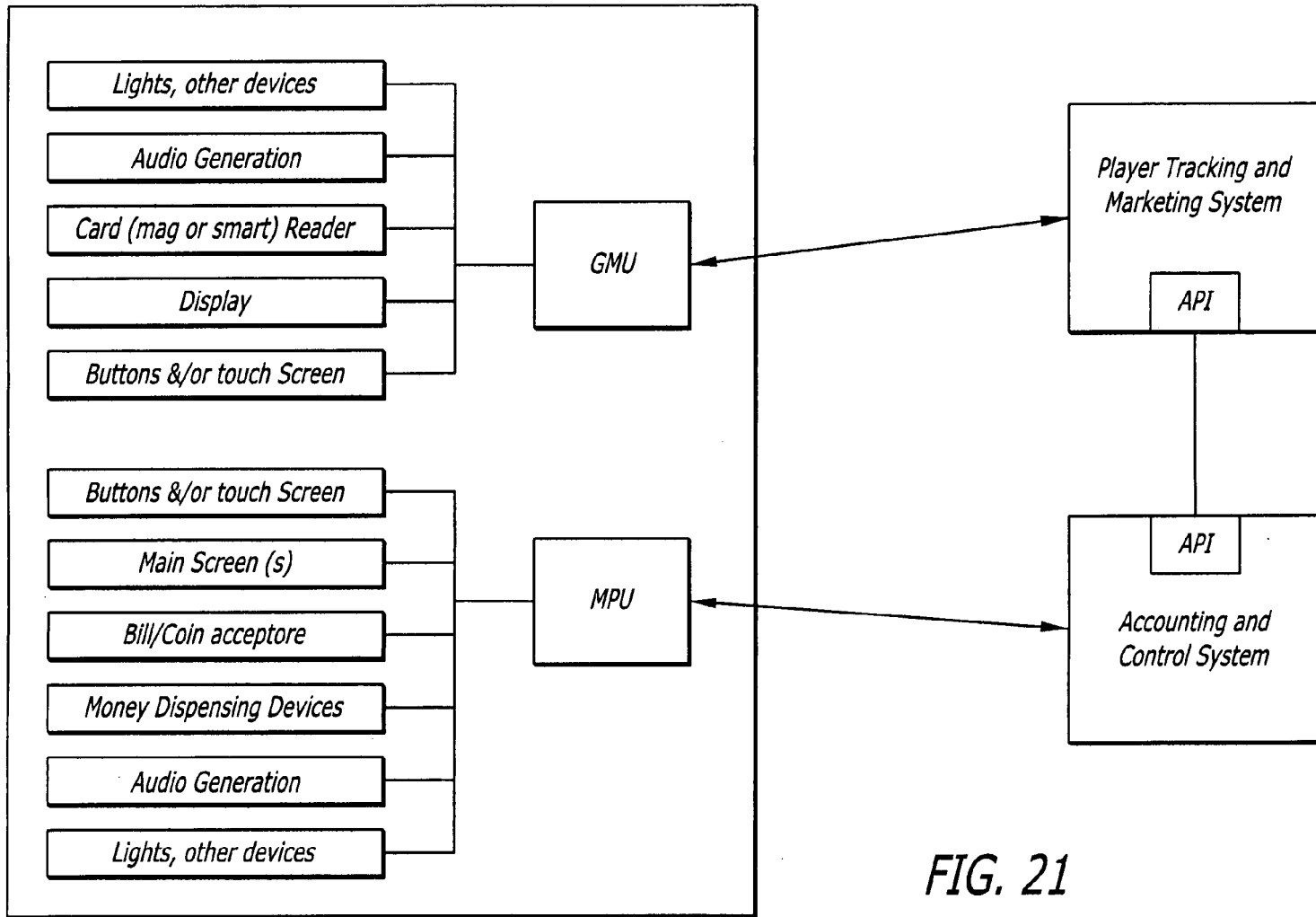


FIG. 21

**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- US 94377104 A [0002]
- US 74685400 A [0002]
- US 71475405 P [0002]
- US 5429361 A, Raven [0137]



## Description

**[0001]** The present invention relates to electronic tools for meetings including methods or devices for providing connection to a communications network, to networks or methods of operating the network, methods or devices for use in displaying media content as well as software for performing any of these methods.

Technical background

Tools for collaboration

**[0002]** Allowing *ad hoc* groups of persons to communicate with each other is one of the fundamental aspects of collaboration, problem solving, negotiation, teaching and education, etc. To assist in communication, there has been an explosion of electronic communication tools such as electronic conferencing tools, e.g. synchronous and asynchronous conferencing, online chat, Instant Messaging, audio conferencing, videoconferencing, data conferencing, application sharing, remote desktop sharing, electronic meeting systems, collaborative management (coordination) tools, project management systems, knowledge management systems, and social software systems.

**[0003]** One classic approach is the lecture or seminar often involving a presentation using presentation software. To a large extent the traditional single person presentation or lecture has been maintained with the audience being in a rather passive mode as far as determining, constructing, augmenting or modifying the information to be presented is concerned.

**[0004]** As with other business processes, meetings are going digital. Increasingly, people are using computer technology alone and in conjunction with broadband networks to support their meeting objectives prior to and during an actual meeting. For example, email is used to pass around files for people to read prior to a meeting.

**[0005]** Collaborative workspaces in corporate networks and on the Internet offer geographically distributed collaborators a virtual repository for documents related to a project or a meeting. Electronic meeting support systems, such as interactive network-connected white boards and videoconferencing appliances, are available for the benefit of those who share the same room as well as those who are in remote locations.

**[0006]** The AMIDA Final Public Report describes the overall methodology behind the development of meeting support technologies. It reports that numerous studies confirm that meetings dominate the way people work. Namely, according to a study conducted by MCI Worldcom in 2003 a business person participates in 60 meetings per month. People meet in groups for a multitude of reasons. They interact in numerous predictable and unpredictable ways and the results of their interactions are as varied as the people who participate and the projects on which they are collaborating or communicating. Stud-

ies of business processes also reveal that approximately 80% of the "workload" associated with a project or process happens in preparation for a meeting. In other words, many people view the "live" meeting as a milestone or deadline by which they can pace and measure their productivity and that of their colleagues. Unfortunately, for many information managers, being in perpetual meetings has reduced their ability to prepare adequately for the next meeting, perpetuating a vicious and negative cycle.

**[0007]** However, Marc Al-Hames et al. report in "Audio-Visual Processing in Meetings: Seven Questions and Current AMI Answers", that although large parts of working days are consumed by meetings and conferences, unfortunately a lot of them are neither efficient, nor especially successful. They report a study in which people were asked to select emotion terms that they thought would be frequently experienced in a meeting. The top answer - mentioned from more than two third of the participants - was "boring"; furthermore nearly one third mentioned "annoyed" as a frequently perceived emotion.

**[0008]** The conclusion is that despite the plethora of electronic aids to meetings, fundamental problems in handling meetings have not been solved. In fact organising and conducting meetings in a business context involves a large number of factors.

Participation

**[0009]** A lack of efficiency of meetings is addressed in the article "Mood indicators on electronic meeting tools" IBM, IP.com number: IPCOM000011711D, Publication Date: March 12, 2003. This article addresses the issue that the lack of direct feedback makes meetings clumsy, inefficient and often unproductive. It proposes a "mood indicator" as well as an "I want to ask a question" indicator which allow the presenter to choose an appropriate moment to pause, change track or field a question. It is argued that interrupting a presenter in full flow can be awkward; however, sometimes it is difficult to get an opportunity to ask a question or make a comment when many different people are trying to make their voices heard. In a similar vein, US6966035 suggests displaying a "murmur frame" for a participant to express a view. To increase user participation, US 2010/0087139 discloses a system for sending a selection to another computer, and US 2006/0095376 discloses a system for secure voting. Commenting, voting or selecting requires that a central authority provides the information that is to be selected or commented or voted on. Hence, these proposals still leave a central figure such as the presenter in a dominating position and the other members of the meeting are largely an audience with limited selection or voting or participation rights.

**[0010]** A further problem with meetings is that someone is usually late or has to leave early. With the person arriving late one has to decide if the meeting is interrupted and a summary of the proceedings so far is given. For the person leaving early (often a senior person), subse-

quent discussions can go missing. If there is a notes taker, this provides a personal summary of the meeting - but not an objective one.

**[0011]** Presents systems do not provide an optimal solution.

Legal and security issues

**[0012]** A legal requirement of a meeting is that presentations, comments and submissions need to be completely reproducible - in some circumstances, e.g. in a share holders' meeting, the events in the meeting should be subject to total recall. Computer-supported collaborative work technologies, particularly those which capture human verbal and non-verbal communications (audio and video interaction) in addition to text and graphics generated during a meeting, promise to have a long term impact on how people will prepare for and behave during and following meetings. In addition, connecting to a network brings the danger of virus, malware or spyware transfer in either direction, and there is danger of copying of confidential information.

Practical Difficulties

Scalability and ease of use

**[0013]** There are even more fundamental problems with using electronic tools in meetings. If two persons want to make two presentations then usually either both presentations must be placed on one machine or there is a need to swap between the presenters' machines. To bring the display content of a computer to a projector, the most common ways are to use a cable that connects the display adapter of the graphics card to the video input of the projector [method 1] or to use a software that captures the display contents and sends it over a wired or wireless network to a remote base unit connected to the projector [method 2]. This is often called "remote desktop" and is mostly used for remote administration or remote IT assistance purposes.

**[0014]** Less common but also practiced methods are to use a special device connected to the display adapter of the graphics card, that captures, encodes and streams the display content over a wired or wireless network [method 3].

**[0015]** Method 1 has several practical problems and disadvantages. In meetings where people want to contribute content from their own computers, e.g. to project images on a display, typically a video cable such as a VGA cable is used to connect each PC one at a time to the projector. This is not only not scalable but also can be and often is quite a cumbersome process that typically wastes valuable meeting time and takes the dynamism out of the meeting. Connection can be made more difficult and time consuming for example if the computer has to be rebooted for it to detect the projector or when the format of the PC differs from the format of the projector. In

addition changing format can leave the computer with a new format that is not compatible with its own screen so that on reboot of the PC alone, nothing is displayed on the computer screen. Without a visible screen image the necessary re-configuration can be difficult. These issues are aggravated by a number of elements:

- The use of many different video adapters, such as VGA, DVI, DP, HDMI,...
- Reach depends on cable length: too long leaves a tangled cable "salad" in the meeting room, too short reduces flexibility, often necessitating people to move around in the meeting room when they want to present something.
- Cable connection is either point to point or requires tedious and extensive cabling and the use of complex and expensive video switches.
- It is often difficult and time consuming to find the right display resolution and refresh rate that both the computer and the display or projector support.

**[0016]** Method 2 also has many drawbacks. If the connection is made to a corporate LAN there is a danger of virus, malware or spyware transfer in either direction, there is danger of copying of confidential information, and there is the difficulty of making the connection, e.g. entry of a user code and password, as well the administration of such passwords and user codes.

**[0017]** The advantage of method 3 is that the computer does not need to use its own processing power to bring the display content in a form that is easily transported over a network. This advantage becomes less relevant as computers grow in processing power. A drawback of method 3 is that the same problems often encountered with method 1 of connecting to the display adapter remain. Another drawback is that the special device referred to requires significant processing power, which means that this device will consume much power, be relatively big and certainly be relatively expensive.

**[0018]** An alternative method in the making today is to use the well known USB interface of the computer for extracting the display content of the computer. US 2009/0198839 discloses such a pluggable cable arrangement. US 2011/0115689 discloses a similar USB solution for wireless connection to a projector. Accordingly connecting a projector to a computer using the standard USB port might become commonplace with time. However, this usually requires special drivers and even special hardware. Connecting a projector to a computer using the standard USB port hence might become commonplace - but even when that happens there will be a mix of new and legacy machines for several years.

Firewalls

**[0019]** Additional problems can occur with firewalls. Typically a visitor to a meeting will bring a computer such as a laptop that is set up for a different corporate net-



working environment and hence has different or incompatible networking settings. The setting up of a firewall can be complicated and if this is not done correctly, telecommunication software that has to pass through a firewall may be blocked. In order to solve problems associated with firewalls it may be necessary to open ports or identify or even add programs in an exception list. If, besides a network (hardware) firewall and an operating system firewall, there is any software based third-party firewall like Zonealarm, CA Internet Security Suite or McAfee Firewall, then it is necessary to follow that software developer's documentation to place programs on a safe list or adding exceptions to the firewall rules. Such activity is beyond the usual user. Fussing with computer settings, or having to call for IT support wastes valuable meeting time and takes the dynamism out of the meeting.

#### Conclusion

**[0020]** The following problems remain for holding a face-to-face meeting using advanced electronic tools at the present time:

- Complexity of the networking infrastructure.
- High demands on technical expertise of users in current systems that are supposed to be designed to support everyday use by the non-expert user.
- Barriers to the use of complicated technology in meetings.
- Great variety of possible collaborative software solutions - none of which seems to solve the fundamental problems of holding successful meetings.
- Meetings being boring or annoying for members of the meeting.
- Complexity of firewalls and other security measures employed in corporate networks.
- Lack of, or restriction of participation by members of a meeting.
- Time taken to prepare presentations for meetings.
- Need to record events in the proper time sequence at meetings without burdening a meeting more than necessary.

**[0021]** Although some tools solve some of these problems effectively, no electronic meeting tool solves all of them.

#### Summary of the invention

**[0022]** An object of the present invention is to provide network solutions including electronic tools for meetings as well as devices for providing connection to a communications network, to methods of operating the network, methods of displaying media content as well as software for performing any of these methods or for implementing such systems.

**[0023]** In an aspect of the present invention a method for displaying arbitrary media content obtained from a

processing device (e.g. a digital processing device) on a display device is provided, the media content being transmitted through a communications network, the processing device having a memory and a display, the method comprising:

use of a peripheral device to provide a token that inherently or discretely provides authentication to display content on the display device and provides a link to the display device.

**[0024]** In particular the present invention provides a method for displaying arbitrary media content obtained from a processing device (e.g. a digital processing device) on a display device in a meeting with a plurality of participants, the media content being transmitted through a shared resource communications network, the processing device having a memory and a display, the method comprising:

use of a peripheral device to provide a token that when transferred to the communications network inherently or discretely provides authentication or permission to display the arbitrary media content on the display device, the token also providing a link to the display device;  
routing the arbitrary media content through the communications network from the processing device;  
obtaining unilateral electronic access to the display device; and displaying the arbitrary media content.

**[0025]** The arbitrary media content is preferably obtained by screen scraping data from the processing device.

**[0026]** In a further aspect the present invention provides a method for displaying arbitrary media content obtained from a processing device on a display device in a meeting with a plurality of participants, the media content being transmitted through a shared resource communications network, the processing device having a memory and a display, the method comprising:

use of a peripheral device to provide a token that when transferred to the communications network inherently or discretely provides authentication or permission to display the arbitrary media content on the display device, the token also providing a link to the display device;  
obtaining the arbitrary media content by screen scraping data from the processing device;  
routing the screen scraped arbitrary media content through the communications network from the processing device;  
obtaining electronic access to the display device; and  
displaying the arbitrary media content.

**[0027]** Obtaining user selected arbitrary media content

is preferably not obtained by application sharing but by the process of screen scrapping. Although software packages that provide screen scraping require installation on the target device, or at least require the installation of dedicated and/or custom drivers, embodiments of the present invention use software loaded onto the peripheral device which allows screen scraping when run on the processing device but leaves a zero footprint when terminated. Embodiments of the present invention can screen scrape full HD videos at 20fps without requiring any installation of a program on the processing device nor requiring configuring the processing device such as a PC that they run on for the connectivity to the network hence meeting "zero footprint" requirements.

**[0028]** On the peripheral device a mass storage device is provided that stores the software to be run on the processing device. The mass storage device can be logically closed once the software has been read and loaded and is running from RAM in the processing device. Also provided on the peripheral device is a further device such as an HID (human interface device) to capture user input and provide user feedback. In embodiments of the present invention, the peripheral device contains multiple internal logical devices that are combined:

An HID (human interface device) used for capturing user input (e.g. following a user action such as pressing or activating a button) and providing user feedback, e.g. by an optical indicator such as a light ring around the button e.g. an LED ring, and for streaming the screen scraped video content to the network and hence to a base unit and a display,

A mass storage device used to store the application, and optionally An audio device that acts as a virtual sound card to a client PC over USB, using a generic driver such as a UAC or UAC2 device driver.

**[0029]** Screen scraping is able to capture all material in a neutral manner rather than being limited by proprietary applications. Further the screen scraper application is zero footprint on termination rather than being fully installed on the processing device. Embodiments of the present invention can provide arbitrary "full content" to the meeting room and participants can display in real-time,

The real-time content is shown on a central display rather than being broadcast to individual participants or archived.

**[0030]** Embodiments of the present invention "auto compose" arbitrary user data on a central display or screen so that full real-time content that is provided by multiple meeting participants who intentionally share this content in order to make the meeting more effective and efficient,

Embodiments of the present invention implement a principle of "democratic screen sharing", in which the meeting participants decide themselves on a peer-to-peer basis which content to share when and where. Peer-to-peer

data sharing differs from systems in which the content to be displayed is determined by a a presenter or meeting director. The user determines where his content is routed to and can do so without any software configuration on the user processing device.

**[0031]** In yet a further aspect the present invention provides an electronic meeting tool for communicating arbitrary media content from users at a meeting comprising:

a node configuration means adapted to operate a display node of a communications network, the display node being coupled to a first display, the node configuration means being adapted to receive user selected arbitrary media content and to control display of the user selected arbitrary media content on the first display; and

at least one peripheral device adapted to communicate the user selected arbitrary media content via the communications network, wherein the peripheral device is a connection unit comprising:

- (a) a connector adapted to couple to a port of a processing device having a second display, a memory and an operating system; and
- (b) a transmitter for communicating with the communications network,

a program adapted to be loaded onto the processing device and to run on the operating system of the processing device, said program being adapted to obtain user selected arbitrary media content, said program leaving a zero footprint on termination, and an input device to allow the user to carry out a user action that triggers transfer of said user selected arbitrary media content to said transmitter through said port.

**[0032]** The program can be stored on the peripheral device. The transmitter can be a wireless transmitter or transceiver. The peripheral device can be a plug-and-play device. The program can be adapted to screen scrape content of the second display.

**[0033]** The input device can be physical actuator coupled to the peripheral device. The physical actuator preferably has a surface area of between 100 and 14,400 square mm. Alternatively, the input device can be a key displayed on the second display. The key displayed on the second display can be one not screen scraped by the program.

**[0034]** In another aspect the present invention provides a method for connecting a processing device to a communications network, the processing device having a memory, a display and an operating system with at least one pre-installed generic driver providing a generic communications protocol for communication between processing device and a standard class of peripheral devices, the method comprising the steps of:

- a) coupling a peripheral device to the processing device, the peripheral device having a transceiver;
- b) setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;
- c) coupling the processing device to a communications network via the peripheral device;
- d) routing screen scraped data between the processing device and the communication network via the means for communication, wherein the generic communication protocol is used for transferring the screen scraped data between the processing device and the peripheral device.

**[0035]** The routing of the screen scraped data can be to a defined network node such as a display node without user entry of configuration details. Thus the routing can be dedicated to a specific network node such as a display node, base station etc. This is achieved by pairing of the peripheral device to the relevant node before the communication starts.

**[0036]** In accordance with embodiments of the present invention users start an application from the peripheral device such as a USB dongle, thus making the connection in a 3 step process: (1) connect, e.g. plug in the peripheral device to the processing device, (2) start the screen scraping application, (3) perform a user action such as click on a button on the peripheral device to allow content to be displayed on the central screen or display. To achieve step 2 Autorun or AutoPlay can be used with some Windows operating systems, but there are many different variants based on the OS version and which patches have been installed. Furthermore, this mechanism is generally considered a security hazard, which is why most IT departments will disable Autorun/AutoPlay. Other OS providers have disabled this function, e.g. Apple removed a similar functionality entirely from its OS/X since Snow Leopard.

**[0037]** In an embodiment of the present invention a very small service - also called daemon on some OS's - is provided that requires installation on the processing device such as a laptop. This service is pre-installed on the processing device. The installation is required only once on every processing device such as a laptop. The role of this is to provide a permanently running service which continuously monitors if a peripheral device according to the present invention has been offered up for connection to the processing device. When such a peripheral device is connected, the service will detect this and start the client application software residing in the mass storage area of the peripheral device. Once the service is installed, connectivity with the peripheral device becomes a 2 step process: connect, e.g. plug in the peripheral device to the processing device, (2) perform a user action such as click on a button on the peripheral device to go allow content to be displayed on the central screen or display. The application loaded from the

processing device still leaves a zero footprint on termination

**[0038]** Step b) can comprise presenting the peripheral device to the processing device as a human interface device and wherein the pre-installed generic driver is a human interface device driver.

**[0039]** Alternatively or additionally step b) can comprise presenting the peripheral device to the processing device as a mass storage device and wherein the pre-installed generic driver is a mass storage device driver.

**[0040]** Alternatively or additionally, step b) comprises presenting the peripheral device to the processing device as a composite device and wherein pre-installed generic drivers drive different device interfaces independently.

**[0041]** A client application can be stored on the peripheral device which when run on the processing device obtains the screen scraped data. Such a client application can be a portable application and leaves no footprint on termination.

**[0042]** In another aspect the present invention provides a peripheral device for providing communication connectivity to a processing device which is provided with memory, a display and an operating system with at least one pre-installed generic driver providing a generic communication protocol for communication between the processing device and a standard class of peripheral devices, the peripheral device comprising a memory in which executable software code is stored for execution on the processing device, said executable software code comprising:

a first software code portion for setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;

a second software code portion for connecting the processing device to a communications network via the peripheral device, the peripheral device having a transceiver;

a third software code portion for screen scraping data from the processing device; and a fourth software code for routing screen scraped data between the processing device and the communications network over the means for communication; wherein the first software code portion is adapted to use the generic communication protocol for transferring the screen scraped data between the processing device and the peripheral device.

**[0043]** The first software code portion can be adapted to present the peripheral device to the processing device as a human interface device and wherein the pre-installed generic driver is a human interface device driver. The first software code portion can be adapted to present the peripheral device to the processing device as a mass storage device and wherein the pre-installed generic driver is a mass storage device driver. The first software code portion can be adapted to present the peripheral device

to the processing device as a composite device and wherein pre-installed generic drivers drive different device interfaces independently.

**[0044]** The executable software code can comprise fifth code for providing a means for connecting to the communications network including a base node. The executable software third code can comprise sixth code for providing means for capturing video frame buffers of the processing device.

**[0045]** The executable software code can comprise seventh code for providing a means for encoding, compressing and optionally encrypting the screen scraped data and sending the screen scraped data the communication network. The executable software code can comprise eighth code for providing a means for handling the peripheral device. The executable software code can comprise ninth code for providing means for initiating connection to the base node. The executable software code can comprise tenth code for receiving inputs from an input device on the peripheral device. The executable software code can comprise eleventh code for providing a means for sending state changes to the visual indicator on the peripheral device. The executable software code can comprise twelfth code for providing a means for presenting to the user a GUI. The executable software code can comprise thirteenth code for presenting a GUI for administration of the said executable software code when executed as a portable application. The executable software code can comprise fourteenth code for providing a means for displaying and activating a key on the display of the client processing device for allowing a user to input the start the transfer of data from the processing device to the base node.

**[0046]** In another aspect the present invention provides a peripheral device for providing communication connectivity to a processing device which is provided with memory, a display and an operating system with at least one pre-installed generic driver providing a generic communication protocol for communication between the processing device and a standard class of peripheral devices, the peripheral device comprising a memory in which executable software code is stored for execution on the processing device, said executable software code comprising:

- a first software code portion for setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;
- a second software code portion for connecting the processing device to a communications network via the peripheral device, the peripheral device having a transceiver; and
- a third processing software code for routing data between the processing device and the communications network over the means for communication; wherein the first software code portion is adapted to use the generic communication protocol for transfer-

ring the data between the processing device and the peripheral device, and an input device coupled to the peripheral device, the input device being adapted to react to a user action to trigger the transfer of the data from the processing device to the peripheral device.

**[0047]** The first software code portion can be adapted to present the peripheral device to the processing device as a human interface device and wherein the pre-installed generic driver is a human interface device driver. The first software code portion can be adapted to present the peripheral device to the processing device as a mass storage device and wherein the pre-installed generic driver is a mass storage device driver. The first software code portion can be adapted to present the peripheral device to the processing device as a composite device and wherein pre-installed generic drivers drive different device interfaces independently.

**[0048]** The input device is preferably a physical actuator coupled to the peripheral device. The physical actuator preferably has a surface area of between 100 and 14,400 square mm. The input device can be for example a key for display on the display. The executable software code can comprise fourth code for providing a means for connecting to the communications network including a base node. The executable software code can comprise fifth code for providing a means for capturing video frame buffers of the processing device. The executable software code can comprise sixth code for providing a means for encoding, compressing and optionally encrypting the video frames and sending them over a secure link to the base node. The executable software code can comprise seventh code for providing a means for handling the peripheral device. The executable software code can comprise eighth code for providing a means for initiating connection to the base node. The executable software code can comprises ninth code for receive inputs from an input device on the peripheral device. The executable software code can comprise tenth code for providing a means for sending state changes to the visual indicator on the peripheral device. The executable software code can comprise eleventh code for providing a means for presenting the user a GUI. The executable software code can comprise twelfth code for presenting GUI for administration of the executable software code when executed as a portable application. The executable software code can comprise thirteenth code for providing a means for displaying and activating a key on the display of the processing device for allowing a user input to start the transfer of data from the processing device to the base node.

**[0049]** In another aspect of the invention a peripheral device is provided for providing communication connectivity to a processing device which is provided with memory, a display and an operating system with at least one pre-installed generic driver providing a generic communication protocol for communication between the processing device and a standard class of peripheral de-

VICES, the peripheral device comprising a memory in which executable software code is stored for execution on the processing device, said executable software code comprising:

- a first software code portion for setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;
- a second software code portion for connecting the processing device to a communications network via the peripheral device, the peripheral device having a transceiver;
- a third software code portion for receiving media content from the network and for displaying the media content on the display in accordance with a set of rules; wherein the first software code portion is adapted to use the generic communication protocol for transferring the media content between the peripheral device and the processing device.

**[0050]** The executable software code can comprise fourth code for providing a means for correctly configuring a receiver as an access point. The executable software code can comprise fifth code for providing a means for listening for output of connection units trying to connect on a specific port. The executable software code can comprise sixth code for providing a means for a GUI for administration purposes. The executable software code can comprise seventh code for providing a means for publishing its presence over the network using the zeroconf protocol. The executable software code can comprise eighth code for providing a means for accepting and installing software updates. The executable software code can comprise ninth code for providing a means for providing facilities for pairing of connection units to the processing device. The executable software code can comprise tenth code for providing a means for auto-composing of different incoming arbitrary media streams and rendering of composited image on display. The executable software code can comprise eleventh code for providing a means for receiving, decrypting and decoding incoming arbitrary media content. The executable software code can comprise twelfth code for scaling of incoming arbitrary media streams. The executable software code can comprise thirteenth code for providing a means for displaying incoming arbitrary media content in accordance with a set of rules.

**[0051]** The present invention also provides a method for communicating arbitrary media content from users at a meeting comprising:

- operating a display node of a communications network, the display node being coupled to a first display, to receive user selected arbitrary media content and to control display of the user selected arbitrary media content on the first display; and
- connecting a peripheral device to a port of a process-

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ing device and communicating the user selected arbitrary media content via the communications network,  
 loading a program onto the processing device and running the program on the operating system of the processing device to obtain user selected arbitrary media content, said program leaving a zero footprint on termination, and  
 triggering transfer of said user selected arbitrary media content to said transmitter through said port after a user action on an input device.

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**[0052]** The present invention also provides a peripheral device comprising:

- a base
- a connector for connection to a plug and play port of a host processing device,
- a flexible connection between the base and the connector for transferring data signals and power,
- an actuator on the base for actuating a signal and for transferring the signal to the connector for transfer to the port, wherein the base has electronics comprising permanent storage for storing a portable application, a processing engine, a transceiver and a visual indicator.

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**[0053]** The present invention also provides a method for providing communication connectivity from a processing device,  
 setting up a communications network between a base node of the communications network and a peripheral device coupled to the processing device;  
 transferring media content between the processing device and the peripheral device,  
 transmitting the media content from the peripheral device to the communications network,  
 receiving media content from the communications network at the base node and  
 displaying the media content on a display in accordance with a set of rules.

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**[0054]** Any of the above software code stored on a non-transitory storage medium.

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**Definitions**

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**[0055]** "unilateral" means that the displaying process is obtained by the action of only one participant involved in the meeting, without requiring the agreement of another or the others. The term "unilateral" implies that the data for display is allowed to override or replace any data displayed on the screen by the same or another participant of the meeting.

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**[0056]** "Plug and play" is a term used to describe the characteristic of a computer bus, or device specification, which facilitates the discovery of a hardware component in a system, without the need for physical device configuration, or user intervention in resolving resource con-

flicts. Plug and play devices can be added to a bus of a computing system (while running or when shut down), and the newly added device and possibly the rest of the computing system is automatically configured to make the newly added device work, both from hardware and from software perspective.

**[0057]** Plug and play interfaces include for example (not an exhaustive list): Firewire (IEEE-1394), PCI, Mini PCI, PCI Express, Mini PCI Express, PCMCIA, PC Card, Universal Serial Bus (USB), SDIO cards.

