

AO 120 (Rev. 08/10)

<b>TO: Mail Stop 8</b> <b>Director of the U.S. Patent and Trademark Office</b> <b>P.O. Box 1450</b> <b>Alexandria, VA 22313-1450</b>	<b>REPORT ON THE</b> <b>FILING OR DETERMINATION OF AN</b> <b>ACTION REGARDING A PATENT OR</b> <b>TRADEMARK</b>
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In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Northern District of Texas, Dallas Division on the following

Trademarks or  Patents. (  the patent action involves 35 U.S.C. § 292.):

DOCKET NO. 3:18-cv-2839	DATE FILED 10/24/2018	U.S. DISTRICT COURT Northern District of Texas, Dallas Division
PLAINTIFF UNILOC USA INC et al		DEFENDANT ZTE (USA) INC et al
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 6,993,049	1/31/2006	Uniloc 2017, LLC
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY <input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading	
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In the above—entitled case, the following decision has been rendered or judgement issued:

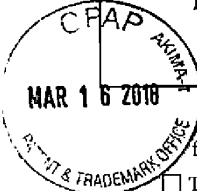
DECISION/JUDGEMENT
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CLERK Karen Mitchell	(BY) DEPUTY CLERK s/A. Anthony	DATE
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In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Marshall Division on the following

Trademarks or  Patents. (  the patent action involves 35 U.S.C. § 292.):

DOCKET NO. 2:18-cv-00074	DATE FILED 3/13/2018	U.S. DISTRICT COURT Eastern District of Texas, Marshall Division
PLAINTIFF UNILOC USA, INC. and UNILOC LUXEMBOURG, S.A.		DEFENDANT HUAWEI DEVICE USA, INC. and HUAWEI DEVICE CO. LTD.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 6,993,049	1/31/2006	Uniloc Luxembourg, S.A.
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DOCKET NO. 2:18-cv-00041	DATE FILED 2/26/2017	U.S. DISTRICT COURT Eastern District of Texas, Marshall Division
PLAINTIFF UNILOC USA, INC. and UNILOC LUXEMBOURG, S.A.		DEFENDANT SAMSUNG ELECTRONICS AMERICA, INC. and SAMSUNG ELECTRONICS, CO. LTD.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 6,993,049	1/31/2006	Uniloc Luxembourg, S.A.
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Trademarks or  Patents. (  the patent action involves 35 U.S.C. § 292.);

DOCKET NO. 1:18-CV-164-RP	DATE FILED 2/22/2018	U.S. DISTRICT COURT Western District of Texas, Austin Division
PLAINTIFF Uniloc USA, Inc. et al		DEFENDANT Apple Inc.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 <del>See Attached</del>		
2 6993049		
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CLERK <b>Jeannette J. Clack</b>	(BY) DEPUTY CLERK 	DATE <b>FEB 22 2018</b>
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DOCKET NO. 8:18-cv-01279	DATE FILED 7/24/2018	U.S. DISTRICT COURT Central District of California
PLAINTIFF Uniloc 2017 LLC, Uniloc Licensing USA LLC and Uniloc USA, Inc.		DEFENDANT Microsoft Corporation
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 7,016,676	3/21/2006	Uniloc 2017 LLC
2 6,993,049	1/31/2006	Uniloc 2017 LLC
3 7,167,487	1/23/2007	Uniloc 2017 LLC
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DOCKET NO. 2:18-cv-307	DATE FILED 7/23/2018	U.S. DISTRICT COURT Eastern District of Texas, Marshall Division
PLAINTIFF UNILOC USA, INC. and UNILOC 2017, LLC		DEFENDANT ZTE (USA), INC. and ZTE (TX), INC.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 6,993,049	1/31/2006	Uniloc 2017, LLC
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Trademarks or  Patents. (  the patent action involves 35 U.S.C. § 292.);

DOCKET NO. 2:18-cv-00074	DATE FILED 3/13/2018	U.S. DISTRICT COURT Eastern District of Texas, Marshall Division
PLAINTIFF UNILOC USA, INC. and UNILOC LUXEMBOURG, S.A.		DEFENDANT HUAWEI DEVICE USA, INC. and HUAWEI DEVICE CO. LTD.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 6,993,049	1/31/2006	Uniloc Luxembourg, S.A.
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Trademarks or  Patents. (  the patent action involves 35 U.S.C. § 292.);

DOCKET NO. 3:18-cv-559-S	DATE FILED 3/9/2018	U.S. DISTRICT COURT Northern District of Texas, Dallas Division
PLAINTIFF Uniloc USA Inc et al		DEFENDANT LG Electronics USA Inc et al
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 6,993,049	1/31/2006	Uniloc Luxembourg, S.A.
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Date: March 9, 2018

Respectfully submitted,

/s/ Edward R. Nelson III

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**ATTORNEYS FOR THE PLAINTIFFS**

# EXHIBIT A



(12) **United States Patent  
Davies**

(10) **Patent No.:** US 6,993,049 B2  
(45) **Date of Patent:** \*Jan. 31, 2006

(54) **COMMUNICATION SYSTEM**  
(75) Inventor: **Robert J. Davies**, Horley (GB)  
(73) Assignee: **Koninklijke Philips Electronics N.V.**, Eindhoven (NL)  
(\* ) Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154 (a)(2).  
Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 635 days.  
This patent is subject to a terminal disclaimer.

(52) **U.S. Cl.** ..... 370/528; 370/346; 370/449; 370/465  
(58) **Field of Classification Search** ..... 370/311, 370/312, 328-330, 336, 337, 346, 347, 350, 370/390, 465, 470, 473, 476, 491, 528, 449  
See application file for complete search history.

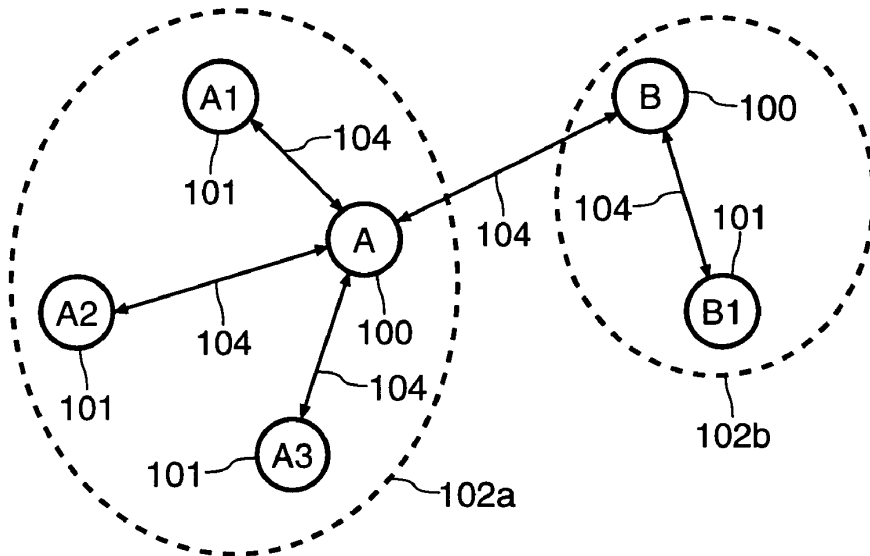
(56) **References Cited**  
U.S. PATENT DOCUMENTS  
4,766,434 A \* 8/1988 Matai et al. .... 340/7.55  
6,574,266 B1 \* 6/2003 Haartsen ..... 375/133  
6,664,891 B2 \* 12/2003 Davies et al. .... 340/505

\* cited by examiner  
*Primary Examiner*—Chi Pham  
*Assistant Examiner*—Ronald Abelson

(21) Appl. No.: **09/876,514**  
(22) Filed: **Jun. 7, 2001**  
(65) **Prior Publication Data**  
US 2002/0028657 A1 Mar. 7, 2002  
(30) **Foreign Application Priority Data**  
Jun. 26, 2000 (GB) ..... 0015454  
Aug. 15, 2000 (GB) ..... 0020076  
(51) **Int. Cl.**  
*H04J 3/12* (2006.01)  
*H04J 3/16* (2006.01)  
*H04L 12/403* (2006.01)

(57) **ABSTRACT**  
A communications system comprises a primary station (100) and at least one secondary station (101). The primary station (100) is arranged to broadcast a series of inquiry messages, each in the form of a plurality of predetermined data fields arranged according to a first communications protocol such as Bluetooth. In addition the primary station (100) adds to some or all of the inquiry messages an additional data field for polling one or more secondary stations, which can respond to the poll if they have data for transmission. This system provides secondary stations (101) with a rapid response time without the need for a permanently active communication link.

12 Claims, 3 Drawing Sheets



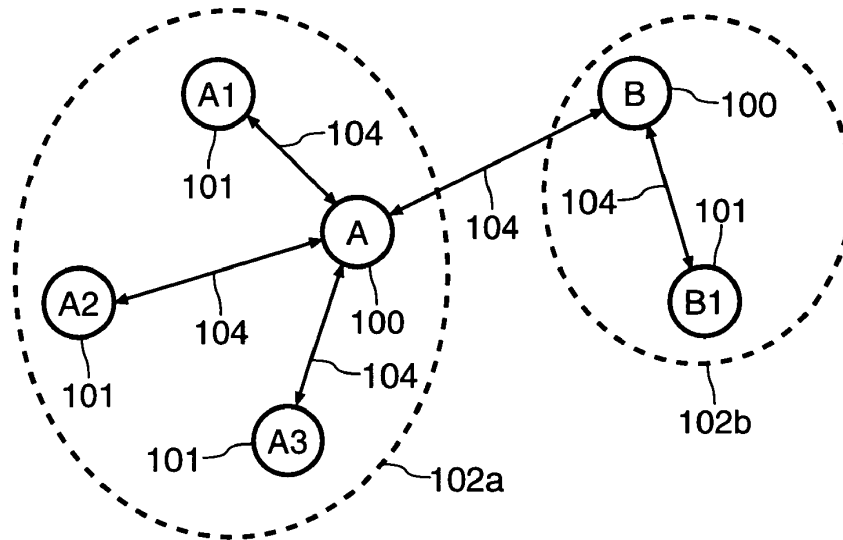


FIG. 1

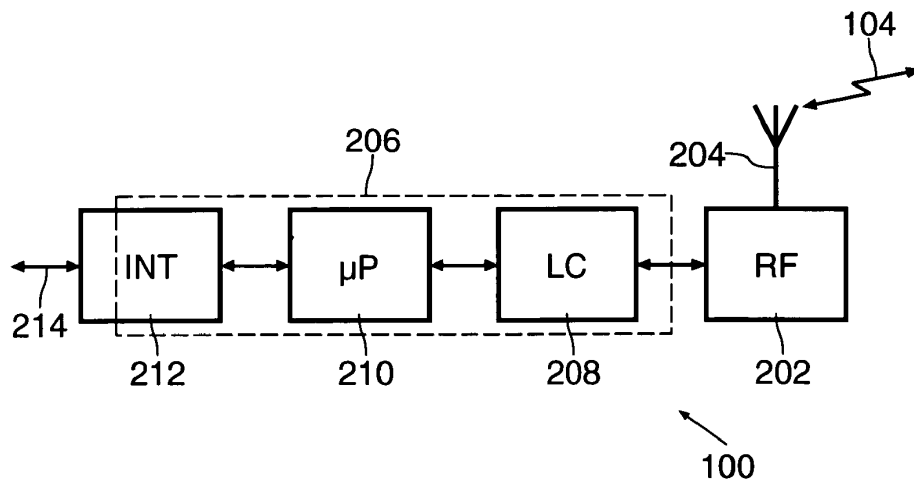


FIG. 2

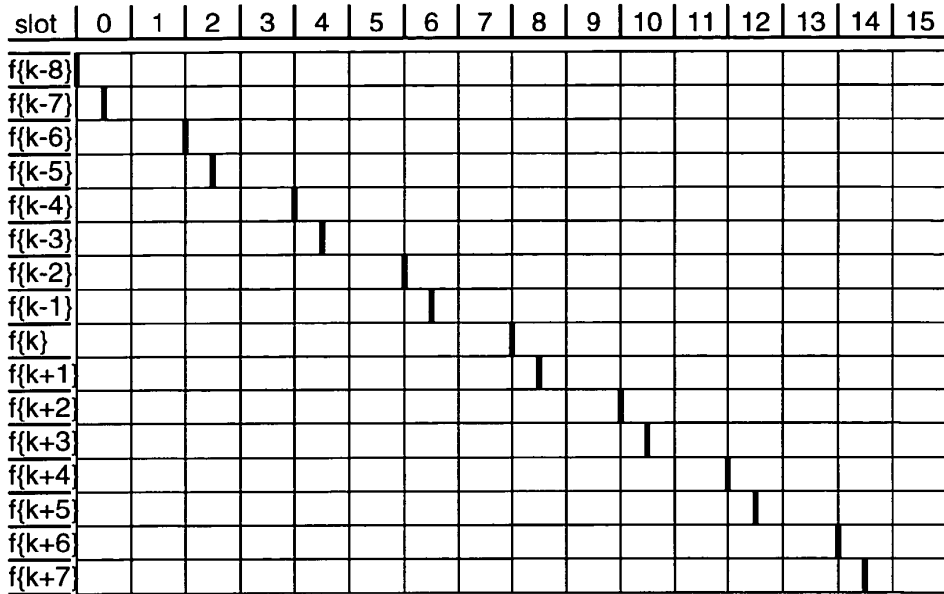


FIG. 3

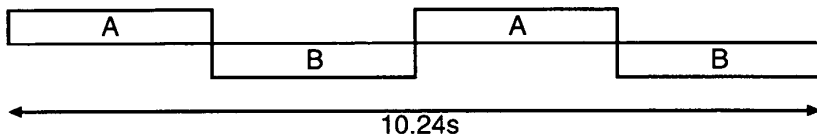


FIG. 4

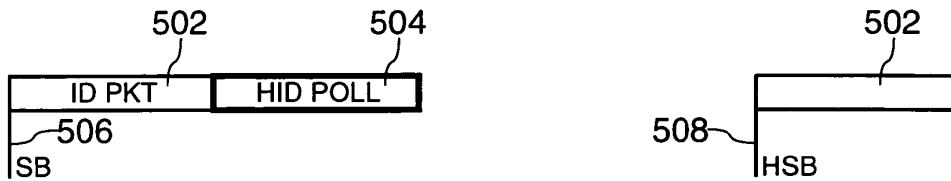
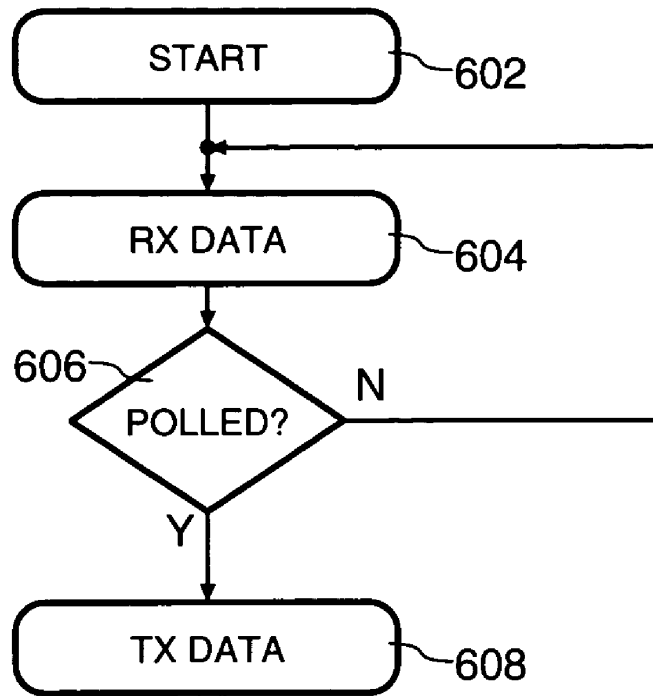


FIG. 5



**FIG. 6**

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**COMMUNICATION SYSTEM**

The present invention relates to a communication system and further relates to primary and secondary stations for use in such a system and to a method of operating such a system. Although the present invention is described with particular reference to a Bluetooth system, it is applicable to a range of other communication systems.

In recent years there has been increasing interest in enabling devices to interact via wireless communication links, thereby avoiding the need for extensive cabling. An example of a communication system which may be used for such wireless links is a Bluetooth network, operating according to the specification defined by the Bluetooth Special Interest Group. Such a network is intended to provide low-cost, short range radio links between mobile PCs, mobile phones and other devices, whether portable or not.

Communication in a Bluetooth network takes place in the unlicensed ISM band at around 2.45 GHz. Stations form ad-hoc networks which are known as piconets, each comprising a master station and up to seven slave stations. All stations are identical and capable of acting as master or slave as required. A station can take part in more than one piconet, thereby linking piconets and enabling communication over an extended range.

One application for which use of Bluetooth is proposed is the connection of controller devices to host systems. A controller device, also known as a Human/machine Interface Device (HID), is an input device such as a keyboard, mouse, games controller, graphics pad or the like. Such HIDs do not typically require a link having high data throughput, but do require a very responsive link.

A Bluetooth system is more than capable of supporting the throughput requirements of HIDs. However, the degree of responsiveness required can be more difficult to achieve. An active Bluetooth link can offer a reasonably responsive service, but this requires both setting up of the link and its maintenance even during periods of inactivity.

Two types of communication link supported in a Bluetooth network are Asynchronous ConnectionLess (ACL) links and Synchronous Connection Oriented (SCO) links. ACL links allow slaves to enter a 'park' mode and cease active communications, which also allows a number of other HIDs to maintain links with the master station without violating the Bluetooth rule that no more than seven slaves can be active at any one time. A slave has to be polled before it can submit a request to leave park mode and become active. SCO links require continuous operation by a slave, but there are only a limited number of SCO channels available.

Setting up a link requires a HID to join, as a slave, the piconet including the host system (which will typically act as piconet master, i.e. a base station). Joining the piconet requires two sets of procedures, namely 'inquiry' and 'page'. Inquiry allows a would-be slave to find a base station and issue a request to join the piconet. Page allows a base station to invite slaves of its choice to join the net. Analysis of these procedures indicates that the time taken to join a piconet and then to be in a position to transfer user input to the master could be several tens of seconds.

It is possible for this procedure to be carried out once and for all when the host system is turned on. However, HIDs will normally be battery operated and it is therefore not acceptable for them to have to remain permanently switched on. In particular, for a HID to sign on to the piconet automatically when the host system is turned on it will either

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have to be regularly waking up to look for Bluetooth inquiry bursts, thereby consuming power, or it will need to be manually woken up by the user.

It is therefore more likely that a HID will remain inactive until it is woken up, either by being explicitly switched on or by a user attempting some form of input. Hence, the host system's Bluetooth master will need to run inquiry cycles periodically, which has two implications. The first is that because the inquiry phase is periodic rather than continuous, initial access time could be several tens of seconds. This could mean that it could take half a minute or more from the time a user moves a mouse to a cursor moving on a screen. Secondly, the fact that an inquiry cycle takes place at all means that ACL links will be suspended during this cycle, for up to 10.24 seconds at a time. Although SCO links could be used, a HID using such a link could not cease transmissions during inactive periods.

It is therefore an object of the invention to address the problem of providing a responsive link between a HID and a host system which allows the HID to go to sleep during periods of inactivity.

According to a first aspect of the present invention there is provided a communications system comprising a primary station and at least one secondary station, wherein the primary station has means for broadcasting a series of inquiry messages, each in the form of a plurality of predetermined data fields arranged according to a first communications protocol, and means for adding to an inquiry message prior to transmission an additional data field for polling at least one secondary station, and wherein the or each polled secondary station has means for determining when an additional data field has been added to the plurality of data fields, for determining whether it has been polled from the additional data field and for responding to a poll when it has data for transmission to the primary station.

According to a second aspect of the present invention there is provided a primary station for use in a communications system comprising at least one secondary station, wherein means are provided for broadcasting a series of inquiry messages, each in the form of a plurality of predetermined data fields arranged according to a first communications protocol, and for adding to each inquiry message prior to transmission an additional data field for polling at least one secondary station.

According to a third aspect of the present invention there is provided a secondary station for use in a communications system comprising a primary station, wherein means are provided for receiving an inquiry message broadcast by the primary station, the message being in the form of a plurality of predetermined data fields arranged according to a first communications protocol and having added to it an additional data field for polling at least one secondary station, and wherein means are provided for determining when an additional data field has been added to the plurality of data fields, for determining whether it has been polled from the additional data field and for responding to a poll when it has data for transmission to the primary station.

According to a fourth aspect of the present invention there is provided a method of operating a communication system comprising a primary station and at least one secondary station, the method comprising the primary station broadcasting a series of inquiry messages, each in the form of a plurality of predetermined data fields arranged according to a first communications protocol, and adding to an inquiry message prior to transmission an additional data field for polling at least one secondary station, and further comprising the or each polled secondary station determining when

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an additional data field has been added to the plurality of data fields, determining whether it has been polled from the additional data field and responding to a poll when it has data for transmission to the primary station.

Embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawings, wherein:

FIG. 1 is a diagram of an ad-hoc wireless network comprising two linked piconets;

FIG. 2 is a block schematic diagram of a typical Bluetooth station;

FIG. 3 is a chart illustrating the transmission of a train of inquiry access codes centred on a given frequency;

FIG. 4 illustrates alternation between trains of inquiry messages over the duration of an inquiry broadcast;

FIG. 5 illustrates the insertion of a packet of broadcast data within an existing transmission slot; and

FIG. 6 is a flow chart illustrating a method of polling a HID in accordance with the present invention.

In the drawings the same reference numerals have been used to indicate corresponding features.

In the following description we consider particularly a system which utilises Bluetooth protocols for communication of messages between stations. As will be recognised, the general invention concept of polling HIDs via a broadcast channel used as part of the inquiry procedure is not restricted to Bluetooth devices and is applicable to other communications arrangements, in particular frequency hopping systems.

A basic Bluetooth network configuration is illustrated in FIG. 1. Such a configuration would typically begin with two connected host devices, for example a portable PC and a cellular phone, and grow to include additional connected devices. A wide range of additional host devices may be included, for example wireless headsets, personal organisers and home entertainment equipment. The network comprises a plurality of stations **100**, **101** each included in such a host device, formed into two piconets **102a**, **102b**. In general the networking components (i.e. the Bluetooth chip for a Bluetooth network) of all stations **100**, **101** will be implemented identically. However, it is only necessary that all stations **100**, **101** comprising the network are able to operate according to a compatible protocol.

The first piconet **102a** is a point-to-multipoint network comprising four stations **100**, a master **100(A)** and three slaves **101(A1,A2,A3)**, with bidirectional communication channels **104** between the master **100** and each of the slaves **101**. The second piconet **102b** is a point-to-point network comprising a master **100(B)** and a slave **101(B1)**. Communication between the piconets **102a**, **102b** is enabled by the master A in the first piconet **102a** also acting as a slave in the second piconet **102b** and vice versa. It is not necessary for the link between the piconets **102a**, **102b** to be between masters: it would be equally possible for the link to be between stations **A3** and **B1** or between **A** and **B1**, for example.

An example of a station **100** for use in a Bluetooth system is illustrated in more detail in FIG. 2, and comprises two main sections. The first section is an analogue unit comprising a radio (RF) **202** having an antenna **204** for transmitting and receiving radio signals on the communication channel **104**. The second section is a digital controller unit **206**, further comprising a link baseband controller (LC) **208**, a microprocessor ( $\mu P$ ) **210** and an interface unit (INT) **212**.

The link controller **208** comprises means for performing baseband processing and execution of basic protocols close to the physical layer, for example implementing error cor-

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rection coding, generating Automatic Repeat reQuests (ARQ) and performing audio coding. The microprocessor **210** manages the station **100**, controlling data transfer between the interface unit **212** and the link controller **208**. The interface unit **212** comprises hardware and software for interfacing the station **100** to a host device such as a portable PC or a cellular phone. The interfacing is performed via a link **214**, which might include interfaces to a USB (Universal Serial Bus), external memory and other items as appropriate for the particular application.

The Bluetooth inquiry procedure allows a would-be slave **101** to find a base station and issue a request to join its piconet. It has been proposed specifically to overcome problems caused by the frequency-hopping nature of Bluetooth and similar systems. The applicants have recognised that it is possible to piggy-back a broadcast channel on the inquiry messages issued by the master **100**. The broadcast channel can be used to poll HIDs at regular intervals. However, at the air interface, the mechanism is entirely compatible with conventional Bluetooth systems.

To illustrate how this is implemented, we first consider how the Inquiry procedures themselves operate, with reference to FIGS. 3 and 4. When a Bluetooth unit wants to discover other Bluetooth devices, it enters a so-called inquiry substate. In this mode, it issues an inquiry message containing a General Inquiry Access Code (GIAC) or a number of optional Dedicated Inquiry Access Codes (DIAC). This message is repeated at several levels; first, it is repeated in a train A of 16 frequencies from a total of 32 making up the inquiry hopping sequence. The message is sent twice on two frequencies in even timeslots with the following, odd timeslots used to listen for replies on the two corresponding inquiry response hopping frequencies. Sixteen frequencies and their response counterparts can therefore be covered in 16 timeslots, or 10 ms. The chart of FIG. 3 illustrates the transmission of a single train on sixteen frequencies centred around  $f\{k\}$ , where  $f\{k\}$  represents the inquiry hopping sequence.

The next step is the repetition of the train a plurality of times. At the very least, as presently specified, this means 256 repetitions of the entire train. Finally, the train A is swapped for the train B consisting of the remaining 16 frequencies and the cycle repeated. As shown by FIG. 4, the specification states that this switch must occur at least three times to ensure the collection of all responses in an error-free environment. This means that an inquiry broadcast could take at least 10.24 seconds.

A portable device that wants to be discovered by a Bluetooth master **100** enters the inquiry scan substate. Here, it listens for a message containing the GIAC or DIACs of interest. It, too, operates in a cyclic way. It listens on a single hop frequency for an inquiry scan period which is long enough to cover the 16 inquiry frequencies used by the inquiry. On hearing an inquiry containing an appropriate IAC, the portable device enters a so-called inquiry response substate and issues a number of inquiry response messages to the master **100**. The master **100** will then page the portable device, inviting it to join the piconet.

As mentioned above and shown in FIG. 5, the applicants propose that the inquiry messages issued by the base station have an extra field **504** appended to them, capable of carrying a HID poll message. The extended field **504** may carry a header that signifies a HID poll to distinguish it from other applications of extended field information, such as context-aware services or broadcast audio (as disclosed in our co-pending United Kingdom patent applications 0015454.2 (applicant's reference PHGB 000084) and



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0015453.4 (applicant's reference PHGB 000085) respectively). It will also carry the address of the HID being polled, and may also carry a small amount of information to the HID which might be used to provide supplementary information to a user (such as text on an LCD screen) or feedback (for example, motion feedback in games controllers). By adding the field to the end of the inquiry message, it will be appreciated that non-HID receivers can ignore it without modification. In addition, by using a special DIAC to signify a HID poll, HID devices can be alerted to the presence of the forthcoming poll.

The presence of the extra data field **504** means that the guard space conventionally allowed at the end of a Bluetooth inquiry packet is reduced. However, this space is provided to give a frequency synthesiser time to change to a new hop frequency and will be generally unused otherwise, as current frequency synthesisers are capable of switching at speeds which do not need extension into the extra guard space. The standard inquiry packet is an ID packet (ID PKT) **502** of length 68 bits. Since it is sent in a half-slot, starting either on a slot boundary (SB) **506** or a half-slot boundary (HSB) **508**, the guard space allocated is  $(625/2-68)=244.5 \mu\text{s}$  (625  $\mu\text{s}$  slot period, 1 Mbit/s signalling rate). Modern synthesisers can switch in much less time with figures of 100  $\mu\text{s}$  or lower considered routine by experts in the field. Hence a suitable size for the extra data field **504** could be 100 bits.

In a typical embodiment, four of the 100 bits will be lost as trailer bits for the ID packet **502**: this is a consequence of it being read by a correlator. Of the 96 bits remaining, applicant's preferred allocation is for 64 bits to be used as data and 32 bits as a 2/3 FEC (Forward Error Correction) checksum. Each inquiry burst thus contains 8 bytes of broadcast data, allowing space for several channels of key coded or digitised analogue inputs.

In order to achieve the desired responsiveness, and because the HID has been specifically addressed, the HID is allowed to respond, if desired, in the next-but-one half-slot with a packet of similar format, containing information corresponding to the user's input. As described above, the inquiry procedure involves the transmission of two sets of sixteen frequencies in trains of inquiry transmissions. The 16 frequencies used within a train can be considered as 16 polling channels, and therefore 16 devices can be polled every 10 ms if desired. Other arrangements are possible, for example polling up to 32 devices every 20 ms or up to 8 devices every 5 ms. The arrangement of polling channels could also be flexible, with more rapid polling provided for devices which need a faster response time and vice versa.

Each device need only monitor a single frequency within a train, but must be able to track the train switches and frequency changes due to changing clock phase. It is assumed that an initial set up procedure synchronises the HID Bluetooth slave **101** to the Bluetooth master **100**, as well as establishing the nature of the HID and the format it uses for uplink and downlink transmissions. At this time the HID is allocated a device address and a channel number corresponding to one of the sixteen channels within a train.

For fast polling, it is necessary for the Bluetooth master **100** to operate continuously. This interferes with the conventional mechanism for setting up two-way links. However, use of two radios operating in tandem, as disclosed in our co-pending United Kingdom patent application 0015452.6 (applicant's reference PHGB 000086), avoids this problem, thereby enabling the provision of fast access to the piconet and an unlimited two-way throughput capacity.

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By polling every 10 ms, with eight bytes per poll, a capacity of 800 bytes per second for sixteen devices is provided. In variations on the basic scheme described above this capacity could be lowered to permit the operation of conventional inquiry procedures, or to increase the number of HIDs that a host system **100** can support beyond sixteen.

In order to minimise their power consumption, HIDs are not obliged to respond to every poll if they have no information to offer. A watchdog timer could be provided in a HID to make it transmit at least once in a given period whilst it is nominally active. The period could for example be predetermined, determined by the host system or determined by negotiation between the host and each HID. HIDs failing to transmit within the determined period would then be removed from the master's list of active devices.