**[0058]** "Auto-configuration" is the automatic configuration of devices without manual intervention, without setting any switches or jumpers, and without any need for software configuration. An example of auto-configuring devices: USB devices. Examples of auto-configuring protocols: DHCP, Zeroconf, Bonjour.

**[0059]** A plug and play device has auto-configuration software by default to make it plug and play. Example: USB devices are made to be plug and play by including the correct auto-configuration software (e.g. host driver, host stack, application software). Autoconfiguration can also refer to a software alone and is not restricted to a physical device.

**[0060]** "Hot swapping and hot plugging" are terms used to describe the functions of replacing computer system components without shutting down the system. More specifically, hot swapping describes replacing components without significant interruption to the system, while hot plugging describes the addition of components that would expand the system without significant interruption to the operation of the system. A well-known example of this functionality is the Universal Serial Bus (USB) that allows users to add or remove peripheral components such as a mouse, keyboard, or printer. Other examples are eSATA, PCIe, FireWire, for example.

**[0061]** A "portable application" (portable app), sometimes also called standalone, is a computer software program designed to run without installation on the target machine. This type of application is stored on a removable storage device such as a CD, USB flash drive, flash card, or floppy disk - storing its program files, configuration information and data on the storage medium alone. It is a program that can be stored on an electronic device such as a USB flash drive, iPod, memory card, portable hard drive or other portable electronic device and runs on a computer or other processing device coupled to the electronic device without making permanent configuration changes to the host computer. All such programs have a zero-footprint, meaning all temporary files, registry entries, and any other changes to the machine exist only while the program is running.

**[0062]** To be considered a portable application, for purpose of this invention, a software program must:

Not require any kind of formal installation onto a computer's permanent storage device to be executed, and can be stored on a removable storage device such as USB flash drive, iPod, memory card, porta-

ble hard drive or other portable electronic storage device thus enabling it to be used on multiple computers.

5 **[0063]** Settings are stored with, and can be preferably carried around with, the software (i.e., they are written to the electronic device such as a USB drive). Settings are not stored to the registry or any other central system database of the computer.

10 **[0064]** Leaves a zero (or near-zero) "footprint" on any PC it is run on after being used. i.e., all temporary files/registry settings should be either avoided or at least removed once the program has exited, and files created by the user can be saved directly to the same removable media as the application is stored on.

15 **[0065]** A portable application does not leave its files or settings on the host computer on which it runs. For example, the application does not write to the Windows registry or store its configuration files (such as an INI file) in the user's profile; instead, it stores its configuration files in the program's directory. Another requirement, since file paths will often differ on changing computers due to variation in Windows drive letter assignments, is the need for applications to store them in a relative format. Preferably, such a program does not require a launcher program to copy necessary settings and files to the host computer when the application starts and move them back to the application's directory when it closes as this may leave a residue on the hard drive in case of power failure.

20 **[0066]** "Electronic meeting systems" (EMS) need to be distinguished on the one hand from classic groupware, on the other from web conferencing systems. In reality, there is some overlap between minor features of products of the named categories. The main difference from groupware is the intensity of collaboration. EMS should be distinguished from systems with which it is possible to show the contents of an individual computer screen on a remote display with multiple users at the same time.

25 **[0067]** "Groupware" supports collaboration within groups where the individual contributions remain identifiable. In contrast, EMS enable the group to cooperatively produce a result for which the group is responsible as a whole. In a business process, groupware and electronic meeting systems complement each other: Groupware supports teams when researching and creating documents in the run up to an EMS session or when implementing the results of such a session.

30 **[0068]** "Web conferencing systems" and "electronic meeting systems" complement each other in the online meeting or workshop: EMS extends the web conferencing system by providing interactive tools for producing and documenting group results. On the other hand, "web conferencing systems" complement EMS with the screen sharing and voice conferencing functionality required in synchronous online meetings and not present in EMS.

35 **[0069]** "Data conferencing" refers to a communication session among two or more participants sharing compu-

ter data in real time. Interaction and presentation devices such as a screen, keyboard, mouse, camera, etc. can be shared. It is a term used to distinguish from video conferencing and audio conferencing. The data can include screen, documents, graphics, drawings and applications that can be seen by the participants of the meeting.

**[0070]** "Application sharing" is an element of remote access, falling under the collaborative software umbrella, that enables two or more users to access a shared application or document from their respective computers simultaneously in real time. Generally, the shared application or document will be running on a host computer, and remote access to the shared content will be provided to other users by the host user. Application sharing should be distinguished from systems in which collaboration on the applications between different users is not possible but the contents of individual computer screens can be projected onto a remote display with multiple users at the same time.

**[0071]** The term "arbitrary media content" refers to the fact that a user may generate, create or select any media content that is appropriate to display. This differs from client voting on, or selecting of media content that is displayed by another in a meeting or presentation. This term refers to client oriented, distributed rights and privileges for the display of content rather than a central presenter providing content which is presented to the members of the meeting.

**[0072]** "Screen scraping" in our sense refers to reading the video frame buffers and processing them, rather than just rendering them on a display. Screen scraping for presentations is described in US2002/0196378 to Slobodin et al which is included herein by reference.

**[0073]** "Auto composition" or "auto layout" refers to the automatic nature in which multiple graphics/video sources are rendered on a central display, without user intervention and in a way that a user would intuitively expect it to happen.

**[0074]** "Wireless" and "wireless communication network" can be any network that does not use cable links between nodes, e.g. uses RF, optical or InfraRed for communication purposes, such as IrDA, diffuse infra-red, WLAN, WiMax, WiFi, WiFi Direct, Bluetooth or any other wireless communication network known to the person skilled in the art.

**[0075]** "Computer" generally refers to a processing device, i.e. having a processing engine capable of various types of digital processing, such as rendering graphics images for display. A computer can be in the form of a work station, a personal computer, a laptop, a palm top, a PDA, a smartphone, a tablet etc. Generally a computer has memory such as volatile RAM. Non-volatile memory such as a hard disc, optical disk or solid state memory can be included in the computer or can be a peripheral device. Currently most computers are electronic but the term "computer" also include optics based computing devices.

**[0076]** The term "pre-installed generic driver" is intend-

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

Brief Descriptions of the drawings

**[0077]** Fig. 1a shows a meeting room that can be used with embodiments of the present invention. Fig. 1b shows a combination of a client processing device, a connection unit, a base node and a display in accordance with an embodiment of the present invention.

Fig 2 shows a screen display in accordance with an embodiment of the present invention.

Figs. 3 to 5 show a base node and a peripheral device and a client processing device in accordance with embodiments of the present invention.

Fig 6 shows a display in accordance with an embodiment of the present invention.

Fig. 7 shows a peripheral device in accordance with an embodiment of the present invention.

Fig. 8 shows a client processing device in accordance with an embodiment of the present invention.

Fig. 9 shows a further client processing device in accordance with an embodiment of the present invention.

Fig. 10 shows an embodiment of a peripheral device in accordance with an embodiment of the present invention.

Fig. 11 shows an embodiment using a tablet.

Fig. 12 shows a further embodiment of the present invention.

Figs. 13 to 15 show use of a QR code in accordance with an embodiment of the present invention for remote access. Fig. 16 shows pairing in accordance with an embodiment of the present invention.

Detailed Description of the Embodiments of the present Invention

**[0078]** The present invention will be described with respect to particular embodiments and with reference to certain drawings but the invention is not limited thereto but only by the claims. The drawings described are only schematic and are non-limiting.

**[0079]** Furthermore, the terms first, second, third and the like in the description and in the claims, are used for distinguishing between similar elements and not necessarily for describing a sequential or chronological order. The terms are interchangeable under appropriate circumstances and the embodiments of the invention can operate in other sequences than described or illustrated herein.

**[0080]** Moreover, the terms top, bottom, over, under and the like in the description and the claims are used for descriptive purposes and not necessarily for describing relative positions. The terms so used are interchangeable under appropriate circumstances and the embodiments of the invention described herein can operate in other orientations than described or illustrated herein.

**[0081]** The term "comprising", used in the claims, should not be interpreted as being restricted to the means listed thereafter; it does not exclude other elements or steps. It needs to be interpreted as specifying the presence of the stated features, integers, steps or components as referred to, but does not preclude the presence or addition of one or more other features, integers, steps or components, or groups thereof. Thus, the scope of the expression "a device comprising means A and B" should not be limited to devices consisting only of components A and B. It means that with respect to the present invention, the only relevant components of the device are A and B.

**[0082]** Similarly, it is to be noticed that the term "coupled", also used in the description or claims, should not be interpreted as being restricted to direct connections only. Thus, the scope of the expression "a device A coupled to a device B" should not be limited to devices or systems wherein an output of device A is directly connected to an input of device B. It means that there exists a path between an output of A and an input of B which may be a path including other devices or means.

**[0083]** Elements or parts of the described devices may comprise logic encoded in media for performing any kind of information processing. Logic may comprise software encoded in a disk or other computer-readable medium and/or instructions encoded in an application specific integrated circuit (ASIC), field programmable gate array (FPGA), or other processor or hardware.

**[0084]** References to software can encompass any type of programs in any language executable directly or indirectly by a processor.

**[0085]** References to logic, hardware, processor or circuitry can encompass any kind of logic or analog circuitry, integrated to any degree, and not limited to general purpose processors, digital signal processors, ASICs, FPGAs, discrete components or transistor logic gates and so on.

**[0086]** Embodiments of the present invention provide solutions to three major problems with meetings:

- a) the time taken to prepare for a meeting. This is mainly achieved by allowing "on-the-fly" presenta-

tion of any displayable information. This information does not have to be linked into any particular presentation software, nor to be compatible with any such presentation software,

b) the time taken to conduct the meeting using electronic meeting tools. This is achieved by reducing the time to connect computers to the display or projection system.

c) the time taken to reflect and review and document the meeting afterwards. This is achieved by providing the possibility of recording the course of the meeting in the same time sequence that it was carried out as well as be able to store all data presented and who presented it.

**[0087]** Meetings in which visual information is presented on a display or projector commonly suffer from a monopoly effect: one single presenter determines the display contents and thereby has a disproportionate power to influence the meeting dynamics and thereby its outcome. Systems are known that allow multiple individuals to simultaneously show their information.

**[0088]** Separately, most meetings are initiated by some sort of invitation system (Outlook, WebEx, GoToMeeting etc.) which is external to the meeting room system (typically via email) and thereby confusing and inflexible.

**[0089]** While the above issues may not present obstacles in highly structured and expertly managed gatherings such as board meetings, they do cause confusion and frequent delays to more ad-hoc meetings especially those without structured agenda's and attendee lists.

**[0090]** Fig. 1a is a schematic representation of a generic meeting room 30 with a meeting table that can be used with embodiments of the present invention. Participants 37 having some form of processing device 31 such as a laptop computer, a tablet, a PDA etc. Each of the processing devices 31 can be a host device and has a first connection unit 47 to which it is coupled. The first connection unit 47 provides access to a network 50 which in this case is a wireless network, but could be a wired network. The network is a shared resources communications network as different devices and participants can transmit data over the network. Each connection unit 47 may be coupled to an input device 48 which will be described in more detail later. A user 37 will typically at a distance from the processing device 37 which is ergonomically satisfactory. This ergonomic boundary is typically an area of about 1000 sq cm to 4000 sq cm. This ergonomic boundary will typically have the user as one side of the boundary and the comfortable reach of the arms will determine an area on the left and right of the processing device which falls within the ergonomic boundary and the far edge of the boundary of the processing device (normally delimited by a display screen) will determine the other side of the ergonomic boundary. The area defined by the ergonomic boundary will overlap or include the processing device 31 itself.



The processing device will also have an outer physical boundary. The input device 48 is preferably arranged to operate outside the boundary of the processing device 31 but within the ergonomic boundary. Preferably the input device is arranged to function when it is flat on the table. The input device preferably has a size of activation area of between 1 and 144 square cm.

**[0091]** Preferably the network 50 is a local area network, i.e. and shared resources communication network and preferably local to the meeting room for security reasons but the network 50 may have access to other local or wide area networks such as 51 or to a larger corporate network or the internet 43, for example via a router 42. Another node of the network 50 is the base or display node 36. This node 36 may optionally be a wireless access point. The base node 36 may also be a processing device or host computer and may be coupled to a second connection unit 49 that provides access to the network 50 thus linking all of the processing devices 31, 36 together. The connection unit may have an input device as described above. Alternatively, network connections installed on the base node 36 can be used. Audio equipment 46 may be provided, e.g. a telephone that allows other members of the meeting to call in from remote destinations.

**[0092]** The display node 36 is coupled to and adapted to allow display of media on some kind of display 44. The display node is in embodiments of the present invention a base node of the communications network 50. The display 44 may be a projector and screen, the projector being coupled to the base node 36. A whiteboard 45 can optionally be provided that can be optionally coupled to the display 44 and/or the base node 36, e.g. when the whiteboard can record electronically what is written on it. Optionally, a camera 35 may be provided to record the entries on the whiteboard 45. The camera 35 may have a third connection unit 52 for connecting the camera 35 to the network 50 so that the data from the whiteboard can be recorded and stored or transmitted to other networks via router 42. The connection unit 52 may have an input device as described above with respect to connection unit 47.

**[0093]** Optional equipment can be cameras 39, 40, 41 for recording the progress of the meeting. These cameras can be linked by a network 51, e.g. a cable network to the router 42 and/or the base node 36. Another optional item is a microphone or microphones 38 that can be used to transfer audio, e.g. to the processing devices 31 and to loud speakers (not shown) attached to the base node 36 or part of the display 44.

**[0094]** Any or all of the outputs of the processing devices 31, the cameras, the whiteboard, etc. can be recorded and stored digitally, e.g. in node 36 or elsewhere to provide a complete record with correct time sequence.

**[0095]** Summarising the above, the present invention provides an electronic meeting tool for communicating arbitrary media content between different users 37 (with their own processing devices 31, e.g. PC, mobile phone,

or tablet) and one display or projector or multiple displays or projectors 44 in the meeting room 30.

**[0096]** Referring to Figs. 1a and 1b embodiments of the present invention comprise a base or display node 36 being a processing device, e.g. a host computer adapted to receive user selected arbitrary media content, the base node 36 being coupled to a central display 44 which can be a fixed format display or a projector or similar. The arbitrary media content can be provided from any of the user processing devices 31. The base node 36 can be adapted to display the received user selected arbitrary media content in accordance with a set of rules, e.g. FIFO, automatically, on request or approval, forced to display, in accordance with a priority etc. Optionally the base node 36 is adapted to force display of the received user selected arbitrary media content, i.e. to allow participation in the meeting by an individual user displaying own selected content on display 44 independently of the person who is nominally responsible for giving a presentation or chairing the meeting. Forcing the display can also be considered as a rule. The phrase "unilateral electronic access to the display device" defines this kind of rule as "unilateral" means that the displaying process is obtained by the action of only one participant involved in the meeting, without requiring the agreement of another or the others. The term "unilateral" implies that the data for display is allowed to override or replace any data displayed on the screen by the same or another participant of the meeting. The meeting tool can also be adapted to allow a priority setting. This means that a user can set a priority setting for the media to be displayed. A priority of "1" for example can be interpreted by the base node as a forced display, a priority "2" can be interpreted by the base node as display as soon as possible, priority "3" can be interpreted by the base node as place in queue and display as the time comes etc. Setting and using priorities for display are also considered to be working to rules. To execute the rules, the base node 36 may have a decision module. The base node 36 may be a host computer having a processing engine such as a microprocessor and a memory. Preferably, the base node 36 is adapted to treat media content passed to the base node 36 from any or all of the connection units 47 in an equal manner. The base node 36 may be adapted to auto compose the media content on the central display 44 connected to it, e.g. from one or more processing devices 31.

**[0097]** An independent aspect of the present invention is at least one connection unit 47, (optionally 49 for receiving or unit 52) adapted to communicate the user selected arbitrary media content to said base node 36. Preferably the connection units 47 and/or optionally 49 or 52 are physical plug-and-play devices. An example of a connection unit is shown schematically in Fig. 10.

**[0098]** The connection unit 47 may be integrated into a user processing device 31, e.g. as an internal peripheral device or may preferably be an external peripheral device comprising a connector adapted to couple to a port of a

user processing device 31. The processing device 31 may have a client display, a processing engine such as a microprocessor, a memory and an operating system. The optional connection unit 49 may be integrated into the base node 36, e.g. as an internal peripheral device or may be an external peripheral device comprising a connector adapted to couple to a port of the base node 36. The connection unit 49 may be fully integrated into the base node 36, e.g. is an internal network interface of the base node 36. The base node 36 may have a processing engine such as a microprocessor, a memory and an operating system.

**[0099]** The user processing devices 31, the connection units 47, (optionally 49 or 52) and the base node 36 cooperate to form a communication network 50 for linking between at least one of the plurality of processing devices 31, 36 and the central display device 44. The communication network 50 is adapted to receive arbitrary media content from at least one of the plurality of processing devices 31 and to transmit the arbitrary media content of at least one of the plurality of processing devices to the central display device 44.

**[0100]** An independent aspect of the present invention is a portable application 60 adapted to be loaded onto a client processing device 31 and to be run on the operating system of the client processing device 31. The portable application 60 runs as a process on the client processing device 31 that is adapted to deliver an arbitrary media content from the client processing device 31 to the communication network 50 in response to a user action applied to an input device 48, the process leaving a zero footprint on the processing device 31 on termination. The network 50 is a shared resources communications network as different devices and participants can transmit data over the network. Optionally the portable application 60 is stored on each connection unit 47 and optionally 49 or 52. Preferably the portable application 60 is adapted to "screen scrape" content of the client display of the client processing device 31. Optionally the portable application 60 when run on a processing device 31 is adapted to "screen scrape" content of the client display of this client processing device 31 and to transmit it via a connection unit 47. Optionally the portable application 60 when run on the processing device is adapted to "screen scrape" content of the client display of the client processing device 31 and to transmit it via a network interface of the processing device 31, for example if the connection unit 47 has no transmitter.

**[0101]** The connection unit 47 for communicating with said base node 36 has a network interface e.g. comprising a transmitter 62. The transmitter 62 is preferably a transceiver. Optionally the transmitter/receiver can be a wireless transmitter/receiver.

**[0102]** The base node 36 for communicating with the connection unit 47 has a receiver 63 which can be included in the connection unit 49 or integrated into the base node 36. The receiver is preferably a transceiver. Optionally the transmitter/receiver can be a wireless

transmitter/receiver.

**[0103]** The input device 48 allows a user interaction with the connection unit 47. Preferably the input device 48 is physical actuator coupled to the connection unit 47. The user action applied to the input device 48 generates a signal that can trigger transfer of data from the processing device 31 (to which the connection unit 47 is coupled) to the network 50. Preferably the input device 48 has an activating surface that is between 100 and 14,400 square mm. Optionally, the input device 48 can be a key displayed on the client display 1 of a client processing device 31. This key can be activated, e.g. by use of a pointing device such as a mouse trigger transfer of data from the processing device 31 to the network 50.

**[0104]** The connection unit 47 is preferably provided with a visual indicator 61, e.g. for allowing user feedback from the connection unit 47 of the status of any activity.

**[0105]** The system also can include a server program 64 adapted to be loaded onto the base node 36, said program 64 being adapted to receive arbitrary media content from one or a plurality of client processing devices 31 through said connection units 47, (optionally 49), and to show this plurality of arbitrary media content streams on one or a plurality of displays 44. The server program 64 may be adapted to allow display in accordance with one or more rules, e.g. FIFO, automatically, on request, forced, in accordance with a priority etc. The forcing rule can be described as allowing "unilateral electronic access to the display device" by a participant. "Unilateral" means that the displaying process is obtained by the action of only one participant involved in the meeting, without requiring the agreement of another or the others. The term "unilateral" implies that the data for display is allowed to override or replace any data displayed on the screen by the same or another participant of the meeting. To execute the rules, the server program 64 may have a decision module.

**[0106]** Preferably, the server program 64 is adapted to treat media content passed to it from any or all of the connection units 47 in an equal manner. The server program 64 may be adapted to auto compose the media content on the central display 44.

**[0107]** The server program 64 may be a portable application adapted to be loaded onto the base node 36 and to be run on the operating system of the base node 36. The portable application 64 runs a process on the base node 36 that is adapted to display an arbitrary media content received from the client processing device 31 via the communication network 50, the process leaving a zero footprint on the base node 36 on termination. Optionally the portable application 64 is stored on each connection unit 49 and optionally 7 and can be installed therefrom.

**[0108]** The system may also include a central display device 44 and optionally a whiteboard 45 or other display means such as a printer. The display 44 being adapted to receive user selected arbitrary media content, and may be adapted to allow display of the received user selected

arbitrary media content in accordance with one or more rules, e.g. FIFO, automatic, forced, on request or approval, in accordance with a priority etc. The forcing rule can be described as allowing "unilateral electronic access to the display device" by a participant. "Unilateral" means that the displaying process is obtained by the action of only one participant involved in the meeting, without requiring the agreement of another or the others. The term "unilateral" implies that the data for display is allowed to override or replace any data displayed on the screen by the same or another participant of the meeting.

**[0109]** Optionally, one of the connection units 47 can be adapted to be a master connection unit. Such a master connection unit may be adapted to instruct the base node when media content from a client processing device 31 may be displayed or which of the processing devices may be allowed to send content for display.

**[0110]** In embodiments of the present invention, at least one portable application is used, e.g. for the client software on a client processing device 31 or optionally on the base node 36. In these embodiments, one of the pre-installed generic drivers of the operating system on the relevant computer device 31, 36 is exploited for setting up communication from the computer device 31, 36 to the network 50 via the connection unit 47, (optionally 49 or 52). The generic driver is used in connection with the connection unit 47, (optionally 49 or 52) operating as a peripheral device but the use can go beyond that of the standard class of peripheral devices for which the generic driver is intended. In some embodiments the connection unit 47, (optionally 49 or 52) operated as a peripheral device communicates with the relevant processing device 31, 36 by using a generic communication protocol provided by the pre-installed generic driver. Pre-installed USB drivers are examples. Preferably the setting up of the communication of network 50 using connection unit 47, (optionally 49) does not alter or affect the networking capability of the relevant processing device 31, 36. For example, if a browser is started on the client processing device 31, this browser can use the standard network interfaces on the processing device 31. This means that transfer of data via the connection unit 47 (optionally 49) is independent of transfer of data over the network interfaces of processing device 31 or 36. This has the advantage that each user can carry out processing such as searching on the internet to gather data independently of the transfer of data to be displayed during a meeting, or receive emails etc.

**[0111]** The use of a portable application has the advantage that any modification to settings in the register or generally in the operating system can be avoided, so that upon any form of termination, e.g. disconnecting the electronic device, system crash, no trace is left. This is generally termed "zero footprint".

**[0112]** The present invention has the advantage of scalability. It can provide a display system for use by a plurality of users in meetings. Every user in the meeting thus can have a client processing device 31 for coupling

to a connection unit 47. A first user action connects the client processing device 31 to the base node 36, e.g. by inserting a connection unit 47 into the relevant interface connector on the processing device 31, e.g. a USB interface. A second user action comprising activating a button or key on the input device (e.g. by depressing it) then starts the process of transmitting arbitrary media content from the client processing device 31 to the base node 36. This process preferably includes screen scraping data from the processing device. Using screen scraping avoids special programs being installed on the base node 36 to carry out graphical commands sent from the processing device 31. When the base node 36 receives the plurality of arbitrary media content, it can allow auto composition of this media content on the central display connected to it.

**[0113]** The present invention will now be described further with reference to certain more specific embodiments.

**[0114]** The present invention in some embodiments provides a system and/or a method to which in one aspect can override all currently displayed material when arbitrary material is presented on a display device from more than one source processing devices such as a laptop, PDA, smartphone, computer, tablet etc. The present invention in one aspect controls the display of visual communication and information by a method akin to talking, i.e. full-duplex and with the option to interrupt or to obtain unilateral electronic access to a display device.

**[0115]** One embodiment the present invention can be implemented through a connectable peripheral device e.g. a USB compatible device, such that when the peripheral device is connected to a processing device that is used to provide arbitrary information such as text, video, pictures etc., each individual user with a processing device can to gain access to the display, e.g. screen. By being present at the meeting a user can pair the peripheral device to a processing device by inserting the peripheral device. The user can also pair the peripheral device to a base node or base unit that controls the display in the meeting room and which is connectable to the peripheral device via a communications network such as a wired or wireless communications network. The network is a shared resources communications network as different devices and participants can transmit data over the network. To achieve this, the peripheral device has a transceiver capable of transmitting the arbitrary data from the processing device to the display via the base node. In one option the information displayed on the local display of the processing device is screen scraped and transmitted. To allow this the peripheral device can include a portable application that is able to execute on the processing device leaving a zero-footprint on termination. Although a physically connectable peripheral device is convenient, the peripheral device could also be coupled to the processing device via a wireless connection, e.g. via the Bluetooth protocol.

**[0116]** For meetings with remote participants it is not possible to rely on the same hardware connectable pe-

ripheral device to provide access from a remote location to the display in the meeting room directly. Typically, at home or in a hotel, the participant only has a phone and internet access on a laptop or some other kind of portable computing device. Remote participants lack context (e.g. non-verbal communications) and have less than ideal audio/video connections and consequently suffer from a power-asymmetry. Typically, remote participants also have no way of 'pushing' their contents on screen, since the meeting is controlled by a meeting organiser or director who orchestrates the sequence of presentations. [0117] One of the key advantages of the present invention is to provide remote collaboration while maintaining a kind of 'situational awareness'. This means that what you see has a straightforward relationship with your internal mental map. This allows keeping track of multiple information flows and being able to correlate that quickly with any other information, e.g. with a search carried out on the local computing device.

[0118] In another aspect of the present invention confusion and frustration is avoided by:

1. retaining aspect ratio of any image that is sent from any location to the display in the meeting room or displays in meeting rooms (e.g. a long thing remains a long thing)
2. not overlapping images and/or windows on any of the display devices in the meeting rooms (e.g. you never have to guess or remember what's hidden)
3. showing the same arrangement of images on each screen (everyone sees the same things and can refer to them), this means that the topological arrangement of images on each screen of multiple screens is the same,
4. maximizing the use of screen real-estate (e.g. the images presented do not have borders containing no useful information), while preferably no allowing overlapping of the images
5. allowing local manipulation of zoom and pan but allowing to return to the default layout of item 3 above
6. arranging the images on each display taking into account the local display characteristics, such as any of resolution, pixel density, aspect ratio,
7. optionally also allowing an ongoing audio connection to be heard by all participants, e.g. that verbal communications will be used to alter the contents of the screen.

[0119] Components of the present invention in embodiments are preferably:

A shared (e.g. virtual, digital) **canvas**, on which all visual information is stored. The canvas is mapped onto one or more physical displays at one or more geographic locations and can be at least as large as the largest display. Meeting participants can add or delete visual information, e.g. local participants can use a peripheral device according to embodiments

of the present invention whose operation is: one click adds the users screen to the canvas, another click removes it. Optionally, a long click replaces the current canvas contents with only the user's screen. The canvas is maintained in a location that is accessible electronically (e.g. virtual, digital)) for all meeting participants, but participants can only change the canvas if they have a "token". By using a single canvas, giving access to all participants to this canvas and broadcasting the information on the canvas to other locations, controllable and consistent amendments can be made to the canvas by any participant.

[0120] A **token** is at the same time a means to change information on the canvas and the right to make these changes. Tokens are a sign of trust; they are only transferred from individual persons to other individual persons. Only participants with tokens can give additional tokens to other individuals. A hardware peripheral device used locally is an example of a token. The user pairs the peripheral device with a processing device and with a base node or unit. The user is associated with the peripheral device because of the selection of it and its pairing to a processing device. This procedure inherently provides trust - the same trust as was granted to the user to be present at the meeting. In accordance with an aspect of the present invention, remote participants have the same rights as anyone else possessing a token, but a physical token is not passed remotely to a user. In one aspect, first contact between meeting participants is with voice communication. Voice communication is a good medium to transfer tokens. It is suitable for trust transfers because a. by knowing someone's phone number (either a personal cell phone number or the number of the location the user is currently at, such as a hotel or home) there is an implication of a personal connection and b. the human voice is a pretty good identification means.

[0121] The token in this embodiment is transferred by verbal instruction and needs to convey the means to make a contribution to the canvas. One way to implement the token is the combination of a URL plus a unique session ID for the meeting and implicitly one or more meeting rooms. In one aspect the combination of these two gives access to a meeting-specific website that serves two purposes: 1. optionally to download and install a screen capture software program and 2. to give access to the shared canvas. The combination of 1. and 2. offers remote participants using a portable processing such as a laptop, PDA or smartphone the same functionality as local participants. Since the verbal instruction needs to be concise, a service similar to tinyURL.com (or liiURL or TightURL) can be used to combine the website + session ID. To avoid mistakes the shortened URL will use a sub-set of characters that are easily pronounced and avoid language confusion (such as between G & J or I & E). An example is hexadecimal characters only.

[0122] An alternative method for transferring a token is the use of a messaging service such as by the Short

Message Service (SMS). This is not a voice contact but it includes the same level of trust as a mobile phone number of a known person is used. If necessary to improve security the person can be contacted by phone first and only then is the SMS message sent. If required a password can be used whereby a second password can be used to indicate that the person is under duress so that the SMS message should not be sent.

**[0123]** A meeting *session ID* indicates a temporary connection between the canvas, the tokens and the screens. In one aspect a session ID is generated automatically when the first physical peripheral device is inserted in a processing device in a meeting room and makes a connection with a base node or unit. This session ID can then be made visible to each individual that owns a peripheral device. It can be implemented by a. changing the name of the mass storage device implemented by the peripheral device, or b. changing the name or the contents of a text file on the mass storage device volume on the peripheral device or c. by a display on the peripheral device if such a display is provided, or d. by display on the central display device in the meeting room. The meeting ID or media conference code makes it easy for multiple participants, who can be at different locations, to engage in a media conference.