A method of polling a HID in accordance with the present invention is summarised in FIG. 6. The method starts, at step **602**, when the HID has data to transmit to the host system. The HID receives, at step **604**, data from the extra field **504** then tests, at step **606**, whether it has been polled by the host system. If it has not been polled, the HID returns to step **604** to receive the next extra field **504**. If the HID has been polled, it transmits its data in the next-but-one half-slot, at step **608**.

Since an inquiry mode is necessary to permit access to the host system's piconet, it must be provided in the conventional manner for at least some of the time. There are a range of strategies which may be employed.

A first strategy involves the operation of one radio in two modes, namely set up and polling. In set up mode the inquiry procedure operates as normal and the HIDs can establish contact with the host master **100** in the conventional manner. Once all HIDs have established themselves, the master radio switches to polling mode, in which the inquiry procedure now operates in polling mode only. This strategy is ideal for games machines since it achieves the fastest response when polling mode is operational, while opportunities for other controllers to join the piconet occur at well-defined times, such as between games.

A second strategy is more appropriate when the host system is a general purpose device, such as a PC, in which case opportunities must be provided for new devices to join at any time. In this case the master's radio can operate in modeless fashion, devoting some of its time to fast polling and other times to conventional inquiry operations. Alternate 10 ms periods could be devoted to each operation to achieve a 50:50 ratio for example, with the ratio being able to be modified as desired. Such a system would still have a quick response to HIDs and the general inquiry operation, although possibly slower, would still operate as normal. The use of a special DIAC in a polling message should ensure that a slave **101** going through normal inquiry response procedures will not send an inquiry response packet in the space reserved for a fast poll response.

Allowing conventional inquiries in parallel with fast polling implies that, occasionally, there will be a slight pause in inquiry or fast polling to allow a new HID access to the host. This will probably not matter to the user since he will no longer be using old HIDs and will therefore not be aware of the temporary loss in responsiveness.

A third strategy is required when conventional Bluetooth data (or other) links are required, so as to support both a fast response for the polling mechanism and the data carrying capacity of conventional Bluetooth. This requires the use of two radios, and the approach disclosed in our co-pending United Kingdom patent application 0015452.6 (applicant's reference PHGB 000086) can also be used here. Alterna-

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tively, one radio could operate as a conventional Bluetooth radio with the other permanently dedicated to fast polling.

From reading the present disclosure, other modifications will be apparent to persons skilled in the art. Such modifications may involve other features which are already known in the design, manufacture and use of fixed and portable communications systems and component parts thereof, and which may be used instead of or in addition to features already described herein. Although claims have been formulated in this application to particular combinations of features, it should be understood that the scope of the disclosure of the present application also includes any novel feature or any novel combination of features disclosed herein either explicitly or implicitly or any generalisation thereof, whether or not it relates to the same invention as presently claimed in any claim and whether or not it mitigates any or all of the same technical problems as does the present invention. The applicants hereby give notice that new claims may be formulated to such features and/or combinations of features during the prosecution of the present application or of any further application derived therefrom.

In the present specification and claims the word “a” or “an” preceding an element does not exclude the presence of a plurality of such elements. Further, the word “comprising” does not exclude the presence of other elements or steps than those listed.

What is claimed is:

1. A communications system comprising a primary station and at least one secondary station, wherein the primary station has means for broadcasting a series of inquiry messages, each in the form of a plurality of predetermined data fields arranged according to a first communications protocol, and means for adding to an inquiry message prior to transmission an additional data field for polling at least one secondary station, and wherein the at least one polled secondary station has means for determining when an additional data field has been added to the plurality of data fields, for determining whether it has been polled from the additional data field and for responding to a poll when it has data for transmission to the primary station.

2. A primary station for use in a communications system comprising at least one secondary station, wherein means are provided for broadcasting a series of inquiry messages, each in the form of a plurality of predetermined data fields arranged according to a first communications protocol, and for adding to each inquiry message prior to transmission an additional data field for polling at least one secondary station.

3. The primary station of claim 2, wherein means are provided for adding the additional data field at the end of a respective inquiry message.

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4. The primary station of claim 2, wherein means are provided for including an indication in one of the predetermined data fields, the indication denoting the presence of the additional data field.

5. The primary station of claim 2, wherein the first communications protocol comprises Bluetooth messaging.

6. The primary station of claim 2, wherein the additional data field comprises at least 64 bits of data.

7. The primary station of claim 2, wherein first radio means are provided for broadcasting substantially continuously inquiry messages having the additional data field and second radio means are provided for handling other aspects of communication links with secondary stations.

8. A secondary station for use in a communications system comprising a primary station, wherein means are provided for receiving an inquiry message broadcast by the primary station, the message being in the form of a plurality of predetermined data fields arranged according to a first communications protocol and having added to it an additional data field for polling at least one secondary station, and wherein means are provided for determining when an additional data field has been added to the plurality of data fields, for determining whether it has been polled from the additional data field and for responding to a poll when it has data for transmission to the primary station.

9. The secondary station of claim 8, wherein the first communications protocol comprises Bluetooth messaging.

10. The secondary station of claim 8, wherein means are provided for responding to a poll after a predetermined interval has passed without transmission of data, whether or not the secondary station has data for transmission.

11. A method of operating a communication system comprising a primary station and at least one secondary station, the method comprising the primary station broadcasting a series of inquiry messages, each in the form of a plurality of predetermined data fields arranged according to a first communications protocol, and adding to an inquiry message prior to transmission an additional data field for polling at least one secondary station, and further comprising the at least one polled secondary station determining when an additional data field has been added to the plurality of data fields, determining whether it has been polled from the additional data field and responding to a poll when it has data for transmission to the primary station.

12. The method of claim 11, wherein not all inquiry messages have an additional data field for polling a secondary station added to them.

\* \* \* \* \*

**IN THE UNITED STATES DISTRICT COURT  
FOR THE NORTHERN DISTRICT OF TEXAS  
DALLAS DIVISION**

UNILOC USA, INC. and	§	
UNILOC LUXEMBOURG, S.A.,	§	Civil Action No.
	§	
Plaintiffs,	§	
	§	
v.	§	PATENT CASE
	§	
LG ELECTRONICS U.S.A., INC.,	§	
LG ELECTRONICS MOBILECOMM	§	
U.S.A. INC. AND	§	
LG ELECTRONICS, INC.,	§	
Defendants.	§	JURY TRIAL DEMANDED
	§	

**COMPLAINT FOR PATENT INFRINGEMENT**

Plaintiffs, Uniloc USA, Inc. (“Uniloc USA”) and Uniloc Luxembourg, S.A. (“Uniloc Luxembourg”) (together, “Uniloc”), for their complaint against defendants LG Electronics U.S.A., Inc. (“LGE USA”), LG Electronics Mobilecomm U.S.A., Inc. (“LGE Mobilecomm”), and LG Electronics, Inc., (“LG Korea”) (collectively, “LG”), allege as follows:

**THE PARTIES**

1. Uniloc USA is a Texas corporation having a principal place of business at Legacy Town Center I, Suite 380, 7160 Dallas Parkway, Plano Texas 75024. Uniloc USA also maintains a place of business at 102 N. College, Suite 603, Tyler, Texas 75702.
2. Uniloc Luxembourg is a Luxembourg public limited liability company having a principal place of business at 15, Rue Edward Steichen, 4<sup>th</sup> Floor, L-2540, Luxembourg (R.C.S. Luxembourg B159161).

CIVIL COVER SHEET

The JS 44 civil cover sheet and the information contained herein neither replace nor supplement the filing and service of pleadings or other papers as required by law, except as provided by local rules of court. This form, approved by the Judicial Conference of the United States in September 1974, is required for the use of the Clerk of Court for the purpose of initiating the civil docket sheet. (SEE INSTRUCTIONS ON NEXT PAGE OF THIS FORM.)

I. (a) PLAINTIFFS

UNILOC USA, INC. and UNILOC LUXEMBOURG, S.A.

(b) County of Residence of First Listed Plaintiff (EXCEPT IN U.S. PLAINTIFF CASES)

(c) Attorneys (Firm Name, Address, and Telephone Number) Edward R. Nelson III, Anthony M. Vecchione: Nelson Bumgardner Albritton, PC, 3131 West 7th Street, Suite 300, Fort Worth, TX 76107 Phone: 817-377-9111

DEFENDANTS

LG ELECTRONICS U.S.A., INC., LG ELETRONICS MOBILECOMM U.S.A. INC., and LG ELECTRONICS, INC.

County of Residence of First Listed Defendant (IN U.S. PLAINTIFF CASES ONLY)

NOTE: IN LAND CONDEMNATION CASES, USE THE LOCATION OF THE TRACT OF LAND INVOLVED.

Attorneys (If Known)

II. BASIS OF JURISDICTION (Place an "X" in One Box Only)

- 1 U.S. Government Plaintiff, 2 U.S. Government Defendant, 3 Federal Question (U.S. Government Not a Party), 4 Diversity (Indicate Citizenship of Parties in Item III)

III. CITIZENSHIP OF PRINCIPAL PARTIES (Place an "X" in One Box for Plaintiff and One Box for Defendant)

- Citizen of This State, Citizen of Another State, Citizen or Subject of a Foreign Country, PTF DEF, Incorporated or Principal Place of Business In This State, Incorporated and Principal Place of Business In Another State, Foreign Nation

IV. NATURE OF SUIT (Place an "X" in One Box Only)

Click here for: Nature of Suit Code Descriptions.

Table with 5 columns: CONTRACT, REAL PROPERTY, TORTS, CIVIL RIGHTS, PRISONER PETITIONS, LABOR, IMMIGRATION, FORFEITURE/PENALTY, SOCIAL SECURITY, FEDERAL TAX SUITS, BANKRUPTCY, OTHER STATUTES. Includes various legal categories like Personal Injury, Property Rights, Labor, etc.

V. ORIGIN (Place an "X" in One Box Only)

- 1 Original Proceeding, 2 Removed from State Court, 3 Remanded from Appellate Court, 4 Reinstated or Reopened, 5 Transferred from Another District, 6 Multidistrict Litigation - Transfer, 8 Multidistrict Litigation - Direct File

VI. CAUSE OF ACTION

Cite the U.S. Civil Statute under which you are filing (Do not cite jurisdictional statutes unless diversity): 35 U.S.C. § 271, et seq.

Brief description of cause: Infringement of U.S. Patent No. 6,993,049

VII. REQUESTED IN COMPLAINT:

CHECK IF THIS IS A CLASS ACTION UNDER RULE 23, F.R.Cv.P. DEMAND \$ CHECK YES only if demanded in complaint: JURY DEMAND: X Yes

VIII. RELATED CASE(S) IF ANY

(See instructions): JUDGE See Attached List DOCKET NUMBER

DATE 03/09/2018 SIGNATURE OF ATTORNEY OF RECORD /s/ Edward R. Nelson, III

FOR OFFICE USE ONLY

RECEIPT # AMOUNT APPLYING IFP JUDGE MAG. JUDGE



Case 3:18-cv-00559-S Document 1-2 Filed 03/09/18 Page 2 of 3 PageID 20  
**INSTRUCTIONS FOR ATTORNEYS COMPLETING CIVIL COVER SHEET FORM JS 44**

Authority For Civil Cover Sheet

The JS 44 civil cover sheet and the information contained herein neither replaces nor supplements the filings and service of pleading or other papers as required by law, except as provided by local rules of court. This form, approved by the Judicial Conference of the United States in September 1974, is required for the use of the Clerk of Court for the purpose of initiating the civil docket sheet. Consequently, a civil cover sheet is submitted to the Clerk of Court for each civil complaint filed. The attorney filing a case should complete the form as follows:

- I.(a) **Plaintiffs-Defendants.** Enter names (last, first, middle initial) of plaintiff and defendant. If the plaintiff or defendant is a government agency, use only the full name or standard abbreviations. If the plaintiff or defendant is an official within a government agency, identify first the agency and then the official, giving both name and title.
  - (b) **County of Residence.** For each civil case filed, except U.S. plaintiff cases, enter the name of the county where the first listed plaintiff resides at the time of filing. In U.S. plaintiff cases, enter the name of the county in which the first listed defendant resides at the time of filing. (NOTE: In land condemnation cases, the county of residence of the "defendant" is the location of the tract of land involved.)
  - (c) **Attorneys.** Enter the firm name, address, telephone number, and attorney of record. If there are several attorneys, list them on an attachment, noting in this section "(see attachment)".
- II. **Jurisdiction.** The basis of jurisdiction is set forth under Rule 8(a), F.R.Cv.P., which requires that jurisdictions be shown in pleadings. Place an "X" in one of the boxes. If there is more than one basis of jurisdiction, precedence is given in the order shown below.  
 United States plaintiff. (1) Jurisdiction based on 28 U.S.C. 1345 and 1348. Suits by agencies and officers of the United States are included here.  
 United States defendant. (2) When the plaintiff is suing the United States, its officers or agencies, place an "X" in this box.  
 Federal question. (3) This refers to suits under 28 U.S.C. 1331, where jurisdiction arises under the Constitution of the United States, an amendment to the Constitution, an act of Congress or a treaty of the United States. In cases where the U.S. is a party, the U.S. plaintiff or defendant code takes precedence, and box 1 or 2 should be marked.  
 Diversity of citizenship. (4) This refers to suits under 28 U.S.C. 1332, where parties are citizens of different states. When Box 4 is checked, the citizenship of the different parties must be checked. (See Section III below; **NOTE: federal question actions take precedence over diversity cases.**)
- III. **Residence (citizenship) of Principal Parties.** This section of the JS 44 is to be completed if diversity of citizenship was indicated above. Mark this section for each principal party.
- IV. **Nature of Suit.** Place an "X" in the appropriate box. If there are multiple nature of suit codes associated with the case, pick the nature of suit code that is most applicable. Click here for: [Nature of Suit Code Descriptions](#).
- V. **Origin.** Place an "X" in one of the seven boxes.  
 Original Proceedings. (1) Cases which originate in the United States district courts.  
 Removed from State Court. (2) Proceedings initiated in state courts may be removed to the district courts under Title 28 U.S.C., Section 1441. When the petition for removal is granted, check this box.  
 Remanded from Appellate Court. (3) Check this box for cases remanded to the district court for further action. Use the date of remand as the filing date.  
 Reinstated or Reopened. (4) Check this box for cases reinstated or reopened in the district court. Use the reopening date as the filing date.  
 Transferred from Another District. (5) For cases transferred under Title 28 U.S.C. Section 1404(a). Do not use this for within district transfers or multidistrict litigation transfers.  
 Multidistrict Litigation – Transfer. (6) Check this box when a multidistrict case is transferred into the district under authority of Title 28 U.S.C. Section 1407.  
 Multidistrict Litigation – Direct File. (8) Check this box when a multidistrict case is filed in the same district as the Master MDL docket.  
**PLEASE NOTE THAT THERE IS NOT AN ORIGIN CODE 7.** Origin Code 7 was used for historical records and is no longer relevant due to changes in statute.
- VI. **Cause of Action.** Report the civil statute directly related to the cause of action and give a brief description of the cause. **Do not cite jurisdictional statutes unless diversity.** Example: U.S. Civil Statute: 47 USC 553 Brief Description: Unauthorized reception of cable service
- VII. **Requested in Complaint.** Class Action. Place an "X" in this box if you are filing a class action under Rule 23, F.R.Cv.P.  
 Demand. In this space enter the actual dollar amount being demanded or indicate other demand, such as a preliminary injunction.  
 Jury Demand. Check the appropriate box to indicate whether or not a jury is being demanded.
- VIII. **Related Cases.** This section of the JS 44 is used to reference related pending cases, if any. If there are related pending cases, insert the docket numbers and the corresponding judge names for such cases.

**Date and Attorney Signature.** Date and sign the civil cover sheet.

JS 44 – Continued for Uniloc, et al. v. LG Electronics U.S.A., Inc., et al:

Style	Case No.	Judge	Pending	Dismissal/ Remanded	Date of Final Judgment/ Order Remanding
<i>Uniloc USA, Inc., et al. v. Apple, Inc.</i>	1:18-cv-158 WDTX	Yeakel	Yes	No	N/A
<i>Uniloc USA, Inc., et al. v. Samsung Electronics America, Inc., et al.</i>	2:18-cv-42 EDTX	Payne	Yes	No	N/A

3. LGE USA is a Delaware corporation having a regular and established place of business at 2151-2155 Eagle Parkway, Fort Worth, Texas 76177. LGE USA offers its products and/or services, including those accused herein of infringement, to customers and potential customers located in Texas and in the judicial Northern District of Texas. LGE USA may be served with process through its registered agent for service in Texas: United States Corporation Company, 211 E. 7<sup>th</sup> Street, Suite 620, Austin, Texas 78701.

4. LGE Mobilecomm is a California corporation having a regular and established place of business in San Diego, California. LGE Mobilecomm offers its products and/or services, including those accused herein of infringement, to customers and potential customers located in Texas and in the judicial Northern District of Texas.

5. LG Korea is a corporation organized under the laws of Korea with a principal place of business at LG Twin Tower 128, Yeoui-daero, Yeongdeungpo-gu, Seoul, Korea. LG Korea is in the business of manufacturing and selling electronic goods, including cellular telephones, tablets, laptops and televisions.

### **JURISDICTION**

6. Uniloc brings this action for patent infringement under the patent laws of the United States, 35 U.S.C. § 271, *et seq.* This Court has subject matter jurisdiction under 28 U.S.C. §§ 1331, and 1338(a).

### **COUNT I**

(INFRINGEMENT OF U.S. PATENT NO. 6,993,049)

7. Uniloc incorporates paragraphs 1-6 above by reference.

8. Uniloc Luxembourg is the owner, by assignment, of U.S. Patent No. 6,993,049 (“the ’049 Patent”), entitled COMMUNICATION SYSTEM, which issued on January 31, 2006. A copy of the ’049 Patent is attached as Exhibit A.

9. Uniloc USA is the exclusive licensee of the '049 Patent, with ownership of all substantial rights, including the right to grant sublicenses, to exclude others, and to enforce and recover past damages for infringement.

10. The '049 Patent describes in detail and claims in various ways inventions in systems and devices developed by Koninklijke Philips Electronics N.V. for improved communication of data there between using polling of secondary devices by a primary device.

11. The '049 Patent describes problems and shortcomings in the then-existing field of communications between devices and describes and claims novel and inventive technological improvements and solutions to such problems and shortcomings. The technological improvements and solutions described and claimed in the '049 Patent were not conventional or generic at the time of their respective inventions but involved novel and non-obvious approaches to the problems and shortcomings prevalent in the art at the time.

12. The inventions claimed in the '049 Patent involve and cover more than just the performance of well-understood, routine and/or conventional activities known to the industry prior to the invention of such novel and non-obvious systems and devices by the '049 Patent inventor.

13. The inventions claimed in the '049 Patent represent technological solutions to technological problems. The written description of the '049 Patent describes in technical detail each of the limitations of the claims, allowing a person of ordinary skill in the art to understand what the limitations cover and how the non-conventional and non-generic combination of claim elements differ markedly from and improved upon what may have been considered conventional or generic.



14. LG imports, uses, offers for sale, and sells in the United States electronic devices that utilize Bluetooth Low Energy version 4.0 and above. Such devices include: LG V30, LG V30+, LG Aristo 2, LG Tribute Dynasty, LG X charge, LG Q6, LG G6+, LG G6, LG Rebel 3, LG Fiesta 2, LG V20, LG Wine, LG X venture, LG Stylo 3, LG Stylo 3 Plus Titan, LG Stylo 3 Plus, LG Tribute HD, LG Rebel 2, LG Fiesta, LG K20 plus, LG Grace, LG K3, LG Stylo, LG phoenix 3, LG Risio 2, LG K8, LG Stylo 2 V, LG K20, LG K20 V, LG Exalt, LG Aristo, LG G5, LG Stylo 2, LG Fortune, LG X power, LG K10, LG G Vista, LG Escape 3, LG Stylo 2 Plus, LG Classic, LG Rebel, LG Treasure, LG X style, LG Premier, LG K7, LG G4, LG K4, LG Optimus Zone 3, LG K8 V, LG Phoenix 2, LG Tribute 5, LG V10, Tribute 5, Nexus 5X, LG Spree, LG G Vista 2, LG Leon, LG Escape 2, LG Sunrise L15G, LG Lucky, G Flex 2, LG Destiny, LG Sunset, LG Power, LG Access, G Flex, LG Volt 2, LG G Stylo, LG Lancet, LG Tribute 2, LG Logos, LG Transpyre, LG Optimus F60, LG G3, LG Ultimate 2, LG Tribute, LG G3 Vigor, LG Realm, LG Optimus L70, LG F90, LG Volt, LG Optimus Fuel, LG Lucid 3, LG Optimus L90, LG Optimus Zone 2, LG Optimus F3Q, LG F7, LG Nexus 5, LG G2, LG Optimus F6, LG Enact, LG Optimus Quest, LG Optimus F3, LG Optimus F7, LG Optimus F5, Optimus G Pro, Lucid 2, LG Nexus 4, LG Optimus REGARD, LG Mach, LG Optimus G, LG Escape, LG Spectrum 2, LG Intuition, LG Motion 4G, LG laptops such as , LG-13Z980-A.AAS5U1, 13Z980-A.AAS7U1, 13Z980-U.AAW5U1, 14Z980-A.AAS7U1, 14Z980-U.AAW5U1, 15Z980-U.AAS5U1, 15Z980-A.AAS7U1, 15Z980-A.AAS8U1, 15Z980-R.AAS9U1, 13Z970-A.AAS5U1, 13Z970-U.AAW5U1, 14Z970-A.AAS5U1, 14Z970-A.AAS7U1, 15Z970-A.AAS7U1, 15Z970-U.AAS5U1, 15Z975-A.AAS7U1, 13Z975-A.AAS7U1, 15Z975-A.AAS5U1, LG wireless speakers such as , 4.1 ch Sound Bar Surround System with Wireless Surround Sound Speakers, 2.1 ch High Resolution Audio Sound Bar, 7.1ch 700W Wi-Fi

Streaming Array Sound Bar with Wireless Subwoofer, NP8540 Music Flow H5 Wireless Speaker, NP8340 Music Flow H3 Wireless Speaker, NP7550 20W 2.0ch P7 Music Flow Portable Speaker, LAS851M 4.1ch 320W Music Flow Wi-Fi Streaming Sound Bar with Wireless Subwoofer, LAS751M 4.1ch 360W Music Flow Wi-Fi Streaming Sound Bar with Wireless Subwoofer, NP8740 Music Flow H7 Wi-Fi Streaming Speaker, NP5550B Music Flow P5 Portable Bluetooth Speaker, LAS855M 4.1ch 360W Music Flow Wireless Curved Sound Bar with Wireless Subwoofer, NP8350B Music Flow H4 Wi-Fi Streaming Portable Speaker, SoloG Portable Bluetooth Speaker, ZeroG Levitating Portable Bluetooth Speaker with Subwoofer, LOUDR Portable Hi-Fi Speaker System with Bluetooth Connectivity, NP7550 20W 2.0ch P7 Music Flow Portable Speaker, PBS-C510 LG Sound360 Bluetooth® Speaker, NP5550B Music Flow P5 Portable Bluetooth Speaker, NP8350B Music Flow H4 Wi-Fi Streaming Portable Speaker, SJ4R 4.1 ch Sound Bar Surround System with Wireless Surround Sound Speakers, LAS475B 2.1ch 300W Sound Bar with Wireless Subwoofer and Bluetooth® Connectivity, SJ9 5.1.2 ch High Resolution Audio Sound Bar with Dolby Atmos, SJC8 4.1 ch High Resolution Audio Sound Bar, SJ8 4.1 ch High Resolution Audio Sound Bar, SJ7 Sound Bar Flex with Wireless Subwoofer, SJ6B 2.1 ch High Resolution Audio Sound Bar, SJ5Y-S 2.1 ch High Resolution Audio Sound Bar, SJ4Y-S 2.1 ch High Resolution Audio Sound Bar, SH7B 360W 4.1ch Music Flow Wi-Fi Streaming Sound Bar with Wireless Subwoofer, SH2 100W 2.1ch Sound Bar with Bluetooth® Connectivity, LASC47 2.1 ch High Resolution Audio Sound Bar, LASC27 100W 2.0 ch Sound Bar with Bluetooth® Connectivity, LAS260B 100W 2.0 ch Sound Bar with Bluetooth® Connectivity, SJ2 160W 2.1ch Sound Bar with Bluetooth® Connectivity, SJ4Y 2.1 ch High Resolution Audio Sound Bar, SH5B 320W 2.1ch Sound Bar with Wireless Subwoofer and Bluetooth® Connectivity, SH4 2.1ch 300W Sound Bar with Wireless Subwoofer

and Bluetooth® Connectivity, SH6 4.0ch Music Flow Wi-Fi Streaming Sound Bar with Dual Bass Ports, SH3K 2.1ch 300W Soundbar with Wireless Subwoofer, LAS950M 7.1ch 700W Wi-Fi Streaming Array Sound Bar with Wireless Subwoofer, HF85JA Ultra Short Throw Laser Smart Home Theater Projector, PH30JG HD LED Portable MiniBeam Projector w/ up to 4 hour battery life, HF80JA Laser Smart Home Theater Projector, PF1000UW Ultra Short Throw LED Home Theater Projector with webOS Smart TV and Magic Remote, PF1500W LED Home Theater Projector with webOS Smart TV and Magic Remote, PH450UG Ultra Short Throw LED Projector with Embedded Battery, PW1500 1500 Lumen Minibeam LED Projector With Screen Share and Bluetooth Sound Out, PH550 Minibeam LED Projector with Built-In Battery, Bluetooth Sound Out and Screen Share, PH150G LED Projector with Embedded Battery and Screen Share, PV150G Minibeam LED Projector with Embedded Battery, PF1000UA Ultra Short Throw LED Home Theater Projector with Digital TV Tuner, PH450U Ultra Short Throw LED Projector with Embedded Battery and Digital TV Tuner, and PH150B Portable HD LED Projector (collectively “Accused Infringing Devices”).

15. The Accused Infringing Devices are electronic devices that implement communications systems wherein a first or primary device broadcasts messages including data to a second or secondary device to poll the second or secondary device that responds to the first or primary device when the second or secondary device has data to transmit to the first or primary device.

16. LG has infringed, and continues to infringe, claims of the '049 Patent in the United States, including at least claims 2-6 and 8-9, by making, using, offering for sale, selling and/or importing the Accused Infringing Devices in violation of 35 U.S.C. § 271(a).

17. LG has also infringed, and continues to infringe, at least claims 2-6 and 8-9 of the '049 Patent by actively inducing others to use, offer for sale, and sell the Accused Infringing Devices. LG's customers who use those devices in accordance with LG's instructions infringe at least claims 2-6 and 8-9 of the '049 Patent, in violation of 35 U.S.C. § 271(a). LG intentionally instructs its customers to infringe through training videos, demonstrations, brochures, installation and user guides, such as those located at:

- [www.lg.com](http://www.lg.com)
- <https://developer.android.com/guide/topics/connectivity/bluetooth-le.html>
- <http://www.lg.com/us/support-mobile/lg-H820-Silver>
- <http://www.lg.com/us/support/manuals-documents>

LG is thereby liable for infringement of the '049 Patent under 35 U.S.C. § 271(b).

18. LG has also infringed, and continues to infringe, at least claims 2-6 and 8-9 of the '049 patent by offering to commercially distribute, commercially distributing, or importing the Accused Infringing Devices which devices are used in practicing the processes, or using the systems, of the '049 patent, and constitute a material part of the invention. LG knows portions of the Accused Devices to be especially made or especially adapted for use in infringement of the '049 patent, not a staple article, and not a commodity of commerce suitable for substantial noninfringing use. LG is thereby liable for infringement of the '049 Patent under 35 U.S.C. § 271(c).

19. LG will have been on notice of the '049 Patent since, at the latest, the service of this complaint upon it. By the time of trial, LG will have known and intended (since receiving such notice) that its continued actions would actively induce and contribute to the infringement of at least claims 2-6 and 8-9 of the '049 Patent.

20. LG may have infringed the '049 Patent through other software and devices utilizing the same or reasonably similar functionality, including other versions of the Accused Infringing Devices.

21. Uniloc has been damaged by LG's infringement of the '049 Patent.

**PRAYER FOR RELIEF**

Uniloc requests that the Court enter judgment against LG:

- (A) declaring that LG has infringed the '049 Patent;
- (B) awarding Uniloc its damages suffered as a result of LG's infringement of the '049 Patent;
- (C) awarding Uniloc its costs, attorneys' fees, expenses, and interest, and
- (D) granting Uniloc such further relief as the Court finds appropriate.

**DEMAND FOR JURY TRIAL**

Uniloc demands trial by jury, under Fed. R. Civ. P. 38.