**[0124]** For example, on the display of the meeting room, a numerical or alpha-numerical media conference code is displayed. In order to share content, the participants can connect their processing devices such as a laptop over the network with the meeting room by entering the media conference code on their processing device, for example either in a webpage or a dedicated software client.

**[0125]** The session ID performs the following functions:

- Access control: Only people physically present in the meeting room are able to see the code. This ensures that only people in the room or people who received the code from someone in the room (e.g. through e-mail or telephone) can connect with the meeting room. This provides trust.
- **Meeting room location:** The remote person entering the code is automatically connected with the right meeting room and doesn't have to bother with searching the meeting room in a list of possible meeting rooms or entering the address (IP, phone number,...) of the meeting room. The participants don't even have to be aware of which meeting room they're in.

**[0126]** A media conference can start as soon as one person is connected to the central display. Optionally, as long as no-one is connected to the central display, the ID or media conference code changes at a certain frequency (e.g. once every minute). When a new code appears, previous codes are no longer usable. This ensures that a possible intruder cannot peek at the media confer-

ence code before the actual conference starts. The ID or code remains the same for the whole duration of the media conference. A media conference ends when the last participant disconnects. Afterwards, the ID or code will change again.

**[0127]** The ID provides a combination of multiple purposes (access control and meeting room location) in a single easy to use code. The products that are currently on the market require a separate meeting room location code (e.g. phone number, e-mail address, IP address,...) and a separate means of controlling access to the media conference (e.g. password, manual acceptance of incoming calls by conference host...). For example, to join a WebEx conference, the participants need to know both the meeting number (= location) and meeting password (= access control). A video conference device requires that remote participants know the telephone number/IP address (= location) and that a local participant accepts the incoming call (= access control).

**[0128]** In an embodiment, the start of a meeting session is preferably asymmetric, in that a remote participant cannot initiate a session. A meeting must start with an individual in possession of a physical peripheral device.

**[0129]** A session ends when all tokens (local and remote) have cut their connections with the canvas i.e. all physical peripheral devices are unplugged and all remote sessions are disconnected from the meeting website. Since it is possible for remote users to stay connected, accidentally or surreptitiously, alternative ways to end a session are: session ends when all peripheral devices are unplugged and a preset time has passed or the reset button on the meeting base station or base unit has been pushed.

**[0130]** A canvas is a shared memory that stores a visual bitmap that is or can be displayed on one or more displays or projectors. A canvas is a simple two-dimensional structure that is easy and cheap to implement. An alternative implementation is to store the canvas as an HTML5 page that can be rendered by a browser.

**[0131]** The size of the canvas (its width, height and color depth) is preferably at least the size of the largest display. This ensures that the largest display is used at its maximum capability. Canvas mapping functions optimize legibility on smaller displays.

**[0132]** The canvas is mapped onto a display by a transform function that optimizes its visual appearance on each particular display (e.g. interpolation, (de-)interlacing, size re-sampling, scaling etc). The canvas mapping function first determines the type of display that it is mapping to and then chooses resolution, frame rate, color depth and color mapping functions (gamma, brightness, contrast) for optimum legibility in a typical meeting room environment and also to maintain the topological arrangement of the images when multiple images are displayed - this means that remote participants can refer to the image consistently, e.g. "top left".

**[0133]** The canvas mapping conserves boundaries and aspect ratio's across displays (i.e. it does not stretch

nor crop). In a typical implementation of mapping onto large fixed format display such as an LCD display or onto projector screens the canvas is preferably re-sized to fill the screen's full height or width. In an implementation for smart phones this same approach is used but the end-user can zoom-in on details e.g. by pinching/stretching.

**[0134]** Multiple contributors can modify rectangular, non-overlapping sections of the canvas. By restricting the layout to simple rectangular sections it is possible to draw attention to particular contents by verbally referring to its position on the screen ("look at the top-left picture"). Canvas sections can be labeled by an identification of their contributors (such as user or computer names).

**[0135]** The size and position of a contribution to the canvas is under control of an automated algorithm. The algorithm is a simple rule, such as: 1. the first contribution fills the whole canvas, 2. the second contributions splits the screen horizontally into two equal sections, with the first contribution displayed on the left, 3. the third contribution splits the canvas vertically with the first two contributions on top, etc. The simplicity of this rule, and the absence of direct contributor influence on the algorithmic positioning, allows meeting participants to predict where contents will be displayed thereby minimizing confusion amongst (remote) participants.

**[0136]** One implementation of a canvas is memory stored on one physical location with (remote) access functions to update and map its contents. Local caching combined with dirty-tiling or region-of interest coding techniques can be used to minimize communication payload. Alternatively a web-based technique can be used as in [www.shared-canvas.org](http://www.shared-canvas.org).

**[0137]** One implementation of the canvas is a logical description of the canvas layout and all it's components in a XML, HTML or similar format, where the physical instantiation of the canvas only takes place at the participating endpoints in a session. Maintaining the canvas content and/or the canvas definition, the session ids, the tokens, the relationships between the tokens and the sessions can be offered as an external service to the users of the solution.

**[0138]** An alternative method for transferring a token is a visual code that can be picked up by a camera, such as a web camera or a camera in smart phones and tablets. The token can be in the form of a code such as a 2D barcode. Such a code is a "QR" code - see Figs 13 to 15. The code can be displayed on a display of a processing device such as a computer, laptop etc.

**[0139]** The QR (Fig. 13) functions as a secret code that is convenient to use for the combination of an electronic screens and smart phones. The secret (i.e. the contents of the QR code) information in the code is *which screen belongs to which meeting*.

**[0140]** So, a local meeting room base station knows which screen it is connected to. It does not know which meeting it belongs too. A mechanism can be provided like the first time a physical peripheral device is inserted in a local processing device, optionally after a suitable

time-out period (see above) to initiate a meeting and thereby make an association between a central display and a meeting. Then a QR code can be generated. The QR code contains a meeting ID and a URL to access the central display (in preferred embodiments indirectly via a shared canvas)

**[0141]** This QR code is displayed and can be picked up by any meeting participant. These participants then do not need a peripheral device, but can use the resources listed in the QR code to connect to an online canvas on which they can display their data.

**[0142]** Fig. 14 shows the images from the processing devices of two participants as seen on a local display or a central display.

**[0143]** The user labels in the center of the images can be visible after each change for a few seconds (e.g. when a new processing devices was added to or removed from the meeting).

**[0144]** The token of the user is what the canvas service knows, when a source is connected it asks the user/source service the public user name of the user associated with the source associated with the token from this the user label is known.

**[0145]** Especially in a remote session this is important because it allows all users to associate sources and hence areas on the screens with users, now they can say 'I don't agree with the numbers Piet is showing, even if Piet is remote and not in the room ...'

**[0146]** The image shown in Fig. 15 can be shown at any moment to allow other participants to get access to the session QR code to start sharing of content if they would have missed that opportunity at the beginning of the meeting.

**[0147]** For remote participants a method is provided to communicate the secret (the meeting ID and the URL). This could be a voice instruction, or SMS message as described earlier.

**[0148]** An aspect of the present invention is the realization that verbal communications can be an integral component of the total system. The verbal meaning is interwoven with the visual meaning, not just in the sense that the presentation is a multimedia event (slides and talk), but that the management of the meeting can be a verbal and a (electronic) visual cooperation. For example:

- One way of transferring tokens is to verbally communicate them to a remote participant. This assumes the presence of a audio link before anything else and needs a short and simple token string to keep communication errors to a minimum.
- By maintaining one single layout (topology) for all meeting participants it is easy to refer to elements on the screen by verbal instruction. Inversely, all screen management that cannot be described in simple words is forbidden.

- Since, in this scenario, one can always rely on the presence of an audio channel, one can also use this infrastructure to eliminate or reduce the number of hardware physical peripheral devices and/or virtual on-screen buttons. One can use verbal commands, in combination with voice recognition, to alter the screen layout. The 'virtual button' could be a Siri-like interface:

- "Show my screen"
- "Enlarge my screen"
- "Hide my screen"
- "Remove top-right screen"
- "Remove all screens"

**[0149]** As described before, users can get access to a token in various ways, by verbal communication, by messaging such as SMS or by scanning a QR code using a camera, e.g. in their smart phone or tablet. The last missing link is a further aspect of the present invention is to connect the user content with the token.

**[0150]** E.g. A user might have a processing device such as a laptop, PC, smart phone or tablet that the user wants to use as a content source in the meeting session, but the user is using a mobile phone to retrieve his token. The user could try to move the token from the phone to the portable processing device PC, e.g. by simply copying it and entering it on a web page on the portable processing device PC, but since this is a repetitive action, i.e. the user would have to do this each time he/she participates in a meeting.

**[0151]** The present invention in another aspect also provides a solution for this problem as shown in Fig. 11. In one embodiment the system or method of the present invention allows the possibility to download and install an application on the mobile device or devices of choice of the user. The user then registers himself/herself at a central service where the user gets assigned an ID. From that application the user can pair computer sources (the user processing device his PC or possibly multiple processing devices such as PC's or tablet computers) with the user ID.

**[0152]** The process of pairing a processing device computer source can be as simple as surfing to a web page from the processing device, which will show a unique source ID (e.g. by showing a QR code again). With reference to Fig. 16, by reading the QR code from the PC local screen of the processing device with the mobile device, the PC local processing device gets linked to the user ID. The information is stored on the processing device PC in the form of a cookie or similar approach. If the user source processing device PC can not store permanent data, an alternative way is that the user would point his processing device PC to a web location where the user logs in to the central service, at which moment the source processing device PC gets automatically associated again with the user ID.

**[0153]** Another implementation could be a browser ap-

plication that plays the same role as the mobile phone app on the processing device PC and that would connect to the central service when the user activates it (example implementation could be a Chrome browser app).

**[0154]** When the user then retrieves a token to participate in a session using the user mobile phone app, the app will allow the user to share the computing source or to select one of the local computing his sources to be added or removed from the canvas cited with the session the token is connected with.

**[0155]** Fig. 11 shows how a tablet could connect leaving a connection to corporate network or the internet, and no integration of the wireless network used for display being in corporate IT. It only requires outbound connectivity of base station, e.g. could be directed straight to a router in DMZ of company.

**[0156]** Here there is a pairing from tablet to session. The app can be for the strongest, non-connected wireless network. The 'session' can be static and named, e.g. a displayed session ID., or by analyzing the content on the screen, e.g. the base station could send fingerprint of content to server that can be computed by the app or the cloud service by sending image of current screen. Since there is an App, it can come with instructions on how to realize the pairing. If the base station has audio input it could be done by a suitable audio message requested by the cloud service.

**[0157]** Referring to Fig. 12, storage in a plug and play peripheral device 1 stores code that is automatically executed by the first processing device when the plug-and-play device is connected to the first processing device via the first plug-and-play interface 1a. When a button 2 on the plug and play device is pressed a first time (first user action), code is executed by the first processing device L11 to initiate a display data exchange between the first processing device and a second computing device, i.e. a base unit or node. The data exchange is preferably done wirelessly (e.g. Bluetooth, IEEE 802.11 / Wi-Fi@ WiFi, IEEE 802.15.4 and ZigBee ...) but could be done via a wired connection. The data exchange between the processing device L11 and the computing device B1 can be done independently of the internet (e.g. direct wireless communication between both computing devices) or through the internet and an intermediary storage device C. The storage device C typically has computing capabilities to extract information from e.g. a data packet, sort it, re-arrange it, create a data file, write to a file, erase specific elements in a file ... Unless stated otherwise or made obvious by the context, the case will be discussed where display data is exchanged between computing processing devices like L11, base units like B1 and a storage device C. In that case, display data is sent to storage device C through the generally available communication interface of processing device L11 (Wifi, Ethernet ...). Supporting equipment like router(s), LAN hardware, internet provider hardware, land lines, access to GPRS and/or Mobile Phone Network ... is assumed to be available and not a limitation on the present invention

and will not be discussed further. The base unit **B1** is for example a computer equipped with among other things a graphical card, a hard disk memory, and with a Processor like e.g. an AMD® Sempron™ 150 (2.9GHz, 1MB Cache), an AMD Athlon™ II X2 250 (3,0 GHz, 1 MB cache), an AMD® Athlon™ II X4 645 (3,1 GHz, 2 MB cache), a processing system like e.g. Windows® 7 Professional, 64-bits, a memory e.g. 6GB Dual Channel DDR3 SDRAM at 1333Mhz -3 DIMM's a hard disk 1000 GB SATA, an optical station to read CD ROM, a video card like e.g. an ATI Radeon™ HD4200 integrated graphic card, a 512 MB NVIDIA® GeForce G405 graphic card, a 1GB DDR3 AMD® Radeon™ HD 6450 graphic card or similar graphical cards available off the shelf, a 10/100/1000 Ethernet-LAN on the system card; a wireless communication interface like e.g. a Dell Wireless 1525 802.11n PCIe-network card, a VGA-connection and/or an HDMI™ connection for connection to display **D1**.

**[0158]** The central storage device **C** may also be a computer identical or similar to **B1** that has been configured as a server.

**[0159]** The display data **3** "screen scraped" from the first processing device **L11** is sent to a central storage device **C** (either directly by **L11** or, in another embodiment, by the base unit **B1**). The information is encoded in e.g. HTML5 including an identifier **id** identifying the origin, in this example **L11**, of the screen scraped information. The storage device **C** is then consulted by the base unit **B1** in order to display the display data on display **D1**.

**[0160]** When the button **2** is pressed a second time, the processing device **L11** informs the central storage **C** that the screen scraped display data **3** must be erased. In a first embodiment, the central storage **C** informs the base unit **B1** that the display data has been altered. **B1** then consults the central storage **C** and upload the display data still available on **C** and displays it on **D1**. In the simple example given here above, assuming that no display data was available on **C** prior to pressing button **2** a first time, no display data will remain on **C** and no data will be displayed on **D1** (e.g. black screen if **D1** is an Liquid Crystal Display). The identifier may be any practical marker that can be encoded in the data packet sent by a processing device as **L11**. This could be an IP address, a MAC address, a unique identifier recorded in the plug and play device (e.g. a number assigned to the plug and play device as it is assembled by either programming a flash memory, setting a dipswitch ...). In the case of a smart phone **P31** discussed further in this description, the unique identifier could be the phone number itself. Biometrics could also be used to identify a user and assign the user an identifier id.

**[0161]** In a second embodiment, **L11** communicates with the base unit **B1** which in turn informs **C** that it must erase the display data **3** from its memory. In a particular case, communication with the base unit **B1** is done through the plug and play device **1** equipped with an RF

interface.

**[0162]** In the remainder of the description, unless stated otherwise, pressing the button (or the equivalent actions described further) and the eventual impact on the data displayed on **D1** / available on the memory device **C** will be referred to as an "event".

**[0163]** The plug and play device might be replaced by e.g. a code running on the processing device **L11**. In that case the button **2** is replaced by a (well defined) zone of a touch screen (as might be the case for a smart phone) or a key on the keyboard of a laptop computer. The zone of the touch screen that will trigger an event might be either indicated by a displayed icon. Alternatively, no icon will be displayed and an event will be triggered by "swiping" the touch screen. Other alternative methods include gesture recognition made by a camera connected to the computing device, voice recognition and activation, fingerprint sensing ...

**[0164]** Several users e.g. **U11**, **U12**, **U13** equipped respectively with computing devices (e.g. "laptop computers") **L11**, **L12** or smart phones like **P13** are gathered in a first meeting room **R1** equipped with a base unit **B1** and a display **D1**. A first processing device **L11** is equipped with a peripheral device **d11** while another, **L12**, will rely on a key of its keyboard (or an alternative sensor) to trigger an event while Smart phone **P13** will rely on its touch screen.

**[0165]** In another meeting room **R2** geographically remote from **R1**, users **U21**, **U22**, **U23** ... are equipped with computing devices **L21**, **L22**, **L23** ... equipped with plug and play devices **d21**, **d22**, **d23** ... or one of the alternative to trigger an event.

**[0166]** In yet another location, e.g. a hotel room, a car ... a "road warrior" **U31** makes use of a smart phone **P31** to communicate with users **U11**, **U12** ... **U23** ...

**[0167]** An event will be identified by a set of indices **i**, **j** and **k**. Indices **i** and **j** represents a user at the origin of an event (example: **i=2** and **j=1** represents an event triggered by user **U21**). Index **k** is either 1 (button **2** of plug and play device **d21** is pressed a first time and display data screen scraped on e.g. processing device **L21** is sent to and stored on **C** and displayed on **D1**, **D2** and **P31**) or 2 (button **2** is pressed a second time and display data **d21** is erased from **C** and disappears from display **D1**, **D2**, **P31**)

**[0168]** The proposed set-up allows any of the users to share display data at the same time with all the other users on the displays **D1** and **D2** and on the display of smart phones like **P31** by triggering a first event. The set-up allows any user to withdraw her / his contribution to the data displayed on **D1**, **D2** and **P31** by triggering a second event.

**[0169]** The data displayed on **D1**, **D2** and **P31** depends on (a) display data sent by any of the computing devices to the memory device **C** and stored in **C** and (b) a configuration document **CD** updated at each event and stored on **C**.

**[0170]** The display data stored in **C** and structured by



the configuration document may be referred to as the Canvas in this description.

**[0171]** For an event **Eij1**, display data screen scraped from the display of a processing device **Lij** (or **Pij**) is sent to the storage device **C** together with an identifier **idij**.

**[0172]** The temporal sequence with which display data is received by the storage device **C** is recorded under the form of a temporal index **m**. The temporal sequence is determined by e.g. the time of the local clock at **C** upon receipt of display data **ddij**. Alternatively, the temporal index for an event **Eij** is determined by the time of the local clock of **Lij** expressed in GMT or Universal Time.

**[0173]** If the storage device **C** receives contribution from more than one processing device **Lij** (or **Pij**) the configuration document is updated to reflect this.

**[0174]** In a first example (for the configuration document), the configuration document will assign to received display data **DDij** from processing device **Lij / Pij** (a) an identifier **idij** (b) a temporal index **mij** and (c) metadata concerning the source (e.g. name or identifier of user **Uij**). The metadata can be superimposed to the corresponding display data on displays **D1**, **D2** ...

**[0175]** Based on the number of contributions, the configuration document will determine the layout for the combined display data. Example: if contributions from 2 computing devices **Lij / Pij** are received, the configuration document assigns half of the display space on **D1** and **D2** to each of the display data **ddij**.

**[0176]** If contributions from 3 or 4 computing devices **Lij / Pij** are received, the configuration document assigns a quarter of the display space on **D1** and **D2** to each of the display data **ddij**.

**[0177]** If contributions from more than 4 computing devices are received, the configuration document assigns a quarter of the display space on **D1** and **D2** to the four display data **ddij** with the most recent temporal index **mij**.

**[0178]** For an event **Eij2**, the display data from processing device **Lij / Pij** is erased from the storage device **C**, the corresponding identifier **idij** and temporal index **mij** disappears from the Configuration Document **CD** and the data displayed on **D1** and **D2** will be modified accordingly, for instance, according to the example given here above.

**[0179]** The display **D1** and **D2** might have different characteristics (resolution, dimension of the active display area ...). In order for all users to have access to (as close as possible) to identical visual data, displays **D1** and **D2** (with or without support from their base unit) use the configuration document to determine if the display data **ddij** must be re-sized to fill the screen's full height or width.

**[0180]** More generally, the display data **ddij** to be displayed are mapped by a transform function **TFi** that optimizes the visual appearance on each particular display by means of e.g. interpolation, de-interlacing, size re-sampling; choice of resolution, frame rate, color depth, gamma, brightness, contrast ... according to the needs of users **Uij** in their meeting room **Ri**. Aspect ratio and

boundaries between contributions **ddij** are conserved.

**[0181]** The configuration document contains a tagged mark-up language description of the image to be displayed

**[0182]** If display data **DDij** is variable, the corresponding temporal index **mij** is kept constant and equal to its earliest value (e.g. upon reception of the first data packet).

**[0183]** The configuration document may be or may contain a tagged mark-up language description of the image to be displayed. Languages/formats/styles such as SGML, XML, SVG can be used, for example.

**[0184]** The configuration document may comprise a full description of the image content to be displayed. The full description may be defined in the document by means of a network address for the display data **ddij**.

**[0185]** A relevant property of SVG drawings is that they can be dynamic and interactive. Time-based modifications to the elements can be described in SMIL (Synchronized Multimedia Integration Language), or can be programmed in a scripting language (e.g., ECMAScript or JavaScript). The W3C explicitly recommends SMIL as the standard for animation in SVG. The SVG drawings may for instance be edited or transformed according to the example developed earlier whenever an Event **Eij** requires it. A related example of canvas as meant in this description is a dynamic web page created by server side scripting (such as PHP, Perl, JSP or ASP.NET) before being sent to a "client" (e.g. a base unit) for display / rendering on a browser running on the client side.

**[0186]** More detailed examples of how the display data stored on the storage device **C** can be distributed to remote displays **D1** and **D2** is given in US patent application 11/487,357 published under number US20070033289 "Network displays and method of their operation" by Geert Nuyttens and Ronny Dewaele. Examples of hardware needed to display graphical information sent by **C** are given in US patent application serial number 11/487,357 as well.

**[0187]** The techniques described in US patent application serial number 11/487,357 are particularly relevant when e.g. the display **D1** in meeting room 1 consists of two (or more) separate display screens e.g. two 82" LCD screens mounted side by side. The configuration document generated at **C** will determine how the canvas will be distributed over the two displays. Building up on the earlier example where maximum 4 contributions are displayed on the (then single screened) **D1**, the display data **ddij** with the latest temporal index **mij** may be displayed on the first of the separate displays in meeting room 1, and doing so making the latest contribution more visible to the participants, while the other contributions **ddij** will be displayed on the second separate display in meeting room 1. The same is done in meeting room 2 assuming that a second screen is also available in meeting room 2. The techniques described in US 11/487,357 are leveraged to take into account e.g. failure of one of the two or more displays in the same meeting room and allow to

continue the meeting with as little disturbance as possible.

[0188] When a processing device **Lij** shares data with others through the base unit **Bi** with the support of a plug and play interface **1**, some adaptations are needed to set-up / draft the configuration document.

(1) Display data **ddij** is sent to the base station **Bi**. Data display **dij** is time stamped either by the local clock of **Lij** or that of **Bi**. The time stamp **tij** is expressed as GMT or universal time.

(2) The display data **ddij** is sent by the base station **Bi** to the storage device **C** where the temporal index **mij** is determined based on the time stamp **tij**. This guarantees that the users and the event they trigger in different meeting rooms will get the same priority regardless of differences in transmission time between the various meeting rooms and the storage device **C**.

(3) The Canvas is assembled based on the display data **ddij** and the temporal indices **mij** as was done when the computing devices **Lij** communicated directly (i.e. without using **Bi** as an intermediary) with the storage device **C**.

[0189] When a base station is required to access the storage device **C**, a specific procedure is required to allow "road warrior" **U31** to share display data with the users **U11, U12... U21 ...**

[0190] A token (i.e. an authorization and means to alter the display data **ddij** stored on **C**) is needed to be transferred by verbal instruction and needs to convey the means to make a contribution to the canvas. One way to implement the token is the combination of a URL plus a unique session ID. The combination of these two gives access to a meeting-specific website that serves two purposes: (1) to download and install screen capture software program and (2) to give access to the shared canvas. The combination of (1) and (2) offers remote participants like road warrior **U31** using laptops or smart phones the same functionality as participants with access to the base units **B1** or **B2**. Since the verbal instruction needs to be concise, a service similar to tinyURL.com (or lilURL or TightURL) will be used to combine the website + session ID. To avoid mistakes the shortened URL will use a sub-set of characters that are easily pronounced and avoid language confusion (such as between G & J or I & E). An example is hexadecimal characters only. When the phone number of **P31** is used as an identifier for **U31**, it can be verified by the downloaded screen capture software program or accessed by the website itself. In that later case, the phone number may be used to authorize access to the canvas **C** through the website.

[0191] Road Warrior **U31** having no access to displays **D1** or **D2** will have to rely on local display means to see the display data **dij** visible to Users **U1j** and **U2j**. The screen of a smart phone being far smaller than the screen

of a display like **D1** and **D2** used in meeting rooms, the configuration document is used advantageously together with a transform function. For instance, having recognized that the screen of smart phone **P31**; geographically remote from displays **D1** and **D2**; has smaller dimension and resolutions, information like the temporal index can be used to display only one contribution **ddij** at a time on the screen of smart phone **P31**. Switching from one of the maximum 4 (in the example treated above) data display **ddij** to another may be done by road warrior **U31** by scrolling, clicking a specific key on his / her smart phone or "swiping" on a touch screen of **P31**.

[0192] Instead of being done by voice over the phone, the invitation to join the virtual meeting between participants **U11, U12 ... U21 ... U31** may be sent by e-mail pr through social media. User **U31** merely has to click the url indicated in the invitation, the web site will verify the phone number of **P31** and **U31** will be able to see and share display data with the other participants.

[0193] The integration of voice command issued by users **Uij** and display data increases the focus of participants **Uij** and in particular participants like "road warrior" **U31** who has only access to a small display screen on his/her smart phone **P31**.

[0194] To that end, the computing devices **Lij** is equipped with off the shelf voice recognition software. When a user, e.g. **U12** issues a voice command, digital information **VC** is generated as a result by the voice recognition software. That digital information can be linked through e.g. a look-up table to an instruction that can be interpreted by server side scripting and trigger a real time modification of the canvas e.g. the dynamic web page discussed previously. Example 1: a voice command like "zoom top corner left" will result in the top left corner of the canvas (as visible before the voice command is issued) being zoomed in and occupying e.g. the full screen of display **D1, D2** and more importantly the screen of smart phone **P31**. Example 2: if the layout of data display is limited to maximum 4 contributions as described previously, the voice command could be "top left" "top right", "bottom left" and "bottom right". Based on those information, server side scripting would tailor the displayed data on smart phone **P31** and only the top left or ... or bottom right contribution would fill in the screen of smart phone **P31**.

[0195] Returning to Fig. 2, the base node software (6) running on a base node 36 can be adapted to display on the central display a splash screen (21) showing its readiness to receive arbitrary media content over its receiver. This splash screen (21) can also show instructions on how to use the system, as well as the configuration parameters (see later) to reach the base node 36. These configuration parameters are also shown in a transparent canvas at the bottom of the central display (22).

[0196] A client processing device 31 that wants to have its arbitrary media content displayed on the central display connected to the base node 36 is connected to a connection unit 47. The portable application 60 will be

executed on the client processing device 31 as a host device. A first user interaction creates a connection between the portable application 60 and the base node 36 using the transmitter in the connection unit 47 and the receiver in the base node 36. A second user interaction, this time on the input device 48, activates screen scraping by the portable application of the arbitrary media content from the client processing device display, which is then sent over the connector unit 47 to the base node.

**[0197]** The base node 36 receives the plurality of arbitrary media content coming from one or more connection units 47, and auto composes this media content for rendering on the central display.

**[0198]** The visual indicator 61 on the connection unit 47 indicates to the user and to other participants in the meeting that media content is being sent by that connection unit 47 to the base node 36 for display.

**[0199]** Repeating the second user interaction on the input device 48 of a connection unit 47 decouples the media content from that connection unit 47 from the base node 36. The base node 36 removes that media content from the composed image on the central display and recomposes the remaining content on the central display.

**[0200]** The content on the central display/projector is auto arranged as shown in figure 2. When user 1 adds content, his/her display will be scaled to fill the available central display canvas as much as possible, but without affecting the aspect ratio. When user 2 adds in, his content is added to the side of the first image. When user 3 adds his content, the arrangement is triangle wise. Adding user 4, the image becomes a 2 by 2 tiling, which is the maximum available. When an additional user attempts to add content, he will be blocked. When a user initiates action to remove his/her content, his/her media content is removed from the central display and one moves backward in the composition sequence shown in figure 2.

Base node software

**[0201]** The base node software has one or more of the following features:

- First code for providing a means or a method step for correctly configuring the receiver of the base node.
- Second code for providing a means or a method step for listening for output of connection units trying to connect on a specific port.
- Optionally, third code for providing a means or a method step for a GUI for administration purposes, offered for example over a web interface.
- Optionally, fourth code for providing a means or a method step for publishing its presence over the network using the zeroconf protocol.
- Optionally, fifth code for providing a means or a method step for accepting and installing software updates of the base node as well as for the portable applica-

tion software for the connection units.

- Sixth code for providing a means or a method step for providing facilities for pairing of connection units to the base node.
- 5 - Seventh code for providing a means or a method step for auto-composiing of different incoming arbitrary media streams and rendering of composited image on display or projector screen.
- Eighth code for providing a means or a method step for receiving, decrypting and decoding incoming arbitrary media content.
- Optionally ninth code for providing a means or a method step for scaling of incoming arbitrary media streams
- 15 - Optionally tenth code for providing a means for displaying incoming arbitrary media content in accordance with a set of one or more rules.

**[0202]** Any of the above code may be stored on a non-transitory machine readable storage medium such as an optical disk, a magnetic disk, magnetic tape, solid state memory etc.

Portable application for the client processing device

**[0203]** The portable application comprises an algorithm for screen scraping. Screen scraping algorithms include VNC and RDP or similar. The algorithm may include a combination of algorithms such as VNC and RDP that are optimized for different content, e.g. static text or video. The portable application has one or more of the following features:

- Eleventh code for providing a means or a method step for connecting to a network including the base node.
- Twelfth code for providing a means or a method step for capturing video frame buffers of the client processing device, i.e. computer (C), also called screen scraping.
- Thirteenth code for providing a means or a method step for encoding, compressing and optionally encrypting these video frames and sending them over a secure link to the base node. Only changed areas such as rectangles or triangles of the screen need to be transferred, and different types of rectangles or triangles are encoded in different ways (e.g. RLE, JPEG,...) to optimise performance.
- Fourteenth code for providing a means or a method step for handling the connection unit.
- Fifteenth code for providing a means or a method step for initiating connection to base node.
- Sixteenth code for receive inputs from the input device on the connection unit.
- 55 - Seventeenth code for providing a means or a method step for sending state changes to the visual indicator on the connection unit.
- Optionally, eighteenth code for providing a means

- or a method step for presenting the user a GUI (18).
- Optionally, nineteenth code for presenting GUI for administration of the portable application.
- Optionally, twentieth code for providing a means or a method step for displaying and activating a key on the display of the client processing device for allowing a user input to start the transfer of data from the client device to the base node.

**[0204]** Any of the above code may be stored on a non-transitory machine readable storage medium such as an optical disk, a magnetic disk, magnetic tape, solid state memory etc.

**[0205]** In this embodiment the portable application stored on the connection unit, and is executed in an execution context on the client processing device. The portable application does not need to be copied to or installed on the computer. It can be executed directly from the connection unit. It will only be copied temporarily into an execution context on the client processing device. There are also no changes in configuration or settings in the client processing device. This means that nothing will remain on the client processing device when the connection unit is removed. It also implies that the portable application will run on client processing devices where the user does not have the necessary access rights to install software.

**[0206]** The portable application is designed in such a way that

- No specific drivers need to be installed on the client processing device.
- Pre-installed drivers are used, e.g. for classes of peripheral devices.
- It is independent from vendor specific graphics hardware.
- It runs on at least one and preferably on a variety of different client processing devices, including Windows, Mac OS/X, Linux, Android, iOS and many others.

#### Advantages

**[0207]** The present application has one or more of the following advantages:

- No need for a master role in the meeting
- Standard plug and play connectivity of connection units to base node
- Simple and well known user actions are employed
- Own networking facilities of client processing devices not blocked
- No configuration changes on the client processing device
- Input devices are easily accessible; e.g. large size
- Program updates of portable application and server program can be performed locally
- Portable applications are used, no installation, multi-

platform, no vendor specifics

- Particular implementation of screen scraping done by portable application avoids vendor specific graphics devices
- Standard drivers are used hence no driver has to be installed
- No configuration changes on the client processing devices
- Zero footprint applications on client processing devices - nothing to clear up or adjust or reset
- Own networking facilities of client processing devices not blocked
- No configuration changes on the user computers
- Low virus, malware and spyware risk

**[0208]** The portable application may be stored on a non-transitory machine readable storage medium such as an optical disk, a magnetic disk, magnetic tape, solid state memory, USB mass storage etc.

#### Second Embodiment

**[0209]** In the second embodiment, referring to Figs. 2 to 5, the base node is a separate physical processing device called base unit (B), comprising permanent storage, memory, a processing engine, a wireless access point (4), a plug and play interface such as a USB port (11), a graphics display output adapter (5) like VGA/DP/DVI/HDMI, and optionally an audio output adapter (27). An input device having an actuator such as a button 13 and a visual indicator 14 are optional.

**[0210]** The connection unit is a physical device in the form of an external peripheral device (shown in the drawings as a "dongle" D) comprising permanent storage storing the portable application (7) and configuration parameters (12), memory, a processing engine (e.g. CPU, FPGA), a wireless transmitter such as WiFi (3), a plug and play interface such as a USB interface (2), a button as input device (9), an LED ring as visual indicator (10). The portable application is stored on the peripheral device (7).

**[0211]** The client processing device is host device, for example a computer or laptop comprising a display, a plug and play interface such as a USB port (2), memory, and a processing engine such as a microprocessor.

The system thus comprises

#### **[0212]**

- an external peripheral device (D) that has a plug and play interface such as a USB interface (2) on one end and a communications interface such as a wireless interface configured as client (3) on the other end.
- a base unit (B) that has a communications interface such as a wireless interface configured as access point on one end (4) and a video card adapter (5) like VGA, DVI, DP or HDMI on the other end.

- a portable application (7) stored on the peripheral device (D) but executed on the client processing device (C)
- a base node software (6) stored and executed on the base unit (B)

**[0213]** The external peripheral device (D) also preferably has any one or any combination of:

- a large button as actuator for the input device (9) allowing user interaction with the peripheral device. The button preferably has an actuation surface area of between 100 and 14,400 square mm.
- visual indication such as a LED (10) allowing user feedback from the peripheral device

**[0214]** An advantage of embodiments of the present invention is to provide data transfer to the peripheral device via a peripheral interface such as a USB interface on any processing device such as a computer in a manner that is largely operating system independent and without leaving a footprint (Zero-Footprint). Installation of drivers and/or applications onto such a processing device as a computer is not necessary wherever pre-installed generic drivers are present. Administrator rights on the processing device such as a computer are preferably not necessary. To avoid the need for administrator rights, embodiments of the present invention use other peripheral device pre-installed drivers such as USB class drivers supported without any extra installation. Embodiments of the present invention route at least screen scraped data presented by client software running on the processing device for transfer to a communications network via a peripheral device such as a USB device. This bypasses any network interface of the processing device (and hence many firewalls) but only for the specific client software. Other applications are not affected and can make use of the standard network interfaces, i.e. packets from/to the TCP/IP stack are transferred to a network device as normal. The client software is launched from the peripheral device such as a USB composite device or storage device as a portable application, which can avoid that any traces are left on the host OS.

Basic usage scenario of the second embodiment

**[0215]** The base node software (6) displays on the projector a splash screen - (21) in figure 5 - showing its readiness to receive arbitrary media content over its receiver (4). This splash screen (21) also shows instructions on how to use the system, as well as the configuration parameters (see later) to reach the base node. These configuration parameters are also shown in a transparent canvas at the bottom of the central display (22).

**[0216]** To avoid user interaction for the configuration of the connection between peripheral device and base unit, a pairing process is used. This pairing process provides the peripheral device, i.e. the connection unit with

networks parameters needed to set up the local network. As an example, the peripheral device can be briefly plugged into the USB port (11) of the base unit (B). The base unit then optionally does a software validity check, optionally does a software update of the portable application stored on the peripheral device, and writes the connection parameters on the peripheral device (D) required for the peripheral device and base unit to find each other to the permanent storage (8). For example, when using WiFi, this would be the SSID, WEP/WPA2 keys and IP address of the base unit's receiver, as well as the port number used by the base node software although not all of these need to be exchanged.

**[0217]** A client processing device that wants to have its arbitrary media content displayed on the central display connected to the base node (5) connects a peripheral device (D) to its USB port via (2). The peripheral device presents itself to the computer over interface (2) as a composite device comprising a mass storage device and a keypad. This has the major advantage that no specific driver is required, since all these devices are natively supported in every personal computer system that has a USB port. If autorun is enabled, then the computer will automatically execute the client software (7) stored in mass storage (8) on the peripheral device. The first user interaction mentioned in the general case is then just the connection of the peripheral device to the USB port. If security measures disabled auto-run, the user needs to explore the mass storage on the mass storage of the peripheral device and start the portable application manually.

**[0218]** The portable application will use the wireless, e.g. WiFi interface of the peripheral device (3) to connect to the correct base node. To know the right base unit to connect to, the configuration parameters needed to make this connection are stored in the database (12) on the mass storage device (8) during the pairing process described earlier.

**[0219]** Once the connection is made, the peripheral device goes into connected mode. This means that there is now at least one channel from the peripheral device to the base unit. The content is not shown yet. The LED (10) on the peripheral device now turns white to give a visual indication of this new state.

**[0220]** When the user at the computer (C) wants to show her content, she presses the button (9). When the button was previously in state "connected" (see figure 6), it will check the state of the base unit (P). If the base unit is not in state "full", the peripheral device will send the screen scraped arbitrary media content to the base unit (B), which will add the media content to the composition on the central display. The peripheral device LED (10) now turns red to indicate "showing" state (figure 6).

**[0221]** The button (9) acts as a toggle. When the user presses the button again, that computer displays content will be removed from the projector. The LED (10) goes back to white.

**[0222]** Use of the auto-run feature is optional if possible

and enabled on the computer (C) to start the client software (7) as soon as the peripheral device is plugged in. On Windows for example, this means mounting the peripheral device as a mass storage device and using the autorun.inf file stored on the peripheral device.

**[0223]** In many cases however, this auto-run feature will be disabled for security reasons. In that case, we will, if possible and enabled on the computer (C), use the auto-play feature to show the logo of the connected peripheral device on the desktop of the computer. The user then needs to double click on that logo to start the client software. If the auto-play feature as described above is also not possible or enabled, the user must browse to the file system of the connected peripheral device and start the application manually. This means double clicking the client.exe file on Windows, client.app on Mac OS/X or tapping the appropriate application icon on a tablet or any mobile device with touch screen.

**[0224]** Third Embodiment: Portable application stored on standard solid state memory such as a USB stick.

**[0225]** In the third embodiment, the portable application is stored on a solid state memory such as a regular USB memory stick (figure 7).

**[0226]** With a solid state memory such as a regular USB memory stick, there is no input device, visual indicator or transmitter of the kinds described above for the connection unit. This means that the system needs to:

- Use the transmitter/receiver from the client processing device.
- Use as input device a key or button on the client processing device like a physical key on the keyboard, a special mouse press, a button area on a touch screen, a button displayed on the screen to be clicked on with a mouse pointer.
- Present the visual indicator on the client processing device's display.

**[0227]** The client processing device then looks like figure 8.

**[0228]** This embodiment provides a peripheral interface such as the USB interface on any processing device acting as a host device such as a computer in a manner that is largely operating system independent. Installation of drivers and/or applications onto such a processing device as a computer is not necessary wherever pre-installed generic drivers are present. Administrator rights on the processing device such as a computer are preferably not necessary. To avoid the need for administrator rights, this embodiment uses other peripheral device pre-installed drivers such as USB class drivers supported without any extra installation. This embodiment of the present invention routes at least screen scraped data presented by client software running on the processing device for transfer to a communications network via a network connection of the processing device. The client software is launched from the peripheral device such as the USB device as a portable application.

**[0229]** The first user operation then comprises:

- plugging in the solid state device such as a USB memory stick,
- starting the portable application (if autorun is disabled)
- configuring the transmitter on the client processing device to connect to the correct base node, using the configuration parameters (22) shown on the central display
- triggering the connection of the portable application with the base node, for example by interacting with an element on the GUI (18) of the portable application presented on the display of the client processing device.

**[0230]** Presenting visual feedback on user actions is in this embodiment also done using elements in the GUI of the display of the client operating device.

**[0231]** In this embodiment, the advantage of zero footprint is partly realized by the portable application in the sense that no software is installed on or copied to the client operating device, but there is a configuration change needed to connect the transmitter of the client operating device with the base node, which needs to be undone afterwards.

**[0232]** Optionally, the portable application can make the configuration changes to the transmitter for the user.

Advantages lost in this embodiment

**[0233]**

- Partial loss of zero footprint nature of portable application
- More complex first user interaction
- More expertise required from user
- GUI needed on client operating device display, which is possibly also shown on central display
- Need to find free key on client operating device when using physical key for second user action
- Network interface is blocked from other uses by portable application

**[0234]** Optionally, the last point can be avoided by using the base unit as a gateway to the network that the client operating device wanted to connect to through its own interface.

**[0235]** Advantages are:

- tight control of user connectivity to corporate network through settings on the base unit
- keep network connectivity intact even when transmitter is now also used for display purposes

**[0236]** Disadvantage is a higher vulnerability of the system because the display connection is now possible a doorway into the corporate network.

[0237] What remains as advantages are

- the availability of a physical medium to distribute the portable application to users
- no need to install or copy software to client operating device
- easy way to maintain software updates on the connection units (here: memory sticks) via the base unit
- possibility to write configuration data on the connection unit by the base unit, for example in the form of a configuration profile that can be read and used by the client operating device

[0238] Fourth Embodiment: Software only client installed on the client processing device.

[0239] This embodiment is similar to the third embodiment, with as only difference that the software is copied on the client operating device (figure 9). In this case, no plug and play port such as a USB port is required on the client operating device.

[0240] This embodiment will typically be used for tablet PC's and mobile devices. In that case

- there is often no USB port available
  - application distribution is easy and widely accepted through application stores
- Fifth embodiment: Base node software OEM'ed to projector or display equipment

[0241] In this embodiment, the base node is not realized as a separate physical box, but integrated into the processing unit inside a display or projector. All other details are as previously described.

Sixth embodiment

[0242] In this embodiment, the base node is not realized as a separate physical box, but integrated into the codec of a video conferencing equipment. All other details are as previously described.

Seventh embodiment: Remote meeting participant

[0243] In this embodiment, one or multiple client operating devices are not in the direct vicinity of the base node but on a remote location.

[0244] To accommodate this case, the following adaptations are needed:

- further compression and or scaling of the arbitrary media content to allow use of low bandwidth connection
- possibility to communicate connection parameters of the base node to a remote user
- connectivity of the base node to the WAN network to which the remote user is connected

[0245] All other details are as previously described.

Eighth embodiment: multiple base nodes

[0246] In this embodiment, multiple base nodes are used. This can be done for different purposes:

- connectivity of multiple central displays
- extension of real estate of central display
- connectivity of base nodes in different remote locations

[0247] Thi provides the advantage that one can present on multiple base units from a single peripheral device. This is useful for a number of cases:

- personal peripheral device: user can have a personal peripheral device that is paired with multiple meeting rooms that he regularly uses
- use in meeting room with multiple base units each controlling a different display in the same meeting room

[0248] The proposal uses a special variant of the peripheral device called a multi base peripheral device. The multi base peripheral device is equipped with a rotating wheel around the circular central "show me" button. This could be a mechanical rotating multi-position switch or something like the touch wheel on the iPod classic.

[0249] The pairing of this multi-base variant of the peripheral device:

- the rotation wheel is put in the position of the corresponding base unit.
- the peripheral device is paired to the base node in the regular way
- the configuration parameters are stored in a permanent storage location; every position of the rotating wheel has a corresponding set of connection parameters (e.g. different rows in a table) each corresponding with a particular base

[0250] The connection of the peripheral device is as follows:

- multi-base peripheral device X is plugged into a PC
- rotation wheel on peripheral device X is put in position A
- peripheral device X reads configuration parameters in position A of its internal memory
- peripheral device X connects to base node A
- base node A indicates connection of multi-base peripheral device X on central display screen
- rotation wheel on peripheral device X is put in position B
- peripheral device X reads configuration parameters in position B of its internal memory
- peripheral device X connects to base node B
- base node B indicates connection of multi-base peripheral device X on screen

- continue until correct base is selected with rotation wheel
- click the peripheral device input device e.g. button to show content on central display of base node
- rotating the wheel always first clicks away content from the base of the last position

Ninth embodiment

**[0251]** Fig. 10 shows a peripheral device 47 in accordance with an independent embodiment of the present invention including an input device. This embodiment can be used with any of the embodiments described above.

**[0252]** The peripheral device is configured as a connection unit and is a physical device in the form of a connector for a plug and play interface of a user processing device as a host computer such as a USB connection, a flexible data and power connection connected to the connector and a base, the base having an actuator, e.g. a button configured to be an input device with the functions as described above.

**[0253]** The base and/or the actuator is preferably large in size, e.g. having a surface area between 100 and 14,400 square mm. The base can be square, rectangular, round, hexagonal, oval, polygonal in shape or any other ergonomically suitable shape. The actuator is preferably round but can be square, rectangular, hexagonal, oval, polygonal in shape etc. there can be more than one actuator on one base.

**[0254]** The length of the flexible data and power connection, e.g. cable is preferably adapted to place the peripheral device (when in its connected in its operating position), especially the base and the actuator, in the region between the boundary of the connected user processing device and the ergonomic boundary as defined above. In addition the flexible data and power connection should be adapted so that the base lies flat on the meeting table independent of the orientation of the connector needed to insert the connector into the plug and play interface.

**[0255]** The base preferably includes electronics such as having permanent storage for storing the portable application and the network configuration parameters, memory, a processing engine (e.g. CPU, FPGA), a wireless transmitter/receiver such as for WiFi, a plug and play interface such as a USB interface, a LED ring as visual indicator. The portable application can be stored on the peripheral device, i.e. in the base. The visual indicator is for allowing user feedback from the connection unit of the status of any activity.

- Some examples for activation of the actuator which can be used with any of the embodiments of the present invention:

- Sound activated (hand clap, voice recognition, computer sound, music, ...)
- Remote controlled via wireless connected de-

vice (IR, Bluetooth, WiFi, ...)

- Light activated
- Pressure activated, e.g. depression with a finger or hand.
- Touch activated
- Proximity ('near-touch' on the actuator or bringing the actuator close to some object
- Biometric reader such as Fingerprint reader, Iris scanner, DNA analyser
- Keypad, e.g. for entering Keycode e.g. a password

Alternative embodiments

**[0256]** In the above embodiments, once the connection is made between the connection device and a host computer, the peripheral device goes into connected mode. This means that there is at least one channel from the peripheral device to the base node. In accordance with any of the embodiments of the present invention a plurality of channels can be set up between the connection device and the base node. These channels may be logical channels.

**[0257]** Some examples for such a multichannel arrangement may include the first and one or more of the additional channels:

- First channel is for the Scraped image stream (XDS)
- Second channel is for GPU commands (OpenGL, DirectX)
- Third channel is for Mouse pointer coordinates (absolute, relative)
- Fourth channel is for Mouse pointer icons
- Fifth channel is for Image data files (JPEG, PNG, GIF, ...)
- Sixth channel is for Multimedia data files or streams (MPEG2, MPEG4, OGG, H.26x, ...)
- Seventh channel is for Audio data files or streams (MP3, MP4, AAC, WMA, ...)
- Eighth channel is for text or Document data files (DOC, DOCX, PPT, PPTX, ODT, ODS, PDF, ...)
- Ninth channel is for transmission of a priority value 1,2, 3... as described above.

**[0258]** In the above embodiments, a particular method of pairing the peripheral device with the base node has been described. Any of the embodiments of the present invention may include other pairing mechanisms of which some examples are given below.

- Some examples for pairing

- Plug in the peripheral device, to a generic peripheral device port such as a USB port of the base node or other USB enabled device. Pairing info is transmitted over the generic peripheral interface such as USB.
- The Signal strength of the wireless channel to



the base node is used to identify which base node is to be used

- The Signal strength of the wireless channel or any other channel. Example is an NFC/RFID transmitter can be provided underneath the meeting room table. Putting the user processing device such as a laptop and the peripheral device plugged in on this table automatically pairs the peripheral device with the base of this meeting room
- Manual pairing (e.g. by entering IP address, hostname, wireless ID (like SSID on WiFi))

## Claims

1. A method for meetings for providing a connection to a communications network (50) for displaying arbitrary media content obtained from a processing device on a display device, the media content being transmitted through the communications network (50) having a base node (36), the method comprising:

use of a peripheral device to provide a token that inherently or discretely provides authentication to display content on the display device and provides a link to the display device and further a camera (35) having a connection unit (52) for connecting the camera (35) to the network (50), the connection unit (52) having an input device adapted to communicate user selected arbitrary media content to said base node (36) for display on the display device.

2. The method of claim 1, wherein the camera (35) captures images from a whiteboard.
3. The method of claim 1 or 2 further comprising connecting the camera (35) to the network (50) for recording and storing data from the whiteboard.
4. The method of claim 1 or 2 further comprising connecting the camera (35) to the network (50) for transmitting the data from the whiteboard to other networks.
5. The method of any previous claim, wherein a token is a visual code that can be picked up by a camera.
6. The method of any previous claim, wherein access to a token is by scanning a QR code using a camera.
7. The method of any previous claim further comprising :

routing the arbitrary media content through the communications network (50) from the process-

ing device;  
obtaining unilateral electronic access to the display device; and  
displaying the arbitrary media content.

8. The method of any previous claim further comprising :

setting up a communications network between the base node (36) of the communications network and the peripheral device coupled to the processing device.

9. The method according to any previous claim wherein the base node (36) is coupled to the display device, the base node (36) being adapted to receive user selected arbitrary media content and to control display of the user selected arbitrary media content on the display device and connecting the peripheral device to a port of a processing device and communicating the user selected arbitrary media content via the communications network (50).

10. An electronic tool for meetings for providing connection to a communications network (50) for displaying arbitrary media content obtained from a processing device on a display device, the media content being transmitted through the communications network (50) having a base node (36), the tool comprising: a peripheral device for providing a token that inherently or discretely provides authentication to display content on the display device and provides a link to the display device and a camera (35) having a connection unit (52) for connecting the camera (35) to the network (50), the connection unit (52) having an input device adapted to communicate user selected arbitrary media content to said base node (36) for display.

11. The electronic tool of claim 10, wherein the camera (35) is adapted to capture images from a whiteboard.

12. The electronic tool according to any of the claims 10 or 11 wherein the connection unit (52) is adapted for connecting the camera (35) to the network (50) so that the data from the whiteboard can be recorded and stored or transmitted to other networks.

13. The electronic tool according to any of the claims 10 to 12 wherein a token is a visual code that can be picked up by a camera.

14. The electronic tool according to any of the claims 10 to 13 wherein a token is a QR code obtainable by scanning using a camera.