AO 120 (Rev. 08/10)

TO: <b>Mail Stop 8</b> <b>Director of the U.S. Patent and Trademark Office</b> <b>P.O. Box 1450</b> <b>Alexandria, VA 22313-1450</b>	<b>REPORT ON THE</b> <b>FILING OR DETERMINATION OF AN</b> <b>ACTION REGARDING A PATENT OR</b> <b>TRADEMARK</b>
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In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Marshall Division on the following

Trademarks or  Patents. (  the patent action involves 35 U.S.C. § 292.);

DOCKET NO. 2:18-cv-00041	DATE FILED 2/26/2017	U.S. DISTRICT COURT Eastern District of Texas, Marshall Division
PLAINTIFF UNILOC USA, INC. and UNILOC LUXEMBOURG, S.A.		DEFENDANT SAMSUNG ELECTRONICS AMERICA, INC. and SAMSUNG ELECTRONICS, CO. LTD.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 6,993,049	1/31/2006	Uniloc Luxembourg, S.A.
2		
3		
4		
5		

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY <input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT
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CLERK	(BY) DEPUTY CLERK	DATE
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Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director  
 Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

**PART B - FEE(S) TRANSMITTAL**

Complete and send this form, together with applicable fee(s), to: Mail

**Mail Stop ISSUE FEE  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
or Fax (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)

24737 7590 08/08/2005

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P.O. BOX 3001  
BRIARCLIFF MANOR, NY 10510**



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**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 facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

<u>EDNA CHAPA</u>	(Depositor's name)
<u>Edna Chapa</u>	(Signature)
<u>11/8/05</u>	(Date)

11/15/2005 GWORDF2 00000054 141270 09876514

01 FC:1501 1400.00 DA  
02 FC:1504 300.00 DA

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/876,514	06/07/2001	Robert J. Davies	PHGB000108	9203

TITLE OF INVENTION: COMMUNICATION SYSTEM

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1400	\$300	\$1700	11/08/2005

EXAMINER	ART UNIT	CLASS-SUBCLASS
ABELSON, RONALD B	2666	370-390000

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 03-02 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list  
 (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, \_\_\_\_\_ 1  
 (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  
 \_\_\_\_\_ 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 has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: **KONINKLIJKE PHILIPS ELECTRONICS N.V.**  
 (B) RESIDENCE: (CITY and STATE OR COUNTRY) **Eindhoven, The Netherlands**

Please check the appropriate assignee category or categories (will not be printed on the patent):  Individual  Corporation or other private group entity  Government

4a. The following fee(s) are enclosed:  
 Issue Fee  
 Publication Fee (No small entity discount permitted)  
 Advance Order - # of Copies \_\_\_\_\_

4b. Payment of Fee(s):  
 A check in the amount of the fee(s) is enclosed.  
 Payment by credit card. Form PTO-2038 is attached.  
 The Director is hereby authorized by charge the required fee(s), or credit any overpayment, to Deposit Account Number 14-1270 (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)  
 a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.  b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

The Director of the USPTO is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above. NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature: Eric M. Bram Date: 11/8/05  
 Typed or printed name: Eric M. Bram Registration No.: 37,285

This collection of information 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 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, 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.

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NOTICE OF ALLOWANCE AND FEE(S) DUE

24737 7590 08/08/2005
PHILIPS INTELLECTUAL PROPERTY & STANDARDS
P.O. BOX 3001
BRIARCLIFF MANOR, NY 10510

EXAMINER

ABELSON, RONALD B

ART UNIT PAPER NUMBER

2666

DATE MAILED: 08/08/2005

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
09/876,514 06/07/2001 Robert J. Davies PHGB000108 9203

TITLE OF INVENTION: COMMUNICATION SYSTEM

Table with 6 columns: APPLN. TYPE, SMALL ENTITY, ISSUE FEE, PUBLICATION FEE, TOTAL FEE(S) DUE, DATE DUE
nonprovisional NO \$1400 \$300 \$1700 11/08/2005

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 REFLECTS A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE APPLIED IN THIS APPLICATION. THE PTOL-85B (OR AN EQUIVALENT) MUST BE RETURNED WITHIN THIS PERIOD EVEN IF NO FEE IS DUE OR THE APPLICATION WILL BE REGARDED AS ABANDONED.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

- A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.
B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

- A. Pay TOTAL FEE(S) DUE shown above, or
B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL should be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). Even if the fee(s) have already been paid, Part B - Fee(s) Transmittal should be completed and returned. If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted.

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: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.



**PART B - FEE(S) TRANSMITTAL**

Complete and send this form, together with applicable fee(s), to: **Mail** **Mail Stop ISSUE FEE**  
**Commissioner for Patents**  
**P.O. Box 1450**  
**Alexandria, Virginia 22313-1450**  
**or Fax (571) 273-2885**

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CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

24737 7590 08/08/2005

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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.

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(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/876,514	06/07/2001	Robert J. Davies	PHGB000108	9203

TITLE OF INVENTION: COMMUNICATION SYSTEM

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nonprovisional	NO	\$1400	\$300	\$1700	11/08/2005

EXAMINER	ART UNIT	CLASS-SUBCLASS
ABELSON, RONALD B	2666	370-390000

<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 03-02 or more recent) attached. Use of a Customer Number is required.</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>
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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 has been filed for recordation as set forth in 37 CFR 3.11. 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

<p>4a. The following fee(s) are enclosed:</p> <p><input type="checkbox"/> Issue Fee</p> <p><input type="checkbox"/> Publication Fee (No small entity discount permitted)</p> <p><input type="checkbox"/> Advance Order - # of Copies _____</p>	<p>4b. Payment of Fee(s):</p> <p><input type="checkbox"/> A check in the amount of the fee(s) is enclosed.</p> <p><input type="checkbox"/> Payment by credit card. Form PTO-2038 is attached.</p> <p><input type="checkbox"/> The Director is hereby authorized by charge the required fee(s), or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).</p>
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5. Change in Entity Status (from status indicated above)

a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.  b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

The Director of the USPTO is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above. NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature \_\_\_\_\_ Date \_\_\_\_\_

Typed or printed name \_\_\_\_\_ Registration No. \_\_\_\_\_

This collection of information 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 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, 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.

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Table with columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO., EXAMINER, ART UNIT, PAPER NUMBER. Includes application details for Robert J. Davies and examiner Abelson, Ronald B.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 641 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 641 day(s).

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 Customer Service Center of the Office of Patent Publication at (703) 305-8283.

SP

<b>Notice of Allowability</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/876,514	DAVIES, ROBERT J.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Ronald Abelson	2666	

-- 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 2/18/2005.
2.  The allowed claim(s) is/are 1-12.
3.  The drawings filed on 07 June 2001 are accepted by the Examiner.
4.  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - 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.**

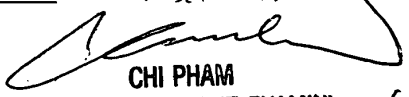
5.  A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6.  CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
  - (a)  including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
    - 1)  hereto or 2)  to Paper No./Mail Date \_\_\_\_\_.
  - (b)  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).

7.  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. <input type="checkbox"/> Notice of References Cited (PTO-892)  | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)           |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                | 6. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____ |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),<br>Paper No./Mail Date _____ | 7. <input type="checkbox"/> Examiner's Amendment/Comment                              |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material          | 8. <input type="checkbox"/> Examiner's Statement of Reasons for Allowance             |
|   | 9. <input checked="" type="checkbox"/> Other <u>Technical Disclaimer</u>              |

  
**CHI PHAM**

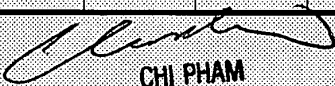

PERMISSORY PATENT EXAMINER  
 TECHNOLOGY CENTER

8/3/05

<b>Issue Classification</b> 	Application No.	Applicant(s)	
	09/876,514	DAVIES, ROBERT J.	
	Examiner	Art Unit	
	Ronald Abelson	2666	

ISSUE CLASSIFICATION										
ORIGINAL				CROSS REFERENCE(S)						
CLASS	SUBCLASS			CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					
370	520			370	346	449	465			
INTERNATIONAL CLASSIFICATION										
H	04	J	3112							
H	04	J	3116							
H	04	L	121403							
			1							
			1							

Ronald Abelson (Assistant Examiner)	6/20/05 (Date)	 <b>CHI PHAM</b> <b>PROVISORY PATENT EXAMINER</b> <small>PROVISORY PATENT EXAMINER</small> (Primary Examiner)	Total Claims Allowed:	
 (Legal Instruments Examiner)	8/5/05 (Date)		12	O.G. Print Claim(s)
			1	1

<input type="checkbox"/> Claims renumbered in the same order as presented by applicant		<input type="checkbox"/> CPA		<input type="checkbox"/> T.D.		<input type="checkbox"/> R.1.47	
Final	Original	Final	Original	Final	Original	Final	Original
1	1		31	61	91	121	151
2	2		32	62	92	122	152
3	3		33	63	93	123	153
4	4		34	64	94	124	154
5	5		35	65	95	125	155
6	6		36	66	96	126	156
7	7		37	67	97	127	157
8	8		38	68	98	128	158
9	9		39	69	99	129	159
10	10		40	70	100	130	160
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12	12		42	72	102	132	162
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UNITED STATES PATENT AND TRADEMARK OFFICE

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 United States Patent and Trademark Office  
 Address: COMMISSIONER FOR PATENTS  
 P.O. Box 1450  
 Alexandria, Virginia 22313-1450  
 www.uspto.gov

**\*BIBDATASHEET\***

**CONFIRMATION NO. 9203**

Bib Data Sheet

SERIAL NUMBER 09/876,514	FILING DATE 06/07/2001  RULE	CLASS 370	GROUP ART UNIT 2666	ATTORNEY DOCKET NO. PHGB000108
APPLICANTS  Robert J. Davies, Horley, UNITED KINGDOM;  ** CONTINUING DATA ***** <p style="text-align: center;"><i>now Ru 6/20/05</i></p> ** FOREIGN APPLICATIONS ***** UNITED KINGDOM 0015454.2 06/26/2000 <i>Ru 6/20/05</i> UNITED KINGDOM 0020076.6 08/15/2000				
IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 08/07/2001				
Foreign Priority claimed <input checked="" type="checkbox"/> yes <input type="checkbox"/> no 35 USC 119 (a-d) conditions met <input checked="" type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> Met after Allowance Verified and Acknowledged Examiner's Signature: <i>Ron Weber</i> Initials: <i>RW</i>	STATE OR COUNTRY UNITED KINGDOM	SHEETS DRAWING 3	TOTAL CLAIMS 12	INDEPENDENT CLAIMS 4
ADDRESS 24737 PHILIPS INTELLECTUAL PROPERTY & STANDARDS P.O. BOX 3001 BRIARCLIFF MANOR , NY 10510				
TITLE Communication system				
FILING FEE RECEIVED 790	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees ( Filing ) <input type="checkbox"/> 1.17 Fees ( Processing Ext. of time ) <input type="checkbox"/> 1.18 Fees ( Issue ) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit	

**Search Notes**



Application No.

09/876,514

Examiner

Ronald Abelson

Applicant(s)

DAVIES, ROBERT J.

Art Unit

2666

**SEARCHED**

Class	Subclass	Date	Examiner
370	528 346 449 465	6/9/05	RU

**SEARCH NOTES  
(INCLUDING SEARCH STRATEGY)**

	DATE	EXMR
East database	6/9/05	RU

**INTERFERENCE SEARCHED**

Class	Subclass	Date	Examiner
Opp. interference search		8/2/05	RU

**Index of Claims**



Application No.

09/876,514

Examiner

Ronald Abelson

Applicant(s)

DAVIES, ROBERT J.

Art Unit

2666

√	Rejected
=	Allowed

-	(Through numeral) Cancelled
+	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

Claim		Date	
Final	Original		
1	1		
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Claim		Date	
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Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
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L2	1	(primary same secondary same poll\$3 same field).clm.	US-PGPUB	OR	ON	2005/08/03 11:41

*Interferem  
search*



S46	2	S45	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2005/06/09 15:43
S47	2912	(370/528 370/346 370/449 370/465).ccis.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2005/06/09 15:45
S48	146	S47 and (poll\$3 same field)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2005/06/09 15:45
S49	2	"6233231".pn.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2005/06/10 10:37
S50	1	S49 and (downlink with shared)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2005/06/10 10:39
S51	17650	umts	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2005/06/10 10:39
S52	804	umts same (field)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2005/06/10 10:40
S53	124	umts same (field same channel)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2005/06/10 10:40
S54	27	umts same (field same channel same code)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2005/06/10 10:40
S55	11	umts same (field same channel same code same (user remote recipient))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2005/06/10 10:42

S56	309	umts same (packet)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2005/06/10 10:42
S57	101	umts same (packet same field)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2005/06/10 10:45
S58	442	downlink adj2 control adj1 channel	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2005/06/10 10:45
S59	269	S58 and (code same channel)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2005/06/10 10:45
S60	105	S58 and (code same channel same (user recipient))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2005/06/10 10:46
S61	205	S58 and (format samecode same channel same (user recipient))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2005/06/10 10:46
S62	14	S58 and (format same code same channel same (user recipient))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2005/06/10 10:49
S63	21	(umts same (downlink adj2 control adj1 channel))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2005/06/10 10:52
S64	344	(header same (code same channel same destination))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2005/06/10 10:54
S65	61	(header same format same (code same channel same destination))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2005/06/10 10:54

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	2	bluetooth and (pag\$3 with signal with (size length))	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2004/04/16 13:43
S2	298	(pag\$3 with signal with (option\$4))	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2004/04/16 13:41
S3	3	(pag\$3 with signal with (option\$4)with field)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2004/04/16 13:41
S4	7	bluetooth and (pag\$3 with signal with (format size length))	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2004/04/16 13:44
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S6	216	(pag\$3 with signal with (format size length)with (bit byte))	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2004/04/16 13:45
S7	20	((paging adj1 signal) with (format size length)with (bit byte))	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2004/04/16 13:46
S8	1051	bluetooth	USPAT	OR	OFF	2004/11/26 08:54
S9	10537	bluetooth	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2004/04/15 15:53
S10	60	bluetooth and((broadcast with channel)same (pag\$3 inquir\$3))	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2004/04/15 16:24
S11	2	"6574266".pn.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2004/04/15 16:24
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S13	322	davies.inv. with robert	US-PGPUB; USPAT	OR	ON	2004/11/23 14:15

S14	13	S13 and (data adj1 delivery)	US-PGPUB; USPAT	OR	ON	20
S15	1	"6664891".pn.	US-PGPUB; USPAT	OR	ON	20
S16	1	"6625901".pn.	US-PGPUB; USPAT	OR	ON	20
S17	1	"6225901".pn.	US-PGPUB; USPAT	OR	ON	2004/11/23 15:13
S18	2749	(370/528 370/346 370/449 370/465).ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/23 15:14
S19	920	S18 and (poll\$3)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/23 15:14
S20	16	S19 and (poll\$3 same guard)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/23 15:23
S21	5	S19 and (poll\$3 with guard)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/23 15:24
S22	112	(poll\$3 with guard)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/23 15:27
S23	0	S22 and bluetooth	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/23 15:24
S24	3	(poll\$3 same guard) and bluetooth	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/23 15:24
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S26	8	(370/528).ccls. and (poll polled polling)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/26 08:55
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S28	59	guard with (poll polled polling)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/26 09:17
S29	4	"6801543".pn.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/26 09:17
S30	1	S29 and "54"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/26 09:18
S31	1028	guard with variable	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/26 09:18
S32	7	(guard with variable) same (poll polled polling)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/26 09:40
S33	2	"6574266".pn.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/26 09:40
S34	1	S33 and pag\$3	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/26 09:42
S35	4	("5528623" "5430775").pn.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/26 09:42

S36	0	S35 and pag\$3	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/26 09:42
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S39	1	S38 and "64"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/26 11:37
S40	0	S38 and "other aspects"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/26 11:37
S41	1	S38 and "other"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/26 11:53
S42	2	S38 and "inquiry"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/26 12:49
S43	66	abelson.xa.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/26 12:49
S44	1	S43 and lucent.asn.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/26 12:49
S45	2	"6574266".pn.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2005/06/09 15:43

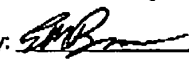
Appl. No. 09/876,514  
Amendment and/or Response  
Reply to Office action of 29 November 2004

FEB 18 2005

Page 1 of 5

**IN THE UNITED STATES  
PATENT AND TRADEMARK OFFICE**

Appl. No. : 09/876,514  
Applicant(s) : Robert J. DAVIES  
Filed : 7 June 2001  
TC/A.U. : 2666  
Examiner : Ronald B. ABELSON  
Atty. Docket : GB-000108

**CERTIFICATE OF  
TRANSMISSION**  
I certify that this paper is  
being transmitted by fac-  
simile to the U.S. Patent  
and Trademark Office at  
**(703) 872-9306**  
on:  
**18 February 2005**  
By: 

Title: COMMUNICATION SYSTEM

**AMENDMENT and/or RESPONSE under 37 C.F.R. § 1.111**

Mail Stop Non-Fee Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

In response to the non-final Office action of 29 November 2004, please amend the above referenced application as follows and reconsider the application in light of the following remarks. Please charge Deposit Account No. 14-1270 for any required extension of time or excess claim fees for filing this paper.

**This paper includes (each beginning on a separate sheet):**

- 1. Amendments to and/or listing of the claims;**
- 2. Remarks / Discussion of issues.**

Appl. No. 09/876,514  
Amendment and/or Response  
Reply to Office action of 29 November 2004

Page 2 of 5

### Amendments to the Claims:

A listing of the entire set of pending claims (including amendments to the claims, if any) is submitted herewith per 37 CFR 1.121. This listing of claims will replace all prior versions, and listings, of claims in the application.

#### **Listing of Claims:**

1. (Previously presented) A communications system comprising a primary station and at least one secondary station, wherein the primary station has means for broadcasting a series of inquiry messages, each in the form of a plurality of predetermined data fields arranged according to a first communications protocol, and means for adding to an inquiry message prior to transmission an additional data field for polling at least one secondary station, and wherein the at least one polled secondary station has means for determining when an additional data field has been added to the plurality of data fields, for determining whether it has been polled from the additional data field and for responding to a poll when it has data for transmission to the primary station.

2. (Original) A primary station for use in a communications system comprising at least one secondary station, wherein means are provided for broadcasting a series of inquiry messages, each in the form of a plurality of predetermined data fields arranged according to a first communications protocol, and for adding to each inquiry message prior to transmission an additional data field for polling at least one secondary station.

3. (Previously presented) The primary station of claim 2, wherein means are provided for adding the additional data field at the end of a respective inquiry message.



Appl. No. 09/876,514  
Amendment and/or Response  
Reply to Office action of 29 November 2004

Page 3 of 3

4. (Previously presented) The primary station of claim 2, wherein means are provided for including an indication in one of the predetermined data fields, the indication denoting the presence of the additional data field.

5. (Previously presented) The primary station of claim 2, wherein the first communications protocol comprises Bluetooth messaging.

6. (Previously presented) The primary station of claim 2, wherein the additional data field comprises at least 64 bits of data.

7. (Previously presented) The primary station of claim 2, wherein first radio means are provided for broadcasting substantially continuously inquiry messages having the additional data field and second radio means are provided for handling other aspects of communication links with secondary stations.

8. (Original) A secondary station for use in a communications system comprising a primary station, wherein means are provided for receiving an inquiry message broadcast by the primary station, the message being in the form of a plurality of predetermined data fields arranged according to a first communications protocol and having added to it an additional data field for polling at least one secondary station, and wherein means are provided for determining when an additional data field has been added to the plurality of data fields, for determining whether it has been polled from the additional data field and for responding to a poll when it has data for transmission to the primary station.

9. (Previously presented) The secondary station of claim 8, wherein the first communications protocol comprises Bluetooth messaging.

10. (Previously presented) The secondary station of claim 8, wherein means are provided for responding to a poll after a predetermined interval has passed

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Reply to Office action of 29 November 2004

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without transmission of data, whether or not the secondary station has data for transmission.

11. (Previously presented) A method of operating a communication system comprising a primary station and at least one secondary station, the method comprising the primary station broadcasting a series of inquiry messages, each in the form of a plurality of predetermined data fields arranged according to a first communications protocol, and adding to an inquiry message prior to transmission an additional data field for polling at least one secondary station, and further comprising the at least one polled secondary station determining when an additional data field has been added to the plurality of data fields, determining whether it has been polled from the additional data field and responding to a poll when it has data for transmission to the primary station.

12. (Previously presented) The method of claim 11, wherein not all inquiry messages have an additional data field for polling a secondary station added to them.

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### REMARKS / DISCUSSION OF ISSUES

Claims 1-12 are pending in the application.

Applicant(s) thank(s) the Examiner for acknowledging the claim for priority and receipt of certified copies of all the priority document(s), and for stating that the drawings are acceptable.

The Office action rejects claims 1-5, 7-9, 11, and 12 for double patenting over claims of U.S. Pat. No. 6,664,891. A Terminal Disclaimer is filed herewith to obviate the double patenting rejection. Accordingly, withdrawal of the rejection of claims 1-5, 7-9, 11, and 12 is respectfully requested.

The **Office Action Summary** states that claims 6 and 10 are objected to, but the body of the Office action does not detail the objection. It is presumed that the objection is only for depending from a rejected claim, and that the Terminal Disclaimer filed herewith obviates this objection. Accordingly, withdrawal of the objection of claims 6 and 10 is respectfully requested.

In view of the foregoing, applicant(s) respectfully request(s) that the Examiner withdraw the objection(s) and/or rejection(s) of record, allow all the pending claims, and find the application in condition for allowance. If any points remain in issue that may best be resolved through a personal or telephonic interview, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.


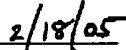

Respectfully submitted,



Eric M. Bram  
Reg. 37,285  
Att'y for Applicant(s)  
Philips Intellectual Property  
& Standards

P.O. Box 3001  
Briarcliff Manor, NY 10510-8001  
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Fax: (914) 332-0615

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<b>TERMINAL DISCLAIMER TO OBTAIN A DOUBLE PATENTING REJECTION OVER A PRIOR PATENT</b>	Docket Number (Optional) <b>GB 000108</b>
<p>In re Application of: <b>ROBERT J. DAVIES</b></p> <p>Application No. <b>09/876,514</b></p> <p>Filed: <b>JUNE 7, 2001</b></p> <p>For: <b>COMMUNICATION SYSTEM</b></p> <p>The owner, Koninklijke Philips Electronics N.V. of the entire interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term defined in 35 U.S.C. 154 to 156 and 173, as presently shortened by any terminal disclaimer, of prior Patent No. <u>6,664,891</u>. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the prior patent are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.</p> <p>In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. 154 to 156 and 173 of the prior patent, as presently shortened by any terminal disclaimer. In the event that it later: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321, has all claims cancelled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.</p> <p>Please charge Deposit Account 14-1270, the terminal disclaimer fee under 37 CFR 1.20(d).</p> <p>The undersigned is an attorney of record.</p> <div style="text-align: center;">         _____        Signature     </div> <div style="text-align: right;">         _____        Date     </div> <div style="text-align: center; margin-top: 10px;"> <b>Eric M. Bram</b>        _____        Typed or printed name     </div> <div style="border: 1px solid black; padding: 10px; margin-top: 20px; text-align: center;"> <p><b>CERTIFICATE OF TRANSMISSION</b></p> <p>I certify that this correspondence is being transmitted by facsimile to the U.S. Patent and Trademark Office at <b>703-872-9306</b></p> <p>On: <u>2/18/05</u></p> <p>By: </p> </div>	

See Comments to form

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**PATENT APPLICATION FEE DETERMINATION RECORD**  
Effective October 1, 2000

Application or Docket Number

09/27/04  
C-000-104

**CLAIMS AS FILED - PART I**

	(Column 1)	(Column 2)
TOTAL CLAIMS	12	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	12 minus 20 =	
INDEPENDENT CLAIMS	4 minus 3 =	1
MULTIPLE DEPENDENT CLAIM PRESENT		<input type="checkbox"/>

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

8/23/04 **CLAIMS AS AMENDED - PART II**

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total	12 Minus	**
	Independent	4 Minus	***
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>			

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2/18/05

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total	12 Minus	** 20
	Independent	4 Minus	*** 4
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>			

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	(Column 1)	(Column 2)	(Column 3)
AMENDMENT C	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total	12 Minus	**
	Independent	4 Minus	***
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>			

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

SMALL ENTITY TYPE  OR OTHER THAN SMALL ENTITY

RATE	FEE	OR	RATE	FEE
BASIC FEE	355.00	OR	BASIC FEE	710.00
X\$ 9=		OR	X\$18=	
X40=		OR	X80=	80
+135=		OR	+270=	
TOTAL		OR	TOTAL	770


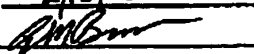
SMALL ENTITY TYPE  OR OTHER THAN SMALL ENTITY

RATE	ADDITIONAL FEE	OR	RATE	ADDITIONAL FEE
X\$ 9=		OR	X\$18=	
X40=		OR	X80=	
+135=		OR	+270=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE	OR	RATE	ADDITIONAL FEE
X\$ 9=		OR	X\$18=	
X40=		OR	X80=	
+135=		OR	+270=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE	OR	RATE	ADDITIONAL FEE
X\$ 9=		OR	X\$18=	
X40=		OR	X80=	
+135=		OR	+270=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

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<b>TERMINAL DISCLAIMER TO OBTAIN A DOUBLE PATENTING REJECTION OVER A PRIOR PATENT</b>	Docket Number (Optional) <b>GB 000108</b>
<p>In re Application of: <b>ROBERT J. DAVIES</b></p> <p>Application No. <b>09/876,514</b></p> <p>Filed: <b>JUNE 7, 2001</b></p> <p>For: <b>COMMUNICATION SYSTEM</b></p> <p>The owner, Koninklijke Philips Electronics N.V. of the entire interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term defined in 35 U.S.C. 154 to 156 and 173, as presently shortened by any terminal disclaimer, of prior Patent No. <u>6,664,891</u>. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the prior patent are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.</p> <p>In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. 154 to 156 and 173 of the prior patent, as presently shortened by any terminal disclaimer, in the event that it later: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321, has all claims cancelled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.</p> <p>Please charge Deposit Account 14-1270, the terminal disclaimer fee under 37 CFR 1.20(d).</p> <p>The undersigned is an attorney of record.</p> <div style="text-align: center;">         Signature     </div> <div style="text-align: right;"> <u>2/18/05</u>        Date     </div> <div style="text-align: center;"> <b>Eric M. Bram</b>        Typed or printed name     </div> <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> <p style="text-align: center; margin: 0;"><b>CERTIFICATE OF TRANSMISSION</b></p> <p style="margin: 0;">I certify that this correspondence is being transmitted by facsimile to the U.S. Patent and Trademark Office at <b>703-872-9306</b></p> <p style="margin: 0;">On: <u>2/18/05</u></p> <p style="margin: 0;">By: </p> </div>	

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PAGE 6/6 \* RCVD AT 2/18/2005 2:07:06 PM [Eastern Standard Time] \* SVR:USPTO-EFXRF-1/0 \* DNS:8729306 \* CSID:914 332 0615 \* DURATION (min:sec):01:52

06/08/2005 16:00:00 0000006 141270 09 76514

01 FC:1614 130. DATA P.05

<b>Application Number</b> 	<b>Application/Control No.</b> 09/876,514	<b>Applicant(s)/Patent under Reexamination</b> DAVIES, ROBERT J.

<b>Document Code - DISQ</b>	<b>Internal Document - DO NOT MAIL</b>
-----------------------------	--

<b>TERMINAL DISCLAIMER</b>	<input checked="" type="checkbox"/> <b>APPROVED</b>	<input type="checkbox"/> <b>DISAPPROVED</b>
Date Filed : 02/18/05	This patent is subject to a Terminal Disclaimer	

<b>Approved/Disapproved by:</b>
jgunter-riley

U.S. Patent and Trademark Office



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/876,514	06/07/2001	Robert J. Davies	PHGB000108	9203

24737 .7590 11/29/2004

PHILIPS INTELLECTUAL PROPERTY & STANDARDS  
P.O. BOX 3001  
BRIARCLIFF MANOR, NY 10510

EXAMINER
----------

ABELSON, RONALD B

ART UNIT	PAPER NUMBER
----------	--------------

2666

DATE MAILED: 11/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.



Ak

<b>Office Action Summary</b>	<b>Application No.</b> 09/876,514	<b>Applicant(s)</b> DAVIES, ROBERT J.	
	<b>Examiner</b> Ronald Abelson	<b>Art Unit</b> 2666	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1)  Responsive to communication(s) filed on 23 August 2004.
- 2a)  This action is FINAL.                      2b)  This action is non-final.
- 3)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4)  Claim(s) 1-12 is/are pending in the application.
  - 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5)  Claim(s) \_\_\_\_\_ is/are allowed.
- 6)  Claim(s) 1-5, 7-9, 11 and 12 is/are rejected.
- 7)  Claim(s) 6 and 10 is/are objected to.
- 8)  Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9)  The specification is objected to by the Examiner.
- 10)  The drawing(s) filed on 07 June 2001 is/are: a)  accepted or b)  objected to by the Examiner. Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a). Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11)  The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    - a)  All    b)  Some \*    c)  None of:
    - 1.  Certified copies of the priority documents have been received.
    - 2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    - 3.  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1)  Notice of References Cited (PTO-892)
- 2)  Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3)  Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4)  Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5)  Notice of Informal Patent Application (PTO-152)
- 6)  Other: \_\_\_\_\_

Art Unit: 2666

**Double Patenting**

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2. Claims 1, 2, 8, 11; 3-5; 7; 9; and 12<sup>are</sup> rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 10; 2-4; 5 and 10; 4; and 3 of U.S. Patent No. 6,664,891. Although the conflicting claims are not identical, they are not patentably distinct from each other.

Regarding applicant's claims 1, 2, and 11, although claim 10 of the patent does not explicitly teach polling and the secondary station responding to a poll when it has data for transmission to the primary station, the claim does teach the secondary device functioning as a transceiver (the at least one

Art Unit: 2666

second portable device is arranged to receive, device to further function as said first portable device). It would be obvious for the second portable device to respond to the first portable device when it has data for transmission to the primary station. This would benefit the system by sending to the first portable device information that is useful to the first portable device when the second portable device has the information.

Regarding claims 3-5, see patented claim 2-4 respectively in combination with claim 10.

Regarding claim 7, the first radio means are provided for broadcasting substantially continuously inquiry messages having the additional data field (see patented claim 5). Regarding the limitation second radio means are provided for handling other aspects of communication links with secondary stations, the examiner corresponds the 'other aspects' to be functioning as a receiver. As previously mentioned the device functions as a receiver as well as transmitter (claim 10).

Regarding claim 8, see patented claim 10.

Regarding claim 9, see patented claim 4 in combination with claim 10.

Regarding claim 12, not all inquiry messages have an additional data field added to them, see patented claim 3 in combination with claim 10. Note, if all inquiry messages have an additional data field added to them, then there would be no need to include an indication denoting the presence of the additional data field.

#### ***Response to Arguments***

3. Applicant's arguments with respect to claims 1-12 have been considered but are moot in view of the new ground(s) of rejection.