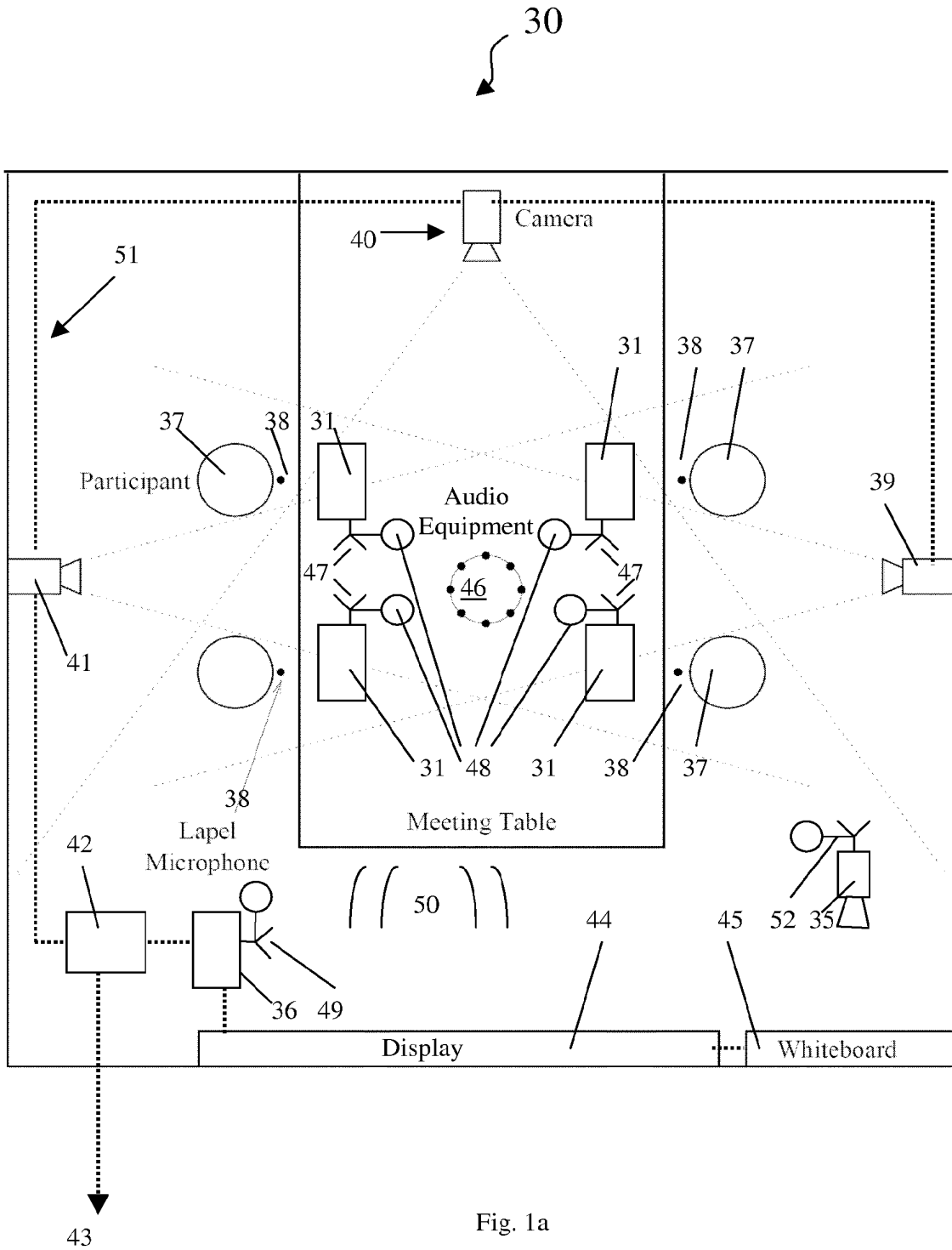


Fig. 1a

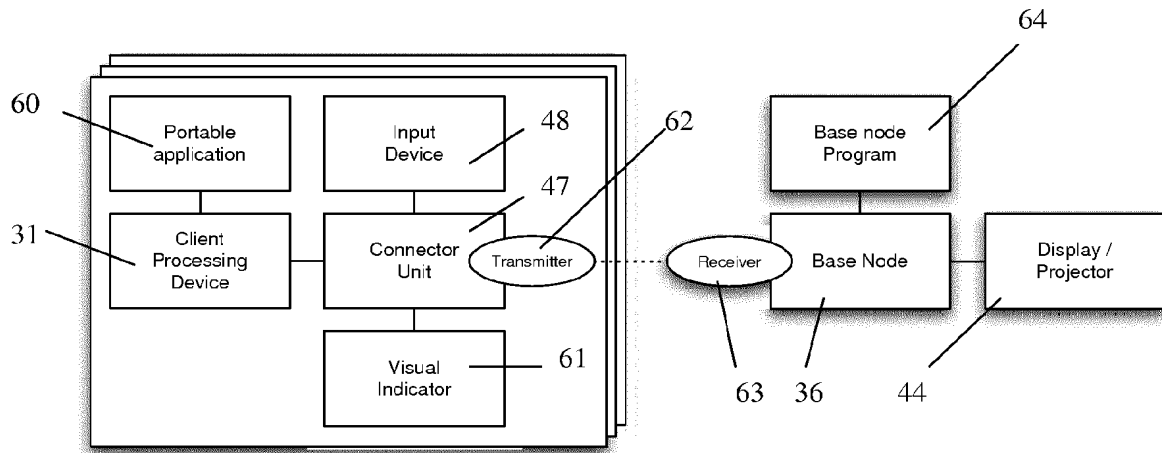


Fig. 1b

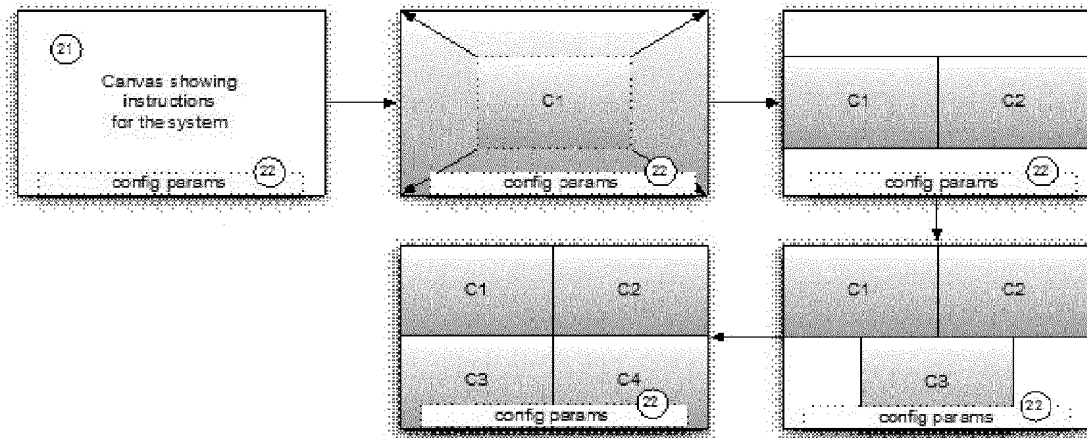


Fig. 2

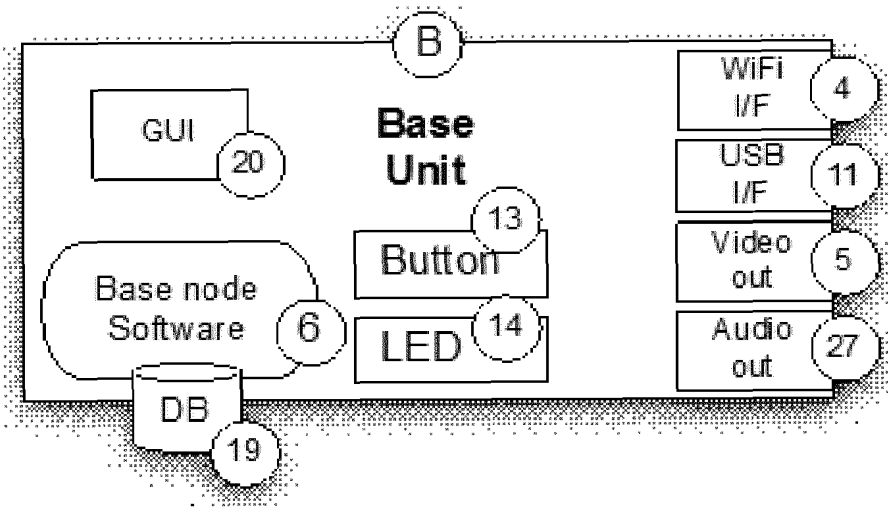


Fig. 3

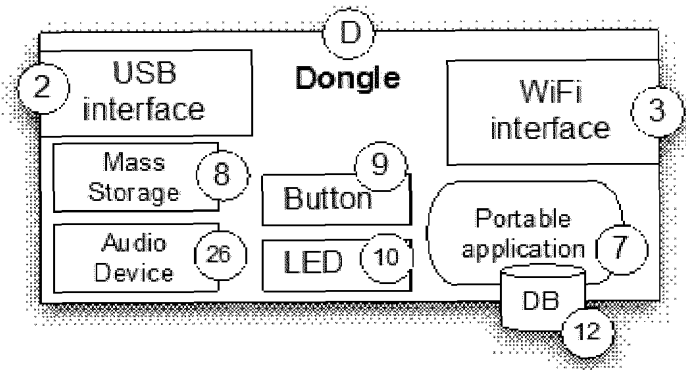


Fig. 4

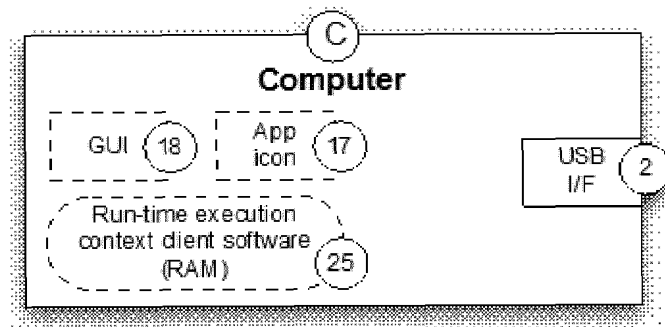


Fig. 5

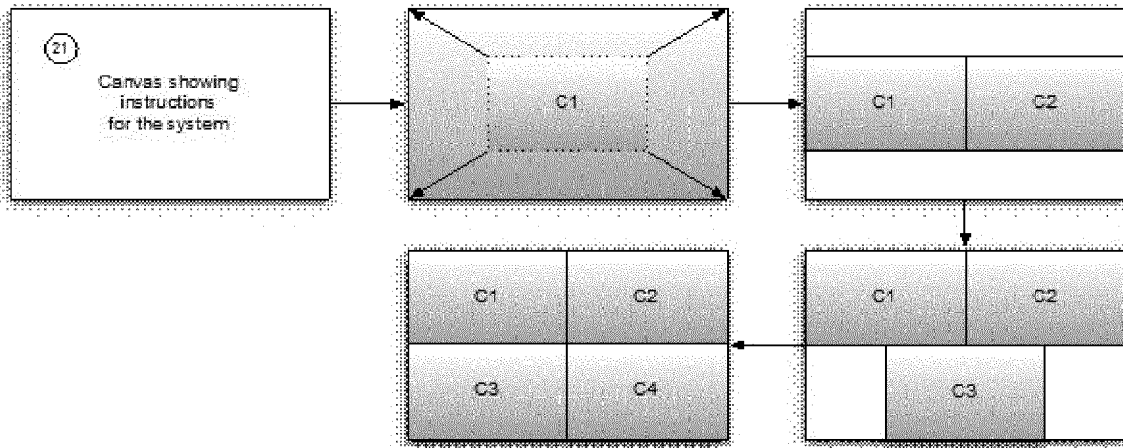


Fig. 6

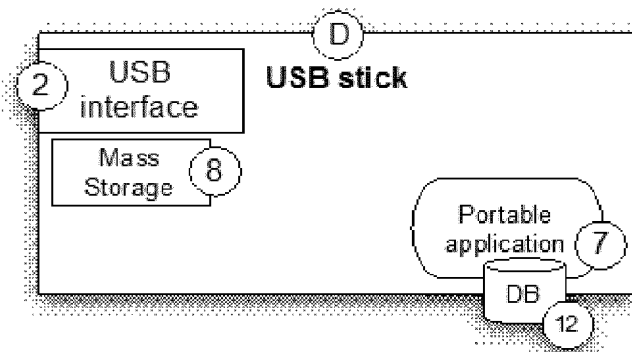


Fig.7

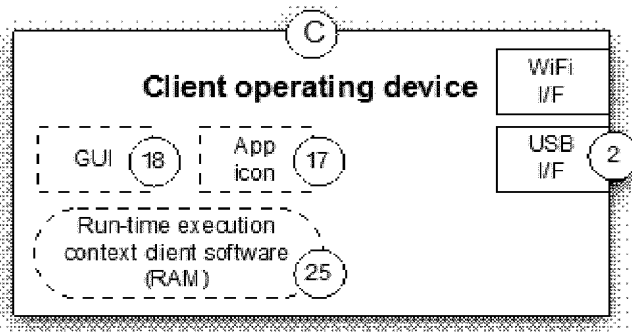


Fig. 8

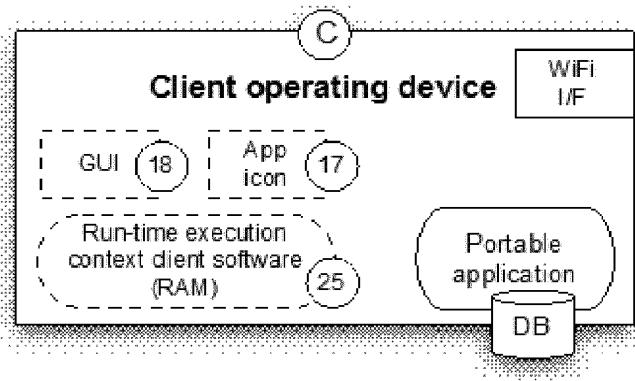


Fig. 9

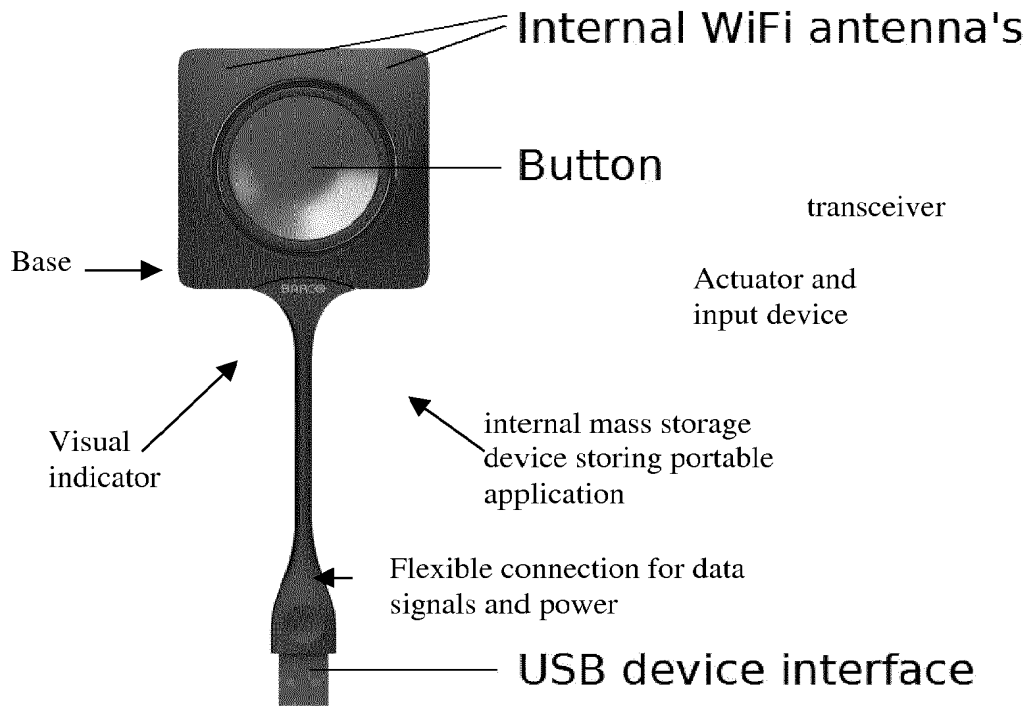


Fig. 10

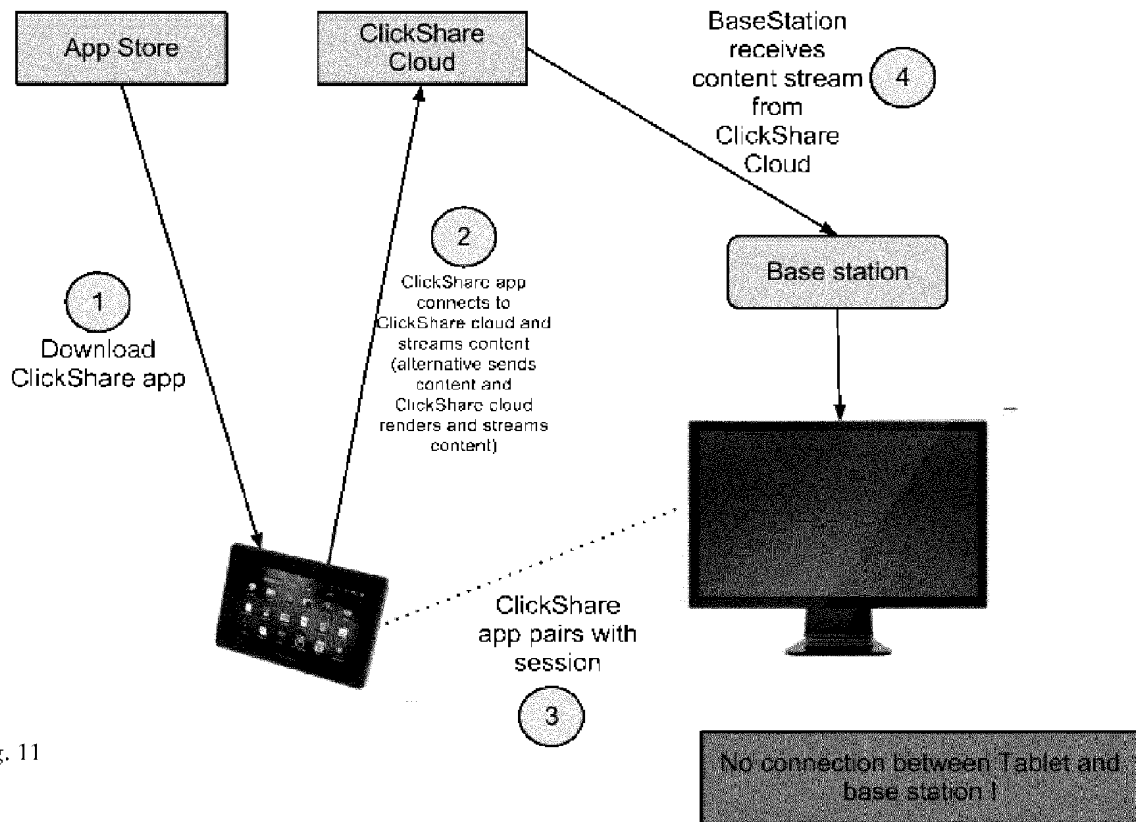


Fig. 11

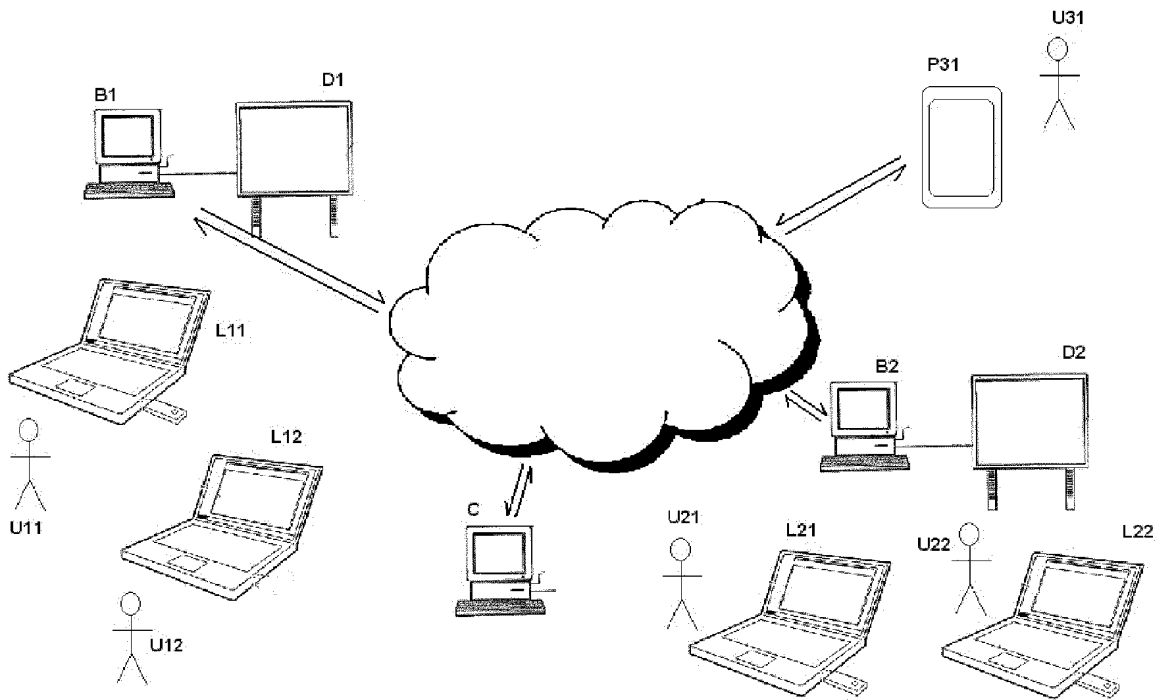


Fig. 12





Fig. 13

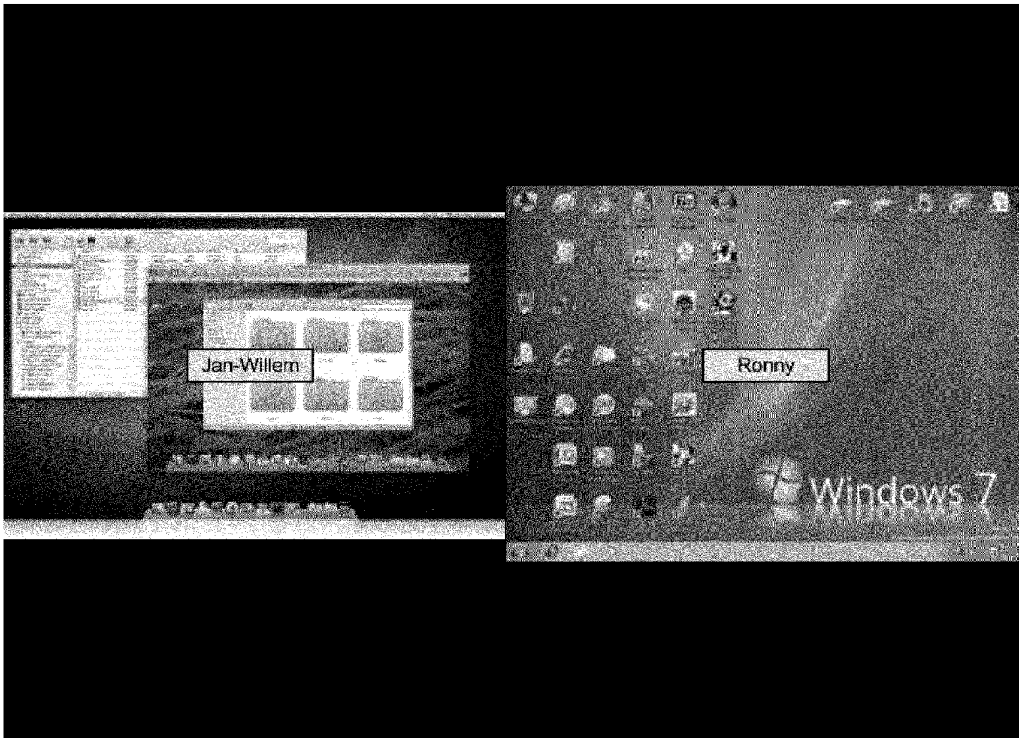


Fig. 14



Fig. 15

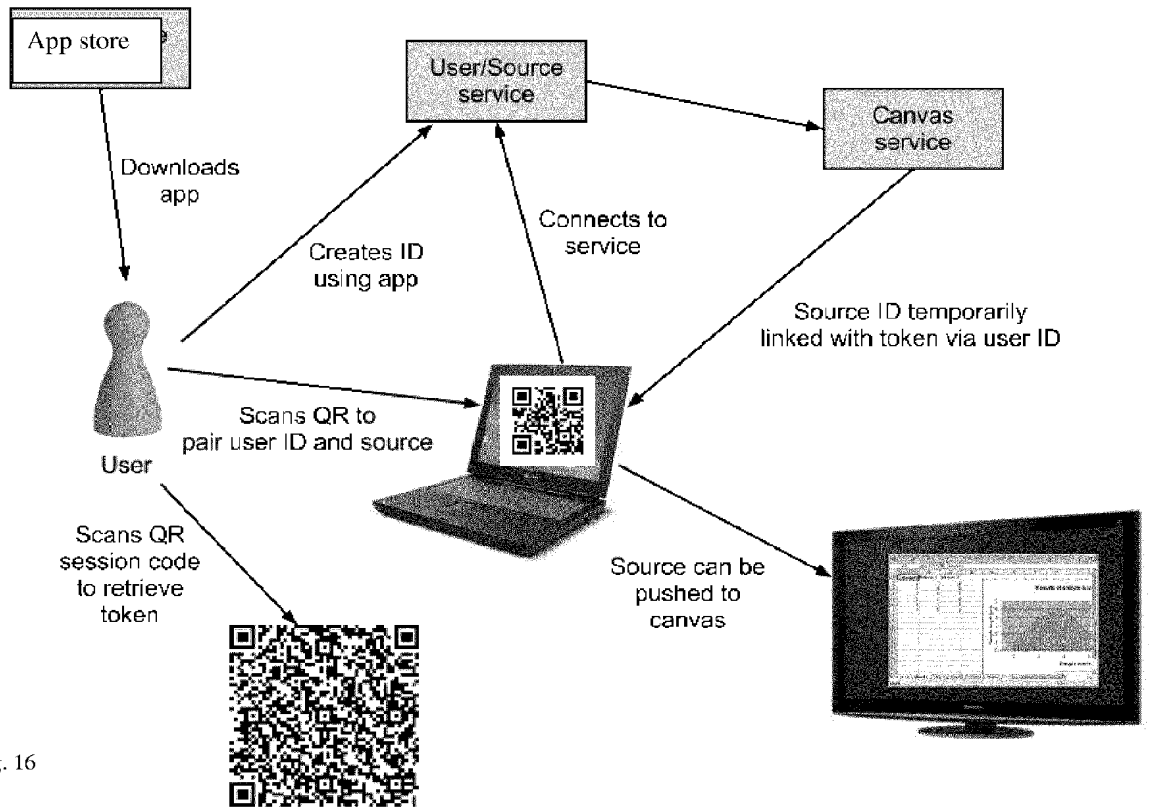


Fig. 16



EUROPEAN SEARCH REPORT

Application Number  
EP 16 17 0760

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Place of search Munich		Date of completion of the search 26 October 2016	Examiner Oteo Mayayo, Carlota
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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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EP 16 17 0760

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EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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# PATENT COOPERATION TREATY

# PCT

From the INTERNATIONAL SEARCHING AUTHORITY

**NOTIFICATION OF TRANSMITTAL OF  
THE INTERNATIONAL SEARCH REPORT AND  
THE WRITTEN OPINION OF THE INTERNATIONAL  
SEARCHING AUTHORITY, OR THE DECLARATION**

To:  
 IPLodge BVBA  
 Technologielaan 9  
 3001 Heverlee  
 BELGIQUE

(PCT Rule 44.1)

Date of mailing <i>(day/month/year)</i>	10 April 2019 (10-04-2019)
Applicant's or agent's file reference BAR4763PCT	<b>FOR FURTHER ACTION</b> See paragraphs 1 and 4 below
International application No. PCT/EP2018/086537	International filing date <i>(day/month/year)</i> 21 December 2018 (21-12-2018)
Applicant  BARCO N.V.	

1.  The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.
- Filing of amendments and statement under Article 19:**  
 The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):
- When?** The time limit for filing such amendments is normally two months from the date of transmittal of the International Search Report.
- How?** Directly to the International Bureau of WIPO, 34 chemin des Colombettes  
 1211 Geneva 20, Switzerland, Facsimile No.: (41-22) 338.82.70
- For more detailed instructions, see *PCT Applicant's Guide*, International Phase, paragraphs 9.004 - 9.011.**
2.  The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the international Searching Authority are transmitted herewith.
3.  **With regard to any protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:
- the protest together with the decision thereon has been transmitted to the International Bureau together with any applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.
- no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.
4. **Reminders**
- The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. These comments will be made available to the public after international publication. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established.
- Shortly after the expiration of **18 months from the priority date, the international application will be published** by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau before the completion of the technical preparations for international publication (Rules 90*bis*.1 and 90*bis*.3).
- Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for **entry into the national phase** before those designated Offices. In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months. For details about the applicable time limits, Office by Office, see [www.wipo.int/pct/en/texts/time\\_limits.html](http://www.wipo.int/pct/en/texts/time_limits.html) and the *PCT Applicant's Guide*, National Chapters.
- Within **22 months from the priority date, the applicant may request that a supplementary international search be carried out** by a different International Searching Authority that offers this service (Rule 45*bis*.1). The procedure for requesting supplementary international search is described in the *PCT Applicant's Guide*, International Phase, paragraphs 8.006-8.032.

Name and mailing address of the International Searching Authority European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040 Fax: (+31-70) 340-3016	Authorized officer TOUYSSERKANI, Tanja Tel: +49 (0)89 2399-2161
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PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference BAR4763PCT	<b>FOR FURTHER ACTION</b>		see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. PCT/EP2018/086537	International filing date (day/month/year) 21 December 2018 (21-12-2018)	(Earliest) Priority Date (day/month/year) 29 December 2017 (29-12-2017)	
Applicant  BARCO N.V.			

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 4 sheets.

It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out on the basis of:

- the international application in the language in which it was filed  
 a translation of the international application into \_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

b.  This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6**bis**(a)).

c.  With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2.  **Certain claims were found unsearchable** (See Box No. II)

3.  **Unity of invention is lacking** (see Box No III)

4. With regard to the **title**,

- the text is approved as submitted by the applicant  
 the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

- the text is approved as submitted by the applicant  
 the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority

6. With regard to the **drawings**,

- a. the figure of the **drawings** to be published with the abstract is Figure No. 8  
 as suggested by the applicant  
 as selected by this Authority, because the applicant failed to suggest a figure  
 as selected by this Authority, because this figure better characterizes the invention
- b.  none of the figures is to be published with the abstract

INTERNATIONAL SEARCH REPORT

International application No  
PCT/EP2018/086537

A. CLASSIFICATION OF SUBJECT MATTER  
INV. H04L12/12  
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 3 099 009 A1 (BARCO NV [BE]) 30 November 2016 (2016-11-30) figures 1a, 11 page 2, paragraph 5 page 3, paragraph 13 page 4, paragraph 20 page 5, paragraph 34 page 6, paragraphs 34, 42	1-35
A	US 2006/075100 A1 (STIRBU VLAD [FI]) 6 April 2006 (2006-04-06) figures 3, 6 page 1, paragraph 9 page 2, paragraph 12 page 3, paragraph 32	1-35
	----- -/--	

Further documents are listed in the continuation of Box C.

See patent family annex.

\* Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier application or patent but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- \*Z\* document member of the same patent family

Date of the actual completion of the international search

Date of mailing of the international search report

3 April 2019

10/04/2019

Name and mailing address of the ISA/  
European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040,  
Fax: (+31-70) 340-3016

Authorized officer

Mircescu, Alexander

## INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2018/086537

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 1 879 143 A2 (BALLY GAMING INC [US]) 16 January 2008 (2008-01-16) figures 1, 5C page 3, paragraph 11 page 7, paragraph 64 page 8, paragraph 67	1-35
A	----- US 2014/148152 A1 (PERIYALWAR SHALINI [CA] ET AL) 29 May 2014 (2014-05-29) figures 1, 2, 4, 5, 11 page 1, paragraph 20 page 3, paragraph 37 page 5, paragraph 51 -----	1-35

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2018/086537

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 3099009	A1	30-11-2016	
		BR 112014026147 A2	27-06-2017
		CA 2909672 A1	24-10-2013
		CN 104412542 A	11-03-2015
		EP 2839604 A1	25-02-2015
		EP 3099009 A1	30-11-2016
		GB 2501471 A	30-10-2013
		HK 1207759 A1	05-02-2016
		SG 11201602993U A	30-05-2016
		US 2015121466 A1	30-04-2015
		WO 2013156092 A1	24-10-2013
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US 2006075100	A1	06-04-2006	
		EP 1794931 A2	13-06-2007
		US 2006075100 A1	06-04-2006
		WO 2006035302 A2	06-04-2006
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EP 1879143	A2	16-01-2008	
		AU 2007203223 A1	24-01-2008
		CA 2593336 A1	10-01-2008
		CN 101159078 A	09-04-2008
		CN 103177510 A	26-06-2013
		EP 1879143 A2	16-01-2008
		US 2011230260 A1	22-09-2011
		US 2016171820 A1	16-06-2016
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US 2014148152	A1	29-05-2014	
		CA 2843539 A1	07-02-2013
		EP 2740319 A1	11-06-2014
		US 2014148152 A1	29-05-2014
		WO 2013016798 A1	07-02-2013
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TITLE: METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

APPLICANT: BARCO N.V.

IPC CLASSIFICATION: H04L12/12

EXAMINER: Mircescu, Alexander

CONSULTED DATABASES:

CLASSIFICATION SYMBOLS DEFINING EXTENT OF THE SEARCH:

IPC:

CPC: H04L12/12

FI/F-TERMS:

KEYWORDS OR OTHER ELEMENTS FEATURING THE INVENTION:  
Automatic connection of devices

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

## PCT

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY  
(PCT Rule 43bis.1)**

To:

see form PCT/ISA/220

Date of mailing  
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference  
see form PCT/ISA/220

**FOR FURTHER ACTION**  
See paragraph 2 below

International application No.  
PCT/EP2018/086537

International filing date (day/month/year)  
21.12.2018

Priority date (day/month/year)  
29.12.2017

International Patent Classification (IPC) or both national classification and IPC  
INV. H04L12/12

Applicant  
BARCO N.V.

**1. This opinion contains indications relating to the following items:**

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

**2. FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA:



European Patent Office  
D-80298 Munich  
Tel. +49 89 2399 - 0  
Fax: +49 89 2399 - 4465

Date of completion of  
this opinion

see form  
PCT/ISA/210

Authorized Officer

Mircescu, Alexander

Telephone No. +49 89 2399-0



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**Box No. 1 Basis of the opinion**

---

1. With regard to the **language**, this opinion has been established on the basis of:
  - the international application in the language in which it was filed.
  - a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).
2.  This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))
3.  With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:
  - a.  forming part of the international application as filed:
    - in the form of an Annex C/ST.25 text file.
    - on paper or in the form of an image file.
  - b.  furnished together with the international application under PCT Rule 13*ter*.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
  - c.  furnished subsequent to the international filing date for the purposes of international search only:
    - in the form of an Annex C/ST.25 text file (Rule 13*ter*.1(a)).
    - on paper or in the form of an image file (Rule 13*ter*.1(b) and Administrative Instructions, Section 713).
4.  In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

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**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	<u>1-35</u>
Inventive step (IS)	Yes: Claims	
	No: Claims	<u>1-35</u>
Industrial applicability (IA)	Yes: Claims	<u>1-35</u>
	No: Claims	

2. Citations and explanations

see separate sheet

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**Box No. VIII Certain observations on the international application**

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The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet



Reference is made to the following document:

D1 EP 3 099 009 A1 (BARCO NV [BE]) 30 November 2016 (2016-11-30)

**Re Item V**

1 It appears appropriate, for technical reasons, to discuss method claim 16 first. The subject matter of claim 16 is not novel (Art 33(1),(2) PCT) for the following reasons.

1.1 Document D1 discloses

(a) a method for connecting a processing device to a functional device

*(see D1, page 5, paragraph 34: "connecting a processing device to a communications network ... communication between processing device and a standard class of peripheral devices";*

*hence, a processing device is connected to a functional/peripheral device; hence, feature (a) is disclosed)*

(b) connected to or in a base unit of a communications network

*(see D1, page 6, paragraph 34: "routing screen scraped data between the processing device and the communication network via the means for communication";*

*hence, there is a means of communication coupled to the processing device, and such a means is functionally the same as a base unit of a network, at least in the claimed broad manner; hence, feature (b) is also disclosed),*

(c) the processing device having a memory, a display and an operating system, the base unit having a transmitter and the first peripheral device having a receiver the method comprising:

*(see D1, page 5, paragraph 34: "the processing device having a memory, a display and an operating system ... communication between processing device and ... peripheral devices";*

*hence, the processing device has a display and an operating system, and the base unit of (b) and the peripheral device of (a) have a transmitter and a receiver; hence, feature (c) is also disclosed)*

(d) coupling a first peripheral device to the processing device via a generic communications protocol

*(see D1, page 4, paragraph 34: "providing a generic communications protocol";*

*hence, the peripheral device and the processing device discussed above communicate via a generic communications protocol; hence, feature (d) is also disclosed),*

(e) providing at least one fixed or a configurable endpoint of the functional device exposed on the first peripheral device

*(see D1, page 6, paragraph 34: "setting up .... a means for communication between the peripheral device and the processing device";*

*hence, the functional/peripheral device is provided with an endpoint by setting up the means for communication; hence, feature (e) is also disclosed);*

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

*(see the citations above: the whole structural and functional features (a)-(e) are used for transmitting and receiving data from the functional device to the processing device via the at least one fixed or configurable endpoint using the generic communications protocol for communication between the processing device and the first peripheral device; hence, feature (f) is also disclosed).*

Since all features (a)-(f) of claim 16 are disclosed by document D1, the subject matter of claim 16 is not novel (Art 33(1),(2) PCT).

- 2 Claim 29 defines an apparatus of broader scope of protection than the method of claim 16. Since the subject matter of claim 16 is not novel (Art 33(1),(2) PCT), the subject matter of claim 29 is a fortiori not novel (Art 33(1), (2) PCT).
- 3 The subject matter of dependent claims 1-15, 17-28, and 30-33 is also not novel (Art 33(1),(2) PCT) since their subject matter is also disclosed in document D1 (*claim 1 corresponds to claim 16; the software features of claims 2-7, 17-22, and 31-32 are disclosed on page 6, paragraph 42; the hardware features of claims 8-15, 23-28, 30, and 33 are disclosed on page 6, paragraph 37).*
- 4 Claim 34 defines a computer program corresponding to the method claims 16-28. Since the subject matter of claims 16-28 is not novel (Art 33(1),(2) PCT), the subject matter of claim 34 is also not novel (Art 33(1),(2) PCT).

- 5 Claim 35 defines a storage device for storing the computer program of claim 34. Since the subject matter of claim 34 is not novel (Art 33(1),(2) PCT), the subject matter of claim 35 is also not novel (Art 33(1),(2) PCT).

**Re Item VIII**

- 1 The subject matter of claims 1 and 29 is not clear (Art 6 PCT) for the following reasons.
- 1.1 Claim 1 defines a system comprising all features of the apparatus of claim 29. Hence, claim 1 defines a dependent claim, being dependent on claim 29. But, contrary to the requirements of Art 6 PCT, claim 1 does not contain a reference to claim 29 in order to explicitly show its dependence on claim 29; instead claim 1 uses the wording of an independent claim.
- 1.2 Contrary to the requirements of Art 6 PCT, independent claim 29 is put before dependent claim 1. Hence, claim 29 contravenes the clarity requirements of Art 6 PCT.
- 1.3 The clarity objections could be easily overcome, by formulating claim 29 as the first claim, followed by dependent claims 30-33, followed by dependent claim 1, followed by dependent claims 2-15, followed by method claims 16-28, followed by claim 34, followed by claim 35. The system claim should read: "A system for connecting the peripheral device of claim 1 to ...".
- 2 The applicant's attention is drawn to the following matters, which should as well be considered:
- 2.1 To meet the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in document D1 should be acknowledged in the description.
- 2.2 Reference signs in parentheses should be inserted in all claims to increase their intelligibility (Rule 6.2(b) PCT).
- 2.3 The attention of the applicant is drawn to the fact that the application may not be amended in such a way that it contains subject matter which extends beyond the content of the application as filed (Art 34(2)(b) PCT).

In his letter of reply, the applicant should indicate the parts of the originally filed application serving as a basis for subject matter newly introduced into the claims.

The applicant is requested to file amendments by way of replacement pages in accordance with Rule 66.8 PCT.

## Possible steps after receipt of the international search report (ISR) and written opinion of the International Searching Authority (WO/ISA)

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### General information

For all international applications, the competent International Searching Authority (ISA) will establish an international search report (ISR) accompanied by a written opinion of the International Searching Authority (WO/ISA). The WO/ISA may be responded to by

- filing informal comments with the International Bureau of WIPO (IB) (where no demand for international preliminary examination (demand) is filed)
- filing amendments under Art. 19 PCT (this can be done whether or not a demand is filed)
- filing amendments under Art. 34 PCT and/or formal observations in response to objections raised in the WO/ISA (where a demand is actually filed)

This document explains these possibilities.

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### Filing informal comments

After receipt of the ISR and WO/ISA, the applicant may file informal comments on the WO/ISA, directly with the IB (see International Search and Preliminary Examination Guidelines 2.15). These will be communicated to the designated/elected Offices, together with the International Preliminary Report on Patentability (IPRP) at 30 months from the priority date.

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### Amending claims under Art. 19 PCT

The applicant may file amended claims under Art. 19 PCT, directly with the IB by the later of the following dates:

- 2 months from the date of mailing of the ISR and the WO/ISA
- 16 months from the priority date

However, any such amendment received by the IB after the expiration of the applicable time limit shall be considered to have been received on time by the IB, if it reaches it before the technical preparations for international publication have been completed (the 15th day prior to the date of publication, see PCT Applicant's Guide, International Phase, 9.013).

For further information, please see Rule 46 PCT as well as form PCT/ISA/220.

Please also note that, when filing amended claims under Art. 19 PCT, such amendments shall be accompanied by a letter identifying the amendments made and also the basis for the amendments in the application as originally filed (Rule 46.5(b) PCT). Where a demand is filed, failure to comply with this requirement may result in the amendments being ignored in the International Preliminary Examination Report (IPER), see Rule 70.2(c-bis) PCT.

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## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	35748151
<b>Application Number:</b>	15858668
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	6421
<b>Title of Invention:</b>	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS
<b>First Named Inventor/Applicant Name:</b>	Gauthier RENARD
<b>Customer Number:</b>	23364
<b>Filer:</b>	Thomas Lee/Shelly Darrenkamp
<b>Filer Authorized By:</b>	Thomas Lee
<b>Attorney Docket Number:</b>	RENA3002/TJM/TL
<b>Receipt Date:</b>	17-APR-2019
<b>Filing Date:</b>	29-DEC-2017
<b>Time Stamp:</b>	10:43:33
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
------------------------	----

### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	RENA3002_IDS.pdf	1034600  44a00fc0a72c77f00fd647fc415a31e6c41cc778	no	4

### Warnings:

<b>Information:</b>					
2	Foreign Reference	EP1879143A2.pdf	2961566	no	48
			a722914a399014deff57ff6151b4871059e1015		
<b>Warnings:</b>					
<b>Information:</b>					
3	Foreign Reference	EP3099009A1.pdf	3597762	no	42
			115a37a7f0954be4a6b6a86f8f57d51f863bcf55		
<b>Warnings:</b>					
<b>Information:</b>					
4	Non Patent Literature	ISR_10APR19.pdf	175513	no	6
			4b1e44b003f3922f9a1762e43148e30dcb30f9c4		
<b>Warnings:</b>					
The page size in the PDF is too large. The pages should be 8.5 x 11 or A4. If this PDF is submitted, the pages will be resized upon entry into the Image File Wrapper and may affect subsequent processing					
<b>Information:</b>					
5	Non Patent Literature	Written_Opinion_10APR19.pdf	289935	no	7
			2e49bc66fbdad468d7069a0066f11a747f5b40a5		
<b>Warnings:</b>					
The page size in the PDF is too large. The pages should be 8.5 x 11 or A4. If this PDF is submitted, the pages will be resized upon entry into the Image File Wrapper and may affect subsequent processing					
<b>Information:</b>					
			<b>Total Files Size (in bytes):</b>	8059376	

**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

Table with 4 columns: APPLICATION NUMBER (15/858,668), FILING OR 371(C) DATE (12/29/2017), FIRST NAMED APPLICANT (Gauthier RENARD), ATTY. DOCKET NO./TITLE (RENA3002/TJM/TL)

CONFIRMATION NO. 6421

PUBLICATION NOTICE



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

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

Publication No.US-2019-0205275-A1

Publication Date:07/04/2019

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/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Public Records Division. The Public Records Division can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Public Records Division, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently https://portal.uspto.gov/pair/PublicPair. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

**In re Application of:**

<b>Application No.:</b>	15/858,668	<b>Confirm. No.:</b>	6421
<b>Filing Date:</b>	December 29, 2017	<b>Art Unit:</b>	2185
<b>First Inventor:</b>	Gauthier RENARD	<b>Customer No.:</b>	23364
<b>Attorney No.:</b>	RENA3002/TJM/TL	<b>Examiner:</b>	Brian T. Misiura
<b>For:</b>	<b>METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS</b>		

**REPLY UNDER 37 C.F.R. § 1.111 TO OFFICE ACTION  
OF MARCH 28, 2019**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

**INTRODUCTORY COMMENTS**

This is responsive to the Office Action dated March 28, 2019 in the above application.

In view of the following amendments and remarks, reconsideration of the application is respectfully requested.

A petition and appropriate fee to extend the period of reply by one month are concurrently filed herewith.

AMENDMENT

Please amend the pending application in accordance with the following particulars.

In the Specification

An amendment to the specification is shown in the following pages under the heading AMENDMENT TO THE SPECIFICATION.

In the Claims

The claims are amended as shown on the following pages under the heading LIST OF CURRENT CLAIMS. The list shows the status of all claims presently in the application and is intended to supersede all prior versions of the claims in the application. Any cancellation of claims is made without prejudice or disclaimer.

AMENDMENT TO THE SPECIFICATION

Please amend paragraph [0065] of the application published as US 2019/0205275, as seen in the following marked-up paragraph:

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

Please amend paragraph [0072] of the application published as US 2019/0205275, as seen in the following marked-up paragraph:

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

conferencing cloud service including a video conferencing node to allow one or more users located at the first video conferencing endpoint to communicate with one or more users located at the second video conferencing endpoint in a video conference.

LIST OF CURRENT CLAIMS

1. (Currently Amended) A system for connecting a processing device to a functional device connected to or in a base unit of a communications network, the processing device having a memory, a display and an operating system, the system comprising:

a first peripheral device being adapted to be coupled to the processing device via a generic communications protocol,

the base unit having a transmitter and the first peripheral device having a receiver and at least one fixed or a configurable endpoint, where the at least one fixed or a configurable endpoint is a data source or a data sink which is able to store data, of the functional device exposed or made available on the first peripheral device;

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

2. (Original) The system of claim 1 wherein the functional device is any one or more of a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a video camera, a webcam.

3. (Original) The system of claim 1 wherein the at least one fixed or a configurable endpoint of the functional device exposed on the first peripheral device is one of a human interface device, a mass storage device, a composite device, a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a video camera, or a webcam.

4. (Original) The system of claim 1 further comprising means for encoding, optionally encrypting the data.
5. (Original) The system of claim 1 wherein the processing device is adapted to host a unified communication between two or more further processing devices.
6. (Original) The system of claim 5 wherein the first peripheral device is adapted to present a functional device to the unified communication between two or more processing devices.
7. (Original) The system of claim 1 adapted to expose the same type of functional device to the processing device as is connected to the Base Unit further comprising at least one driver for the functional device installed on the processing device.
8. (Original) The system of claim 1 wherein the functional device is a second peripheral device.
9. (Original) The system of claim 1 wherein the functional device is a data capturing device.
10. (Currently Amended) A method for connecting a processing device to a functional device connected to or in a base unit of a communications network, the processing device having a memory, a display and an operating system, the base unit having a transmitter and the first peripheral device having a receiver the method comprising:
  - coupling a first peripheral device ~~being~~ to the processing device via a generic communications protocol,
  - providing at least one fixed or a configurable endpoint, where the at least one fixed or a configurable endpoint is a data source or a data sink which is able to store data,of the functional device exposed or made available on the first peripheral device;

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

11. (Original) The method of claim 10 wherein the functional device provides any one or more of a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a video camera, a webcam.

12. (Original) The method of claim 10 further comprising presenting the at least one fixed or a configurable endpoint of the functional device exposed on the first peripheral device as one of a human interface device, a mass storage device, a composite device, a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a video camera, or a webcam.

13. (Original) The method of claim 10 further comprising encoding, and/or optionally encrypting the data.

14. (Original) The method of claim 10 further comprising hosting a unified communication between two or more further processing devices on the processing device.

15. (Original) The method of claim 14 further comprising the first peripheral device presenting a functional device to the unified communication between two or more processing devices.

16. (Original) The method of claim 10 comprising exposing the same type of functional device to the processing device as is connected to the Base Unit and using at least one driver for the functional device installed on the processing device.

17. (Currently Amended) A peripheral device adapted to be coupled to a processing device via a generic communications protocol, the peripheral device having a receiver and at least one fixed or a configurable endpoint, where the at least one fixed or a configurable endpoint is a data source or a data sink which is able to store data, of a functional device exposed or made available on the first peripheral device;

the receiver of the first peripheral device being adapted to receive data over the communications network from the functional device and for sending the data to the processing device via the at least one fixed or configurable endpoint using the generic communications protocol for communication between the processing device and the peripheral device.

18. (Original) The peripheral device of claim 17 wherein the at least one fixed or a configurable endpoint of the functional device exposed on the first peripheral device is one of a human interface device, a mass storage device, a composite device, a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a video camera, or a webcam.

19. (Currently Amended) A computer program product comprising a non-transitory signal storage means for storing computer program instructions that, for carrying out any of the method steps of claim 10 when executed on a processor, carry out any of the methods steps of claim 10.

20. (Cancelled)



21. (New) The peripheral device of claim 17 wherein the at least one fixed or configurable endpoint has one transfer direction.

REMARKS

Reconsideration of the pending application is respectfully requested on the basis of the following particulars.

1. In the specification

Applicant respectfully requests correction of U.S. publication 2019/0205275 as amended in the AMENDMENT TO THE SPECIFICATION to correct the published application to properly publish the application as originally filed.

2. Claim Amendments

Claim 1 is amended to recite “the base unit having a transmitter and the first peripheral device having a receiver and at least one fixed or a configurable endpoint, where the at least one fixed or a configurable endpoint is a data source or a data sink which is able to store data, of the functional device exposed or made available on the first peripheral device.”

It is respectfully submitted that no new matter is added, since support for the amendment may be found, for example, at least on page 12, lines 19-22 of the specification as originally filed.

Claims 10 and 17 are amended to recite similar features as recited in amended claim 1.

Claim 19 is amended to overcome the Examiner’s rejection under 35 U.S.C. 101, as suggested by the Examiner.

Claim 10 is amended to correct a minor grammatical informality.

Claim 20 is cancelled without prejudice or disclaimer.

Claims 2-9, 11-16, and 18 are left unchanged.

New claim 21 is supported at least by page 13, line 5 of the specification.

3. Rejection of claim 19 under 35 U.S.C. § 101

Reconsideration of this rejection is requested, in view of the amendment to the claims, on the basis that claim 19 has been amended to be more clearly directed to statutory subject matter.

Specifically, claim 19 has been amended as suggested by the Examiner.

Accordingly, withdrawal of this rejection is respectfully requested.

4. Rejection of claims 1-20 under 35 U.S.C. § 102(a)(1) as being anticipated by U.S. publication 2015/0121466 (*Brands*)

Reconsideration of this rejection is respectfully requested on the basis that *Brands* fails to disclose each and every recited element of amended claims 1, 10, and 17, from which the remaining claims depend.

Specifically, *Brands* fails to at least disclose or suggest “the base unit having a transmitter and the first peripheral device having a receiver and at least one fixed or a configurable endpoint, where the at least one fixed or a configurable endpoint is a data source or a data sink which is able to store data, of the functional device exposed or made available on the first peripheral device” and “the base unit and the first peripheral device being adapted to transmit and receive data respectively over the communications network from the functional device to the processing device via the at least one fixed or configurable endpoint using the generic communications protocol for communication between the processing device and the first peripheral device,” as recited in amended claim 1.

Although the Examiner suggests on page 5 of the Office Action that *Brands* discloses the recited features, Applicant submits that the skilled person would not have observed the necessary evidence to support this conclusion. Rather, the skilled person would have appreciated that the features recited in the claims are at least directed to, in one embodiment of the invention, the first peripheral device having a receiver and at least one fixed or a configurable endpoint, where the at least one fixed or a configurable endpoint is a data source or a data sink which is able to store data, of the functional device exposed or

made available on the first peripheral device and the base unit and the first peripheral device being adapted to transmit and receive data respectively over the communications network from the functional device to the processing device via the at least one fixed or configurable endpoint using the generic communications protocol for communication between the processing device and the first peripheral device. In so doing, the skilled person would have understood that the exposed endpoints for functional devices allow these devices to be controlled by the peripheral device and to appear as if they were local to the processing device, e.g., the laptop. That is, such a hardware solution allows the base unit to expose and make available any functional device such as a second peripheral device that is connected to the base unit, to one or more first peripheral devices (e.g., receiver devices) such as to expose and make available simultaneously with a plurality of first peripheral devices (page 16, lines 3-7), e.g., the exposure of the endpoint is a specific hardware solution. For example, a loudspeaker (connected to the base unit) can be made visible on the processing device as any other resource, and it can be accessed and controlled from the processing device such as the laptop.

On the other hand, Applicant submits that skilled person would have understood that *Brands* does not disclose how to connect a functional device, such as a loudspeaker, with a peripheral device in such a way that the functional device is exposed on or made available on the peripheral device. Rather, the skilled person would have understood that *Brands* teaches that the peripheral device is plugged into a processing device, e.g., laptop, while the optional equipment can be cameras, microphones and loudspeakers. While these optional equipment can be linked to the network and linked by a network to the router or the base node, *Brands* does not teach that such optional equipment are exposed or made available on a peripheral device. At most, paragraph [0121] of *Brands* teaches:

“The optional equipment can be cameras 39, 40, 41 for recording the progress of the meeting. These cameras can be linked by a network 51, e.g. a cable network to the router 42 and/or the base node 36. Another optional item is a microphone or microphones 38 that can be used to transfer audio, e.g. to the processing

devices 31 and to loud speakers (not shown) attached to the base node 36 or part of the display 44.”

That is, the skilled person would have understood that a camera of *Brands* is controlled by an app (where no endpoints are needed) and *Brands* fails to disclose any other way in which the camera is controlled. Instead, *Brands* in paragraphs [0120]-[0130] only teaches transfer via the dongle of screen scraped material (hence visual data) from the processing device (laptop) to the room display 44.

Since *Brands* fails to disclose or suggest each and every feature recited in amended claim 1, *Brands* cannot anticipate the claim.

Claims 10 and 17 are allowable over the cited prior art at least for reciting similar features as recited in claim 1, as well as their individually recited features.

The remaining claims are allowable over the cited prior art at least for their dependency on amended claims 1, 10, and 17, as well as their individually recited features.

Accordingly, withdrawal of this rejection is respectfully requested.

5. Rejection of claims 1-3, 5, 6, 8-12, 14, 15, 17, and 18 under 35 U.S.C. § 102(a)(1) as being anticipated by U.S. publication 2014/0362161 (*Leete*)

Reconsideration of this rejection is respectfully requested on the basis that *Leete* fails to disclose each and every recited element of amended claims 1, 10, and 17, from which the remaining claims depend.

Specifically, *Leete* fails to at least disclose or suggest “the base unit having a transmitter and the first peripheral device having a receiver and at least one fixed or a configurable endpoint, where the at least one fixed or a configurable endpoint is a data source or a data sink which is able to store data, of the functional device exposed or made available on the first peripheral device” and “the base unit and the first peripheral device being adapted to transmit and receive data respectively over the communications network from the functional device to the processing device via the at least one fixed or configurable

endpoint using the generic communications protocol for communication between the processing device and the first peripheral device,” as recited in amended claim 1.

At most, *Leete* discloses a system for providing access to shared multimedia content within a defined room environment, where the system comprises a hub and a plurality of remote connection devices (para. [0009]). Each of the remote connection devices is configured to be connected with at least one of a user device brought into the room environment or a multimedia device located within the room environment (para. [0009]). Via the wireless network, the hub 16 communicates shared multimedia content with peripheral devices including user devices 18 and multimedia devices 20 located within the meeting room 10 via one or more remote connection devices 22 (para. [0017]). The hub 16 rebroadcasts the multimedia content from the source to at least some of the other connected remote connection devices 22 (para. [0029]). A software application resides on the hub 15 which may only be accessed by a designated source remote connection device 22 (para. [0031]). The switching logic processor in the hub 16 then selectively multiplexes the multimedia content to direct, for example, the graphical or video data to television screen 20A, an electronic whiteboard or monitor and the audio data to speakers 20 (para. [0032]). In other words, *Leete* discloses a software application that does not include any endpoint, and fails to disclose “the base unit having a transmitter and the first peripheral device having a receiver and at least one fixed or a configurable endpoint, where the at least one fixed or a configurable endpoint is a data source or a data sink which is able to store data, of the functional device exposed or made available on the first peripheral device” and “the base unit and the first peripheral device being adapted to transmit and receive data respectively over the communications network from the functional device to the processing device via the at least one fixed or configurable endpoint using the generic communications protocol for communication between the processing device and the first peripheral device.”

Although the Examiner suggests on pages 7-8 of the Office Action that *Leete* discloses the previously recited features, Applicant submits that the skilled person would not have observed the necessary evidence to support this conclusion. Rather, the skilled

person would have appreciated that *Leete* uses a software solution for which there are no endpoints. For example, the skilled person would have appreciated that *Leete* teaches in paragraphs [0031] and [0032] of a software application that resides on the hub 16, where using the software application transmitted by the hub 16, the designated source remote connection device 22 may control one or more of the multimedia devices 20 located in the environment of the meeting room. The skilled person, however, would not have observed any evidence in *Leete* that the endpoint of the functional device is exposed or made available on the connection device, where the base unit and the first peripheral device are adapted to transmit and receive data respectively over the communications network from the functional device to the processing device via the at least one fixed or configurable endpoint, which is a specific hardware solution of exposing endpoints (on the peripheral device), e.g., the at least one fixed or a configurable endpoint is a data source or a data sink which is able to store data.

Since *Leete* fails to disclose or suggest each and every feature recited in amended claim 1, *Leete* cannot anticipate the claim.

Claims 10 and 17 are allowable over the cited prior art at least for reciting similar features as recited in amended claim 1, as well as their individually recited features.

The remaining claims are allowable over the cited prior art at least for their dependency on amended claims 1, 10, and 17, as well as their individually recited features.

Accordingly, withdrawal of this rejection is respectfully requested.

## 6. Conclusion

As a result of the amendments to the claims and further in view of the foregoing remarks, it is respectfully submitted that the application is in condition for allowance. Accordingly, it is requested that the currently presented claims be approved and the application passed to issue.

Please charge any additional fees required or credit any overpayments in connection with this paper to Deposit Account No. 02-0200.

Application No.: 15/858,668

If any issues remain that may be resolved by a telephone or facsimile communication with the applicant's attorney, the examiner is invited to contact the undersigned at the numbers shown below.

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Date: July 29, 2019

Respectfully submitted,

/Thomas J. Moore/

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<b>PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)</b>		Docket Number (Optional) RENA3002/TJM/TL
Application Number <b>15/858,668</b>	Filed <b>December 29, 2017</b>	
For <b>METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS</b>		
Art Unit <b>2185</b>	Examiner <b>Brian T. Misiura</b>	

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	
<input checked="" type="checkbox"/> One month (37 CFR 1.17(a)(1))	\$200	\$100	\$50	\$ <u>200</u>
<input type="checkbox"/> Two months (37 CFR 1.17(a)(2))	\$600	\$300	\$150	\$ _____
<input type="checkbox"/> Three months (37 CFR 1.17(a)(3))	\$1,400	\$700	\$350	\$ _____
<input type="checkbox"/> Four months (37 CFR 1.17(a)(4))	\$2,200	\$1,100	\$550	\$ _____
<input type="checkbox"/> Five months (37 CFR 1.17(a)(5))	\$3,000	\$1,500	\$750	\$ _____

 Applicant asserts small entity status. See 37 CFR 1.27. Applicant certifies micro entity status. See 37 CFR 1.29.  
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously. 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 28974 attorney or agent acting under 37 CFR 1.34. Registration number \_\_\_\_\_/Thomas J. Moore/

Signature

July 29, 2019

Date

THOMAS J. MOORE

Typed or printed name

703-683-0500

Telephone Number

**NOTE:** This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below\*. \* 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.

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	15858668
<b>Filing Date:</b>	29-Dec-2017
<b>Title of Invention:</b>	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS
<b>First Named Inventor/Applicant Name:</b>	Gauthier RENARD
<b>Filer:</b>	Thomas J. Moore/Shelly Darrenkamp
<b>Attorney Docket Number:</b>	RENA3002/TJM/TL

Filed as Large Entity

**Filing Fees for Utility under 35 USC 111(a)**

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

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension - 1 month with \$0 paid	1251	1	200	200
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>200</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	36709575
<b>Application Number:</b>	15858668
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	6421
<b>Title of Invention:</b>	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS
<b>First Named Inventor/Applicant Name:</b>	Gauthier RENARD
<b>Customer Number:</b>	23364
<b>Filer:</b>	Thomas J. Moore/Shelly Darrenkamp
<b>Filer Authorized By:</b>	Thomas J. Moore
<b>Attorney Docket Number:</b>	RENA3002/TJM/TL
<b>Receipt Date:</b>	29-JUL-2019
<b>Filing Date:</b>	29-DEC-2017
<b>Time Stamp:</b>	10:08:42
<b>Application Type:</b>	Utility under 35 USC 111(a)

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The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

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1		RENA3002_nfoa_amnd.pdf	72751	yes	16
			52c9f7b69626835dd52aeae7780b22569625167d		
<b>Multipart Description/PDF files in .zip description</b>					
<b>Document Description</b>			<b>Start</b>	<b>End</b>	
Amendment/Req. Reconsideration-After Non-Final Reject			1	2	
Specification			3	4	
Claims			5	9	
Applicant Arguments/Remarks Made in an Amendment			10	16	
<b>Warnings:</b>					
<b>Information:</b>					
2	Extension of Time	RENA3002_EOT_26JUL19.pdf	140994	no	2
			0f05655d02ed51aaa0a257ac169b22e780abdd9c		
<b>Warnings:</b>					
<b>Information:</b>					
3	Fee Worksheet (SB06)	fee-info.pdf	31117	no	2
			2316702ac8f7f433c705f060e966c670fd1d4486		
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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.**

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<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875	Application or Docket Number 15/858,668	Filing Date 12/29/2017	<input type="checkbox"/> To be Mailed
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ENTITY:  LARGE  SMALL  MICRO

**APPLICATION AS FILED - PART I**

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 = *		x \$80 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 = *		x \$420 =	
<input type="checkbox"/> 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).			
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

**APPLICATION AS AMENDED - PART II**

	(Column 1)		(Column 2)	(Column 3)	RATE (\$)	ADDITIONAL FEE (\$)
<b>AMENDMENT</b>	07/29/2019		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	
	Total (37 CFR 1.16(i))	*	20	Minus	** 20	= 0
	Independent (37 CFR 1.16(h))	*	3	Minus	*** 3	= 0
<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))						
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
TOTAL ADD'L FEE						0
	(Column 1)		(Column 2)	(Column 3)	RATE (\$)	ADDITIONAL FEE (\$)
<b>AMENDMENT</b>			CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	
	Total (37 CFR 1.16(i))	*		Minus	**	= 0
	Independent (37 CFR 1.16(h))	*		Minus	***	= 0
<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))						
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
TOTAL ADD'L FEE						

\* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. LIE

\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". /KIM R WATSON/

\*\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO. Includes application details for 15/858,668 and 23364 7590, listing inventor Gauthier RENARD, attorney RENA3002/TJM/TL, examiner MISIURA, BRIAN T, art unit 2185, and notification date 10/11/2019.

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



***Notice of Pre-AIA or AIA Status***

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

**Detailed Action**

***Response to Arguments***

Applicant's arguments with respect to claims 1-19 and 21 have been considered but are moot in view of the new ground(s) of rejection.

***Claim Interpretation***

The following is a quotation of 35 U.S.C. 112(f):

(f) Element in Claim for a Combination. – An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

The following is a quotation of pre-AIA 35 U.S.C. 112, sixth paragraph:

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

The claims in this application are given their broadest reasonable interpretation using the plain meaning of the claim language in light of the specification as it would be understood by one of ordinary skill in the art. The broadest reasonable interpretation of a claim element (also commonly referred to as a claim limitation) is limited by the description in the specification when 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, is invoked.

As explained in MPEP § 2181, subsection I, claim limitations that meet the following three-prong test will be interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph:

- (A) the claim limitation uses the term “means” or “step” or a term used as a substitute for “means” that is a generic placeholder (also called a nonce term or a non-

- structural term having no specific structural meaning) for performing the claimed function;
- (B) the term “means” or “step” or the generic placeholder is modified by functional language, typically, but not always linked by the transition word “for” (e.g., “means for”) or another linking word or phrase, such as “configured to” or “so that”; and
- (C) the term “means” or “step” or the generic placeholder is not modified by sufficient structure, material, or acts for performing the claimed function.

Use of the word “means” (or “step”) in a claim with functional language creates a rebuttable presumption that the claim limitation is to be treated in accordance with 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph. The presumption that the claim limitation is interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, is rebutted when the claim limitation recites sufficient structure, material, or acts to entirely perform the recited function.

Absence of the word “means” (or “step”) in a claim creates a rebuttable presumption that the claim limitation is not to be treated in accordance with 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph. The presumption that the claim limitation is not interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, is rebutted when the claim limitation recites function without reciting sufficient structure, material or acts to entirely perform the recited function.

Claim limitations in this application that use the word “means” (or “step”) are being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, except as otherwise indicated in an Office action. Conversely, claim limitations in this application that do not use the word “means” (or “step”) are not being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, except as otherwise indicated in an Office action.

- Claim 19 recites the term “means”, which is supported by lines 17-21 of the Specification as originally filed.

***Claim Rejections - 35 USC § 102***

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

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

A person shall be entitled to a patent unless –

(a)(1) the claimed invention was patented, described in a printed publication, or in public use, on sale or otherwise available to the public before the effective filing date of the claimed invention.