#### ***Conclusion***


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ronald Abelson whose telephone number is (571) 272-3165. The examiner can normally be reached on M-F.

Application/Control Number: 09/876,514  
Art Unit: 2666


Page 5

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema Rao can be reached on (571) 272-3174. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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).

  
Ronald Abelson  
Examiner  
Art Unit 2666

\*\*\*

  
CHI PHAM  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2666 02/29/07

<b>Notice of References Cited</b>	Application/Control No. 09/876,514	Applicant(s)/Patent Under Reexamination DAVIES, ROBERT J.	
	Examiner Ronald Abelson	Art Unit 2666	Page 1 of 1

**U.S. PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
A	US-6,664,891 B2	12-2003	Davies et al.	340/505
B	US-			
C	US-			
D	US-			
E	US-			
F	US-			
G	US-			
H	US-			
I	US-			
J	US-			
K	US-			
L	US-			
M	US-			

**FOREIGN PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
N					
O					
P					
Q					
R					
S					
T					

**NON-PATENT DOCUMENTS**

*	Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
U	
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.



**Search Notes**



Application No.

09/876,514

Applicant(s)

DAVIES, ROBERT J.

Examiner

Ronald Abelson

Art Unit

2666

**SEARCHED**

Class	Subclass	Date	Examiner
370	5 28 3 46 449, 465	11/24, 26/01	R U

**SEARCH NOTES  
(INCLUDING SEARCH STRATEGY)**

	DATE	EXMR
East database	11/24, 26/01	R U

**INTERFERENCE SEARCHED**

Class	Subclass	Date	Examiner





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**\*BIBDATASHEET\***

**CONFIRMATION NO. 9203**

Bib Data Sheet

SERIAL NUMBER 09/876,514	FILING DATE 06/07/2001  RULE	CLASS 370	GROUP ART UNIT 2666	ATTORNEY DOCKET NO. PHGB000108
-----------------------------	---------------------------------------	--------------	------------------------	--------------------------------------

APPLICANTS

Robert J. Davies, Horley, UNITED KINGDOM;

\*\* CONTINUING DATA \*\*\*\*\*


\*\* FOREIGN APPLICATIONS \*\*\*\*\*

UNITED KINGDOM 0015454.2 06/26/2000  
 UNITED KINGDOM 0020076.6 08/15/2000

*ra 11/26/04*

IF REQUIRED, FOREIGN FILING LICENSE GRANTED

\*\* 08/07/2001

Foreign Priority claimed 35 USC 119 (a-d) conditions met Verified and Acknowledged	<input checked="" type="checkbox"/> yes <input type="checkbox"/> no <input checked="" type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> Met after Allowance  Examiner's Signature	STATE OR  COUNTRY UNITED KINGDOM	SHEETS  DRAWING 3	TOTAL  CLAIMS 12	INDEPENDENT  CLAIMS 4
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ADDRESS

24737  
 PHILIPS INTELLECTUAL PROPERTY & STANDARDS  
 P.O. BOX 3001  
 BRIARCLIFF MANOR , NY  
 10510

TITLE

Communication system

FILING FEE  RECEIVED 790	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:	<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees ( Filing ) <input type="checkbox"/> 1.17 Fees ( Processing Ext. of time ) <input type="checkbox"/> 1.18 Fees ( Issue ) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit
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Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	2	"6664891".pn.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/26 11:36
L2	1	1 and "64"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/26 11:37
L3	0	1 and "other aspects"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/26 11:37
L4	1	1 and "other"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/26 11:53
L5	2	1 and "inquiry"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/26 11:54
S1	2	bluetooth and (pag\$3 with signal with (size length))	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2004/04/16 13:43
S2	298	(pag\$3 with signal with (option\$4))	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2004/04/16 13:41
S3	3	(pag\$3 with signal with (option\$4)with field)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2004/04/16 13:41
S4	7	bluetooth and (pag\$3 with signal with (format size length))	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2004/04/16 13:44
S5	1891	(pag\$3 with signal with (format size length))	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2004/04/16 13:45
S6	216	(pag\$3 with signal with (format size length)with (bit byte))	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2004/04/16 13:45

Search History 11/26/04 12:36:12 PM Page 1  
C:\APPS\EAST\Workspaces\09876514.wsp

S7	20	((paging adj1 signal) with (format size length)with (bit byte))	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2004/04/16 13:46
S8	1051	bluetooth	USPAT	OR	OFF	2004/11/26 08:54
S9	10537	bluetooth	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2004/04/15 15:53
S10	60	bluetooth and((broadcast with channel)same (pag\$3 inquir\$3))	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2004/04/15 16:24
S11	2	"6574266".pn.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2004/04/15 16:24
S12	2	"6574266".pn. and (master with slave)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2004/04/15 16:24
S13	322	davies.inv. with robert	US-PGPUB; USPAT	OR	ON	2004/11/23 14:15
S14	13	S13 and (data adj1 delivery)	US-PGPUB; USPAT	OR	ON	2004/11/23 14:16
S15	1	"6664891".pn.	US-PGPUB; USPAT	OR	ON	2004/11/23 14:28
S16	1	"6625901".pn.	US-PGPUB; USPAT	OR	ON	2004/11/23 14:29
S17	1	"6225901".pn.	US-PGPUB; USPAT	OR	ON	2004/11/23 15:13
S18	2749	(370/528 370/346 370/449 370/465).ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/23 15:14
S19	920	S18 and (poll\$3)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/23 15:14
S20	16	S19 and (poll\$3 same guard)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/23 15:23

S21	5	S19 and (poll\$3 with guard)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/23 15:24
S22	112	(poll\$3 with guard)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/23 15:27
S23	0	S22 and bluetooth	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/23 15:24
S24	3	(poll\$3 same guard) and bluetooth	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/23 15:24
S25	8	(370/528).ccls. and (poll polled polling)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2004/11/26 08:55
S26	8	(370/528).ccls. and (poll polled polling)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/26 08:55
S27	8	(370/528).ccls. and (poll polled polling)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/26 08:57
S28	59	guard with (poll polled polling)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/26 09:17
S29	4	"6801543".pn.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/26 09:17
S30	1	S29 and "54"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/26 09:18

S31	1028	guard with variable	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/26 09:18
S32	7	(guard with variable) same (poll polled polling)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/26 09:40
S33	2	"6574266".pn.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/26 09:40
S34	1	S33 and pag\$3	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/26 09:42
S35	4	("5528623" "5430775").pn.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/26 09:42
S36	0	S35 and pag\$3	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/26 09:42
S37	2	"6664891".pn.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2004/11/26 11:36

**PATENT APPLICATION FEE DETERMINATION RECORD**  
Effective October 1, 2000

Application or Docket Number  
*09/876514*  
*6 D 000 108*

**CLAIMS AS FILED - PART I**

	(Column 1)	(Column 2)
TOTAL CLAIMS	12	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	12 minus 20=	
INDEPENDENT CLAIMS	4 minus 3 =	1
MULTIPLE DEPENDENT CLAIM PRESENT <input type="checkbox"/>		

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

*8/23/04* **CLAIMS AS AMENDED - PART II**

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total	12 Minus	** =
	Independent	4 Minus	*** =
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>			

*Best available copy*

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total	Minus	** =
	Independent	Minus	*** =
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>			

*Best Available Copy*

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT C	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total	Minus	** =
	Independent	Minus	*** =
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>			

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

**SMALL ENTITY TYPE**  OR

RATE	FEE
BASIC FEE	355.00
X\$ 9=	
X40=	
+135=	
TOTAL	

**OTHER THAN SMALL ENTITY**

RATE	FEE
BASIC FEE	710.00
X\$18=	
X80=	80
+270=	
TOTAL	790

**SMALL ENTITY** OR

RATE	ADDITIONAL FEE
X\$ 9=	
X40=	
+135=	
TOTAL ADDIT. FEE	

**OTHER THAN SMALL ENTITY**

RATE	ADDITIONAL FEE
X\$18=	
X80=	
+270=	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
X\$ 9=	
X40=	
+135=	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
X\$18=	
X80=	
+270=	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
X\$ 9=	
X40=	
+135=	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
X\$18=	
X80=	
+270=	
TOTAL ADDIT. FEE	

41  
Appl. No. 09/876,514  
Amendment and/or Response  
Reply to Office action of 21 April 2004

2666/14  
Page 1 of 9



IN THE UNITED STATES  
PATENT AND TRADEMARK OFFICE

Appl. No. : 09/876,514  
Applicant(s) : Robert J. DAVIES  
Filed : 7 June 2001  
TC/A.U. : 2666  
Examiner : Ronald B. ABELSON  
Atty. Docket : GB-000108

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AUG 27 2004

Technology Center 2600

Title: COMMUNICATION SYSTEM

**AMENDMENT and/or RESPONSE under 37 C.F.R. § 1.111**

U.S. Patent and Trademark Office  
220 20th Street S.  
Customer Window, Mail Stop **Amendment**  
Crystal Plaza Two, Lobby, Room 1B03  
Arlington, VA 22202

Sir:

In response to the non-final Office action of 21 April 2004, the period for response being extended by the accompanying Petition and Petition Fee through 21 August 2004, reconsideration and reexamination of the above-identified U.S. patent application are respectfully requested in light of the following remarks.

**This paper includes** (each beginning on a separate sheet):

- 1. Amendments to the claims**
- 2. Remarks/Discussion of issues.**

Atty. Docket No. **GB-010108**

**Amendments to the Claims:**

A clean version of the entire set of pending claims (including amendments to the claims) is submitted herewith per 37 CFR 1.121(c)(3). This listing of claims will replace all prior versions, and listings, of claims in the application.

**Listing of Claims:**

1. (Currently Amended) A communications system comprising a primary station and at least one secondary station, wherein the primary station has means for broadcasting a series of inquiry messages, each in the form of a plurality of predetermined data fields arranged according to a first communications protocol, and means for adding to an inquiry message prior to transmission an additional data field for polling at least one secondary station, and wherein the ~~or each~~ at least one polled secondary station has means for determining when an additional data field has been added to the plurality of data fields, for determining whether it has been polled from the additional data field and for responding to a poll when it has data for transmission to the primary station.

2. (Original) A primary station for use in a communications system comprising at least one secondary station, wherein means are provided for broadcasting a series of inquiry messages, each in the form of a plurality of predetermined data fields arranged according to a first communications protocol, and for adding to each inquiry message prior to transmission an additional data field for polling at least one secondary station.

3. (Currently Amended) ~~A~~ The primary station as claimed in ~~of~~ claim 2, ~~characterised in that~~ wherein means are provided for adding the additional data field at the end of a respective inquiry message.



4. (Currently Amended) ~~A-The primary station as claimed in~~ of claim 2, characterised in that wherein means are provided for including an indication in one of the predetermined data fields, the indication denoting the presence of the additional data field.

5. (Currently Amended) ~~A-The primary station as claimed in~~ of claim 2, characterised in that wherein the first communications protocol comprises Bluetooth messaging.

6. (Currently Amended) ~~A-The primary station as claimed in~~ of claim 2, characterised in that wherein the additional data field comprises at least 64 bits of data.

7. (Currently Amended) ~~A-The primary station as claimed in~~ of claim 2, characterised in that wherein first radio means are provided for broadcasting substantially continuously inquiry messages having the additional data field and second radio means are provided for handling other aspects of communication links with secondary stations.

8. (Original) A secondary station for use in a communications system comprising a primary station, wherein means are provided for receiving an inquiry message broadcast by the primary station, the message being in the form of a plurality of predetermined data fields arranged according to a first communications protocol and having added to it an additional data field for polling at least one secondary station, and wherein means are provided for determining when an additional data field has been added to the plurality of data fields, for determining whether it has been polled from the additional data field and for responding to a poll when it has data for transmission to the primary station.

9. (Currently Amended) ~~A~~The secondary station ~~as claimed in~~ of claim 8, characterised in that wherein the first communications protocol comprises Bluetooth messaging.

10. (Currently Amended) ~~A~~The secondary station ~~as claimed in~~ of claim 8, characterised in that wherein means are provided for responding to a poll after a predetermined interval has passed without transmission of data, whether or not the secondary station has data for transmission.

11. (Currently Amended) A method of operating a communication system comprising a primary station and at least one secondary station, the method comprising the primary station broadcasting a series of inquiry messages, each in the form of a plurality of predetermined data fields arranged according to a first communications protocol, and adding to an inquiry message prior to transmission an additional data field for polling at least one secondary station, and further comprising the ~~or each~~ at least one polled secondary station determining when an additional data field has been added to the plurality of data fields, determining whether it has been polled from the additional data field and responding to a poll when it has data for transmission to the primary station.

12. (Currently Amended) ~~A~~The method ~~as claimed in~~ of claim 11, characterised in that wherein not all inquiry messages have an additional data field for polling a secondary station added to them.

### **REMARKS/DISCUSSION OF ISSUES**

Claims 1-12 are pending in the application.

Applicant thanks the Examiner for acknowledging the claim for priority and receipt of certified copies of the priority document, and for stating that the drawings are acceptable. Applicant also acknowledges the indication in the Office Action that claim 12 defines patentable subject matter and would be allowable if rewritten in independent form, including all limitations of the base claim and any intervening claims from which it depends.

Claims 1, 3-7, and 9-12 are amended for non-statutory reasons, to replace European-style claim phraseology with American-style claim language and to fix minor typographical errors. The claims are not narrowed in scope and no new matter is added.

New claims are added to restore at least partially the original range of claims that existed before multiple dependencies were removed in the preliminary amendment. No new matter is added.

### **35 U.S.C. § 102 & 103**

The Office Action rejected claims 1-5 and 7-11 under 35 U.S.C. § 102 over Haartsen U.S. Patent 6,574,266 ("Haartsen") and claim 6 under 35 U.S.C. § 103 over Haartsen in view of Matai U.S. patent 4,766,434 ("Matai").

Applicant respectfully traverses those rejections for at least the following reasons.

#### **Claim 1**

Among other things, in the system of claim 1, a polled secondary station includes means for determining whether when an **additional data field** has been added to the plurality of data fields of an **inquiry message**, for **determining whether it has been polled** from the additional data field.

Applicant respectfully submits that Haartsen discloses none of these features.

The Office Action states that these features are disclosed at col. 11, lines 17-20.

Reproduced below is the text of Haartsen at col. 11, lines 17-20.

Suppose that the terminal 240 wants to connect to the terminal 250. As part of its normal mode of operation, terminal 250 periodically wakes up and scans for page request messages from other terminals. After terminal 250 locks to base station 210, terminal 250 transmits to base station 210 the timing and frequency hop sequence terminal 250 uses for its page scanning procedure. It will be noted

First, Applicant respectfully submits that nowhere in the cited text - or elsewhere in Haartsen - is there any mention of a secondary station determining whether any additional data field has been added to an inquiry message. Indeed, the cited text does not even pertain to inquiry messages at all, but instead pertains to paging messages. Furthermore, the cited text also does not disclose or even remotely suggest that a secondary terminal determines whether when an additional data field has been added to any message.

Second, Applicant respectfully submits that nowhere in the cited text - or elsewhere in Haartsen - is there any mention of a secondary station determining (1) whether it has been polled; or (2) whether it has been polled from an additional data field added to an inquiry message. The cited text does not pertain to any polling process - nor is such a polling process disclosed elsewhere in Haartsen.

Finally, Applicant also notes for the record that col. 10, lines 60-65 of Haartsen, cited as supposedly disclosing a primary station broadcasting a series of inquiry message, does not disclose any inquiry messages at all.

Accordingly, for at least these reasons, Applicant respectfully submits that claim 1 is patentable over Haartsen.

Claim 2

Among other things, the primary station of claim 2 includes means for adding to each of a series of inquiry messages, prior to transmission, an additional data field for polling at least one secondary station.

The Office action states that Haartsen discloses such means as box 402 of

FIG. 4.

Applicant respectfully disagrees. Haartsen discloses that element 402 is a TX section that includes an error correction/scrambling encoder 406, a modulator/up-converter 408, and an amplifier 410. None of these elements even operate on the data link layer or could possibly add any data fields to a transmission. Moreover, nothing in Haartsen even suggests that anything in block 402 adds any data fields of any kind to an inquiry prior to transmission (nor has anything been cited that supposedly would disclose this).

Applicant also notes for the record that col. 10, lines 60-65 of Haartsen, cited as supposedly disclosing "polling at least one secondary station," does not disclose any polling - or even any inquiry messages - at all! And it certainly mentions nothing whatsoever about adding any data field to an inquiry message for polling a secondary station.

Accordingly, for at least these reasons, Applicant respectfully submits that claim 2 is patentable over Haartsen.

Claims 3-5 and 7

Claims 3-5 and 7 depend from claim 2 and are all patentable over Haartsen for at least the reasons set forth above with respect to claim 2, and for the following additional reasons.

Claim 4

Among other things, the primary station of claim 4 includes means for including an indication in one of the predetermined data fields, denoting the presence of the additional data field.

Haartsen does not even remotely suggest an indication in one of the predetermined data fields, denoting the presence of the additional data field. Certainly nothing in col. 10, lines 60-65 discloses this feature.

For at least these additional reasons, Applicant respectfully submits that claim 4 is patentable over Haartsen.

Claim 7

Among other things, the primary station of claim 7 includes first radio

means for broadcasting substantially continuously inquiry messages having the additional data field, and second radio means handling other aspects of communication links with secondary stations.

Haartsen does not even remotely suggest any first and second radio means at all. Certainly nothing in FIG. 8 or col. 10, lines 60-65 discloses first and second radio means. Indeed, FIG. 4 fairly clearly shows that Haartsen's primary station includes only one radio means.

For at least these additional reasons, Applicant respectfully submits that claim 4 is patentable over Haartsen.

Claim 6

Claim 6 depends from claim 2. Matai does not remedy the shortcomings of Haartsen with respect to claim 2. Accordingly, for at least these reasons, Applicant respectfully submits that claim 6 is patentable over any possible combination of Matai and Haartsen.

Claim 8

Among other things, the secondary station of claim 8 includes means for determining whether when an additional data field has been added to the plurality of data fields of an inquiry message, and for determining whether it has been polled from the additional data field.

As explained above with respect to claim 1, Haartsen fails to disclose or suggest any of these features.

Accordingly, for at least these reasons, Applicant respectfully submits that claim 8 is patentable over Haartsen.

Claims 9-10

Claims 9-10 depend from claim 8 and are all patentable over Haartsen for at least the reasons set forth above with respect to claim 8.

Claim 11

Among other things, in the method of claim 11: (1) a primary station adds an inquiry message, prior to transmission, an additional data field for polling at least one secondary station; and (2) the polled secondary station determines whether when an

additional data field has been added to the plurality of data fields of an inquiry message, and determines whether it has been polled from the additional data field.

As explained above with respect to claims 1 and 2, Haartsen fails to disclose or suggest any of these features.

Accordingly, for at least these reasons, Applicant respectfully submits that claim 11 is patentable over Haartsen.

### **CONCLUSION**

In view of the foregoing explanations, Applicant respectfully requests that the Examiner reconsider and reexamine the present application, allow claims 1-12 and pass the application to issue. In the event that there are any outstanding matters remaining in the present application, the Examiner is invited to contact Kenneth D. Springer (Reg. No. 39,843) at (703) 715-0870 to discuss these matters.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment (except for the issue fee) to Deposit Account No. 50-0238 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17, particularly extension of time fees.

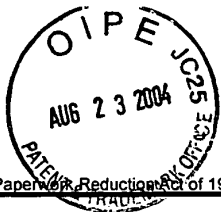
Respectfully submitted,

VOLENTINE FRANCOS, P.L.L.C.

Date: 23 August 2004

By:   
Kenneth D. Springer  
Registration No. 39,843

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Reston, Virginia 20190  
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PTO/SB/17 (10-03)

Approved for use through 07/31/2006. OMB 0651-0032  
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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

<b>FEE TRANSMITTAL</b> <b>for FY 2004</b> <small>Effective 10/01/2003. Patent fees are subject to annual revision.</small>	<b>Complete if Known</b>
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27	Application Number: 09/876,514
TOTAL AMOUNT OF PAYMENT (\$) <b>110.00</b>	Filing Date: 7 June 2001
	First Named Inventor: Robert J. DAVIES
	Examiner Name: Ronald B. ABELSON
	Art Unit: 2666
	Attorney Docket No.: GB-000108

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<p><b>METHOD OF PAYMENT</b> (check all that apply)</p> <p><input type="checkbox"/> Check <input type="checkbox"/> Credit card <input type="checkbox"/> Money Order <input type="checkbox"/> Other <input type="checkbox"/> None</p> <p><input checked="" type="checkbox"/> Deposit Account:</p> <p>Deposit Account Number: 50-0238</p> <p>Deposit Account Name: Volentine Francos</p> <p>The Director is authorized to: (check all that apply)</p> <p><input checked="" type="checkbox"/> Charge fee(s) indicated below <input checked="" type="checkbox"/> Credit any overpayments</p> <p><input checked="" type="checkbox"/> Charge any additional fee(s) or any underpayment of fee(s)</p> <p><input type="checkbox"/> Charge fee(s) indicated below, except for the filing fee to the above-identified deposit account.</p>	<p><b>FEE CALCULATION</b> (continued)</p> <p style="text-align: right; font-weight: bold;">AUG 27 2004</p> <p style="text-align: right; font-weight: bold;">Technology Center 2600</p> <p><b>3. ADDITIONAL FEES</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">Large Entity</th> <th colspan="2">Small Entity</th> <th rowspan="2">Fee Description</th> <th rowspan="2">Fee Paid</th> </tr> <tr> <th>Fee Code</th> <th>Fee (\$)</th> <th>Fee Code</th> <th>Fee (\$)</th> </tr> </thead> <tbody> <tr><td>1051</td><td>130</td><td>2051</td><td>65</td><td>Surcharge - late filing fee or oath</td><td></td></tr> <tr><td>1052</td><td>50</td><td>2052</td><td>25</td><td>Surcharge - late provisional filing fee or cover sheet</td><td></td></tr> <tr><td>1053</td><td>130</td><td>1053</td><td>130</td><td>Non-English specification</td><td></td></tr> <tr><td>1812</td><td>2,520</td><td>1812</td><td>2,520</td><td>For filing a request for <i>ex parte</i> reexamination</td><td></td></tr> <tr><td>1804</td><td>920*</td><td>1804</td><td>920*</td><td>Requesting publication of SIR prior to Examiner action</td><td></td></tr> <tr><td>1805</td><td>1,840*</td><td>1805</td><td>1,840*</td><td>Requesting publication of SIR after Examiner action</td><td></td></tr> <tr><td>1251</td><td>110</td><td>2251</td><td>55</td><td>Extension for reply within first month</td><td rowspan="5" style="text-align: center; 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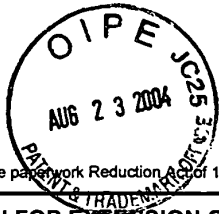
<b>SUBMITTED BY</b>		(Complete if applicable)	
Name (Print/Type)	Kenneth D. Springer	Registration No. (Attorney/Agent)	39,843
Signature		Telephone	703-715-0870
		Date	8/23/2004

**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.**

This collection of information is required by 37 CFR 1.17 and 1.27. 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.*






PTO/SB/22 (06-04)

Approved for use through 07/31/2006. OMB 0651-0031  
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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<b>PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)</b>		Docket Number (Optional) GB-000108	
Application Number 09/876,514		Filed 7 June 2001	
For Robert J. DAVIES			
Art Unit 2666		Examiner Ronald B. ABELSON	
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):			
		<u>Fee</u>	<u>Small Entity Fee</u>
<input checked="" type="checkbox"/>	One month (37 CFR 1.17(a)(1))	\$110	\$55      \$ <u>110</u>
<input type="checkbox"/>	Two months (37 CFR 1.17(a)(2))	\$420	\$210      \$ _____
<input type="checkbox"/>	Three months (37 CFR 1.17(a)(3))	\$950	\$475      \$ _____
<input type="checkbox"/>	Four months (37 CFR 1.17(a)(4))	\$1480	\$740      \$ _____
<input type="checkbox"/>	Five months (37 CFR 1.17(a)(5))	\$2010	\$1005      \$ _____
<input type="checkbox"/>	Applicant claims small entity status. See 37 CFR 1.27.		
<input type="checkbox"/>	A check in the amount of the fee is enclosed.		
<input type="checkbox"/>	Payment by credit card. Form PTO-2038 is attached.		
<input type="checkbox"/>	The Director has already been authorized to charge fees in this application to a Deposit Account.		
<input checked="" type="checkbox"/>	The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number <u>50-0238</u> . I have enclosed a duplicate copy of this sheet.		
<b>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.</b>			
I am the	<input type="checkbox"/>	applicant/inventor.	
	<input type="checkbox"/>	assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed (Form PTO/SB/96).	
	<input type="checkbox"/>	attorney or agent of record. Registration Number _____	
	<input checked="" type="checkbox"/>	attorney or agent under 37 CFR 1.34. Registration number if acting under 37 CFR 1.34 <u>39,843</u>	
			<u>8/23/2004</u>
	Signature		Date
	<u>Kenneth D. Springer</u>		<u>703-715-0870</u>
	Typed or printed name		Telephone Number
NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.			
<input checked="" type="checkbox"/>	Total of <u>1</u> forms are submitted.		

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AUG 27 2004

Technology Center 2600

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: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/876,514	06/07/2001	Robert J. Davies	PHGB000108	9203

24737 7590 04/21/2004

PHILIPS INTELLECTUAL PROPERTY & STANDARDS  
P.O. BOX 3001  
BRIARCLIFF MANOR, NY 10510

EXAMINER

ABELSON, RONALD B

ART UNIT PAPER NUMBER

2666

DATE MAILED: 04/21/2004

4

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/876,514	<b>Applicant(s)</b> DAVIES, ROBERT J.	
	<b>Examiner</b> Ronald Abelson	<b>Art Unit</b> 2666	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1)  Responsive to communication(s) filed on 07 June 2001.
- 2a)  This action is **FINAL**.
- 2b)  This action is non-final.
- 3)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4)  Claim(s) 1-12 is/are pending in the application.
  - 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5)  Claim(s) \_\_\_\_\_ is/are allowed.
- 6)  Claim(s) 1-11 is/are rejected.
- 7)  Claim(s) 12 is/are objected to.
- 8)  Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9)  The specification is objected to by the Examiner.
- 10)  The drawing(s) filed on 07 June 2001 is/are: a)  accepted or b)  objected to by the Examiner. Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a). Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11)  The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    - a)  All    b)  Some \*    c)  None of:
    - 1.  Certified copies of the priority documents have been received.
    - 2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    - 3.  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1)  Notice of References Cited (PTO-892)
- 2)  Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3)  Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4)  Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5)  Notice of Informal Patent Application (PTO-152)
- 6)  Other: \_\_\_\_\_.

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**Claim Rejections - 35 USC § 102**

1. 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 -

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-5 and 7-11 rejected under 35 U.S.C. 102(e) as being anticipated by Haartsen (US 6,574,266).

Regarding claims 1, 2, 8, and 11, Haartsen teaches a communications system comprising a primary station (fig. 7B box 210) and at least one secondary station (fig. 7B box 250), wherein the primary station has means for broadcasting a series of inquiry messages (col. 10 lines 60-65), each in the form of a plurality of predetermined data fields arranged (base station's identity, system information, paging information, col. 10 lines 60-65) according to a first communications protocol (fig. 4 box 402, Bluetooth, col. 4 line 26) , and means (fig. 4 box 402) for adding to an inquiry message prior to transmission an additional data field for polling at least one secondary station (paging information, col. 10 lines 60-65), and wherein the or each

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polled secondary station has means for determining when an additional data field has been added to the plurality of data fields, for determining whether it has been polled from the additional data field and for responding to a poll when it has data for transmission to the primary station (col. 11 lines 17-20).

Regarding claim 3, a primary station as claimed in claim 2, characterised in that means are provided (fig. 4 box 402) for adding the additional data field at the end of a respective inquiry message.

Regarding claim 4, a primary station as claimed in claim 2, characterised in that means (fig. 4 box 402) are provided for including an indication in one of the predetermined data fields; the indication denoting the presence of the additional data field (paging information, col. 10 lines 60-65).

Regarding claim 5, a primary station as claimed in claim 2, characterised in that the first communications protocol comprises Bluetooth messaging (Bluetooth, col. 4 line 26).

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Regarding claim 7, a primary station as claimed in claim 2, characterised in that first radio means are provided for broadcasting substantially continuously inquiry messages having the additional data field (fig. 8: see stream of BC's, paging information, col. 10 lines 60-65) and second radio means are provided for handling other aspects of communication links with secondary stations (system information, col. 10 lines 60-65).

Regarding claim 8, in addition to the limitations previously presented a secondary station (fig. 7B box 250) for use in a communications system comprising a primary station (fig. 7B box 210), wherein means are provided for receiving an inquiry message (fig. 4 box 404) broadcast by the primary station (remote terminals are locked to the base station).

Regarding claim 9, a secondary station as claimed in claim 8, characterised in that the first communications protocol comprises Bluetooth messaging (Bluetooth, col. 4 line 26).

Regarding claim 10, a secondary station (fig. 7B box 250) as claimed in claim 8, characterised in that means are provided for responding to a poll after a predetermined interval has passed without transmission of data, whether or not the

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secondary station has data for transmission (col. 11 lines 17-20).

**Claim Rejections - 35 USC § 103**

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

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

4. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Haartsen (US 6,574,266) as applied to claim 1 above, and further in view of Matai (US 4,766,434).

Haartsen is silent on the additional data field / paging signal comprises at least 64 bits of data.

Matai teaches the additional data field / paging signal comprises at least 64 bits of data (col. 3 lines 41-44).

Therefore it would have been obvious to one of ordinary skill in the art, having both Haartsen and Matai before him/her and with the teachings [a] as shown by Haartsen, a Bluetooth communications system comprising a primary and at least one secondary station, and [b] as shown by Matai, a paging signal

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comprising a 62 bit preamble, a 31 bit frame sync, and a 31 bit address, to be motivated to modify the system of Haartsen by transmitting the paging signal of Matai. This would improve the system since the paging signal of Matai has been tested and proven to be reliable.