Claims 1-3, 7-12, 16-19, and 21 are rejected under 35 U.S.C. 102(a)(1) as being anticipated by **Christison** et al. U.S. Patent No. 7,761,627.

Per Claim 1, Christison discloses a system for connecting a processing device (**host 400**) to a functional device (**USB devices 421, 422, 431, 432**) connected to or in a base unit (**DWA 420/430**) of a communications network, the processing device having a memory, a display and an operating system (**Host 400 represents a personal computing device. Laptop and desktop computers are well known personal computing devices that comprise each of a memory, display, and an operating system.**), the system comprising: a first peripheral device (**HWA 410**) being adapted to be coupled to the processing device via a generic communications protocol (**Col. 4 lines 12-13**), the base unit having a transmitter (**Col. 4 lines 13-16**) and the first peripheral device having a receiver (**HWA 410 has a transceiver for communicating wirelessly with DWA.**) and at least one fixed or a configurable endpoint of the functional device exposed on the first peripheral device; were the at least one fixed or a configurable endpoint is a data source or a data sink which is able to store data of the functional device exposed or made available on the first peripheral device (**Col. 6 line 13 – Col. 7 line 35; Wired devices appear to the host as if they are native WUSB devices. Attached USB devices are presented as a separate function on an already existing device by using wired device endpoints mapped into WUSB hub**

**endpoints.);** the base unit and the first peripheral device being adapted to transmit and receive data respectively over the communications network from the functional device to the processing device via the at least one fixed or configurable endpoint using the generic communications protocol for communication between the processing device and the first peripheral device (**Figures 5-9 and their accompanying sections discuss the sequence of steps that occur in a communication between the wired USB device and the host device. Additionally, Col. 6 line 13 – Col. 7 line 35 outline the implementation of the USB device endpoints.**).

Per Claim 2, Christison discloses the system of claim 1 wherein the functional device is any one or more of a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a video camera, a webcam (Col. 1 lines 44-47).

Per Claim 3, Christison discloses the system of claim 1 wherein the at least one fixed or a configurable endpoint of the functional device exposed on the first peripheral device is one of a human interface device, a mass storage device, a composite device, a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a video camera, or a webcam (Col. 1 lines 44-47).

Per Claim 7, Christison discloses the system of claim 1 adapted to expose the same type of functional device to the processing device as is connected to the Base Unit further comprising at least one driver for the functional device installed on the processing device (Col. 4 lines 7-11).

Per Claim 8, Christison discloses the system of claim 1 wherein the functional device is a second peripheral device (Col. 1 lines 44-47).

Per Claim 9, Christison discloses the system of claim 1 wherein the functional device is a data capturing device (Col. 1 lines 44-47; **scanners, digital cameras**).

Per Claims 10-12 and 16, please refer to the above rejection of claims 1-3 and 7, as the limitations are substantially similar.

Per Claim 17, please refer to the above rejection of claim 1, as the limitations are substantially similar. Specifically, the peripheral device of claim 1, is taught by Christison's HWA 410.

Per Claim 18, Christison discloses the peripheral device of claim 17 wherein the at least one fixed or a configurable endpoint of the functional device exposed on the first peripheral device is one of a human interface device, a mass storage device, a composite device, a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a video camera, or a webcam (Col. 1 lines 44-47).

Per Claim 19, Christison discloses the teachings of claim 10 as a computer program product embodiment, including a non-transitory signal storage means (Col. 10 lines 32-46).

Per Claim 21, Christison discloses the peripheral device of claim 17 wherein the at least one fixed or configurable endpoint has one transfer direction (Col. 1 lines 44-47; **Each of the endpoints listed would comprise at least one transfer direction. Also, a device such as a mouse would comprise only a single transfer direction.**).

#### **Allowable Subject Matter**

Claims 4, 5, 13, and 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 6 and 15 inherit the allowable subject matter of Claims 5 and 14.

- Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRIAN T MISIURA whose telephone number is (571)272-0889. The examiner can normally be reached on M-F: 8-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tim Vo can be reached on (571) 272-36423642. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you



Application/Control Number: 15/858,668  
Art Unit: 2185

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have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Brian T Misiura/

Primary Examiner, Art Unit 2185

<b>Notice of References Cited</b>	Application/Control No. 15/858,668	Applicant(s)/Patent Under Reexamination RENARD et al.	
	Examiner BRIAN T MISIURA	Art Unit 2185	Page 1 of 1

**U.S. PATENT DOCUMENTS**

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-9934168-B2	04-2018	Griffin; Timothy E	G06F13/102	1/1
*	B	US-9804977-B2	10-2017	Ghosh; Atish	G06F1/266	1/1
*	C	US-9201826-B2	12-2015	Huang; Xiaolong	G06F13/385	1/1
*	D	US-9183164-B2	11-2015	Brabenac; Charles L.	G06F13/10	1/1
*	E	US-7761627-B2	07-2010	Christison; Gregory L.	G06F13/387	710/62
*	F	US-7617342-B2	11-2009	Rofougaran; Ahmadreza Reza	H01Q1/2275	235/492
*	G	US-20160092153-A1	03-2016	DeMik; Lisa Kay	G06F3/1454	434/309
	H					
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**FOREIGN PATENT DOCUMENTS**

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
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**NON-PATENT DOCUMENTS**

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
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	X	

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

<b>Search Notes</b> 	<b>Application/Control No.</b> 15/858,668	<b>Applicant(s)/Patent Under Reexamination</b> RENARD et al.
	<b>Examiner</b> BRIAN T MISIURA	<b>Art Unit</b> 2185

CPC - Searched*		
Symbol	Date	Examiner
H04M3/567	03/25/2019	BTM
H04L65/4038, 403		
H04L12/1813		
H04L12/18-1895	10/09/2019	BTM
H04M3/56-568		
H04L65/403-4061		

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

\* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
IDS Consideration, Inventor, NPL Database, CPC, and EAST Search	03/25/2019	BTM
IDS Consideration and updated CPC/EAST Search	10/09/2019	BTM

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

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

PTO/SB/08a (02-18)  
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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	15858668
	Filing Date	2017-12-29
	First Named Inventor	Gauthier RENARD
	Art Unit	2185
	Examiner Name	Brian Thomas Misiura
	Attorney Docket Number	RENA3002/TJM/TL

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	1	20060075100	A1	2006-04-06	Stirbu		
	2	20140148152	A1	2014-05-29	Periyalwar et al.		

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	1	1879143	EP	A2	2008-01-16	Bally Gaming Inc.		
	2	3099009	EP	A1	2016-11-30	Barco N.V.		

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		15858668
	Filing Date		2017-12-29
	First Named Inventor	Gauthier RENARD	
	Art Unit		2185
	Examiner Name	Brian Thomas Misiura	
	Attorney Docket Number		RENA3002/TJM/TL

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**NON-PATENT LITERATURE DOCUMENTS**

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 <sup>5</sup>
	1	International Search Report in corresponding PCT Application No. PCT/EP2018/086537, dated April 10, 2019.	
	2	Written Opinion in corresponding PCT Application No. PCT/EP2018/086537, dated April 10, 2019.	

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**EXAMINER SIGNATURE**

Examiner Signature	/BRIAN T MISIURA/	Date Considered	10/07/2019
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\*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.

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

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		15858668
	Filing Date		2017-12-29
	First Named Inventor	Gauthier RENARD	
	Art Unit		2185
	Examiner Name	Brian Thomas Misiura	
	Attorney Docket Number		RENA3002/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 Lee/	Date (YYYY-MM-DD)	2019-04-17
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 records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent 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.

## EAST Search History

## EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L2	2554	BYOD	US-PGPUB; USPAT; FPRS	ADJ	ON	2019/10/09 06:46
L4	1241	l2 and (meeting or conferenc\$3 or teleconferenc\$3 or collaborat\$3)	US-PGPUB; USPAT; FPRS	ADJ	ON	2019/10/09 06:52
L5	801	l4 and ((share\$1 or sharing) with (USB or peripheral\$1 or device))	US-PGPUB; USPAT; FPRS	ADJ	ON	2019/10/09 06:53
L6	165	l2 and (meeting or conferenc\$3 or teleconferenc\$3 or collaborat\$3) room	US-PGPUB; USPAT; FPRS	ADJ	ON	2019/10/09 06:55
S37	2	"20190205275"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/10/07 14:15
S38	19	(US-20150169477-\$ or US-20150089395-\$ or US-20100302130-\$ or US-20090198839-\$ or US-20150121466-\$ or US-20150263905-\$ or US-20130067121-\$ or US-20100115145-\$ or US-20140362161-\$ or US-20190205275-\$).did. or (US-7180475-\$ or US-8756348-\$ or US-8896656-\$ or US-8316138-\$ or US-9722986-\$ or US-9083769-\$ or US-9538138-\$).did. or (WO-2013037980-\$).did.	US-PGPUB; USPAT; FPRS	ADJ	ON	2019/10/07 14:15
S39	4	S38 and endpoint\$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/10/07 14:15
S40	1252	USB (HID or human interface (device or device class))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/10/07 14:48
S41	1289	(universal serial bus or USB) (HID or human interface (device or device class))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	ADJ	ON	2019/10/07 14:48



			IBM_TDB			
S42	307	(HID or human interface (device or device class)) (universal serial bus or USB)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/10/07 14:48
S43	12	(HID or human interface (device or device class)) endpoint\$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/10/07 14:49
S44	1436	S40 or S41 or S42	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/10/07 14:53
S45	6	S44 and barco	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/10/07 14:53
S46	6	("20060075100"   "20140148152").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/10/07 15:14
S48	29	"3099009"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/10/07 15:15
S49	70	(USB or universal serial bus) near3 middleware	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/10/08 10:06
S50	91	(wireless or bluetooth) (USB or universal serial bus) hub	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/10/08 10:19
S51	10	S50 and (meeting\$1 or conferenc\$3)	US-PGPUB; USPAT; USOCR; FPRS;	ADJ	ON	2019/10/08 10:24

			EPO; JPO; DERWENT; IBM_TDB			
S52	27	("20050278472"   "20060048196"   "20060061963"   "20060073788"   "20060143330"   "20060166621"   "20060179144"   "20060215574"   "20060218315"   "20070066314"   "20070204076"   "20070230500"   "20070286416"   "20080005395"   "20080025329"   "20090006676"   "20090172216"   "6725302"   "6944687"   "7334059"   "7502011"   "7526590"   "7574323").PN. OR ("7761627").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/10/08 10:28
S53	344	control (HID or human interface (device or device class))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/10/08 11:58
S54	46	S53 and (emulat\$3 or mirror\$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/10/08 12:00
S57	10	S50 and endpoint\$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/10/08 13:23
S59	426	(IN or OUT) endpoint same USB	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/10/08 13:32
S60	150	S59 and (conferenc\$3 or meeting or collaborat\$5)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/10/08 13:35
S64	53	clickshare	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/10/08 14:37
S67	419	Connected (classroom or (meeting or conference or board) room)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	ADJ	ON	2019/10/08 14:47

			DERWENT; IBM_TDB			
S68	53	S67 and (prox\$3 or emulat\$3 or endpoint\$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/10/08 14:47
S69	47	("20030098819"   "20050078172"   "20050135611"   "20050176416"   "20060160489"   "20060258300"   "20070287498"   "20090156120"   "20090328189"   "20100046455"   "20100115145"   "20100302454"   "20100321402"   "20110090942"   "20110134852"   "20120082069"   "20120083215"   "20120133727"   "20120202426"   "20120278192"   "20120300759"   "20130016079"   "20130029685"   "20130034184"   "20130044695"   "20130050398"   "20130070739"   "20130084796"   "20130094439"   "20150035938"   "7142812"   "7593704"   "7912449"   "7912506"   "7965837"   "8218427"   "8229352"   "8259647"   "8265657"   "8279784"   "8285223"   "8306483"   "8320877"   "8326221"   "8332495"   "8345577"   "8396042").PN. OR ("9538138").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/10/08 15:56
S74	116	(USB or universal serial bus) (sharing or device sharing)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2019/10/08 16:24
S77	4835	H04L65/4061.CPC.	US-PGPUB; USPAT; FPRS	ADJ	ON	2019/10/08 16:34
S78	74532	H04L12/18-1895.cpc. OR H04M3/56-568.cpc OR H04L65/403-4061.CPC.	US-PGPUB; USPAT; FPRS	ADJ	ON	2019/10/08 16:35
S79	21993	S78 AND (teleconference or conferenc\$3 or meeting)	US-PGPUB; USPAT; FPRS	ADJ	ON	2019/10/08 16:36
S80	153	S79 and (emulat\$3 with device)	US-PGPUB; USPAT; FPRS	ADJ	ON	2019/10/08 16:36
S81	159	S79 and (emulat\$3 with (USB or peripheral\$1 or device\$1))	US-PGPUB; USPAT; FPRS	ADJ	ON	2019/10/08 16:36
S82	3297	S79 and endpoint\$1	US-PGPUB; USPAT; FPRS	ADJ	ON	2019/10/08 16:37
S85	165	S78 AND ((expos\$3 or appear\$5) with nativ\$3)	US-PGPUB; USPAT; FPRS	ADJ	ON	2019/10/08 16:45
S86	1726	((expos\$3 or appear\$5) with nativ\$3 with	US-PGPUB;	ADJ	ON	2019/10/08

		(device\$1 or peripheral\$1))	USPAT; FPRS			16:50
S89	815	((expos\$3 or appear\$5) near5 nativ\$3 with (device\$1 or peripheral\$1))	US-PGPUB; USPAT; FPRS	ADJ	ON	2019/10/08 16:52
S90	195	S89 and (meeting or conferenc\$3 or teleconferenc\$3 or collaborat\$3)	US-PGPUB; USPAT; FPRS	ADJ	ON	2019/10/08 16:57
S91	929	appear\$4 near2 (direct\$2) near2 (connect\$3 or insert\$2)	US-PGPUB; USPAT; FPRS	ADJ	ON	2019/10/08 17:01
S93	267	appear\$5 near2 (direct\$2) near2 (connect\$3 or insert\$2) with (USB or device or peripheral)	US-PGPUB; USPAT; FPRS	ADJ	ON	2019/10/08 17:01

### EAST Search History (Interference)

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10/ 9/ 2019 9:34:51 AM

C:\Users\bmisiura\Documents\EAST\Workspaces\15858668.wsp

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.

<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875	Application or Docket Number 15/858,668	Filing Date 12/29/2017	<input type="checkbox"/> To be Mailed
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ENTITY:  LARGE  SMALL  MICRO

**APPLICATION AS FILED - PART I**

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 = *		x \$80 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 = *		x \$420 =	
<input type="checkbox"/> 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).			
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

**APPLICATION AS AMENDED - PART II**

		(Column 1)		(Column 2)	(Column 3)	RATE (\$)	ADDITIONAL FEE (\$)
<b>AMENDMENT</b>	01/15/2020	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		
	Total (37 CFR 1.16(i))	* 18	Minus	** 20	= 0	x \$ 100 =	0
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 3	= 0	x \$ 460 =	0
<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))							
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
						TOTAL ADD'L FEE	0
<b>AMENDMENT</b>		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		
	Total (37 CFR 1.16(i))	*	Minus	**	=	x \$ 0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x \$ 0 =	
<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))							
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
						TOTAL ADD'L FEE	
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.						LIE	
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".						/CAROL A BARNES/	
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".							
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.							

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**  
 If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

**CERTIFICATION AND REQUEST FOR CONSIDERATION UNDER THE  
AFTER FINAL CONSIDERATION PILOT PROGRAM 2.0**

Practitioner Docket No.: <b>RENA3002/TJM/TL</b>	Application No.: <b>15/858,668</b>	Filing Date: <b>December 29, 2017</b>
First Named Inventor: <b>Gauthier RENARD</b>	Title: METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS	
<p>APPLICANT HEREBY CERTIFIES THE FOLLOWING AND REQUESTS CONSIDERATION UNDER THE AFTER FINAL CONSIDERATION PILOT PROGRAM 2.0 (AFCP 2.0) OF THE ACCOMPANYING RESPONSE UNDER 37 CFR 1.116.</p> <ol style="list-style-type: none"> <li>1. The above-identified application is (i) an original utility, plant, or design nonprovisional application filed under 35 U.S.C. 111(a) [a continuing application (<i>e.g.</i>, a continuation or divisional application) is filed under 35 U.S.C. 111(a) and is eligible under (i)], or (ii) an international application that has entered the national stage in compliance with 35 U.S.C. 371(c).</li> <li>2. The above-identified application contains an outstanding final rejection.</li> <li>3. Submitted herewith is a response under 37 CFR 1.116 to the outstanding final rejection. The response includes an amendment to at least one independent claim, and the amendment does not broaden the scope of the independent claim in any aspect.</li> <li>4. This certification and request for consideration under AFCP 2.0 is the only AFCP 2.0 certification and request filed in response to the outstanding final rejection.</li> <li>5. Applicant is willing and available to participate in any interview requested by the examiner concerning the present response.</li> <li>6. This certification and request is being filed electronically using the Office's electronic filing system (EFS-Web).</li> <li>7. Any fees that would be necessary consistent with current practice concerning responses after final rejection under 37 CFR 1.116, <i>e.g.</i>, extension of time fees, are being concurrently filed herewith. [There is no additional fee required to request consideration under AFCP 2.0.]</li> <li>8. By filing this certification and request, applicant acknowledges the following: <ul style="list-style-type: none"> <li>• Reissue applications and reexamination proceedings are not eligible to participate in AFCP 2.0.</li> <li>• The examiner will verify that the AFCP 2.0 submission is compliant, <i>i.e.</i>, that the requirements of the program have been met (see items 1 to 7 above). For compliant submissions: <ul style="list-style-type: none"> <li>○ The examiner will review the response under 37 CFR 1.116 to determine if additional search and/or consideration (i) is necessitated by the amendment and (ii) could be completed within the time allotted under AFCP 2.0. If additional search and/or consideration is required but cannot be completed within the allotted time, the examiner will process the submission consistent with current practice concerning responses after final rejection under 37 CFR 1.116, <i>e.g.</i>, by mailing an advisory action.</li> <li>○ If the examiner determines that the amendment does not necessitate additional search and/or consideration, or if the examiner determines that additional search and/or consideration is required and could be completed within the allotted time, then the examiner will consider whether the amendment places the application in condition for allowance (after completing the additional search and/or consideration, if required). If the examiner determines that the amendment does not place the application in condition for allowance, then the examiner will contact the applicant and request an interview. <ul style="list-style-type: none"> <li>▪ The interview will be conducted by the examiner, and if the examiner does not have negotiation authority, a primary examiner and/or supervisory patent examiner will also participate.</li> <li>▪ If the applicant declines the interview, or if the interview cannot be scheduled within ten (10) calendar days from the date that the examiner first contacts the applicant, then the examiner will proceed consistent with current practice concerning responses after final rejection under 37 CFR 1.116.</li> </ul> </li> </ul> </li> </ul> </li> </ol>		
Signature /Thomas Lee/	Date <b>January 15, 2020</b>	
Name (Print/Typed) <b>THOMAS LEE</b>	Practitioner Registration No. <b>66396</b>	
<p><b>Note:</b> This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.</p>		
<input type="checkbox"/> * Total of _____ forms are submitted.		

## 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.

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.

<b>PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)</b>		Docket Number (Optional) RENA3002/TJM/TL
Application Number <b>15/858,668</b>	Filed <b>December 29, 2017</b>	
For <b>METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS</b>		
Art Unit <b>2185</b>	Examiner <b>Brian T. Misiura</b>	

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	
<input checked="" type="checkbox"/> One month (37 CFR 1.17(a)(1))	\$200	\$100	\$50	\$ <u>200</u>
<input type="checkbox"/> Two months (37 CFR 1.17(a)(2))	\$600	\$300	\$150	\$ _____
<input type="checkbox"/> Three months (37 CFR 1.17(a)(3))	\$1,400	\$700	\$350	\$ _____
<input type="checkbox"/> Four months (37 CFR 1.17(a)(4))	\$2,200	\$1,100	\$550	\$ _____
<input type="checkbox"/> Five months (37 CFR 1.17(a)(5))	\$3,000	\$1,500	\$750	\$ _____

 Applicant asserts small entity status. See 37 CFR 1.27. Applicant certifies micro entity status. See 37 CFR 1.29.  
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously. 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 020200 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 66396 attorney or agent acting under 37 CFR 1.34. Registration number \_\_\_\_\_/Thomas Lee/

Signature

January 15, 2020

Date

THOMAS LEE

Typed or printed name

703-683-0500

Telephone Number

**NOTE:** This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below\*. \* 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.



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

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
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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.

REMARKS

Reconsideration of the pending application is respectfully requested on the basis of the following particulars.

1. Claim Amendments

Claim 1 is amended to include the allowable subject matter of claim 5. Applicant notes that the term “further” has not been included to clarify the claimed features as supported by the specification.

It is respectfully submitted that no new matter is added, since support for the amendment may be found, for example, at least in Figs. 8-11 and, for example, at least on page 3, lines 14-19 and page 11, lines 6-9 of the specification as originally filed.

Claim 10 is amended to include the allowable subject matter of claim 14.

Claim 17 is amended to recite similar features as recited in amended claim 1.

Claims 6 and 15 are amended to change their dependency from cancelled claims.

Claims 5 and 14 are cancelled without prejudice or disclaimer.

Claims 2-4, 7-9, 11-13, 16, 18-19, and 21 are left unchanged.

2. Certification under 37 C.F.R. § 116

Applicant submits that consideration of the amendments to the claims is proper under 37 C.F.R. 116 and under the U.S. PTO’s After Final Consideration Pilot 2.0 (AFCP) program since the changes to the claims do not broaden the scope of the claims but are made to place the application in condition for allowance. Additionally, Applicant is willing to conduct an interview to discuss any proposed amendments with the Examiner to expedite the prosecution of this application. Applicant currently submits PTO/SB/434 to have the pending application considered for the AFCP program.

3. Allowable Subject Matter

Applicant is gratefully appreciative of the indication that claims 4, 5, 6, 13, 14, and 15 recite allowable subject matter and would be allowable if rewritten in independent form

including all of the limitations of the base claim and any intervening claims. Accordingly, independent claims 1, 10, and 17 have been amended to include the allowable subject matter.

4. Rejection of claims 1-3, 7-12, 16-19, and 21 under 35 U.S.C. § 102(a)(1) as being anticipated by U.S. patent 7,761,627 (*Christison*)

This rejection is moot in view of the amendments to claims 1, 10, and 17 to include the allowable subject matter of claims 5 and 14, respectively.

Accordingly, withdrawal of this rejection is respectfully requested.

5. Conclusion

As a result of the amendments to the claims and further in view of the foregoing remarks, it is respectfully submitted that the application is in condition for allowance. Accordingly, it is requested that the currently presented claims be approved and the application passed to issue.

Please charge any additional fees required or credit any overpayments in connection with this paper to Deposit Account No. 02-0200.

If any issues remain that may be resolved by a telephone or facsimile communication with the applicant's attorney, the examiner is invited to contact the undersigned at the numbers shown below.

BACON & THOMAS, PLLC  
625 Slaters Lane, Fourth Floor  
Alexandria, Virginia 22314-1176  
Phone: (703) 683-0500  
Facsimile: (703) 683-1080  
Email: mail@baconthomas.com

Date: January 15, 2020

Respectfully submitted,

/Thomas Lee/

THOMAS LEE  
Attorney for Applicant  
Registration No. 66,396

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	15858668			
<b>Filing Date:</b>	29-Dec-2017			
<b>Title of Invention:</b>	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS			
<b>First Named Inventor/Applicant Name:</b>	Gauthier RENARD			
<b>Filer:</b>	Thomas Lee			
<b>Attorney Docket Number:</b>	RENA3002/TJM/TL			
Filed as Large Entity				
<b>Filing Fees for Utility under 35 USC 111(a)</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension - 1 month with \$0 paid	1251	1	200	200
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>200</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	38305654
<b>Application Number:</b>	15858668
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	6421
<b>Title of Invention:</b>	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS
<b>First Named Inventor/Applicant Name:</b>	Gauthier RENARD
<b>Customer Number:</b>	23364
<b>Filer:</b>	Thomas Lee
<b>Filer Authorized By:</b>	
<b>Attorney Docket Number:</b>	RENA3002/TJM/TL
<b>Receipt Date:</b>	15-JAN-2020
<b>Filing Date:</b>	29-DEC-2017
<b>Time Stamp:</b>	16:20:43
<b>Application Type:</b>	Utility under 35 USC 111(a)

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The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

<b>File Listing:</b>					
<b>Document Number</b>	<b>Document Description</b>	<b>File Name</b>	<b>File Size(Bytes)/ Message Digest</b>	<b>Multi Part /.zip</b>	<b>Pages (if appl.)</b>
1	After Final Consideration Program Request	RENA3002_AFCP_15JAN20.pdf	226149 f314d385045211618bc415879eb91db2706e311a	no	2
<b>Warnings:</b>					
<b>Information:</b>					
2	Extension of Time	RENA3002_EOT_15JAN20.pdf	140958 8622d25bb70c1870f95f400a74341be3fadfffo	no	2
<b>Warnings:</b>					
<b>Information:</b>					
3		RENA3002_foa_116_afcp_amnd_15JAN20.pdf	165710 a930814081b25021e5bf3e601d2f203989d974ec	yes	9
	<b>Multipart Description/PDF files in .zip description</b>				
	<b>Document Description</b>		<b>Start</b>	<b>End</b>	
	Applicant Arguments/Remarks Made in an Amendment		8	9	
	Claims		3	7	
	Response After Final Action		1	2	
<b>Warnings:</b>					
<b>Information:</b>					
4	Fee Worksheet (SB06)	fee-info.pdf	31010 e989ca6f55df81f17c8f6eeaed68fedc2cd7ca243	no	2
<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>			563827		

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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.**



**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

**In re Application of:**

<b>Application No.:</b>	15/858,668	<b>Confirm. No.:</b>	6421
<b>Filing Date:</b>	December 29, 2017	<b>Art Unit:</b>	2185
<b>First Inventor:</b>	Gauthier RENARD	<b>Customer No.:</b>	23364
<b>Attorney No.:</b>	RENA3002/TJM/TL	<b>Examiner:</b>	Brian T. Misiura
<b>For:</b>	<b>METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS</b>		

**REPLY UNDER 37 C.F.R. § 1.116 TO OFFICE ACTION  
OF OCTOBER 11, 2019**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

**INTRODUCTORY COMMENTS**

This is responsive to the Office Action dated October 11, 2019 in the above application, where claims 1-3, 7-12, 16-19, and 21 are finally rejected. Applicant currently files herewith PTO/SB/434 for consideration of the pending application in the U.S. PTO's After Final Consideration Program 2.0.

In view of the following amendments and remarks, reconsideration of the application is respectfully requested.

A petition and appropriate fee to extend the period of reply by one month are concurrently filed herewith.

AMENDMENT

Please amend the pending application in accordance with the following particulars.

In the Claims

The claims are amended as shown on the following pages under the heading LIST OF CURRENT CLAIMS. The list shows the status of all claims presently in the application and is intended to supersede all prior versions of the claims in the application. Any cancellation of claims is made without prejudice or disclaimer.

LIST OF CURRENT CLAIMS

1. (Currently Amended) A system for connecting a processing device to a functional device connected to or in a base unit of a communications network, the processing device having a memory, a display and an operating system, the system comprising:

a first peripheral device being adapted to be coupled to the processing device via a generic communications protocol,

the base unit having a transmitter and the first peripheral device having a receiver and at least one fixed or a configurable endpoint, where the at least one fixed or a configurable endpoint is a data source or a data sink which is able to store data, of the functional device exposed or made available on the first peripheral device;

the base unit and the first peripheral device being adapted to transmit and receive data respectively over the communications network from the functional device to the processing device via the at least one fixed or configurable endpoint using the generic communications protocol for communication between the processing device and the first peripheral device,

wherein the processing device is adapted to host a unified communication between two or more processing devices.

2. (Original) The system of claim 1 wherein the functional device is any one or more of a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a video camera, a webcam.

3. (Original) The system of claim 1 wherein the at least one fixed or a configurable endpoint of the functional device exposed on the first peripheral device is one of a human interface device, a mass storage device, a composite device, a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a video camera, or a webcam.

4. (Original) The system of claim 1 further comprising means for encoding, optionally encrypting the data.
5. (Cancelled)
6. (Currently Amended) The system of claim [[5]] 1, wherein the first peripheral device is adapted to present a functional device to the unified communication between two or more processing devices.
7. (Original) The system of claim 1 adapted to expose the same type of functional device to the processing device as is connected to the Base Unit further comprising at least one driver for the functional device installed on the processing device.
8. (Original) The system of claim 1 wherein the functional device is a second peripheral device.
9. (Original) The system of claim 1 wherein the functional device is a data capturing device.
10. (Currently Amended) A method for connecting a processing device to a functional device connected to or in a base unit of a communications network, the processing device having a memory, a display and an operating system, the base unit having a transmitter and the first peripheral device having a receiver the method comprising:
  - coupling a first peripheral device to the processing device via a generic communications protocol,
  - providing at least one fixed or a configurable endpoint, where the at least one fixed or a configurable endpoint is a data source or a data sink which is able to store data, of the functional device exposed or made available on the first peripheral device;

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

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

11. (Original) The method of claim 10 wherein the functional device provides any one or more of a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a video camera, a webcam.

12. (Original) The method of claim 10 further comprising presenting the at least one fixed or a configurable endpoint of the functional device exposed on the first peripheral device as one of a human interface device, a mass storage device, a composite device, a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a video camera, or a webcam.

13. (Original) The method of claim 10 further comprising encoding, and/or optionally encrypting the data.

14. (Cancelled)

15. (Currently Amended) The method of claim ~~[[14]]~~ 10, further comprising the first peripheral device presenting a functional device to the unified communication between two or more processing devices.

16. (Original) The method of claim 10 comprising exposing the same type of functional device to the processing device as is connected to the Base Unit and using at least one driver for the functional device installed on the processing device.

17. (Currently Amended) A peripheral device adapted to be coupled to a processing device via a generic communications protocol, the peripheral device having a receiver and at least one fixed or a configurable endpoint, where the at least one fixed or a configurable endpoint is a data source or a data sink which is able to store data, of a functional device exposed or made available on the first peripheral device;

the receiver of the first peripheral device being adapted to receive data over the communications network from the functional device and for sending the data to the processing device via the at least one fixed or configurable endpoint using the generic communications protocol for communication between the processing device and the peripheral device,

wherein the peripheral device is configured to present the processing device to host a unified communication between two or more processing devices.

18. (Original) The peripheral device of claim 17 wherein the at least one fixed or a configurable endpoint of the functional device exposed on the first peripheral device is one of a human interface device, a mass storage device, a composite device, a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a video camera, or a webcam.

19. (Previously Presented) A computer program product comprising a non-transitory signal storage means for storing computer program instructions that, when executed on a processor, carry out any of the methods steps of claim 10.

20. (Cancelled)

21. (Previously Presented) The peripheral device of claim 17 wherein the at least one fixed or configurable endpoint has one transfer direction.



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NOTICE OF ALLOWANCE AND FEE(S) DUE

23364 7590 01/29/2020
BACON & THOMAS, PLLC
625 SLATERS LANE
FOURTH FLOOR
ALEXANDRIA, VA 22314-1176

Table with 2 columns: EXAMINER (MISIURA, BRIAN THOMAS), ART UNIT (2185), PAPER NUMBER (6421)

DATE MAILED: 01/29/2020

Table with 5 columns: APPLICATION NO. (15/858,668), FILING DATE (12/29/2017), FIRST NAMED INVENTOR (Gauthier RENARD), ATTORNEY DOCKET NO. (RENA3002/TJM/TL), CONFIRMATION NO. (6421)

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

Table with 7 columns: APPLN. TYPE (nonprovisional), ENTITY STATUS (UNDISCOUNTED), ISSUE FEE DUE (\$1000), PUBLICATION FEE DUE (\$0.00), PREV. PAID ISSUE FEE (\$0.00), TOTAL FEE(S) DUE (\$1000), DATE DUE (04/29/2020)

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

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III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.



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 Alexandria, Virginia 22313-1450

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(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/858,668	12/29/2017	Gauthier RENARD	RENA3002/TJM/TL	6421

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

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1000	\$0.00	\$0.00	\$1000	04/29/2020

EXAMINER	ART UNIT	CLASS-SUBCLASS
MISIURA, BRIAN THOMAS	2185	710-011000

<p>1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).</p> <p><input type="checkbox"/> Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.</p> <p><input type="checkbox"/> "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. <b>Use of a Customer Number is required.</b></p>	<p>2. For printing on the patent front page, list</p> <p>(1) The names of up to 3 registered patent attorneys or agents OR, alternatively, _____ 1</p> <p>(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. _____ 2</p> <p>_____ 3</p>
---	---

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE \_\_\_\_\_ (B) RESIDENCE: (CITY and STATE OR COUNTRY) \_\_\_\_\_

Please check the appropriate assignee category or categories (will not be printed on the patent) :  Individual  Corporation or other private group entity  Government

4a. Fees submitted:  Issue Fee  Publication Fee (if required)  Advance Order - # of Copies \_\_\_\_\_

4b. Method of Payment: (Please first reapply any previously paid fee shown above)

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The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. \_\_\_\_\_

5. Change in Entity Status (from status indicated above)

Applicant certifying micro entity status. See 37 CFR 1.29

Applicant asserting small entity status. See 37 CFR 1.27

Applicant changing to regular undiscounted fee status.

**NOTE:** Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

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**NOTE:** Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

**NOTE:** This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature \_\_\_\_\_ Date \_\_\_\_\_

Typed or printed name \_\_\_\_\_ Registration No. \_\_\_\_\_



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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
Row 1: 15/858,668, 12/29/2017, Gauthier RENARD, RENA3002/TJM/TL, 6421
Row 2: 23364, 7590, 01/29/2020, BACON & THOMAS, PLLC, 625 SLATERS LANE, FOURTH FLOOR, ALEXANDRIA, VA 22314-1176
Row 3: EXAMINER, MISIURA, BRIAN THOMAS
Row 4: ART UNIT, PAPER NUMBER, 2185

DATE MAILED: 01/29/2020

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

## OMB Clearance and PRA Burden Statement for PTOL-85 Part B

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The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

### Privacy Act Statement

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

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

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

**Notice of Allowability**

<b>Application No.</b> 15/858,668	<b>Applicant(s)</b> RENARD et al.	
<b>Examiner</b> BRIAN T MISIURA	<b>Art Unit</b> 2185	<b>AIA (FITF) Status</b> Yes

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

- 1.  This communication is responsive to 1/15/2020.  
 A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on \_\_\_\_\_.
- 2.  An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_\_; the restriction requirement and election have been incorporated into this action.
- 3.  The allowed claim(s) is/are See Continuation Sheet. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/pph/index.jsp](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to **PPHfeedback@uspto.gov**.
- 4.  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
**Certified copies:**
  - a)  All      b)  Some      \*c)  None of the:
    - 1.  Certified copies of the priority documents have been received.
    - 2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    - 3.  Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**


- 5.  CORRECTED DRAWINGS (as "replacement sheets") must be submitted.  
 including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.  
**Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
- 6.  DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- 1.  Notice of References Cited (PTO-892)
- 2.  Information Disclosure Statements (PTO/SB/08),  
Paper No./Mail Date \_\_\_\_\_.
- 3.  Examiner's Comment Regarding Requirement for Deposit  
of Biological Material \_\_\_\_\_.
- 4.  Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_.
- 5.  Examiner's Amendment/Comment
- 6.  Examiner's Statement of Reasons for Allowance
- 7.  Other PTO-2323.

/BRIAN T MISIURA/  
Primary Examiner, Art Unit 2185

Continuation of 3. The allowed claim(s) is/are: 1-4,6-13,15-19 and 21

<b>Search Notes</b> 	<b>Application/Control No.</b> 15/858,668	<b>Applicant(s)/Patent Under Reexamination</b> RENARD et al.
	<b>Examiner</b> BRIAN T MISIURA	<b>Art Unit</b> 2185

<b>CPC - Searched*</b>		
<b>Symbol</b>	<b>Date</b>	<b>Examiner</b>
H04M3/567	03/25/2019	BTM
H04L65/4038, 403		
H04L12/1813		
H04L12/18-1895	10/09/2019	BTM
H04M3/56-568		
H04L65/403-4061		


<b>CPC Combination Sets - Searched*</b>		
<b>Symbol</b>	<b>Date</b>	<b>Examiner</b>

<b>US Classification - Searched*</b>			
<b>Class</b>	<b>Subclass</b>	<b>Date</b>	<b>Examiner</b>

\* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.


<b>Search Notes</b>		
<b>Search Notes</b>	<b>Date</b>	<b>Examiner</b>
IDS Consideration, Inventor, NPL Database, CPC, and EAST Search	03/25/2019	BTM
IDS Consideration and updated CPC/EAST Search	10/09/2019	BTM
Update EAST and Interference Search	01/21/2020	BTM

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<b><i>Search Notes</i></b> 	<b>Application/Control No.</b> 15/858,668	<b>Applicant(s)/Patent Under Reexamination</b> RENARD et al.
	<b>Examiner</b> BRIAN T MISIURA	<b>Art Unit</b> 2185

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
H04L12	18-1895	01/21/2020	BTM
H04M3	56-568	01/21/2020	BTM
H04L65	403-4061	01/21/2020	BTM

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<b>Issue Classification</b> 	<b>Application/Control No.</b> 15/858,668	<b>Applicant(s)/Patent Under Reexamination</b> RENARD et al.
	<b>Examiner</b> BRIAN T MISIURA	<b>Art Unit</b> 2185

CPC						
Symbol					Type	Version
G06F	/	13	/	387	F	2013-01-01
H04L	/	12	/	12	I	2013-01-01
G06F	/	13	/	122	I	2013-01-01
G06F	/	13	/	4282	I	2013-01-01
H04L	/	63	/	0428	I	2013-01-01

CPC Combination Sets				
Symbol	Type	Set	Ranking	Version
/	/			

NONE	<b>Total Claims Allowed:</b>	
(Assistant Examiner)	(Date)	18
/BRIAN T MISIURA/ Primary Examiner, Art Unit 2185	21 January 2020	O.G. Print Claim(s)   O.G. Print Figure
(Primary Examiner)	(Date)	1   5



<b><i>Issue Classification</i></b> 	<b>Application/Control No.</b> 15/858,668	<b>Applicant(s)/Patent Under Reexamination</b> RENARD et al.
	<b>Examiner</b> BRIAN T MISIURA	<b>Art Unit</b> 2185


<b>INTERNATIONAL CLASSIFICATION</b>			
<b>CLAIMED</b>			
G06F13/38		13	38

<b>NON-CLAIMED</b>			

<b>US ORIGINAL CLASSIFICATION</b>	
<b>CLASS</b>	<b>SUBCLASS</b>

<b>CROSS REFERENCES(S)</b>						
<b>CLASS</b>	<b>SUBCLASS (ONE SUBCLASS PER BLOCK)</b>					

NONE		<b>Total Claims Allowed:</b>	
(Assistant Examiner)	(Date)	18	
/BRIAN T MISIURA/ Primary Examiner, Art Unit 2185	21 January 2020	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	5

<b>Issue Classification</b> 	<b>Application/Control No.</b> 15/858,668	<b>Applicant(s)/Patent Under Reexamination</b> RENARD et al.
	<b>Examiner</b> BRIAN T MISIURA	<b>Art Unit</b> 2185

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

CLAIMS															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	9	10	17	19										
2	2	10	11		20										
3	3	11	12	18	21										
4	4	12	13												
	5		14												
5	6	13	15												
6	7	14	16												
7	8	15	17												
8	9	16	18												

NONE			<b>Total Claims Allowed:</b>
(Assistant Examiner)	(Date)		18
/BRIAN T MISIURA/ Primary Examiner, Art Unit 2185	21 January 2020		O.G. Print Claim(s)
(Primary Examiner)	(Date)		O.G. Print Figure
			1
			5

# AFCP 2.0 Decision

**Application No.**

15/858,668

**Applicant(s)**

RENARD et al.

**Examiner**

BRIAN T MISIURA

**Art Unit**

2185

**AIA (FITF) Status**

Yes

This is in response to the After Final Consideration Pilot request filed 15 January 2020.

1. **Improper Request** – The AFCP 2.0 request is improper for the following reason(s) and the after final amendment submitted with the request will be treated under pre-pilot procedure.

- An AFCP 2.0 request form PTO/SB/434 (or equivalent document) was not submitted.
- A non-broadening amendment to at least one independent claim was not submitted.
- The request is not the first proper AFCP 2.0 request submitted in response to the most recent final rejection.
- Other: \_\_\_\_\_

2. **Proper Request**

A. After final amendment submitted with the request will not be treated under AFCP 2.0.

The after final amendment cannot be reviewed and a search conducted within the guidelines of the pilot program.

- The after final amendment will be treated under pre-pilot procedure.

B. Updated search and/or completed additional consideration.

The examiner performed an updated search and/or completed additional consideration of the after final amendment within the time authorized for the pilot program. The result(s) of the updated search and/or completed additional consideration are:

- 1. All of the rejections in the most recent final Office action are overcome and a Notice of Allowance is issued herewith.
- 2. The after final amendment would not overcome all of the rejections in the most recent final Office action. See attached interview summary for further details.
- 3. The after final amendment was reviewed, and it raises a new issue(s). See attached interview summary for further details.
- 4. The after final amendment raises new issues, but would overcome all of the rejections in the most recent final Office action. A decision on determining allowability could not be made within the guidelines of the pilot. See attached interview summary for further details, including any newly discovered prior art.
- 5. Other: \_\_\_\_\_

Examiner Note: Please attach an interview summary when necessary as described above.

## Bibliographic Data

Application No: 15/858,668

Foreign Priority claimed:  Yes  No

35 USC 119 (a-d) conditions met:  Yes  No  Met After Allowance

Verified and Acknowledged: /BRIAN T MISIURA/

Examiner's Signature

Initials

Title:

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

---

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
12/29/2017	710	2185	RENA3002/TJM/TL
<b>RULE</b>			

### APPLICANTS

BARCO NV, Kortrijk, BELGIUM

### INVENTORS

Gauthier RENARD Oudenaarde, BELGIUM

Johan Peter Frans DEGRAEF Gent, BELGIUM

### CONTINUING DATA

### FOREIGN APPLICATIONS

### IF REQUIRED, FOREIGN LICENSE GRANTED\*\*

01/24/2018

### STATE OR COUNTRY

BELGIUM

### ADDRESS

BACON & THOMAS, PLLC

625 SLATERS LANE

FOURTH FLOOR

ALEXANDRIA, VA 22314-1176

UNITED STATES

### FILING FEE RECEIVED

\$1,740

## EAST Search History

## EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L7	92	(wireless or bluetooth) (USB or universal serial bus) hub	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/01/21 15:24
L9	11	l7 and (meeting or conferenc\$3 or teleconferenc\$3 or collaborat\$3 or unified)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/01/21 15:25
L10	1	l7 and (skype or facetime)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/01/21 15:27
L14	163	unified (meeting or conferenc\$3 or teleconferenc\$3 or collaborat\$3 communication)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/01/21 15:40

## EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L8	35517	H04L12/18-1895.cpc. OR H04M3/56-568.cpc OR H04L65/403-4061.CPC.	US-PGPUB; USPAT	ADJ	ON	2020/01/21 15:25
L12	55	(wireless or bluetooth) (USB or universal serial bus) hub	US-PGPUB; USPAT	ADJ	ON	2020/01/21 15:40
L16	4126	unified (meeting or conferenc\$3 or teleconferenc\$3 or collaborat\$3 or communication)	US-PGPUB; USPAT	ADJ	ON	2020/01/21 15:41
L19	469	l8 and l16	US-PGPUB; USPAT	ADJ	ON	2020/01/21 15:44

1/21/2020 3:55:52 PM

C:\Users\bmisiura\Documents\EAST\Workspaces\15858668.wsp

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

**In re Application of:**

<b>Application No.:</b>	15/858,668	<b>Confirm. No.:</b>	6421
<b>Filing Date:</b>	December 29, 2017	<b>Art Unit:</b>	2185
<b>First Inventor:</b>	Gauthier RENARD	<b>Customer No.:</b>	23364
<b>Attorney No.:</b>	RENA3002/TJM/TL	<b>Examiner:</b>	Brian T. Misiura
<b>For:</b>	<b>METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS</b>		

**REPLY UNDER 37 C.F.R. § 1.116 TO OFFICE ACTION  
OF OCTOBER 11, 2019**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

**INTRODUCTORY COMMENTS**

This is responsive to the Office Action dated October 11, 2019 in the above application, where claims 1-3, 7-12, 16-19, and 21 are finally rejected. Applicant currently files herewith PTO/SB/434 for consideration of the pending application in the U.S. PTO's After Final Consideration Program 2.0.

In view of the following amendments and remarks, reconsideration of the application is respectfully requested.

A petition and appropriate fee to extend the period of reply by one month are concurrently filed herewith.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

<b>Application No.:</b>	15/858,668	<b>Confirm. No.:</b>	6421
<b>Filing Date:</b>	December 29, 2017	<b>Art Unit:</b>	2185
<b>First Inventor:</b>	Gauthier RENARD	<b>Customer No.:</b>	23364
<b>Attorney No.:</b>	RENA3002/TJM/TL	<b>Examiner:</b>	Brian T. Misiura
<b>Applicant:</b>	BARCO NV		
<b>For:</b>	<b>METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS</b>		

**AMENDMENT AFTER NOTICE OF ALLOWANCE**  
**(37 C.F.R. § 1.312)**

Mail Stop Issue Fee  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

**INTRODUCTORY COMMENTS**

Please amend this application in accordance with the following particular under 37 C.F.R. § 1.312, where the claims are amended.

**AMENDMENT**

Please amend the pending application in accordance with the following particulars.

**In the Claims**

The claims are amended as shown on the following pages under the heading LIST OF CURRENT CLAIMS. The list shows the status of all claims presently in the application and is intended to supersede all prior versions of the claims in the application. Any cancellation of claims is made without prejudice or disclaimer.

LIST OF CURRENT CLAIMS

1. (Currently Amended) A system for connecting a processing device to a functional device connected to or in a base unit of a communications network, the processing device having a memory, a display and an operating system, the system comprising:

a first peripheral device being adapted to be coupled to the processing device via a generic communications protocol,

the base unit having a transmitter and the first peripheral device having a receiver and at least one fixed or a configurable endpoint, where the at least one fixed or a configurable endpoint is a data source or a data sink which is able to store or emit data, of the functional device exposed or made available on the first peripheral device;

the base unit and the first peripheral device being adapted to transmit and receive data respectively over the communications network from the functional device to the processing device via the at least one fixed or configurable endpoint using the generic communications protocol for communication between the processing device and the first peripheral device,

wherein the processing device is adapted to host a unified communication between two or more processing devices.

2. (Original) The system of claim 1 wherein the functional device is any one or more of a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a video camera, a webcam.

3. (Original) The system of claim 1 wherein the at least one fixed or a configurable endpoint of the functional device exposed on the first peripheral device is one of a human interface device, a mass storage device, a composite device, a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a video camera, or a webcam.



4. (Original) The system of claim 1 further comprising means for encoding, optionally encrypting the data.
5. (Cancelled)
6. (Previously Presented) The system of claim 1, wherein the first peripheral device is adapted to present a functional device to the unified communication between two or more processing devices.
7. (Original) The system of claim 1 adapted to expose the same type of functional device to the processing device as is connected to the Base Unit further comprising at least one driver for the functional device installed on the processing device.
8. (Original) The system of claim 1 wherein the functional device is a second peripheral device.
9. (Original) The system of claim 1 wherein the functional device is a data capturing device.
10. (Currently Amended) A method for connecting a processing device to a functional device connected to or in a base unit of a communications network, the processing device having a memory, a display and an operating system, the base unit having a transmitter and the first peripheral device having a receiver the method comprising:
  - coupling a first peripheral device to the processing device via a generic communications protocol,
  - providing at least one fixed or a configurable endpoint, where the at least one fixed or a configurable endpoint is a data source or a data sink which is able to store or emit data, of the functional device exposed or made available on the first peripheral device;

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

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

11. (Original) The method of claim 10 wherein the functional device provides any one or more of a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a video camera, a webcamera.

12. (Original) The method of claim 10 further comprising presenting the at least one fixed or a configurable endpoint of the functional device exposed on the first peripheral device as one of a human interface device, a mass storage device, a composite device, a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a video camera, or a webcamera.

13. (Original) The method of claim 10 further comprising encoding, and/or optionally encrypting the data.

14. (Cancelled)

15. (Previously Presented) The method of claim 10, further comprising the first peripheral device presenting a functional device to the unified communication between two or more processing devices.

16. (Original) The method of claim 10 comprising exposing the same type of functional device to the processing device as is connected to the Base Unit and using at least one driver for the functional device installed on the processing device.

17. (Currently Amended) A peripheral device adapted to be coupled to a processing device via a generic communications protocol, the peripheral device having a receiver and at least one fixed or a configurable endpoint, where the at least one fixed or a configurable endpoint is a data source or a data sink which is able to store or emit data, of a functional device exposed or made available on the first peripheral device;

the receiver of the first peripheral device being adapted to receive data over the communications network from the functional device and for sending the data to the processing device via the at least one fixed or configurable endpoint using the generic communications protocol for communication between the processing device and the peripheral device,

wherein the peripheral device is configured to present the processing device to host a unified communication between two or more processing devices.

18. (Original) The peripheral device of claim 17 wherein the at least one fixed or a configurable endpoint of the functional device exposed on the first peripheral device is one of a human interface device, a mass storage device, a composite device, a microphone, a speakerphone, a speaker, a display, a touchscreen, a projector, a camera, a video camera, or a webcam.

19. (Previously Presented) A computer program product comprising a non-transitory signal storage means for storing computer program instructions that, when executed on a processor, carry out any of the methods steps of claim 10.

20. (Cancelled)

21. (Previously Presented) The peripheral device of claim 17 wherein the at least one fixed or configurable endpoint has one transfer direction.

REMARKS

Reconsideration of the pending application is respectfully requested on the basis of the following particulars.

1. Amendment to the claims

Claims 1, 10 and 17 are amended to recite “store or emit data.” It is respectfully submitted that no new matter is added, since support for the amendments may be found, for example, at least on page 12, lines 19-22 of the specification as originally filed.

Applicant requests that the term “emit” be amended to clarify the recited feature. Applicant submits that entry of the amendment under 37 C.F.R. § 1.312 is appropriate in view of the fact that the amendments do not raise any new issue of patentability or require a new search or detailed consideration in view of the Notice of Allowance dated January 29, 2020 and indication of the allowable subject matter on page 6 of the Final Office Action dated October 11, 2019, since the amendment to the claims merely clarify the previously presented features of the at least one fixed or a configurable endpoint being a data source or a data sink and does not affect the subject matter considered allowable in the Final Office Action.

The remaining claims are left unchanged.

2. Conclusion

Therefore, Applicant respectfully requests entry of the amendments after allowance as not affecting the patentability of the claims and not requiring reopening of prosecution of the application.

Please charge any additional fees required or credit any overpayments in connection with this paper to Deposit Account No. 02-0200.

If any issues remain that may be resolved by a telephone or facsimile communication with the applicants’ attorney, the examiner is invited to contact the undersigned at the numbers shown below.

Application No.: 15/858,668

BACON & THOMAS, PLLC  
625 Slaters Lane, Fourth Floor  
Alexandria, Virginia 22314-1176  
Phone: (703) 683-0500  
Facsimile: (703) 683-1080  
Email: mail@baconthomas.com

Date: April 29, 2020

Respectfully submitted,

/Thomas Lee/

THOMAS LEE  
Attorney for Applicant  
Registration No. 66,396

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	39298531
<b>Application Number:</b>	15858668
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	6421
<b>Title of Invention:</b>	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS
<b>First Named Inventor/Applicant Name:</b>	Gauthier RENARD
<b>Customer Number:</b>	23364
<b>Filer:</b>	Thomas Lee
<b>Filer Authorized By:</b>	
<b>Attorney Docket Number:</b>	RENA3002/TJM/TL
<b>Receipt Date:</b>	29-APR-2020
<b>Filing Date:</b>	29-DEC-2017
<b>Time Stamp:</b>	12:35:28
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		RENA3002_312_amnd_29APR20.pdf	140605  25ae834c0d6d4cc34191f05d579a5352e9082014	yes	8

<b>Multipart Description/PDF files in .zip description</b>			
<b>Document Description</b>		<b>Start</b>	<b>End</b>
Amendment after Notice of Allowance (Rule 312)		1	1
Claims		2	6
Applicant Arguments/Remarks Made in an Amendment		7	8

**Warnings:**

**Information:**

<b>Total Files Size (in bytes):</b>	140605
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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.**



**PART B - FEE(S) TRANSMITTAL**

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: **Mail Stop ISSUE FEE**  
**Commissioner for Patents**  
**P.O. Box 1450**  
**Alexandria, Virginia 22313-1450**

By fax, send to: (571)-273-2885

**INSTRUCTIONS:** This form should be used for transmitting the **ISSUE FEE** and **PUBLICATION FEE** (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

23364 7590 01/29/2020  
**BACON & THOMAS, PLLC**  
**625 SLATERS LANE**  
**FOURTH FLOOR**  
**ALEXANDRIA, VA 22314-1176**

**Certificate of Mailing or Transmission**

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/858,668	12/29/2017	Gauthier RENARD	RENA3002/TJM/TL	6421

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

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1000	\$0.00	\$0.00	\$1000	04/29/2020

EXAMINER	ART UNIT	CLASS-SUBCLASS
MISIURA, BRIAN THOMAS	2185	710-011000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
- (2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Bacon & Thomas, PLLC

2 \_\_\_\_\_

3 \_\_\_\_\_

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

**BARCO NV**

**KORTRIJK, BELGIUM**

Please check the appropriate assignee category or categories (will not be printed on the patent) :  Individual  Corporation or other private group entity  Government

4a. Fees submitted:  Issue Fee  Publication Fee (if required)  Advance Order - # of Copies \_\_\_\_\_

4b. Method of Payment: (Please first reapply any previously paid fee shown above)

- Electronic Payment via EFS-Web  Enclosed check  Non-electronic payment by credit card (Attach form PTO-2038)

The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. 020200

5. Change in Entity Status (from status indicated above)

- Applicant certifying micro entity status. See 37 CFR 1.29
- Applicant asserting small entity status. See 37 CFR 1.27
- Applicant changing to regular undiscounted fee status.

**NOTE:** Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

**NOTE:** If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

**NOTE:** Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

**NOTE:** This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Thomas J. Moore/

Date April 29, 2020

Typed or printed name THOMAS J. MOORE

Registration No. 28974

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	15858668			
<b>Filing Date:</b>	29-Dec-2017			
<b>Title of Invention:</b>	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS			
<b>First Named Inventor/Applicant Name:</b>	Gauthier RENARD			
<b>Filer:</b>	Thomas J. Moore/Shelly Darrenkamp			
<b>Attorney Docket Number:</b>	RENA3002/TJM/TL			
Filed as Large Entity				
<b>Filing Fees for Utility under 35 USC 111(a)</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
UTILITY APPL ISSUE FEE	1501	1	1000	1000

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Extension-of-Time:</b>				
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>1000</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	39298656
<b>Application Number:</b>	15858668
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	6421
<b>Title of Invention:</b>	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS
<b>First Named Inventor/Applicant Name:</b>	Gauthier RENARD
<b>Customer Number:</b>	23364
<b>Filer:</b>	Thomas J. Moore/Shelly Darrenkamp
<b>Filer Authorized By:</b>	Thomas J. Moore
<b>Attorney Docket Number:</b>	RENA3002/TJM/TL
<b>Receipt Date:</b>	29-APR-2020
<b>Filing Date:</b>	29-DEC-2017
<b>Time Stamp:</b>	13:07:44
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$1000
RAM confirmation Number	E20204SD08177573
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

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**File Listing:**

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	RENA3002_if.pdf	616732	no	1
			2970f4929ed54c8dfae496d8f677a710d11ae5b		

**Warnings:**

**Information:**

2	Fee Worksheet (SB06)	fee-info.pdf	30675	no	2
			b82ddb49dea21a4ad69893e0cf2f2daf018c11e1		

**Warnings:**

**Information:**

<b>Total Files Size (in bytes):</b>	647407
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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.**



UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office
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www.uspto.gov

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO. Includes application details for 15/858,668 and 23364 7590, examiner MISIURA, BRIAN THOMAS, art unit 2185, and notification date 05/08/2020.

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

<b>Response to Rule 312 Communication</b>	<b>Application No.</b> 15/858,668	<b>Applicant(s)</b> RENARD et al.	
	<b>Examiner</b> BRIAN T MISIURA	<b>Art Unit</b> 2185	<b>AIA (FITF) Status</b> Yes

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

1.  The amendment filed on 29 April 2020 under 37 CFR 1.312 has been considered, and has been:
- a)  entered.
  - b)  entered as directed to matters of form not affecting the scope of the invention.
  - c)  disapproved because the amendment was filed after the payment of the issue fee.  
Any amendment filed after the date the issue fee is paid must be accompanied by a petition under 37 CFR 1.313(c)(1) and the required fee to withdraw the application from issue.
  - d)  disapproved. See explanation below.
  - e)  entered in part. See explanation below.

\_\_\_\_\_

/BRIAN T MISIURA/  
Primary Examiner, Art Unit 2185

/B.T.M/ 05/06/2020

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

**In re Application of:**

<b>Application No.:</b>	15/858,668	<b>Confirm. No.:</b>	6421
<b>Filing Date:</b>	December 29, 2017	<b>Art Unit:</b>	2185
<b>First Inventor:</b>	Gauthier RENARD	<b>Customer No.:</b>	23364
<b>Attorney No.:</b>	RENA3002/TJM/TL	<b>Examiner:</b>	Brian T. Misiura
<b>Applicant:</b>	<b>BARCO NV</b>		

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

**AMENDMENT AFTER NOTICE OF ALLOWANCE**  
**(37 C.F.R. § 1.312)**

Mail Stop Issue Fee  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

**INTRODUCTORY COMMENTS**

Please amend this application in accordance with the following particular under 37 C.F.R. § 1.312, where the claims are amended.

**AMENDMENT**

Please amend the pending application in accordance with the following particulars.

**In the Claims**

The claims are amended as shown on the following pages under the heading LIST OF CURRENT CLAIMS. The list shows the status of all claims presently in the application and is intended to supersede all prior versions of the claims in the application. Any cancellation of claims is made without prejudice or disclaimer.





APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/858,668	06/16/2020	10684972	RENA3002/TJM/TL	6421

23364 7590 05/27/2020  
BACON & THOMAS, PLLC  
625 SLATERS LANE  
FOURTH FLOOR  
ALEXANDRIA, VA 22314-1176

### ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

**Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)**  
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Gauthier RENARD, Oudenaarde, BELGIUM;  
BARCO NV, Kortrijk, BELGIUM;  
Johan Peter Frans DEGRAEF, Gent, BELGIUM;

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