***Allowable Subject Matter***

5. Claim 12 is 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.

Regarding claim 12, nothing in the prior art of the record teaches or fairly suggests not all inquiry messages have an additional data field for polling a secondary station added to them in view of the prior art teachings of Haartsen, in combination with all the other limitations listed in the claim.

***Conclusion***

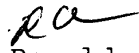
6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ronald Abelson whose telephone number is (703) 306-5622. The examiner can normally be reached on M-F.



Art Unit: 2666

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema Rao can be reached on (703) 308-5463. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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).

  
Ronald Abelson  
Examiner  
Art Unit 2666

\*\*\*

4/16/04



DANG TON  
TRUSTEE EXAMINER

<b>Notice of References Cited</b>	Application/Control No. 09/876,514	Applicant(s)/Patent Under Reexamination DAVIES, ROBERT J.	
	Examiner Ronald Abelson	Art Unit 2666	Page 1 of 1

**U.S. PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
A	US-6,574,266 B1.	06-2003	Haartsen, Jacobus Cornelis	375/133
k	US-4,766,434	08-1988	Matai et al.	340/7.55
C	US-			
D	US-			
E	US-			
F	US-			
G	US-			
H	US-			
I	US-			
J	US-			
K	US-			
L	US-			
M	US-			

**FOREIGN PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
N					
O					
P					
Q					
R					
S					
T					

**NON-PATENT DOCUMENTS**

*	Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
U	
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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

3662  
#3

In re Application of

Atty. Docket

ROBERT J. DAVIES

GB 000108

Serial No.: 09/876,514

Group Art Unit: 3662

Filed: JUNE 7, 2001

Examiner:

Title: COMMUNICATION SYSTEM

RECEIVED

FEB 25 2002

Commissioner of Patents, Washington, D.C. 20231

GROUP 3600

LETTER

Sir:

Pursuant to the duty of disclosure set forth in 37 CFR 1.56, Applicant calls to the attention of the Patent and Trademark Office a Search Report issued abroad in reference to a corresponding foreign application. A copy of the Search Report dated January 22, 2002 is attached.

The enclosed document is being called to the attention of the Patent and Trademark Office solely to comply with the duty of disclosure set forth in 37 CFR 1.56 and is not intended to be construed as an admission by the Applicant that any of the documents listed is material.

RECEIVED

FEB 28 2002

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to:

Commissioner of Patents and Trademarks  
Washington, D.C. 20231

Date: Jan. 31, 2002

By: Elissa DeLucca

Respectfully submitted,

Technology Center 2600

By: Eric M. Bram  
Eric M. Bram, Reg. 37,285  
Attorney

Encl. Search Report

APPLICATION TRANSFER REQUEST FOR APPLICATION S.N. 09/876514

Section I. TRANSFER REQUEST BY (PRINT NAME) ISSINO Date 8-23-01  
TO: Art Unit 2635 Class/Sub 340/P25+ FROM: A.U. 3662 Class 342

REASON: *communication with polling. No directive/position determination for cl. 342.*

*Thom D. N. Sanger*

Gatekeeper Concurrence MS Hand carried: Personally accepted by \_\_\_\_\_

Section IIa. DISPOSITION BY RECEIVING TC By: BZ A.U. 2635 Date 10/23/01

ACCEPTED BY RECEIVING T.C.

NOT ACCEPTED

Forward to receiving TC Post Classifier

Nonclassification issue/other, return to Originating TC/AU \_\_\_\_\_

REASON: *polling for Multiplexing  
Suggest 370*

*10/26/01*

Section IIb. DISPOSITION BY RECEIVING TC POST CLASSIFIER

This dispute was resolved. Forward to TC/AU 2635 Class/Sub 370 Post Classifier Montgomery Date 10/27/01

Concurring \_\_\_\_\_ Date \_\_\_\_\_

This dispute was not resolved, forward to DISPUTE RESOLUTION PANEL

Post Classifier Assessment:

*As set forth in section II.*

Gatekeeper Concurrence \_\_\_\_\_ Post Classifier \_\_\_\_\_ Date \_\_\_\_\_

Section III. DISPOSITION BY DISPUTE RESOLUTION PANEL

Panel Decision: Forward to Technology Center/Art Unit \_\_\_\_\_ Class/Sub \_\_\_\_\_

REASON:

Panel Member \_\_\_\_\_ Concurring Panel Member \_\_\_\_\_

This application MAY NOT be returned to the dispute resolution panel, THIS IS A FINAL DISPOSITION.

Best Available Copy

06-08-01 - 14

Case Docket No. PHGB000108

A

06/07/01  
1c961 U.S. PTO

THE COMMISSIONER FOR PATENTS, Washington, D.C. 20231

Enclosed for filing is the patent application of Inventor(s):  
Robert J. Davies

For: COMMUNICATION SYSTEM

1c903 U.S. PTO  
09/876514  
06/07/01

**ENCLOSED ARE:**

- Appointment of Associates;
- Information Disclosure Statement, Form PTO-1449 and copies of documents listed therein;
- Preliminary Amendment;
- Specification (18 Pages of Specification, Claims, & Abstract);
- Declaration and Power of Attorney:  
(1 Page of a  fully executed  unsigned Declaration);
- Drawing (3 sheets of  informal  formal sheets);
- Certified copies of Great Britain application Serial Nos. 0015454.2 and 0020076.6;
- Authorization Pursuant to 37 CFR §1.136(a) (3)
- Other: ;
- Assignment to Koninklijke Philips Electronics N.V.

FEE COMPUTATION

CLAIMS AS FILED				
FOR	NUMBER FILED	NUMBER EXTRA	RATE	BASIC FEE - \$710.00
Total Claims	12 - 20 =	0	X \$18 =	0.00
Independent Claims	4 - 3 =	1	X \$80 =	80.00
Multiple Dependent Claims, if any			\$270 =	0.00
TOTAL FILING FEE . . . . .				\$790.00

Please charge Deposit Account No. 14-1270 in the amount of the total filing fee indicated above, plus any deficiencies. The Commissioner is also hereby authorized to charge any other fees which may be required, except the issue fee, or credit any overpayment to Account No. 14-1270.

Amend the specification by inserting before the first line as a centered heading --Cross Reference to Related Applications--; and insert below that as a new paragraph --This is a continuation-in-part of application Serial No. , filed , which is herein incorporated by reference--.

CERTIFICATE OF EXPRESS MAILING

Express Mail Mailing Label No: EL66160503US  
Date of Deposit June 7, 2001  
I hereby certify that this paper and/or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 C.F.R. 1.10 on the date indicated above and is addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231.

Elissa DeLuccy  
Typed Name      Elissa DeLuccy  
Signature

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06/07/01 09/876514

DESCRIPTION

**COMMUNICATION SYSTEM**

5 The present invention relates to a communication system and further relates to primary and secondary stations for use in such a system and to a method of operating such a system. Although the present invention is described with particular reference to a Bluetooth system, it is applicable to a range of other communication systems.

10 In recent years there has been increasing interest in enabling devices to interact via wireless communication links, thereby avoiding the need for extensive cabling. An example of a communication system which may be used for such wireless links is a Bluetooth network, operating according to the specification defined by the Bluetooth Special Interest Group. Such a network is intended to provide low-cost, short range radio links between mobile PCs, mobile phones and other devices, whether portable or not.

15 Communication in a Bluetooth network takes place in the unlicensed ISM band at around 2.45GHz. Stations form ad-hoc networks which are known as piconets, each comprising a master station and up to seven slave stations. All stations are identical and capable of acting as master or slave as required. A station can take part in more than one piconet, thereby linking piconets and enabling communication over an extended range.

20 One application for which use of Bluetooth is proposed is the connection of controller devices to host systems. A controller device, also known as a Human/machine Interface Device (HID), is an input device such as a keyboard, mouse, games controller, graphics pad or the like. Such HID's do not typically require a link having high data throughput, but do require a very responsive link.

25 A Bluetooth system is more than capable of supporting the throughput requirements of HID's. However, the degree of responsiveness required can be more difficult to achieve. An active Bluetooth link can offer a reasonably

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responsive service, but this requires both setting up of the link and its maintenance even during periods of inactivity.

Two types of communication link supported in a Bluetooth network are Asynchronous ConnectionLess (ACL) links and Synchronous Connection Oriented (SCO) links. ACL links allow slaves to enter a 'park' mode and cease active communications, which also allows a number of other HIDs to maintain links with the master station without violating the Bluetooth rule that no more than seven slaves can be active at any one time. A slave has to be polled before it can submit a request to leave park mode and become active. SCO links require continuous operation by a slave, but there are only a limited number of SCO channels available.

Setting up a link requires a HID to join, as a slave, the piconet including the host system (which will typically act as piconet master, i.e. a base station). Joining the piconet requires two sets of procedures, namely 'inquiry' and 'page'. Inquiry allows a would-be slave to find a base station and issue a request to join the piconet. Page allows a base station to invite slaves of its choice to join the net. Analysis of these procedures indicates that the time taken to join a piconet and then to be in a position to transfer user input to the master could be several tens of seconds.

It is possible for this procedure to be carried out once and for all when the host system is turned on. However, HIDs will normally be battery operated and it is therefore not acceptable for them to have to remain permanently switched on. In particular, for a HID to sign on to the piconet automatically when the host system is turned on it will either have to be regularly waking up to look for Bluetooth inquiry bursts, thereby consuming power, or it will need to be manually woken up by the user.

It is therefore more likely that a HID will remain inactive until it is woken up, either by being explicitly switched on or by a user attempting some form of input. Hence, the host system's Bluetooth master will need to run inquiry cycles periodically, which has two implications. The first is that because the inquiry phase is periodic rather than continuous, initial access time could be several tens of seconds. This could mean that it could take half a minute or

more from the time a user moves a mouse to a cursor moving on a screen. Secondly, the fact that an inquiry cycle takes place at all means that ACL links will be suspended during this cycle, for up to 10.24 seconds at a time. Although SCO links could be used, a HID using such a link could not cease  
5 transmissions during inactive periods.

It is therefore an object of the invention to address the problem of providing a responsive link between a HID and a host system which allows the HID to go to sleep during periods of inactivity.

10 According to a first aspect of the present invention there is provided a communications system comprising a primary station and at least one secondary station, wherein the primary station has means for broadcasting a series of inquiry messages, each in the form of a plurality of predetermined data fields arranged according to a first communications protocol, and means  
15 for adding to an inquiry message prior to transmission an additional data field for polling at least one secondary station, and wherein the or each polled secondary station has means for determining when an additional data field has been added to the plurality of data fields, for determining whether it has been polled from the additional data field and for responding to a poll when it has  
20 data for transmission to the primary station.

According to a second aspect of the present invention there is provided a primary station for use in a communications system comprising at least one secondary station, wherein means are provided for broadcasting a series of inquiry messages, each in the form of a plurality of predetermined data fields  
25 arranged according to a first communications protocol, and for adding to each inquiry message prior to transmission an additional data field for polling at least one secondary station.

According to a third aspect of the present invention there is provided a secondary station for use in a communications system comprising a primary  
30 station, wherein means are provided for receiving an inquiry message broadcast by the primary station, the message being in the form of a plurality of predetermined data fields arranged according to a first communications

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protocol and having added to it an additional data field for polling at least one secondary station, and wherein means are provided for determining when an additional data field has been added to the plurality of data fields, for determining whether it has been polled from the additional data field and for responding to a poll when it has data for transmission to the primary station.

According to a fourth aspect of the present invention there is provided a method of operating a communication system comprising a primary station and at least one secondary station, the method comprising the primary station broadcasting a series of inquiry messages, each in the form of a plurality of predetermined data fields arranged according to a first communications protocol, and adding to an inquiry message prior to transmission an additional data field for polling at least one secondary station, and further comprising the or each polled secondary station determining when an additional data field has been added to the plurality of data fields, determining whether it has been polled from the additional data field and responding to a poll when it has data for transmission to the primary station.

Embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawings, wherein:

Figure 1 is a diagram of an ad-hoc wireless network comprising two linked piconets;

Figure 2 is a block schematic diagram of a typical Bluetooth station;

Figure 3 is a chart illustrating the transmission of a train of inquiry access codes centred on a given frequency;

Figure 4 illustrates alternation between trains of inquiry messages over the duration of an inquiry broadcast;

Figure 5 illustrates the insertion of a packet of broadcast data within an existing transmission slot; and

Figure 6 is a flow chart illustrating a method of polling a HID in accordance with the present invention.

In the drawings the same reference numerals have been used to indicate corresponding features.

In the following description we consider particularly a system which utilises Bluetooth protocols for communication of messages between stations. As will be recognised, the general invention concept of polling HIDs via a broadcast channel used as part of the inquiry procedure is not restricted to Bluetooth devices and is applicable to other communications arrangements, in particular frequency hopping systems.

A basic Bluetooth network configuration is illustrated in Figure 1. Such a configuration would typically begin with two connected host devices, for example a portable PC and a cellular phone, and grow to include additional connected devices. A wide range of additional host devices may be included, for example wireless headsets, personal organisers and home entertainment equipment. The network comprises a plurality of stations 100,101 each included in such a host device, formed into two piconets 102a,102b. In general the networking components (i.e. the Bluetooth chip for a Bluetooth network) of all stations 100,101 will be implemented identically. However, it is only necessary that all stations 100,101 comprising the network are able to operate according to a compatible protocol.

The first piconet 102a is a point-to-multipoint network comprising four stations 100, a master 100 (A) and three slaves 101 (A1,A2,A3), with bidirectional communication channels 104 between the master 100 and each of the slaves 101. The second piconet 102b is a point-to-point network comprising a master 100 (B) and a slave 101 (B1). Communication between the piconets 102a,102b is enabled by the master A in the first piconet 102a also acting as a slave in the second piconet 102b and vice versa. It is not necessary for the link between the piconets 102a,102b to be between masters: it would be equally possible for the link to be between stations A3 and B1 or between A and B1, for example.

An example of a station 100 for use in a Bluetooth system is illustrated in more detail in Figure 2, and comprises two main sections. The first section is an analogue unit comprising a radio (RF) 202 having an antenna 204 for transmitting and receiving radio signals on the communication channel 104.

The second section is a digital controller unit 206, further comprising a link baseband controller (LC) 208, a microprocessor ( $\mu$ P) 210 and an interface unit (INT) 212.

5 The link controller 208 comprises means for performing baseband processing and execution of basic protocols close to the physical layer, for example implementing error correction coding, generating Automatic Repeat reQuests (ARQ) and performing audio coding. The microprocessor 210 manages the station 100, controlling data transfer between the interface unit 212 and the link controller 208. The interface unit 212 comprises hardware and  
10 software for interfacing the station 100 to a host device such as a portable PC or a cellular phone. The interfacing is performed via a link 214, which might include interfaces to a USB (Universal Serial Bus), external memory and other items as appropriate for the particular application.

The Bluetooth inquiry procedure allows a would-be slave 101 to find a  
15 base station and issue a request to join its piconet. It has been proposed specifically to overcome problems caused by the frequency-hopping nature of Bluetooth and similar systems. The applicants have recognised that it is possible to piggy-back a broadcast channel on the inquiry messages issued by the master 100. The broadcast channel can be used to poll HIDs at regular  
20 intervals. However, at the air interface, the mechanism is entirely compatible with conventional Bluetooth systems.

To illustrate how this is implemented, we first consider how the Inquiry procedures themselves operate, with reference to Figures 3 and 4. When a Bluetooth unit wants to discover other Bluetooth devices, it enters a so-called  
25 inquiry substate. In this mode, it issues an inquiry message containing a General Inquiry Access Code (GIAC) or a number of optional Dedicated Inquiry Access Codes (DIAC). This message is repeated at several levels; first, it is repeated in a train A of 16 frequencies from a total of 32 making up the inquiry hopping sequence. The message is sent twice on two frequencies in  
30 even timeslots with the following, odd timeslots used to listen for replies on the two corresponding inquiry response hopping frequencies. Sixteen frequencies and their response counterparts can therefore be covered in 16 timeslots, or

10ms. The chart of Figure 3 illustrates the transmission of a single train on sixteen frequencies centred around  $f\{k\}$ , where  $f\{k\}$  represents the inquiry hopping sequence.

The next step is the repetition of the train a plurality of times. At the very least, as presently specified, this means 256 repetitions of the entire train. Finally, the train A is swapped for the train B consisting of the remaining 16 frequencies and the cycle repeated. As shown by Figure 4, the specification states that this switch must occur at least three times to ensure the collection of all responses in an error-free environment. This means that an inquiry broadcast could take at least 10.24 seconds.

A portable device that wants to be discovered by a Bluetooth master 100 enters the inquiry scan substate. Here, it listens for a message containing the GIAC or DIACs of interest. It, too, operates in a cyclic way. It listens on a single hop frequency for an inquiry scan period which is long enough to cover the 16 inquiry frequencies used by the inquiry. On hearing an inquiry containing an appropriate IAC, the portable device enters a so-called inquiry response substate and issues a number of inquiry response messages to the master 100. The master 100 will then page the portable device, inviting it to join the piconet.

As mentioned above and shown in Figure 5, the applicants propose that the inquiry messages issued by the base station have an extra field 504 appended to them, capable of carrying a HID poll message. The extended field 504 may carry a header that signifies a HID poll to distinguish it from other applications of extended field information, such as context-aware services or broadcast audio (as disclosed in our co-pending United Kingdom patent applications 0015454.2 (applicant's reference PHGB 000084) and 0015453.4 (applicant's reference PHGB 000085) respectively). It will also carry the address of the HID being polled, and may also carry a small amount of information to the HID which might be used to provide supplementary information to a user (such as text on an LCD screen) or feedback (for example, motional feedback in games controllers). By adding the field to the end of the inquiry message, it will be appreciated that non-HID receivers can

ignore it without modification. In addition, by using a special DIAC to signify a HID poll, HID devices can be alerted to the presence of the forthcoming poll.

The presence of the extra data field 504 means that the guard space conventionally allowed at the end of a Bluetooth inquiry packet is reduced. However, this space is provided to give a frequency synthesiser time to change to a new hop frequency and will be generally unused otherwise, as current frequency synthesisers are capable of switching at speeds which do not need extension into the extra guard space. The standard inquiry packet is an ID packet (ID PKT) 502 of length 68 bits. Since it is sent in a half-slot, starting either on a slot boundary (SB) 506 or a half-slot boundary (HSB) 508, the guard space allocated is  $(625/2 - 68) = 244.5\mu\text{s}$  (625 $\mu\text{s}$  slot period, 1 Mbit/s signalling rate). Modern synthesisers can switch in much less time with figures of 100 $\mu\text{s}$  or lower considered routine by experts in the field. Hence a suitable size for the extra data field 504 could be 100 bits.

In a typical embodiment, four of the 100 bits will be lost as trailer bits for the ID packet 502: this is a consequence of it being read by a correlator. Of the 96 bits remaining, applicant's preferred allocation is for 64 bits to be used as data and 32 bits as a 2/3 FEC (Forward Error Correction) checksum. Each inquiry burst thus contains 8 bytes of broadcast data, allowing space for several channels of key coded or digitised analogue inputs.

In order to achieve the desired responsiveness, and because the HID has been specifically addressed, the HID is allowed to respond, if desired, in the next-but-one half-slot with a packet of similar format, containing information corresponding to the user's input. As described above, the inquiry procedure involves the transmission of two sets of sixteen frequencies in trains of inquiry transmissions. The 16 frequencies used within a train can be considered as 16 polling channels, and therefore 16 devices can be polled every 10ms if desired. Other arrangements are possible, for example polling up to 32 devices every 20ms or up to 8 devices every 5ms. The arrangement of polling channels could also be flexible, with more rapid polling provided for devices which need a faster response time and vice versa.

Each device need only monitor a single frequency within a train, but must be able to track the train switches and frequency changes due to changing clock phase. It is assumed that an initial set up procedure synchronises the HID Bluetooth slave 101 to the Bluetooth master 100, as well as establishing the nature of the HID and the format it uses for uplink and downlink transmissions. At this time the HID is allocated a device address and a channel number corresponding to one of the sixteen channels within a train.

For fast polling, it is necessary for the Bluetooth master 100 to operate continuously. This interferes with the conventional mechanism for setting up two-way links. However, use of two radios operating in tandem, as disclosed in our co-pending United Kingdom patent application 0015452.6 (applicant's reference PHGB 000086), avoids this problem, thereby enabling the provision of fast access to the piconet and an unlimited two-way throughput capacity.

By polling every 10ms, with eight bytes per poll, a capacity of 800 bytes per second for sixteen devices is provided. In variations on the basic scheme described above this capacity could be lowered to permit the operation of conventional inquiry procedures, or to increase the number of HIDs that a host system 100 can support beyond sixteen.

In order to minimise their power consumption, HIDs are not obliged to respond to every poll if they have no information to offer. A watchdog timer could be provided in a HID to make it transmit at least once in a given period whilst it is nominally active. The period could for example be predetermined, determined by the host system or determined by negotiation between the host and each HID. HIDs failing to transmit within the determined period would then be removed from the master's list of active devices.

A method of polling a HID in accordance with the present invention is summarised in Figure 6. The method starts, at step 602, when the HID has data to transmit to the host system. The HID receives, at step 604, data from the extra field 504 then tests, at step 606, whether it has been polled by the host system. If it has not been polled, the HID returns to step 604 to receive the next extra field 504. If the HID has been polled, it transmits its data in the next-but-one half-slot, at step 608.

Since an inquiry mode is necessary to permit access to the host system's piconet, it must be provided in the conventional manner for at least some of the time. There are a range of strategies which may be employed.

5 A first strategy involves the operation of one radio in two modes, namely set up and polling. In set up mode the inquiry procedure operates as normal and the HIDs can establish contact with the host master 100 in the conventional manner. Once all HIDs have established themselves, the master radio switches to polling mode, in which the inquiry procedure now operates in polling mode only. This strategy is ideal for games machines since it achieves  
10 the fastest response when polling mode is operational, while opportunities for other controllers to join the piconet occur at well-defined times, such as between games.

A second strategy is more appropriate when the host system is a general purpose device, such as a PC, in which case opportunities must be  
15 provided for new devices to join at any time. In this case the master's radio can operate in modeless fashion, devoting some of its time to fast polling and other times to conventional inquiry operations. Alternate 10ms periods could be devoted to each operation to achieve a 50:50 ratio for example, with the ratio being able to be modified as desired. Such a system would still have a quick  
20 response to HIDs and the general inquiry operation, although possibly slower, would still operate as normal. The use of a special DIAC in a polling message should ensure that a slave 101 going through normal inquiry response procedures will not send an inquiry response packet in the space reserved for a fast poll response.

25 Allowing conventional inquiries in parallel with fast polling implies that, occasionally, there will be a slight pause in inquiry or fast polling to allow a new HID access to the host. This will probably not matter to the user since he will no longer be using old HIDs and will therefore not be aware of the temporary loss in responsiveness.

30 A third strategy is required when conventional Bluetooth data (or other) links are required, so as to support both a fast response for the polling mechanism and the data carrying capacity of conventional Bluetooth. This

requires the use of two radios, and the approach disclosed in our co-pending United Kingdom patent application 0015452.6 (applicant's reference PHGB 000086) can also be used here. Alternatively, one radio could operate as a conventional Bluetooth radio with the other permanently dedicated to fast polling.

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From reading the present disclosure, other modifications will be apparent to persons skilled in the art. Such modifications may involve other features which are already known in the design, manufacture and use of fixed and portable communications systems and component parts thereof, and which may be used instead of or in addition to features already described herein. Although claims have been formulated in this application to particular combinations of features, it should be understood that the scope of the disclosure of the present application also includes any novel feature or any novel combination of features disclosed herein either explicitly or implicitly or any generalisation thereof, whether or not it relates to the same invention as presently claimed in any claim and whether or not it mitigates any or all of the same technical problems as does the present invention. The applicants hereby give notice that new claims may be formulated to such features and/or combinations of features during the prosecution of the present application or of any further application derived therefrom.

In the present specification and claims the word "a" or "an" preceding an element does not exclude the presence of a plurality of such elements. Further, the word "comprising" does not exclude the presence of other elements or steps than those listed.



## CLAIMS

1. A communications system comprising a primary station and at least one secondary station, wherein the primary station has means for broadcasting a series of inquiry messages, each in the form of a plurality of predetermined data fields arranged according to a first communications protocol, and means for adding to an inquiry message prior to transmission an additional data field for polling at least one secondary station, and wherein the or each polled secondary station has means for determining when an additional data field has been added to the plurality of data fields, for determining whether it has been polled from the additional data field and for responding to a poll when it has data for transmission to the primary station.

2. A primary station for use in a communications system comprising at least one secondary station, wherein means are provided for broadcasting a series of inquiry messages, each in the form of a plurality of predetermined data fields arranged according to a first communications protocol, and for adding to each inquiry message prior to transmission an additional data field for polling at least one secondary station.

3. A primary station as claimed in claim 2, characterised in that means are provided for adding the additional data field at the end of a respective inquiry message.

4. A primary station as claimed in claim 2, characterised in that means are provided for including an indication in one of the predetermined data fields, the indication denoting the presence of the additional data field.

5. A primary station as claimed in claim 2, characterised in that the first communications protocol comprises Bluetooth messaging.

6. A primary station as claimed in claim 2, characterised in that the additional data field comprises at least 64 bits of data.

5 7. A primary station as claimed in claim 2, characterised in that first radio means are provided for broadcasting substantially continuously inquiry messages having the additional data field and second radio means are provided for handling other aspects of communication links with secondary stations.

10 8. A secondary station for use in a communications system comprising a primary station, wherein means are provided for receiving an inquiry message broadcast by the primary station, the message being in the form of a plurality of predetermined data fields arranged according to a first communications protocol and having added to it an additional data field for  
15 polling at least one secondary station, and wherein means are provided for determining when an additional data field has been added to the plurality of data fields, for determining whether it has been polled from the additional data field and for responding to a poll when it has data for transmission to the primary station.

20

9. A secondary station as claimed in claim 8, characterised in that the first communications protocol comprises Bluetooth messaging.

25 10. A secondary station as claimed in claim 8, characterised in that means are provided for responding to a poll after a predetermined interval has passed without transmission of data, whether or not the secondary station has data for transmission.

30 11. A method of operating a communication system comprising a primary station and at least one secondary station, the method comprising the primary station broadcasting a series of inquiry messages, each in the form of a plurality of predetermined data fields arranged according to a first

communications protocol, and adding to an inquiry message prior to transmission an additional data field for polling at least one secondary station, and further comprising the or each polled secondary station determining when an additional data field has been added to the plurality of data fields, 5 determining whether it has been polled from the additional data field and responding to a poll when it has data for transmission to the primary station.

12. A method as claimed in claim 11, characterised in that not all inquiry messages have an additional data field for polling a secondary station 10 added to them.

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## ABSTRACT

**COMMUNICATION SYSTEM**

5           A communications system comprises a primary station (100) and at  
least one secondary station (101). The primary station (100) is arranged to  
broadcast a series of inquiry messages, each in the form of a plurality of  
predetermined data fields arranged according to a first communications  
protocol such as Bluetooth. In addition the primary station (100) adds to some  
10 or all of the inquiry messages an additional data field for polling one or more  
secondary stations, which can respond to the poll if they have data for  
transmission. This system provides secondary stations (101) with a rapid  
response time without the need for a permanently active communication link.

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(Figure 1)

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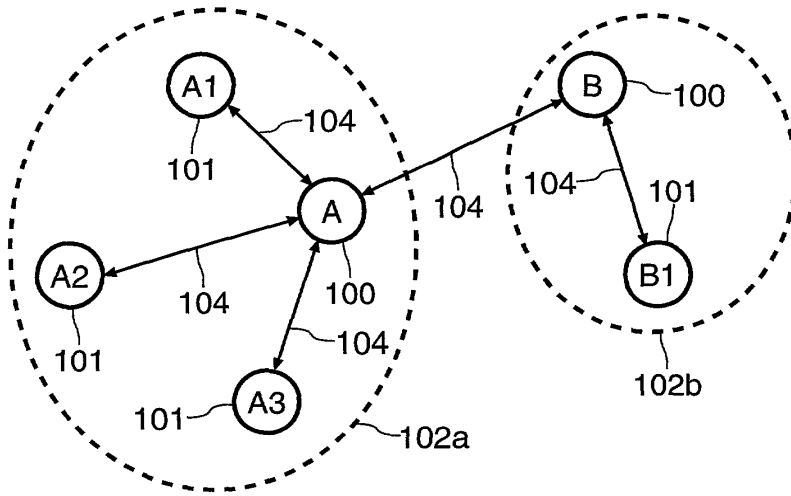


FIG. 1

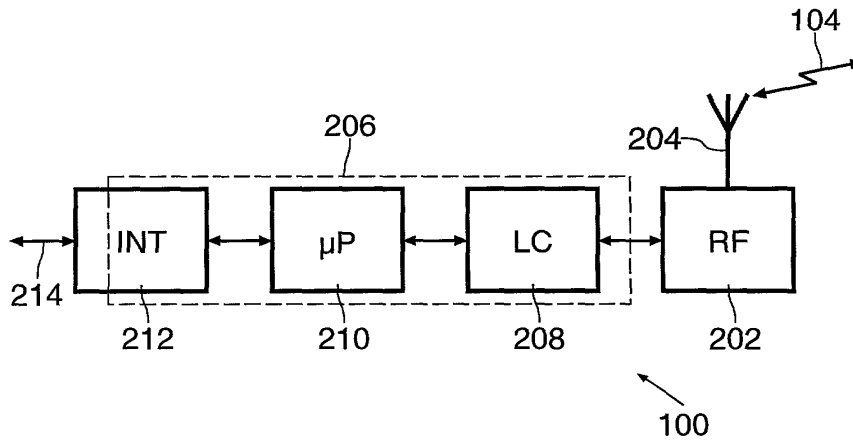


FIG. 2

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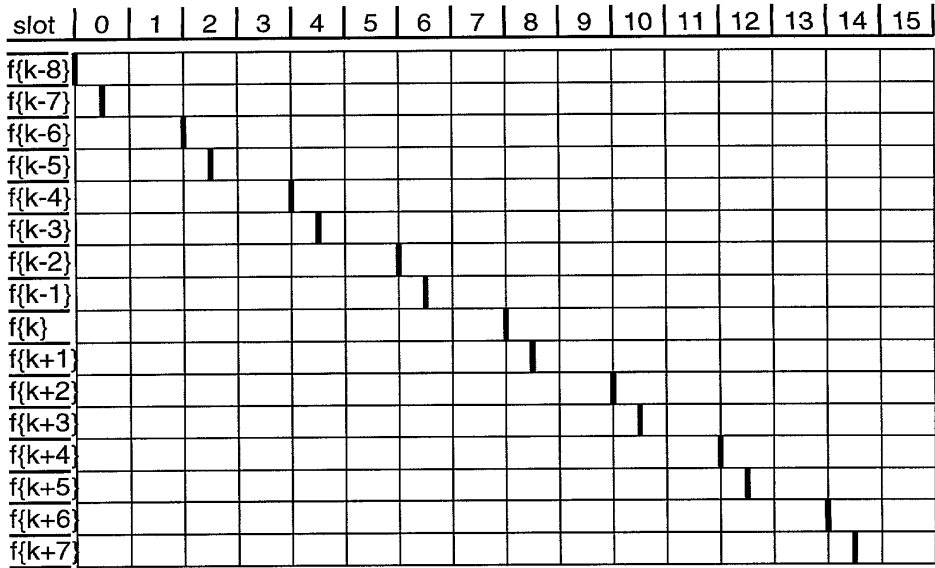


FIG. 3

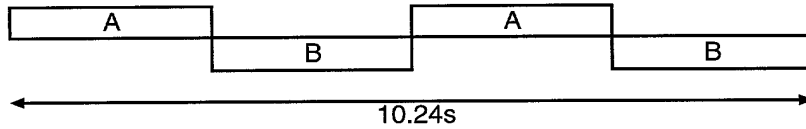


FIG. 4

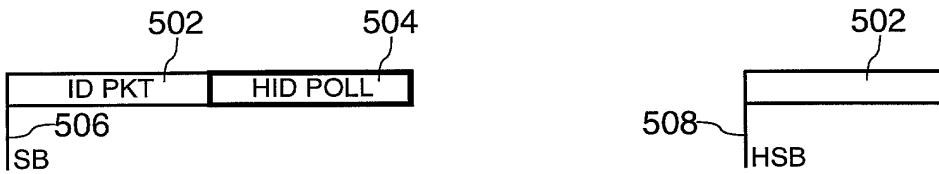


FIG. 5

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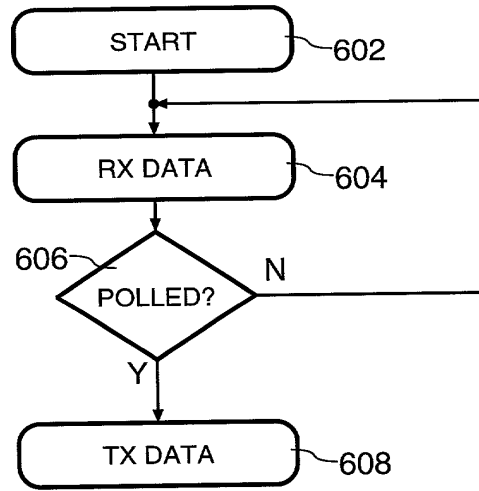


FIG. 6

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# DECLARATION AND POWER OF ATTORNEY

Sole/Joint

Attorney's Docket No:  
PHGB 000108 US

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

COMMUNICATION SYSTEM

the specification of which (check one)

is attached hereto

was filed on \_\_\_\_\_ as Application Serial No: \_\_\_\_\_ and was amended on \_\_\_\_\_

(if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56 (a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

### PRIOR FOREIGN APPLICATION(S)

COUNTRY	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY Claimed Under 35 U.S.C. 119	
GREAT BRITAIN	0015454.2	26-06-2000	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
GREAT BRITAIN	0020076.6	15-08-2000	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35 United States Code §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

### PRIOR UNITED STATES APPLICATION(S)

APPLICATION SERIAL NUMBER	FILING DATE	STATUS (PATENTED, PENDING, ABANDONED)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

**POWER OF ATTORNEY:** As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (list name and registration number)

Jack E. Haken, Reg. No 26,902  
Algy Tamoshunas, Reg. No 27,677

SEND CORRESPONDENCE TO: Corporate Patent Counsel U.S. Philips Corporation 580 White Plains Road Tarrytown, New York 10591	DIRECT TELEPHONE CALLS TO: (Name and telephone number)  (914) 332-0222
---	---

Dated: 1 <sup>st</sup> May 2001		Inventor's Signature: Robert J. Davis	
FULL NAME OF INVENTOR:	Last name: DAVIES	First Name: Robert	Middle Name: J.
RESIDENCE & CITIZENSHIP:	City: HURLEY	State or Foreign Country: ENGLAND	Country of Citizenship: GREAT BRITAIN
POST OFFICE ADDRESS:	Street & No: 7 WITHER DALE	City: HURLEY	State or Country: GREAT BRITAIN Zip Code: RH6 9BW

Dated:		Inventor's Signature:	
FULL NAME OF INVENTOR:	Last name:	First Name:	Middle Name:
RESIDENCE & CITIZENSHIP:	City:	State or Foreign Country:	Country of Citizenship:
POST OFFICE ADDRESS:	Street & No:	City:	State or Country: Zip Code:



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Atty. Docket

ROBERT J. DAVIES

GB000108

Serial No.

Group Art Unit

Filed: CONCURRENTLY

Ex.

COMMUNICATION SYSTEM

Honorable Commissioner for Patents  
Washington, D.C. 20231

APPOINTMENT OF ASSOCIATES

Sir:

The undersigned Attorney of Record hereby revokes all prior appointments (if any) of Associate Attorney(s) or Agent(s) in the above-captioned case and appoints:

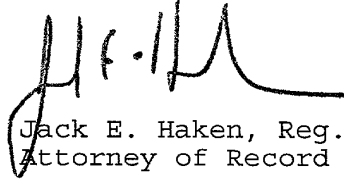
Eric Bram (Registration No. 37,285)

Michael E. Marion (Registration No. 32,266) and

c/o U.S. PHILIPS CORPORATION, Intellectual Property Department, 580 White Plains Road, Tarrytown, New York 10591, his Associate Attorney(s)/Agent(s) with all the usual powers to prosecute the above-identified application and any division or continuation thereof, to make alterations and amendments therein, and to transact all business in the Patent and Trademark Office connected therewith.

ALL CORRESPONDENCE CONCERNING THIS APPLICATION AND THE LETTERS PATENT WHEN GRANTED SHOULD BE ADDRESSED TO THE UNDERSIGNED ATTORNEY OF RECORD.

Respectfully,

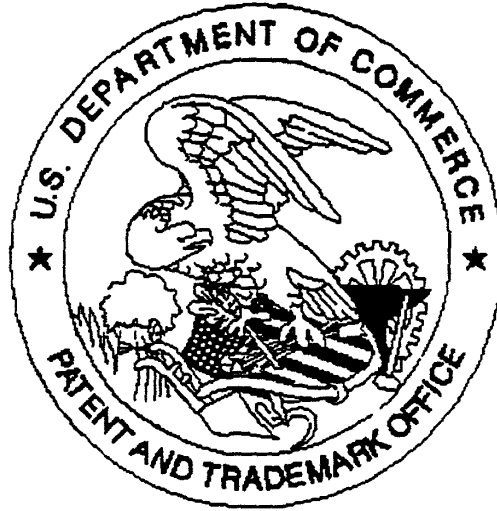


Jack E. Haken, Reg. 26,902  
Attorney of Record

Dated at Tarrytown, New York  
this June 6, 2001

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United States Patent & Trademark Office  
Office of Initial Patent Examination -- Scanning Division



FOI 2009-04594-000

Application deficiencies found during scanning:

Page(s) \_\_\_\_\_ of \_\_\_\_\_ were not present  
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Page(s) \_\_\_\_\_ of \_\_\_\_\_ were not present  
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There are only 15 pages of specification.

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3509 U.S. PTO  
 09/876514  
 06/07/05

Class	Subclass
ISSUE CLASSIFICATION	

PATENT NUMBER

U.S. UTILITY Patent Application

O.I.P.E. PATENT DATE  
 SCANNED TR3 G.A. [Signature]

APPLICATION NO. 09/876514	CONT/PRIOR F	CLASS 342 370	SUBCLASS 390	ART UNIT 3662 2663	EXAMINER ABELSON
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APPLICANTS  
 Robert Davies  
 Communication system

TITLE  
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ISSUING CLASSIFICATION							
ORIGINAL		CROSS REFERENCE(S)					
CLASS	SUBCLASS	CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)				
370	390	370	432				
INTERNATIONAL CLASSIFICATION							
H04L	12/56						

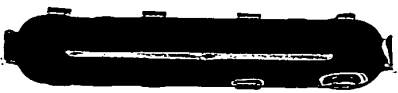
Continued on Issue Slip Inside File Jacket

<input type="checkbox"/> <b>TERMINAL DISCLAIMER</b>	<b>DRAWINGS</b>			<b>CLAIMS ALLOWED</b>	
	Sheets Drwg.	Figs. Drwg.	Print Fig. 1	Total Claims	Print Claim for O.G.
<input type="checkbox"/> The term of this patent subsequent to _____ (date) has been disclaimed.	_____ (Assistant Examiner)			_____ (Date)	
<input type="checkbox"/> The term of this patent shall not extend beyond the expiration date of U.S. Patent. No. _____	_____ (Primary Examiner)			_____ (Date)	
<input type="checkbox"/> The terminal _____ months of this patent have been disclaimed.	_____ (Legal Instruments Examiner)			_____ (Date)	
			<b>ISSUE FEE</b>		
			Amount Due	Date Paid	
			<b>ISSUE BATCH NUMBER</b>		

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SEARCHED			
Class	Sub.	Date	Exmr.
370	311	4/15-4/16	RU
	312	2004	
	328-330		
	336		
	337		
	<del>341</del>		
	*346*		
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	390		
	465		
	*470*		
	473		
	476		
	*491*		

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	Date	Exmr.
East database	4/15-16	RU
	2004	

INTERFERENCE SEARCHED			
Class	Sub.	Date	Exmr.

(RIGHT OUTSIDE)

ISSUE SLIP STAPLE AREA (for additional cross references)

POSITION	INITIALS	ID NO.	DATE
FEE DETERMINATION	<i>JH</i>		08/12/01
O.I.P.E. CLASSIFIER	<i>JH</i>	720	8-21-01
FORMALITY REVIEW	<i>JH</i>		08-07-01
RESPONSE FORMALITY REVIEW			

INDEX OF CLAIMS

- ✓ ..... Rejected                      N ..... Non-elected
- = ..... Allowed                        I ..... Interference
- (Through numeral) ... Canceled      A ..... Appeal
- ÷ ..... Restricted                        O ..... Objected

Claim	Date
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Case Docket No. PHGB000108

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06/07/01  
1998 U.S. PTO

1993 U.S. PTO  
09/076514  
06/07/01

THE COMMISSIONER FOR PATENTS, Washington, D.C. 20231

Enclosed for filing is the patent application of Inventor(s):  
Robert J. Davies

For: COMMUNICATION SYSTEM

**ENCLOSED ARE:**

- Appointment of Associates;
- Information Disclosure Statement, Form PTO-1449 and copies of documents listed therein;
- Preliminary Amendment;
- Specification (18 Pages of Specification, Claims, & Abstract);
- Declaration and Power of Attorney:  
(1 Page of a  fully executed  unsigned Declaration);
- Drawing (3 sheets of  informal  formal sheets);
- Certified copies of Great Britain application Serial Nos. 0015454.2 and 0020076.6;
- Authorization Pursuant to 37 CFR §1.136(a)(3)
- Other: ;
- Assignment to Koninklijke Philips Electronics N.V.

**FEE COMPUTATION**

CLAIMS AS FILED				
FOR	NUMBER FILED	NUMBER EXTRA	RATE	BASIC FEE - \$710.00
Total Claims	12 - 20 =	0	X \$18 =	0.00
Independent Claims	4 - 3 =	1	X \$80 =	80.00
Multiple Dependent Claims, if any			\$270 =	0.00
TOTAL FILING FEE . . . . .				\$790.00

Please charge Deposit Account No. 14-1270 in the amount of the total filing fee indicated above, plus any deficiencies. The Commissioner is also hereby authorized to charge any other fees which may be required, except the issue fee, or credit any overpayment to Account No. 14-1270.

Amend the specification by inserting before the first line as a centered heading --Cross Reference to Related Applications--; and insert below that as a new paragraph --This is a continuation-in-part of application Serial No. , filed , which is herein incorporated by reference--.

**CERTIFICATE OF EXPRESS MAILING**

Express Mail Mailing Label No: EL66160503US  
Date of Deposit June 7, 2001  
I hereby certify that this paper and/or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 C.F.R. 1.10 on the date indicated above and is addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231.

Elissa DeLuccy  
Typed Name

Elissa DeLuccy  
Signature

Michael E. Marion, Reg. 32,266  
Attorney  
(914) 333-9641  
U.S. Philips Corporation  
580 White Plains Road  
Tarrytown, New York 10591

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Atty. Docket

ROBERT J. DAVIES

GB000108

Serial No.

Group Art Unit

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Ex.

COMMUNICATION SYSTEM

Honorable Commissioner for Patents  
Washington, D.C. 20231



AUTHORIZATION PURSUANT TO 37 CFR §1.136(a)(3)  
AND TO CHARGE DEPOSIT ACCOUNT

Sir:

The Commissioner is hereby requested and authorized to treat any concurrent or future reply in this application requiring a petition for extension of time for its timely submission, as incorporating a petition for extension of time for the appropriate length of time.

Please charge any additional fees which may now or in the future be required in this application, including extension of time fees, but excluding the issue fee unless explicitly requested to do so, and credit any overpayment, to Deposit Account No. 14-1270.

Respectfully submitted,

By 

Michael E. Marion, Reg. 32,266  
Attorney  
(914) 333-9641

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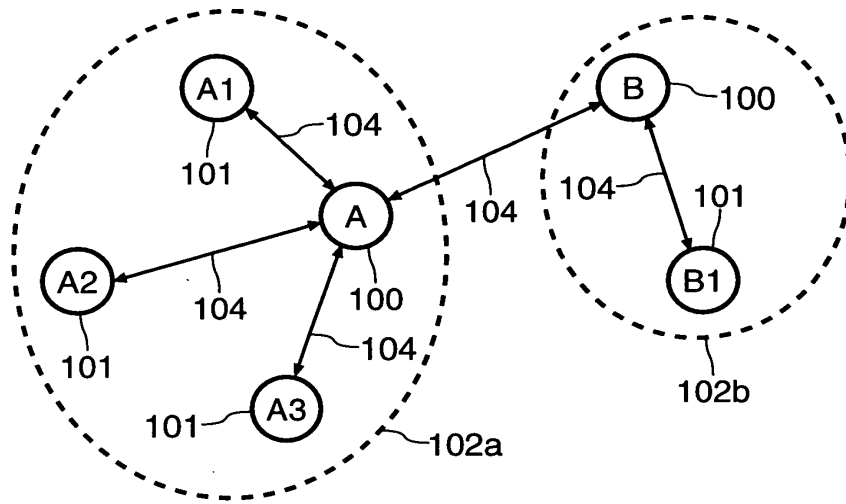


FIG. 1

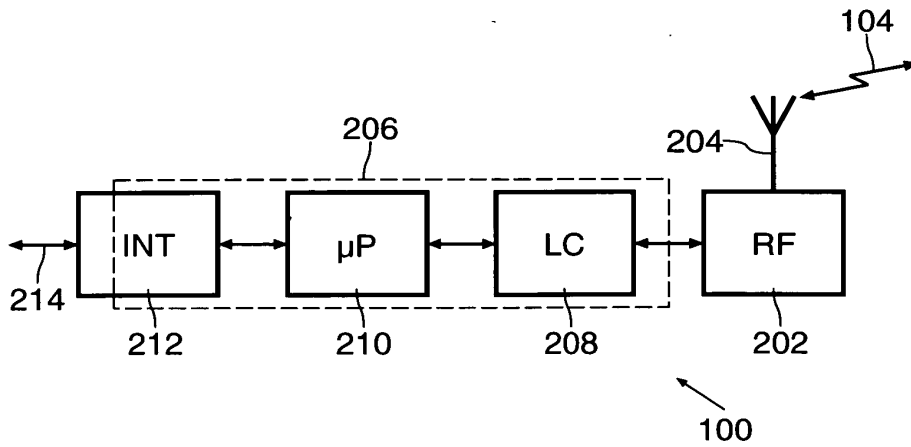


FIG. 2

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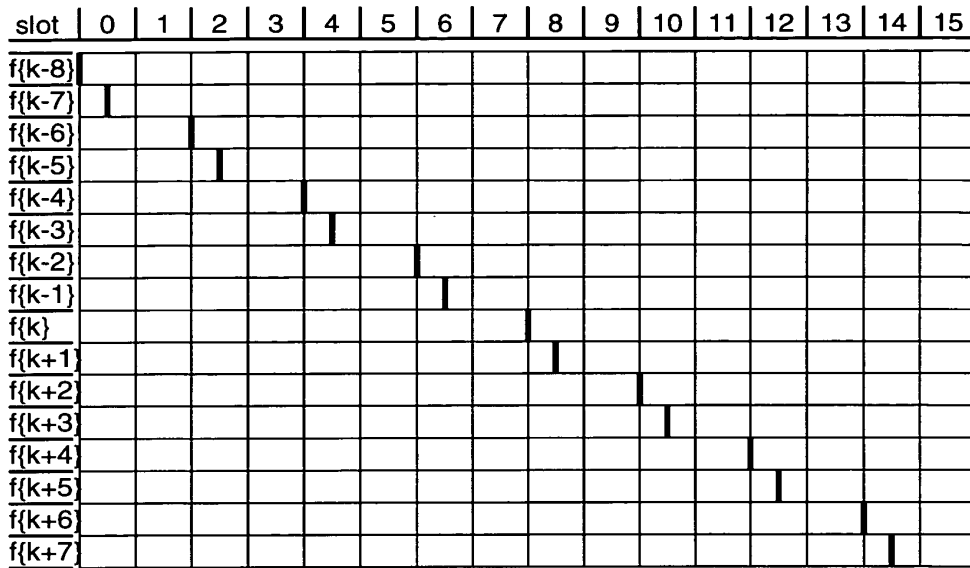


FIG. 3

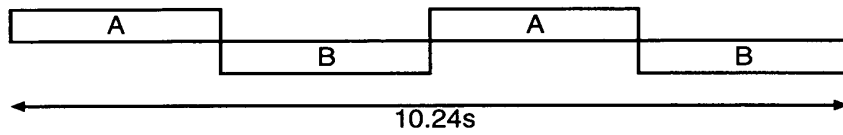


FIG. 4

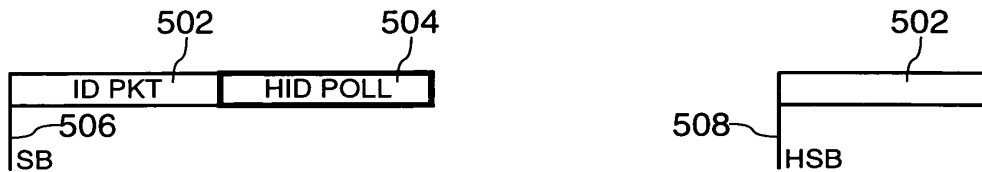


FIG. 5

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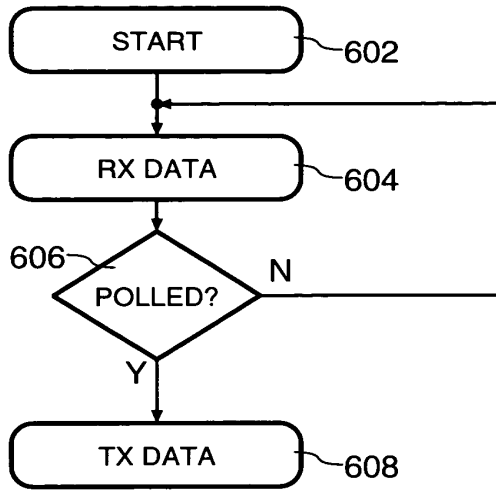


FIG. 6

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DESCRIPTION

**COMMUNICATION SYSTEM**

5           The present invention relates to a communication system and further relates to primary and secondary stations for use in such a system and to a method of operating such a system. Although the present invention is described with particular reference to a Bluetooth system, it is applicable to a range of other communication systems.

10

          In recent years there has been increasing interest in enabling devices to interact via wireless communication links, thereby avoiding the need for extensive cabling. An example of a communication system which may be used for such wireless links is a Bluetooth network, operating according to the specification defined by the Bluetooth Special Interest Group. Such a network is intended to provide low-cost, short range radio links between mobile PCs, mobile phones and other devices, whether portable or not.

15

          Communication in a Bluetooth network takes place in the unlicensed ISM band at around 2.45GHz. Stations form ad-hoc networks which are known as piconets, each comprising a master station and up to seven slave stations. All stations are identical and capable of acting as master or slave as required. A station can take part in more than one piconet, thereby linking piconets and enabling communication over an extended range.

20

          One application for which use of Bluetooth is proposed is the connection of controller devices to host systems. A controller device, also known as a Human/machine Interface Device (HID), is an input device such as a keyboard, mouse, games controller, graphics pad or the like. Such HIDs do not typically require a link having high data throughput, but do require a very responsive link.

25

30           A Bluetooth system is more than capable of supporting the throughput requirements of HIDs. However, the degree of responsiveness required can be more difficult to achieve. An active Bluetooth link can offer a reasonably

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responsive service, but this requires both setting up of the link and its maintenance even during periods of inactivity.

Two types of communication link supported in a Bluetooth network are Asynchronous ConnectionLess (ACL) links and Synchronous Connection  
 5 Oriented (SCO) links. ACL links allow slaves to enter a 'park' mode and cease active communications, which also allows a number of other HIDs to maintain links with the master station without violating the Bluetooth rule that no more than seven slaves can be active at any one time. A slave has to be polled before it can submit a request to leave park mode and become active. SCO  
 10 links require continuous operation by a slave, but there are only a limited number of SCO channels available.

Setting up a link requires a HID to join, as a slave, the piconet including the host system (which will typically act as piconet master, i.e. a base station). Joining the piconet requires two sets of procedures, namely 'inquiry' and  
 15 'page'. Inquiry allows a would-be slave to find a base station and issue a request to join the piconet. Page allows a base station to invite slaves of its choice to join the net. Analysis of these procedures indicates that the time taken to join a piconet and then to be in a position to transfer user input to the master could be several tens of seconds.

20 It is possible for this procedure to be carried out once and for all when the host system is turned on. However, HIDs will normally be battery operated and it is therefore not acceptable for them to have to remain permanently switched on. In particular, for a HID to sign on to the piconet automatically when the host system is turned on it will either have to be regularly waking up  
 25 to look for Bluetooth inquiry bursts, thereby consuming power, or it will need to be manually woken up by the user.

It is therefore more likely that a HID will remain inactive until it is woken up, either by being explicitly switched on or by a user attempting some form of input. Hence, the host system's Bluetooth master will need to run inquiry  
 30 cycles periodically, which has two implications. The first is that because the inquiry phase is periodic rather than continuous, initial access time could be several tens of seconds. This could mean that it could take half a minute or

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more from the time a user moves a mouse to a cursor moving on a screen.  
Secondly, the fact that an inquiry cycle takes place at all means that ACL links  
will be suspended during this cycle, for up to 10.24 seconds at a time.  
Although SCO links could be used, a HID using such a link could not cease  
5 transmissions during inactive periods.

It is therefore an object of the invention to address the problem of  
providing a responsive link between a HID and a host system which allows the  
HID to go to sleep during periods of inactivity.

10 According to a first aspect of the present invention there is provided a  
communications system comprising a primary station and at least one  
secondary station, wherein the primary station has means for broadcasting a  
series of inquiry messages, each in the form of a plurality of predetermined  
data fields arranged according to a first communications protocol, and means  
15 for adding to an inquiry message prior to transmission an additional data field  
for polling at least one secondary station, and wherein the or each polled  
secondary station has means for determining when an additional data field has  
been added to the plurality of data fields, for determining whether it has been  
polled from the additional data field and for responding to a poll when it has  
20 data for transmission to the primary station.

According to a second aspect of the present invention there is provided  
a primary station for use in a communications system comprising at least one  
secondary station, wherein means are provided for broadcasting a series of  
inquiry messages, each in the form of a plurality of predetermined data fields  
25 arranged according to a first communications protocol, and for adding to each  
inquiry message prior to transmission an additional data field for polling at  
least one secondary station.

According to a third aspect of the present invention there is provided a  
secondary station for use in a communications system comprising a primary  
station, wherein means are provided for receiving an inquiry message  
30 broadcast by the primary station, the message being in the form of a plurality  
of predetermined data fields arranged according to a first communications

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protocol and having added to it an additional data field for polling at least one secondary station, and wherein means are provided for determining when an additional data field has been added to the plurality of data fields, for determining whether it has been polled from the additional data field and for responding to a poll when it has data for transmission to the primary station.

According to a fourth aspect of the present invention there is provided a method of operating a communication system comprising a primary station and at least one secondary station, the method comprising the primary station broadcasting a series of inquiry messages, each in the form of a plurality of predetermined data fields arranged according to a first communications protocol, and adding to an inquiry message prior to transmission an additional data field for polling at least one secondary station, and further comprising the or each polled secondary station determining when an additional data field has been added to the plurality of data fields, determining whether it has been polled from the additional data field and responding to a poll when it has data for transmission to the primary station.

Embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawings, wherein:

Figure 1 is a diagram of an ad-hoc wireless network comprising two linked piconets;

Figure 2 is a block schematic diagram of a typical Bluetooth station;

Figure 3 is a chart illustrating the transmission of a train of inquiry access codes centred on a given frequency;

Figure 4 illustrates alternation between trains of inquiry messages over the duration of an inquiry broadcast;

Figure 5 illustrates the insertion of a packet of broadcast data within an existing transmission slot; and

Figure 6 is a flow chart illustrating a method of polling a HID in accordance with the present invention.

In the drawings the same reference numerals have been used to indicate corresponding features.

In the following description we consider particularly a system which utilises Bluetooth protocols for communication of messages between stations. As will be recognised, the general invention concept of polling HIDs via a broadcast channel used as part of the inquiry procedure is not restricted to Bluetooth devices and is applicable to other communications arrangements, in particular frequency hopping systems.

A basic Bluetooth network configuration is illustrated in Figure 1. Such a configuration would typically begin with two connected host devices, for example a portable PC and a cellular phone, and grow to include additional connected devices. A wide range of additional host devices may be included, for example wireless headsets, personal organisers and home entertainment equipment. The network comprises a plurality of stations 100,101 each included in such a host device, formed into two piconets 102a,102b. In general the networking components (i.e. the Bluetooth chip for a Bluetooth network) of all stations 100,101 will be implemented identically. However, it is only necessary that all stations 100,101 comprising the network are able to operate according to a compatible protocol.

The first piconet 102a is a point-to-multipoint network comprising four stations 100, a master 100 (A) and three slaves 101 (A1,A2,A3), with bidirectional communication channels 104 between the master 100 and each of the slaves 101. The second piconet 102b is a point-to-point network comprising a master 100 (B) and a slave 101 (B1). Communication between the piconets 102a,102b is enabled by the master A in the first piconet 102a also acting as a slave in the second piconet 102b and vice versa. It is not necessary for the link between the piconets 102a,102b to be between masters: it would be equally possible for the link to be between stations A3 and B1 or between A and B1, for example.

An example of a station 100 for use in a Bluetooth system is illustrated in more detail in Figure 2, and comprises two main sections. The first section is an analogue unit comprising a radio (RF) 202 having an antenna 204 for transmitting and receiving radio signals on the communication channel 104.

The second section is a digital controller unit 206, further comprising a link baseband controller (LC) 208, a microprocessor ( $\mu$ P) 210 and an interface unit (INT) 212.

5 The link controller 208 comprises means for performing baseband processing and execution of basic protocols close to the physical layer, for example implementing error correction coding, generating Automatic Repeat reQuests (ARQ) and performing audio coding. The microprocessor 210 manages the station 100, controlling data transfer between the interface unit 212 and the link controller 208. The interface unit 212 comprises hardware and  
10 software for interfacing the station 100 to a host device such as a portable PC or a cellular phone. The interfacing is performed via a link 214, which might include interfaces to a USB (Universal Serial Bus), external memory and other items as appropriate for the particular application.

15 The Bluetooth inquiry procedure allows a would-be slave 101 to find a base station and issue a request to join its piconet. It has been proposed specifically to overcome problems caused by the frequency-hopping nature of Bluetooth and similar systems. The applicants have recognised that it is possible to piggy-back a broadcast channel on the inquiry messages issued by the master 100. The broadcast channel can be used to poll HIDs at regular  
20 intervals. However, at the air interface, the mechanism is entirely compatible with conventional Bluetooth systems.

To illustrate how this is implemented, we first consider how the Inquiry procedures themselves operate, with reference to Figures 3 and 4. When a Bluetooth unit wants to discover other Bluetooth devices, it enters a so-called  
25 inquiry substate. In this mode, it issues an inquiry message containing a General Inquiry Access Code (GIAC) or a number of optional Dedicated Inquiry Access Codes (DIAC). This message is repeated at several levels; first, it is repeated in a train A of 16 frequencies from a total of 32 making up the inquiry hopping sequence. The message is sent twice on two frequencies in  
30 even timeslots with the following, odd timeslots used to listen for replies on the two corresponding inquiry response hopping frequencies. Sixteen frequencies and their response counterparts can therefore be covered in 16 timeslots, or

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10ms. The chart of Figure 3 illustrates the transmission of a single train on sixteen frequencies centred around  $f\{k\}$ , where  $f\{k\}$  represents the inquiry hopping sequence.

5 The next step is the repetition of the train a plurality of times. At the very least, as presently specified, this means 256 repetitions of the entire train. Finally, the train A is swapped for the train B consisting of the remaining 16 frequencies and the cycle repeated. As shown by Figure 4, the specification states that this switch must occur at least three times to ensure the collection of all responses in an error-free environment. This means that an inquiry  
10 broadcast could take at least 10.24 seconds.

A portable device that wants to be discovered by a Bluetooth master 100 enters the inquiry scan substate. Here, it listens for a message containing the GIAC or DIACs of interest. It, too, operates in a cyclic way. It listens on a single hop frequency for an inquiry scan period which is long enough to cover  
15 the 16 inquiry frequencies used by the inquiry. On hearing an inquiry containing an appropriate IAC, the portable device enters a so-called inquiry response substate and issues a number of inquiry response messages to the master 100. The master 100 will then page the portable device, inviting it to join the piconet.

20 As mentioned above and shown in Figure 5, the applicants propose that the inquiry messages issued by the base station have an extra field 504 appended to them, capable of carrying a HID poll message. The extended field 504 may carry a header that signifies a HID poll to distinguish it from other applications of extended field information, such as context-aware services or  
25 broadcast audio (as disclosed in our co-pending United Kingdom patent applications 0015454.2 (applicant's reference PHGB 000084) and 0015453.4 (applicant's reference PHGB 000085) respectively). It will also carry the address of the HID being polled, and may also carry a small amount of information to the HID which might be used to provide supplementary  
30 information to a user (such as text on an LCD screen) or feedback (for example, motional feedback in games controllers). By adding the field to the end of the inquiry message, it will be appreciated that non-HID receivers can

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ignore it without modification. In addition, by using a special DIAC to signify a HID poll, HID devices can be alerted to the presence of the forthcoming poll.

The presence of the extra data field 504 means that the guard space conventionally allowed at the end of a Bluetooth inquiry packet is reduced. However, this space is provided to give a frequency synthesiser time to change to a new hop frequency and will be generally unused otherwise, as current frequency synthesisers are capable of switching at speeds which do not need extension into the extra guard space. The standard inquiry packet is an ID packet (ID PKT) 502 of length 68 bits. Since it is sent in a half-slot, starting either on a slot boundary (SB) 506 or a half-slot boundary (HSB) 508, the guard space allocated is  $(625/2 - 68) = 244.5\mu\text{s}$  (625 $\mu\text{s}$  slot period, 1 Mbit/s signalling rate). Modern synthesisers can switch in much less time with figures of 100 $\mu\text{s}$  or lower considered routine by experts in the field. Hence a suitable size for the extra data field 504 could be 100 bits.

In a typical embodiment, four of the 100 bits will be lost as trailer bits for the ID packet 502: this is a consequence of it being read by a correlator. Of the 96 bits remaining, applicant's preferred allocation is for 64 bits to be used as data and 32 bits as a 2/3 FEC (Forward Error Correction) checksum. Each inquiry burst thus contains 8 bytes of broadcast data, allowing space for several channels of key coded or digitised analogue inputs.

In order to achieve the desired responsiveness, and because the HID has been specifically addressed, the HID is allowed to respond, if desired, in the next-but-one half-slot with a packet of similar format, containing information corresponding to the user's input. As described above, the inquiry procedure involves the transmission of two sets of sixteen frequencies in trains of inquiry transmissions. The 16 frequencies used within a train can be considered as 16 polling channels, and therefore 16 devices can be polled every 10ms if desired. Other arrangements are possible, for example polling up to 32 devices every 20ms or up to 8 devices every 5ms. The arrangement of polling channels could also be flexible, with more rapid polling provided for devices which need a faster response time and vice versa.

Each device need only monitor a single frequency within a train, but must be able to track the train switches and frequency changes due to changing clock phase. It is assumed that an initial set up procedure synchronises the HID Bluetooth slave 101 to the Bluetooth master 100, as well as establishing the nature of the HID and the format it uses for uplink and downlink transmissions. At this time the HID is allocated a device address and a channel number corresponding to one of the sixteen channels within a train.

For fast polling, it is necessary for the Bluetooth master 100 to operate continuously. This interferes with the conventional mechanism for setting up two-way links. However, use of two radios operating in tandem, as disclosed in our co-pending United Kingdom patent application 0015452.6 (applicant's reference PHGB 000086), avoids this problem, thereby enabling the provision of fast access to the piconet and an unlimited two-way throughput capacity.

By polling every 10ms, with eight bytes per poll, a capacity of 800 bytes per second for sixteen devices is provided. In variations on the basic scheme described above this capacity could be lowered to permit the operation of conventional inquiry procedures, or to increase the number of HIDs that a host system 100 can support beyond sixteen.

In order to minimise their power consumption, HIDs are not obliged to respond to every poll if they have no information to offer. A watchdog timer could be provided in a HID to make it transmit at least once in a given period whilst it is nominally active. The period could for example be predetermined, determined by the host system or determined by negotiation between the host and each HID. HIDs failing to transmit within the determined period would then be removed from the master's list of active devices.

A method of polling a HID in accordance with the present invention is summarised in Figure 6. The method starts, at step 602, when the HID has data to transmit to the host system. The HID receives, at step 604, data from the extra field 504 then tests, at step 606, whether it has been polled by the host system. If it has not been polled, the HID returns to step 604 to receive the next extra field 504. If the HID has been polled, it transmits its data in the next-but-one half-slot, at step 608.

TO: "THE" "HID"

Since an inquiry mode is necessary to permit access to the host system's piconet, it must be provided in the conventional manner for at least some of the time. There are a range of strategies which may be employed.

5 A first strategy involves the operation of one radio in two modes, namely set up and polling. In set up mode the inquiry procedure operates as normal and the HID can establish contact with the host master 100 in the conventional manner. Once all HIDs have established themselves, the master radio switches to polling mode, in which the inquiry procedure now operates in polling mode only. This strategy is ideal for games machines since it achieves 10 the fastest response when polling mode is operational, while opportunities for other controllers to join the piconet occur at well-defined times, such as between games.

A second strategy is more appropriate when the host system is a general purpose device, such as a PC, in which case opportunities must be 15 provided for new devices to join at any time. In this case the master's radio can operate in modeless fashion, devoting some of its time to fast polling and other times to conventional inquiry operations. Alternate 10ms periods could be devoted to each operation to achieve a 50:50 ratio for example, with the ratio being able to be modified as desired. Such a system would still have a quick 20 response to HIDs and the general inquiry operation, although possibly slower, would still operate as normal. The use of a special DIAC in a polling message should ensure that a slave 101 going through normal inquiry response procedures will not send an inquiry response packet in the space reserved for a fast poll response.

25 Allowing conventional inquiries in parallel with fast polling implies that, occasionally, there will be a slight pause in inquiry or fast polling to allow a new HID access to the host. This will probably not matter to the user since he will no longer be using old HIDs and will therefore not be aware of the temporary loss in responsiveness.

30 A third strategy is required when conventional Bluetooth data (or other) links are required, so as to support both a fast response for the polling mechanism and the data carrying capacity of conventional Bluetooth. This

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requires the use of two radios, and the approach disclosed in our co-pending United Kingdom patent application 0015452.6 (applicant's reference PHGB 000086) can also be used here. Alternatively, one radio could operate as a conventional Bluetooth radio with the other permanently dedicated to fast polling.

From reading the present disclosure, other modifications will be apparent to persons skilled in the art. Such modifications may involve other features which are already known in the design, manufacture and use of fixed and portable communications systems and component parts thereof, and which may be used instead of or in addition to features already described herein. Although claims have been formulated in this application to particular combinations of features, it should be understood that the scope of the disclosure of the present application also includes any novel feature or any novel combination of features disclosed herein either explicitly or implicitly or any generalisation thereof, whether or not it relates to the same invention as presently claimed in any claim and whether or not it mitigates any or all of the same technical problems as does the present invention. The applicants hereby give notice that new claims may be formulated to such features and/or combinations of features during the prosecution of the present application or of any further application derived therefrom.

In the present specification and claims the word "a" or "an" preceding an element does not exclude the presence of a plurality of such elements. Further, the word "comprising" does not exclude the presence of other elements or steps than those listed.

FOR PUBLICATION

## CLAIMS

1. A communications system comprising a primary station and at least one secondary station, wherein the primary station has means for broadcasting a series of inquiry messages, each in the form of a plurality of predetermined data fields arranged according to a first communications protocol, and means for adding to an inquiry message prior to transmission an additional data field for polling at least one secondary station, and wherein the or each polled secondary station has means for determining when an additional data field has been added to the plurality of data fields, for determining whether it has been polled from the additional data field and for responding to a poll when it has data for transmission to the primary station.
2. A primary station for use in a communications system comprising at least one secondary station, wherein means are provided for broadcasting a series of inquiry messages, each in the form of a plurality of predetermined data fields arranged according to a first communications protocol, and for adding to each inquiry message prior to transmission an additional data field for polling at least one secondary station.
3. A primary station as claimed in claim 2, characterised in that means are provided for adding the additional data field at the end of a respective inquiry message.
4. A primary station as claimed in claim 2, characterised in that means are provided for including an indication in one of the predetermined data fields, the indication denoting the presence of the additional data field.
5. A primary station as claimed in claim 2, characterised in that the first communications protocol comprises Bluetooth messaging.

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6. A primary station as claimed in claim 2, characterised in that the additional data field comprises at least 64 bits of data.

5 7. A primary station as claimed in claim 2, characterised in that first radio means are provided for broadcasting substantially continuously inquiry messages having the additional data field and second radio means are provided for handling other aspects of communication links with secondary stations.

10 8. A secondary station for use in a communications system comprising a primary station, wherein means are provided for receiving an inquiry message broadcast by the primary station, the message being in the form of a plurality of predetermined data fields arranged according to a first communications protocol and having added to it an additional data field for  
15 polling at least one secondary station, and wherein means are provided for determining when an additional data field has been added to the plurality of data fields, for determining whether it has been polled from the additional data field and for responding to a poll when it has data for transmission to the primary station.

20

9. A secondary station as claimed in claim 8, characterised in that the first communications protocol comprises Bluetooth messaging.

25 10. A secondary station as claimed in claim 8, characterised in that means are provided for responding to a poll after a predetermined interval has passed without transmission of data, whether or not the secondary station has data for transmission.

30 11. A method of operating a communication system comprising a primary station and at least one secondary station, the method comprising the primary station broadcasting a series of inquiry messages, each in the form of a plurality of predetermined data fields arranged according to a first

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communications protocol, and adding to an inquiry message prior to transmission an additional data field for polling at least one secondary station, and further comprising the or each polled secondary station determining when an additional data field has been added to the plurality of data fields,  
5 determining whether it has been polled from the additional data field and responding to a poll when it has data for transmission to the primary station.

12. A method as claimed in claim 11, characterised in that not all inquiry messages have an additional data field for polling a secondary station  
10 added to them.

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## ABSTRACT

**COMMUNICATION SYSTEM**

5           A communications system comprises a primary station (100) and at  
least one secondary station (101). The primary station (100) is arranged to  
broadcast a series of inquiry messages, each in the form of a plurality of  
predetermined data fields arranged according to a first communications  
10           protocol such as Bluetooth. In addition the primary station (100) adds to some  
or all of the inquiry messages an additional data field for polling one or more  
secondary stations, which can respond to the poll if they have data for  
transmission. This system provides secondary stations (101) with a rapid  
15           response time without the need for a permanently active communication link.

15

(Figure 1)

PHGB 000108 US

# DECLARATION AND POWER OF ATTORNEY

Sole/Joint

Attorney's Docket No:  
PHGB 000108 US

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

COMMUNICATION SYSTEM

the specification of which (check one)

is attached hereto

was filed on \_\_\_\_\_ as Application Serial No: \_\_\_\_\_ and was amended on \_\_\_\_\_ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56 (a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

### PRIOR FOREIGN APPLICATION(S)

COUNTRY	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY Claimed Under 35 U.S.C. 119	
GREAT BRITAIN	0015454.2	26-06-2000	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
GREAT BRITAIN	0020076.6	15-08-2000	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35 United States Code §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

### PRIOR UNITED STATES APPLICATION(S)

APPLICATION SERIAL NUMBER	FILING DATE	STATUS (PATENTED, PENDING, ABANDONED)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

**POWER OF ATTORNEY:** As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (list name and registration number)

Jack E. Haken, Reg. No 26,902  
Algy Tamoshunas, Reg. No 27,677

SEND CORRESPONDENCE TO: Corporate Patent Counsel U.S. Philips Corporation 580 White Plains Road Tarrytown, New York 10591	DIRECT TELEPHONE CALLS TO: (Name and telephone number)  (914) 332-0222
---	---

Dated: 1 <sup>st</sup> May 2001		Inventor's Signature: Robert J. Davies	
FULL NAME OF INVENTOR:	Last name: DAVIES	First Name: Robert	Middle Name: J.
RESIDENCE & CITIZENSHIP	City: HORLEY	State or Foreign Country: ENGLAND	Country of Citizenship: GREAT BRITAIN
POST OFFICE ADDRESS	Street & No: 7 WITHER DALE	City: HORLEY	State or Country: GREAT BRITAIN Zip Code: RH6 9BW
Dated: _____		Inventor's Signature: _____	
FULL NAME OF INVENTOR:	Last name: _____	First Name: _____	Middle Name: _____
RESIDENCE & CITIZENSHIP	City: _____	State or Foreign Country: _____	Country of Citizenship: _____
POST OFFICE ADDRESS	Street & No: _____	City: _____	State or Country: _____ Zip Code: _____

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Atty. Docket

ROBERT J. DAVIES

GB000108

Serial No.

Group Art Unit

Filed: CONCURRENTLY

Ex.

COMMUNICATION SYSTEM

Honorable Commissioner for Patents  
Washington, D.C. 20231

APPOINTMENT OF ASSOCIATES

Sir:

The undersigned Attorney of Record hereby revokes all prior appointments (if any) of Associate Attorney(s) or Agent(s) in the above-captioned case and appoints:

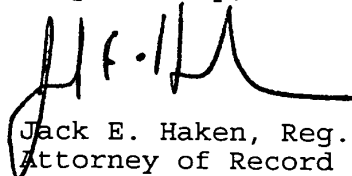
Eric Bram (Registration No. 37,285)

Michael E. Marion (Registration No. 32,266) and

c/o U.S. PHILIPS CORPORATION, Intellectual Property Department, 580 White Plains Road, Tarrytown, New York 10591, his Associate Attorney(s)/Agent(s) with all the usual powers to prosecute the above-identified application and any division or continuation thereof, to make alterations and amendments therein, and to transact all business in the Patent and Trademark Office connected therewith.

ALL CORRESPONDENCE CONCERNING THIS APPLICATION AND THE LETTERS PATENT WHEN GRANTED SHOULD BE ADDRESSED TO THE UNDERSIGNED ATTORNEY OF RECORD.

Respectfully,



Jack E. Haken, Reg. 26,902  
Attorney of Record

Dated at Tarrytown, New York  
this June 6, 2001

mh06bre0.wa0.doc

APPROVED FOR RECORD



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Bib Data Sheet

CONFIRMATION NO. 9203

<b>SERIAL NUMBER</b> 09/876,514	<b>FILING DATE</b> 06/07/2001 <b>RULE</b>	<b>CLASS</b> 342	<b>GROUP ART UNIT</b> 3662	<b>ATTORNEY DOCKET NO.</b> PHGB000108
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**APPLICANTS**  
 Robert J. Davies, Horley, UNITED KINGDOM;

**\*\* CONTINUING DATA \*\*\*\*\***

**\*\* FOREIGN APPLICATIONS \*\*\*\*\***  
 UNITED KINGDOM 0015454.2 06/26/2000  
 UNITED KINGDOM 0020076.6 08/15/2000

**IF REQUIRED, FOREIGN FILING LICENSE GRANTED**  
**\*\* 08/07/2001**

Foreign Priority claimed <input checked="" type="checkbox"/> yes <input type="checkbox"/> no	<b>STATE OR COUNTRY</b> UNITED KINGDOM	<b>SHEETS DRAWING</b> 3	<b>TOTAL CLAIMS</b> 12	<b>INDEPENDENT CLAIMS</b> 4
35 USC 119 (a-d) conditions met <input checked="" type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> Met after allowance				
Verified and Acknowledged <i>Ron Oliver</i> Examiner's Signature	<i>RA</i> Initials			

**ADDRESS**  
 Corporate Patent counsel  
 U.S. Philips Corporation  
 580 White Plains Road  
 Tarrytown ,NY 10591

**TITLE**  
 Communication system

<b>FILING FEE RECEIVED</b> 790	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:	<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees ( Filing ) <input type="checkbox"/> 1.17 Fees ( Processing Ext. of time ) <input type="checkbox"/> 1.18 Fees ( Issue ) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit
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PATENT APPLICATION SERIAL NO. \_\_\_\_\_

U.S. DEPARTMENT OF COMMERCE  
PATENT AND TRADEMARK OFFICE  
FEE RECORD SHEET

06/12/2001 EFLORES 00000098 141270 09876514

01 FC:101	710.00 CH
02 FC:102	80.00 CH

PTO-1556  
(5/87)

\*U.S. GPO: 1999-459-082/19144

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**PATENT APPLICATION FEE DETERMINATION RECORD**

Effective October 1, 2000

Application or Docket Number

09/876514  
~~6-D-000-108~~

**CLAIMS AS FILED - PART I**

	(Column 1)	(Column 2)
TOTAL CLAIMS	12	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	12 minus 20= *	
INDEPENDENT CLAIMS	4 minus 3= *	1
MULTIPLE DEPENDENT CLAIM PRESENT		<input type="checkbox"/>

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

**SMALL ENTITY TYPE**

**OR OTHER THAN SMALL ENTITY**

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BASIC FEE	355.00
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X40=	
+135=	
TOTAL	

RATE	FEE
BASIC FEE	710.00
X\$18=	
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+270=	
TOTAL	70

**CLAIMS AS AMENDED - PART II**

	(Column 1)	(Column 2)	(Column 3)
<b>AMENDMENT A</b>	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
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	Independent	Minus ***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>			

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TOTAL ADDIT. FEE	

	(Column 1)	(Column 2)	(Column 3)
<b>AMENDMENT B</b>	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
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FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>			

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RATE	ADDITIONAL FEE
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X40=	
+135=	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
X\$18=	
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+270=	
TOTAL ADDIT. FEE	

	(Column 1)	(Column 2)	(Column 3)
<b>AMENDMENT C</b>	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
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+135=	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
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X80=	
+270=	
TOTAL ADDIT. FEE	

\* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20."

\*\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3."

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

# CLAIMS ONLY

SERIAL NO. **098 765N**

FILING DATE

APPLICANT(S)

## CLAIMS

	AS FILED		AFTER 1st AMENDMENT		AFTER 2nd AMENDMENT			*		*		*	
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TOTAL IND.	4						TOTAL IND.						
TOTAL DEP.	8						TOTAL DEP.						
TOTAL CLAIMS	12						TOTAL CLAIMS						

\* MAY BE USED FOR ADDITIONAL CLAIMS OR ADMMENDMENTS

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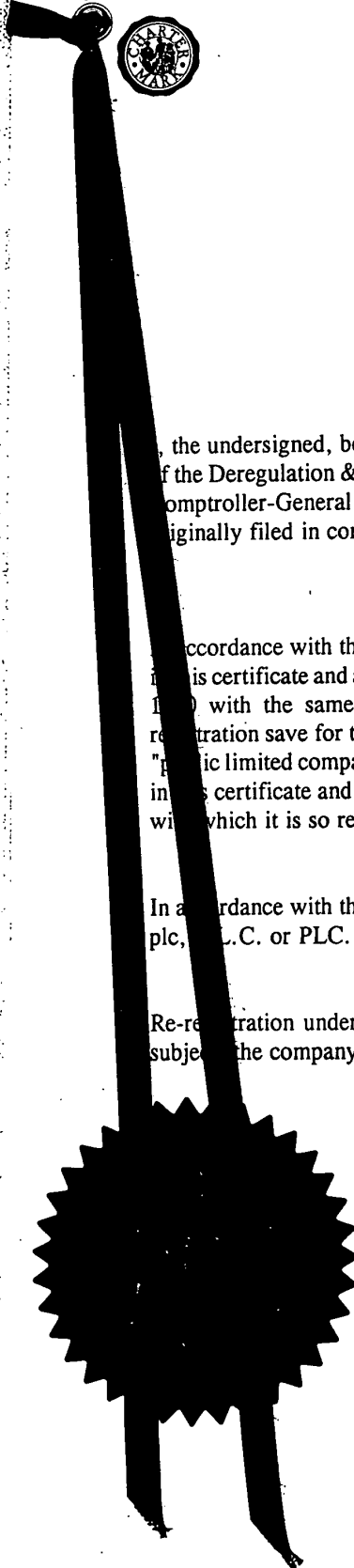
I - II

INVESTOR IN PEOPLE

The Patent Office  
Concept House  
Cardiff Road  
Newport  
South Wales  
NP10 8QQ

1c-903 U.S. PTO

09/076514



the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

In accordance with the Patents (Companies Re-registration) Rules 1982, if a company named in this certificate and any accompanying documents has re-registered under the Companies Act 1985 with the same name as that with which it was registered immediately before re-registration save for the substitution as, or inclusion as, the last part of the name of the words "public limited company" or their equivalents in Welsh, references to the name of the company in this certificate and any accompanying documents shall be treated as references to the name with which it is so re-registered.

In accordance with the rules, the words "public limited company" may be replaced by p.l.c., plc, L.L.C. or PLC.

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Signed

Dated

1 MAY 2001

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P01/7700 0.00-0015454.2

1// //

THE PATENT OFFICE  
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26 JUN 2000  
NEWPORT

The Patent Office  
Cardiff Road  
Newport  
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**Request for grant of a patent**  
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1. Your reference PHGB 000084

2. Patent application number (The Patent Office will fill in this part) **0015454.2** **26 JUN 2000**

3. Full name, address and postcode of the or of each applicant (underline all surnames)  
KONINKLIJKE PHILIPS ELECTRONICS N.V.  
GROENEWOUDSEWEG 1  
5621 BA EINDHOVEN  
THE NETHERLANDS  
Patents ADP Number (if you know it) 7586605002  
If the applicant is a corporate body, give the country/state of its incorporation THE NETHERLANDS

4. Title of the invention DATA DELIVERY THROUGH BEACONS

5. Name of your agent (if you have one) ANDREW GORDON WHITE  
"Address for service" in the United Kingdom Philips Corporate Intellectual Property  
to which all correspondence should be sent Cross Oak Lane  
(including the postcode) Redhill  
Surrey  
RH1 5HA  
Patents ADP number (if you know it) 7133473002 IK

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country	Priority Application number (if you know it)	Date of filing (day/month/year)
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7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application	Date of filing (day/month/year)
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8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer "Yes" if:  
a) any applicant named in part 3 is not an inventor, or  
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Description	14
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Drawings	3 <i>MM</i>

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Statement of inventorship and right to grant of a patent (*Patents Form 7/77*)

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Any other documents

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11.

I/We request the grant of a patent on the basis of this application.

Signature

Date 23/6/2000

12. Name and daytime telephone number of person to contact in the United Kingdom

01293 815299

(A. G. WHITE)

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Description

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## DESCRIPTION

**DATA DELIVERY THROUGH BEACONS**

5           The present invention relates to services offered to users of electronic equipment, especially but not exclusively to users of mobile communications devices such as portable telephones and suitably equipped PDA's (personal digital assistants). The invention further relates to means for delivery of such services, and to portable devices for receiving them.

10

          Recent years have seen a great increase in subscribers world-wide to mobile telephone networks and, through advances in technology and the addition of functionalities, cellular telephones have become personal, trusted devices. A result of this is that a mobile information society is developing, with  
15   personalised and localised services becoming increasingly more important. Such "Context-Aware" (CA) mobile telephones are used with low power, short range base stations in places like shopping malls to provide location-specific information. This information might include local maps, information on nearby shops and restaurants and so on. The user's CA terminal may be equipped to  
20   filter the information received according to pre-stored user preferences and the user is only alerted if an item of data of particular interest has been received.

          An example of a CA terminal is given in U.S. patent 5,835,861 which discloses the use of wireless telephones within the context of advertisement billboards. The user of a wireless telephone obtains the telephone number of a  
25   vendor by activating his/her wireless telephone to transmit a prompt signal to an active advertisement source and to receive from the advertisement source a response signal containing the telephone number of the advertising vendor. The telephone number can then be used to automatically place a call to that vendor via the public switched telephone network. Alternatively, the telephone  
30   number can be stored for use later on. This arrangement can be used to place a call to a vendor without having to either memorise the telephone number or

to write it down. The signals between the billboard and the caller can be transmitted as modulated infrared (IR) signals.

In another example, Hewlett-Packard has posted a publication on the Web at <http://www.cooltown.hp.com/papers/webpres/WebPresence.htm> about their "Cooltown" project. The convergence of Web technology, wireless networks and portable client devices provides design opportunities for computer/communications systems. In the Cooltown project, systems that are location-aware can be created using URL's for addressing, physical URL's for delivery via beacons and sensing of URL's for discovery, and localised web servers for directories. The systems are ubiquitous to support nomadic users. On top of this infrastructure the Internet connectivity can be leveraged to support communications services. Web presence bridges the World Wide Web and the physical world inhabited by the users, providing a model for supporting nomadic users without a central control point.

The Cooltown Museum and Bookstore offers visitors a Web-enhanced experience. As visitors tour the museum, their portable digital assistant (PDA) can receive Web URLs from wireless "beacons". These beacons are small infrared transceivers located close to pictures or sculptures; the URLs link into a Web of information about the items. Using the PDA's Web browser, visitors can read or hear about the artist or the work and about related art works in the museum. The URLs can also be stored as bookmarks for further study or they can be used to select reproductions of the artwork from the museum's online store.

It will be recognised that an important requirement for CA devices is that they quickly and efficiently gather data from beacons such that the user is not required to undertake actions such as staying close to a beacon whilst contact is established between portable device and beacon, nor having to specifically initiate interaction (as is the case with the above-mentioned system in US 5,835,861). A further requirement is that the portable device should be kept relatively simple insofar as the data gathering from beacons is concerned: in the Cooltown system, a full web browser and display capability is required to

support user navigation within the web page indicated by the URL being broadcast.

5 It is therefore an object of the invention to provide a system for the delivery of data via beacons whereby the amount of dedicated circuitry and operating procedure are kept to low levels.

10 In accordance with a first aspect of the present invention there is provided a communications system comprising at least one beacon device capable of wireless message transmission and at least one portable device capable of receiving such a message transmission, wherein the beacon is arranged to broadcast a series of inquiry messages each in the form of a plurality of predetermined data fields arranged according to a first communications protocol, wherein the beacon is further arranged to add to each inquiry message prior to transmission an additional data field, and 15 wherein the at least one portable device is arranged to receive the transmitted inquiry messages and read data from said additional data field. By adding the additional field (suitably at the end of a respective inquiry message), data broadcast may be carried on top of an existing inquiry process, such that the usual delays while such a process is carried out prior to data transfer are 20 avoided. Furthermore, by placing the additional field at the end of those sent according to the communications protocol (preferably but not essentially Bluetooth), those protocol-compatible devices not intended for reception of beacon signals can simply ignore the additional data without compromising operation according to protocol.

25 Where the protocol is Bluetooth (or a similar frequency hopping arrangement) the beacon may be configured to broadcast a series of inquiry messages on a predetermined clocked sequence of frequencies, with clock information for the beacon being carried by the additional data field. As will be described in greater detail hereinafter with respect to embodiments of the 30 invention, this can improve the inquiry performance of a Bluetooth system, shortening the time to establish a connection for data exchange.

The beacon may be arranged to include an indication in one of said predetermined data fields (suitably in a currently unused or unassigned field), said indication denoting the presence of said additional data field, such that devices configured for reception of beacon data may be triggered to read from  
5 the additional data field.

The beacon may be arranged to include in a message first comparison data, with the portable device further comprising storage means holding second comparison data and comparator means arranged to identify when there is a match between the first and second comparison data and present  
10 the data read from the additional data field, otherwise to not present the data. Such second comparison data may be predetermined and/or pre-stored, or it may be determined adaptively from user profiling of the portable device user.

Also in accordance with the present invention there is provided a mobile communication device for use in the system recited above, the device  
15 comprising a receiver capable of receiving a short-range wireless inquiry message including a plurality of data fields according to a first communications protocol, means for determining when an additional data field has been added to said plurality of data fields, and means for reading data from such an additional data field and presenting the same to a user.

Still further in accordance with the present invention, there is provided a  
20 method for enabling the user of a portable communications device to receive broadcast messages wherein at least one beacon device broadcasts a series of inquiry messages each in the form of a plurality of predetermined data fields arranged according to a first communications protocol, wherein the beacon  
25 adds to each inquiry message prior to transmission an additional data field carrying broadcast message data, and wherein the portable device receives the transmitted inquiry messages and reads the broadcast data from said additional data field.

30 Preferred embodiments of the invention will now be described, by way of example only, and with reference to the accompanying drawings, in which:

Figure 1 is a block schematic diagram of a beacon and portable device embodying the invention;

Figure 2 is a schematic diagram of a series of devices in a linked beacon infrastructure;

5 Figure 3 is a chart illustrating the transmission of a train of inquiry access codes centred on a given frequency ;

Figure 4 illustrates alternation between trains of inquiry messages over the duration of an inquiry broadcast;

10 Figure 5 illustrates the insertion of a packet of broadcast data within an existing transmission slot;

Figure 6 illustrates a first arrangement for sending beacon clock data in a sequence of inquiry message trains; and

Figure 7 illustrates an alternate arrangement to that of Figure 6 for the sending of beacon clock data.

15

In the following description we consider particularly a CA application which utilises Bluetooth protocols for communication of messages from beacon to portable device (whether telephone, PDA or other). As will be recognised, the general invention concept of including a broadcast channel as part of the inquiry procedure is not restricted to Bluetooth devices, and is applicable to other communications arrangements, in particular frequency hopping systems.

20 Figure 1 is a block schematic diagram of a CA mobile telephone 10 in use with one or more low power, short range base stations or beacons 12, 14. As mentioned previously, and discussed in greater detail below, such an arrangement may be used in places like shopping malls to provide location-specific information such as local maps, information on nearby shops and restaurants and so on, with the beacon downloading information keys to a mobile device. An information key is a small data object that provides a reference to a source of full information, and it is in the form of a number of predetermined fields, one of which will contain a short piece of descriptive text presented to a user. Another field will be a pointer or address of some form,

30



for example a URL or telephone number. Other supplementary fields may control how the data is presented to a user and how the address may be exploited. The beacon will generally broadcast cyclically a number of these keys, each typically relating to a different service.

5 Issues relating to the beacon construction and configuration include the beacons range which will be dependent on output power (typical range being 1mW to 100mW), levels of local interference, and receiver sensitivity.

The user's CA terminal 10 comprises an aerial 16 coupled with transceiver stage 18 for the reception and transmission of messages.  
10 Outgoing messages result from user input to the telephone, either audio input via microphone 20 and A/D converter 22 or other data input via the keypad or other input means 24. These inputs are processed to message data format by signal and data processing stage 26 and converted to transmission format by encoder 28 before being supplied to the transceiver stage 18.

15 Messages received via the aerial 16 and transceiver 18 are passed via a decoding stage 30 to a filtering and signal processing stage 32. If the data carried by the message is for presentation on a display screen 34 of the telephone, the data will be passed to a display driver 36, optionally after buffering 38, with the driver formatting the display image. As will be  
20 recognised, the display 34 may be a relatively simple low-resolution device, and the conversion of received data to display data may be carried out as a subset of the processing stage 32 functionality, without the requirement for a dedicated display driver stage.

Where the message is carrying data from one or other of the beacons  
25 12, 14, the telephone has the ability to filter the information received according to pre-stored 40 user preferences and the user is only alerted (i.e. the information will only be retained in buffer 38 and/or presented on screen 34) if comparison of stored preference data and subject matter indicators in the message indicate that an item of data of particular interest has been received.

30 For conventional audio messages, the audio data is output by the filter and processing stage 32, via D/A converter 42 and amplifier 44 to an earphone or speaker 46. Receipt of such messages from the telephone

network 48 is indicated by arrow 50: the telephone network 48 also provides the link from the telephone 10 to a wide-area network (WAN) server 52 and, via the WAN 54 (which may be the internet), to one or more remote service providers 56 providing a source of data for the telephone 10.

5           Communication between the CA terminal (telephone 10) and the CA base station (beacon 12) takes two forms: 'push' and 'pull'. In 'push' mode, information is broadcast by the beacons 12, 14, to all portable terminals 10 in the form of short 'keys' indicated at 60. The keys will take various forms according to the application but will generally include a concise description of  
10 the information being sent and a pointer to fuller information, e.g. a URL identifying one of the service providers 56.

          Keys are received by the terminal 10 'unconsciously', that is, without direct intervention by the user, and automatically filtered according to the user's pre-set preferences. Some will be discarded, some kept for further  
15 study, others might cause the user to be alerted immediately. By way of example, shops might choose to push details of special offers into passing terminals in the knowledge that users who have interest and have therefore set their filters 32 accordingly will be alerted by their terminal.

          Sometimes the user will wish to obtain more information than is  
20 contained in the keys. Here, 'pull' mode allows a user to set up a connection with a server 56 (which need not necessarily be specially configured for CA use) and actively request information to pull down into the terminal 10. This mode is therefore typically interactive.

          Whilst base stations or beacons will typically be independent of one  
25 another (in a shopping mall set up, each shop provides and maintains its own beacon without reference to any beacons provided by neighbouring shops), the beacons may be wholly or partially networked with at least some co-ordination as to their broadcast messages.

          Figure 2 is a diagram of such a system 100 of linked beacons  
30 embodying the invention and providing an implementation of an infrastructure for use in, for example, department stores, shopping malls, theme parks, etc. The system 100 comprises a plurality of beacons 102, 104, 106, 108

distributed over a series of locales. Each of the beacons 102-108 broadcasts one or more short-range inquiry signals in a time-slot format as described in greater detail hereinafter. The beacons 102 - 108 are controlled by a beacon infrastructure server (BIS) 110, with one or more terminals 112, 114, 116, 118 being connected to the server 110. The terminals 112 - 118 enable service providers, i.e., the users of beacons 102 - 108, to author or edit allocated service slots in the form of added data piggy backed on inquiry facilitation signals transmitted by beacons 102 - 108. A service provider may lease a beacon or one of the beacon's service slots from the infrastructure provider. To this end, server 110 provides simple HTML templates for filling out by the user via one of terminals 112 - 118. Having filled out the template with, for example, a description of the service and other information for the data to be carried via the beacon broadcast, the template is returned to server 110, preferably via a secure link using, e.g., Secure HTTP (S-HTTP) or Secure Sockets Layer (SSL). SSL creates a secure link between a client and a server, over which any amount of data can be sent securely. S-HTTP is designed to transmit individual messages securely. Server 110 then creates the appropriate additional data package for appending to the inquiry signal of a relevant one of the beacons 102 - 108 based on the information submitted with the template. The system 100 may further comprise an application server 120 to assist in carrying out various functions, as will be readily understood by the skilled reader.

Referring back to Figure 1, a strong candidate technology for the wireless link necessary for at least the 'push' mode of the above-described CA system is Bluetooth, on the grounds that it is expected to become a component part of a large number of mobile telephones 10. In analysing the Bluetooth protocol for CA broadcast or 'push' mode utilisation, a problem may be seen. In the ideal case, the terminal 10 will detect fixed beacons 12, 14 and extract basic information from them without the terminal 10 needing to transmit at all. However, this type of broadcast operation is not supported by the current Bluetooth specification.

In part, the incompatibility follows the frequency hopping nature of Bluetooth beacon systems which means that, in order for broadcast messages (or, indeed, any messages) to be received by a passing terminal, the terminal has to be synchronised to the beacon in both time and frequency. The portable device 10 has to synchronise its clock to the beacon clock and, from the beacons identity, deduce which of several hopping sequences is being employed.

To make this deduction, the portable device has conventionally been required to join – as a slave - the piconet administered by the beacon as piconet master. Two sets of procedures are used, namely “inquiry” and “page”. Inquiry allows a would-be slave to find a base station and issue a request to join the piconet. Page allows a base station to invite slaves of its choice to join the net. Analysis of these procedures indicates that the time taken to join a piconet and then be in a position to receive information from the master could be several tens of seconds, which is much too long for CA applications, where a user may move out of range of a beacon before joining could be completed.

The difficulty of receiving broadcast data from beacons is caused at least partially by the frequency-hopping nature of Bluetooth and similar systems. The Bluetooth inquiry procedure has been proposed specifically to solve the problem of bringing together master and slave: the applicants have recognised that it is possible to piggy-back a broadcast channel on the inquiry messages issued by the master. Only CA terminals need read the broadcast channel messages and only CA base stations or beacons send them. In consequence, at the air interface, the mechanism is entirely compatible with conventional (non-CA) Bluetooth systems.

To illustrate how this is implemented, we first consider how the Inquiry procedures themselves operate, with reference to Figures 3 and 4. When a Bluetooth unit wants to discover other Bluetooth devices, it enters a so-called inquiry substate. In this mode, it issues an inquiry message containing a General Inquiry Access Code (GIAC) or a number of optional Dedicated Inquiry Access Codes (DIAC). This message is repeated at several levels;

first, it is repeated in a train A of 16 frequencies from a total of 32 making up the inquiry hopping sequence. The message is sent twice on two frequencies in even timeslots with the following, odd timeslots used to listen for replies on the two corresponding inquiry response hopping frequencies. Sixteen  
5 frequencies and their response counterparts can therefore be covered in 16 timeslots, or 10ms. The chart of Figure 3 illustrates the transmission of a single train on sixteen frequencies centred around  $f\{k\}$ , where  $f\{k\}$  represents the inquiry hopping sequence.

The next step is the repetition of the train at least  $N_{inquiry}$  times. At the  
10 very least, this means 256 repetitions of the entire train. Finally, the train A is swapped for the train B consisting of the remaining 16 frequencies and the cycle repeated. As shown by Figure 4, the specification states that this switch must occur at least three times to ensure the collection of all responses in an error-free environment. This means that an inquiry broadcast could take at  
15 least 10.24 seconds.

A portable device that wants to be discovered by a beacon enters the inquiry scan substate. Here, it listens for a message containing the GIAC or DIAC's of interest. It, too, operates in a cyclic way. It listens on a single hop frequency for an inquiry scan period of  $T_{w\_inquiry\_scan}$ . This must be long enough  
20 to cover the 16 inquiry frequencies used by the inquiry. The interval between the beginning of successive scans must be no greater than 1.28 seconds. The frequency chosen comes from the list of 32 making up the inquiry hopping sequence.

On hearing an inquiry containing an appropriate IAC, the portable  
25 device enters a so-called inquiry response substate and issues a number of inquiry response messages to the beacon. The beacon will then page the portable device, inviting it to join the piconet.

As mentioned above and shown in Figure 5, the applicants propose that the inquiry messages issued by the base station have an extra field appended  
30 to them, capable of carrying a user-defined payload (CA DATA). In the CA scenario, this payload is used to carry broadcast information, or keys, to CA terminals during the inquiry procedure. By adding the field to the end of the

inquiry message, it will be appreciated that non-CA receivers can ignore it without modification. In addition, by using a CA-specific DIAC, CA receivers can be alerted to the presence of the extra information field.

5 The presence of the extra data field means that the guard space conventionally allowed at the end of a Bluetooth inquiry packet is reduced. However, this space - provided to give a frequency synthesiser time to change to a new hop frequency - will be generally unused otherwise, as current frequency synthesisers are capable of switching at speeds which do not need extension into the extra guard space. The standard inquiry packet is an ID  
10 packet of length 68 bits. Since it is sent in a half-slot, the guard space allocated is  $(625/2 - 68) = 244.5 \mu\text{s}$  (625  $\mu\text{s}$  slot period, 1 Mbit/s signalling rate). Modern synthesisers can switch in much less time with figures of 100  $\mu\text{s}$  or lower considered routine by experts in the field. Applicants therefore propose allocation of 100 bits as a suitable size for this new field.

15 CA handsets can receive the broadcast data quickly without being required to run through a lengthy procedure to join a piconet. In addition, since there is no need for the handset to transmit any information whatsoever, there is a consequent power saving that will be particularly important in dense environments where many CA base stations may be present. Nevertheless,  
20 when the handset is in interactive mode and wishes to join a piconet in order to obtain more information, it may employ the default inquiry procedures as normal. There is no loss of functionality through supporting the additional data field.

In a typical embodiment, four of our 100 bits will be lost as trailer bits for  
25 the ID field; this is a consequence of it being read by a correlator. Of the 96 bits remaining, applicants preferred allocation is that 64 be used as data and 32 as a 2/3 FEC (forward error correction) checksum. Each inquiry burst thus contains 8 bytes of broadcast data. In a most common scenario, by the second group of A and B trains the portable device has found the base station,  
30 understood it to be a CA beacon and is awaiting the broadcast data. Since it will be listening specifically, the portable device will at least be able to read

256 bursts of data twice (A and B), giving us two lots of 2 Kbytes, or 4 Kbytes in total.

At this stage, the portable device does not know the phase of the beacons clock because this information is not been transmitted. To assist the portable device, clock information is transmitted in at least some of the trains in the first A and B groups, as shown in Figure 6, together with some auxiliary information indicating when the next switches between A and B will occur. This clock information will be transmitted in place of the CA broadcast data so means are provided to discriminate between the two data channels. Use of separate DIAC's is one possible method.

In the case where the portable device knows the timing of the beacon, the portable devices also knows how it will hop, which gives the ability to track all transmissions of a train. Since there are 16 transmissions in a frame, then the resultant CA channel has 16 times as much capacity and can convey 64 Kbytes of information.

Since the terminal wakes up every 1.28 seconds or less, it will generally have obtained the clocking information it needs by the half way mark in the first A or B periods. Switching from clock to data at these halfway marks, as illustrated in Figure 7, provides a number of useful advantages. Firstly, some data can be received in less than five seconds from the start of the inquiry procedure. Secondly, the terminal can still respond to an important key by automatically issuing an inquiry response message to the base station (if that is the appropriate action for the terminal to take) even if the key appears comparatively late in the cycle. It will be noted that no increase in capacity is assumed.

In the foregoing, a portable device will receive all the additional data field packets on one of the 32 inquiry channels, thereby using only 1/32 of the available bandwidth. As will be recognised, if the uncertainty as to when a portable terminal (beacon slave) receives the first inquiry packet can be overcome, the predetermined nature of the hopping sequence may be accommodated and the full bandwidth therefore utilised. For a slave to synchronise with a masters inquiry hopping sequence from the point where it

received the first packet, the slave needs to know both the masters clock offset and the position of the first received packet in the masters hopping sequence. In the following example, it is assumed that the master follows the Bluetooth minimum enquiry procedure, which comprises 256 repetitions of the 16-channel inquiry hopping sequences, with three train switches (as in Figure 4).  
5 Each sweep across the 16 channels takes 10ms.

To synchronise the slave hopping, the additional data field (BCD; Fig. 1) carries the following information:

- Master clock offset (2 bytes);
- 10 • Number of full train repetitions (1 byte) – assuming that a full train consists of 256 repetitions of 10ms trains, the range of this parameter is 0-255 (before the inquiry switches to the next full train). This indicates to the slave when the master will next switch the full train.
- 15 • How many full train switches have been completed in the current inquiry cycle (1 byte) – this data indicates to the slave what the master is likely to do at the end of the current full train, i.e. whether it will switch over to another full train or whether the inquiry procedure will terminate.

20 As long as no channel repeats in the 10ms train, no field is required to indicate the position of the current channel in the hopping sequence as the slave is able to derive this from knowledge of the sequence.

From the foregoing it will be seen that, by adding 4 bytes to each additional field packet, the slave can then pick up all additional field packets to  
25 the end of the inquiry, whilst still having 4 bytes available (from our preferred assignment of 64 from 100 bits for data) to carry broadcast data.

Considering a complete beacon signal, it will be readily understood that it will need to be divided into a number of 4-byte packets with one being sent with each inquiry packet. Assuming a fixed length of beacon signal for the  
30 purposes of illustration, at 16kB the full signal can be accommodated on a single inquiry train (a train being 256 repetitions of the 16-channel hop sequence, giving  $256 \times 16 \times 4$  bytes = 16kB).



Extending this, by fixing that the first packet of a beacon signal goes on the first packet of an inquiry train, from the message indicator field for the number of repetitions for the current 16-channel hopping sequence in the message header, the slave is enabled to derive the position of the beacon packet it has received in the complete beacon signal.

From reading the present disclosure, other modifications will be apparent to persons skilled in the art. Such modifications may involve other features which are already known in the design, manufacture and use of fixed and portable communications systems, and systems and components for incorporation therein and which may be used instead of or in addition to features already described herein.

## CLAIMS:

1. A communications system comprising at least one beacon device capable of wireless message transmission and at least one portable device capable of receiving such a message transmission, wherein the beacon is arranged to broadcast a series of inquiry messages each in the form of a plurality of predetermined data fields arranged according to a first communications protocol, wherein the beacon is further arranged to add to each inquiry message prior to transmission an additional data field, and wherein the at least one portable device is arranged to receive the transmitted inquiry messages and read data from said additional data field.
2. A system as claimed in Claim 1, wherein the beacon is arranged to add said additional data field at the end of a respective inquiry message.
3. A system as claimed in Claim 1 or Claim 2, wherein the beacon is arranged to include an indication in one of said predetermined data fields, said indication denoting the presence of said additional data field.
4. A system as claimed in any of Claims 1 to 3, wherein said first communications protocol comprises Bluetooth messaging.
5. A system as claimed in Claim 4, wherein the beacon is configured to broadcast a series of inquiry messages on a predetermined clocked succession of frequencies, with clock information for said beacon being included in data carried by said additional data field.
6. A system as claimed in any of Claims 1 to 5, wherein said additional data field carries at least 64 bits of data.
7. A system as claimed in Claim 1, wherein the beacon is arranged to include in a message first comparison data, the portable device further

comprising storage means holding second comparison data and comparator means arranged to identify when there is a match between the first and second comparison data and present the data read from the additional data field, otherwise to not present the data.

5

8. A system as claimed in Claim 7, further comprising means for generating said second comparison data from user profiling of the portable device user.

10

9. A mobile communication device for use in the system of any of Claims 1 to 8, the device comprising a receiver capable of receiving a short-range wireless inquiry message including a plurality of data fields according to a first communications protocol, means for determining when an additional data field has been added to said plurality of data fields, and means for reading data from such an additional data field and presenting the same to a user.

15

10. A device as claimed in Claim 9, wherein the receiver is configured to receive messages according to Bluetooth protocols.

20

11. A method for enabling the user of a portable communications device to receive broadcast messages wherein at least one beacon device broadcasts a series of inquiry messages each in the form of a plurality of predetermined data fields arranged according to a first communications protocol, wherein the beacon adds to each inquiry message prior to transmission an additional data field carrying broadcast message data, and wherein the portable device receives the transmitted inquiry messages and reads the broadcast data from said additional data field.

25

30

12. A method as claimed in Claim 11, wherein the beacon adds said additional data field at the end of a respective inquiry message.

13. A method as claimed in Claim 11 or Claim 12, wherein the beacon includes an indication in one of said predetermined data fields, said indication denoting the presence of said additional data field.

5 14. A method as claimed in any of Claims 11 to 13, wherein said first communications protocol comprises Bluetooth messaging.

15. A communications system substantially as hereinbefore described with reference to the accompanying drawings.

10

16. A portable communications device substantially as hereinbefore described with reference to the accompanying drawings.

17. A method for enabling the user of a portable communications  
15 device to receive broadcast messages substantially as hereinbefore described with reference to the accompanying drawings.

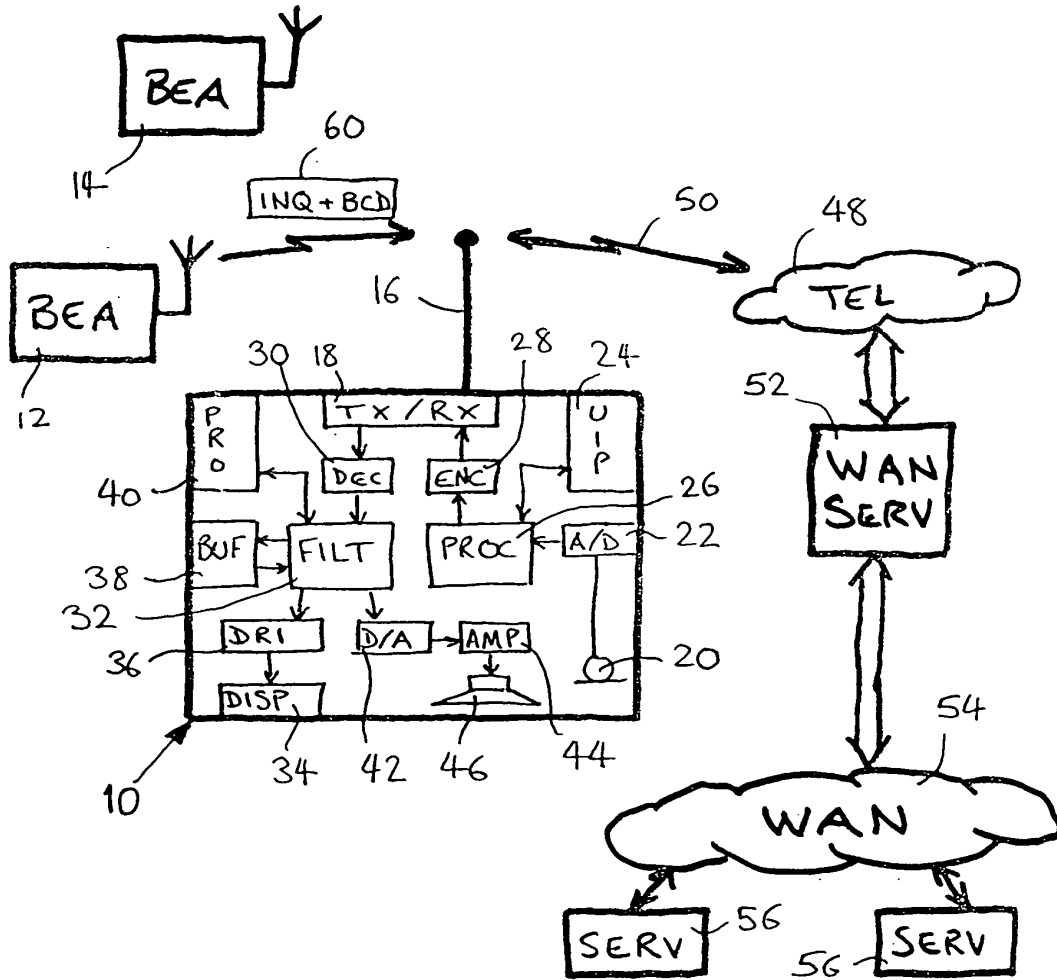
## ABSTRACT

**DATA DELIVERY THROUGH BEACONS**

5           A communications system comprises at least one beacon device (12,  
14) capable of wireless message transmission and at least one portable device  
(10) capable of receiving such a message transmission. The beacon (12) is  
arranged to broadcast a series of inquiry messages (60) each in the form of a  
plurality of predetermined data fields (INQ) arranged according to a first  
10 communications protocol, such as Bluetooth. For the delivery of additional  
data via broadcast, the beacon (12) adds to each inquiry message prior to  
transmission an additional data field (BCD) carrying broadcast data, with the  
portable device (10) receiving the transmitted inquiry messages and reading  
the broadcast data from the additional data field.

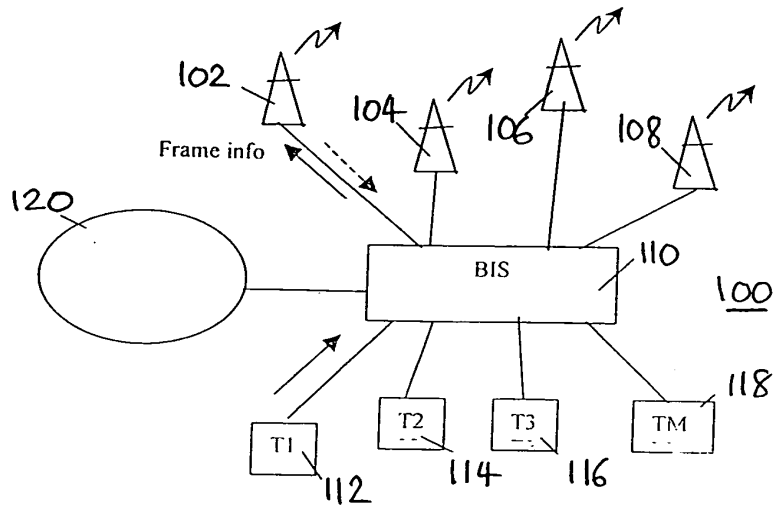
15

(Figure 1)

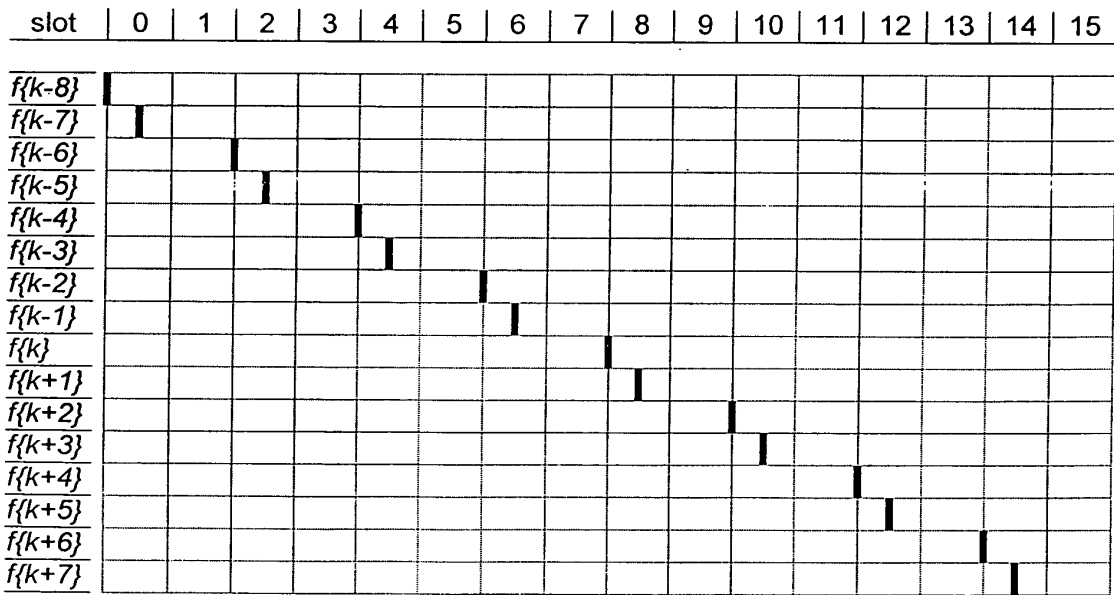


**Fig. 1**

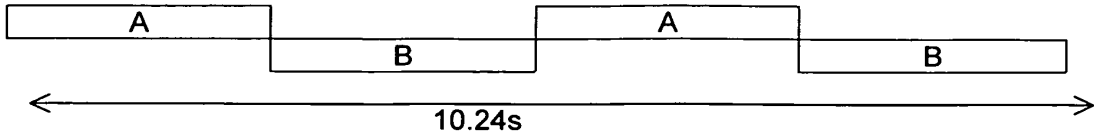
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**Fig. 2**



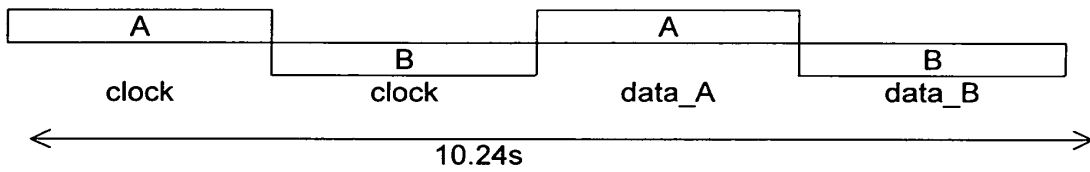
**Fig. 3**



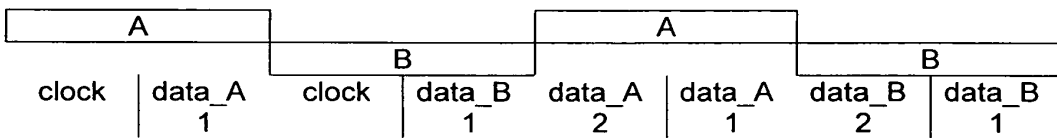
**Fig. 4**



**Fig. 5**



**Fig. 6**



**Fig. 7**





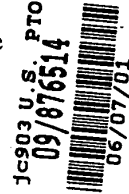
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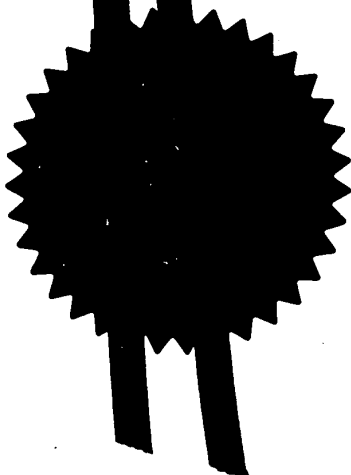


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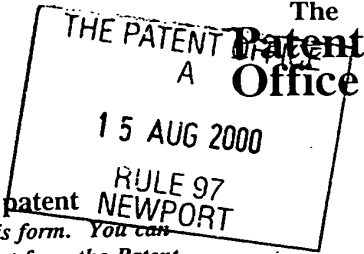
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2. Patent application number (The Patent Office will fill in this part)	0020076.6 15 AUG 2000		
3. Full name, address and postcode of the or of each applicant (underline all surnames)	KONINKLIJKE PHILIPS ELECTRONICS N.V. GROENEWOUDSEWEG 1 5621 BA EINDHOVEN THE NETHERLANDS		
Patents ADP Number (if you know it)	16AUG00 E561032-1 003008 -----P01/7700 0.00-0020076.6		
If the applicant is a corporate body, give the country/state of its incorporation	THE NETHERLANDS	7586605002	
4. Title of the invention	COMMUNICATION SYSTEM		
5. Name of your agent (if you have one)	KEVIN JAMES SCOTT		
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Patents ADP number (if you know it)	7688914001		
6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number	Country GB	Priority Application number 0015454.2	Date of filing 26 June 2000
7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application	Number of earlier application	Date of filing (day/month/year)	
8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer "Yes" if: a) any applicant named in part 3 is not an inventor, or b) there is an inventor who is not named as an applicant, or c) any named applicant is a corporate body. See note (d))	YES		

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Abstract	1
Drawings	3

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- Request for substantive examination (*Patents Form 10/77*)
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Signature



Date

16<sup>th</sup> August 2000

- 
12. Name and daytime telephone number of person to contact in the United Kingdom

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## DESCRIPTION

## COMMUNICATION SYSTEM

5           The present invention relates to a communication system and further relates to primary and secondary stations for use in such a system and to a method of operating such a system. Although the present invention is described with particular reference to a Bluetooth system, it is applicable to a range of other communication systems.

10

          In recent years there has been increasing interest in enabling devices to interact via wireless communication links, thereby avoiding the need for extensive cabling. An example of a communication system which may be used for such wireless links is a Bluetooth network, operating according to the specification defined by the Bluetooth Special Interest Group. Such a network is intended to provide low-cost, short range radio links between mobile PCs, mobile phones and other devices, whether portable or not.

          Communication in a Bluetooth network takes place in the unlicensed ISM band at around 2.45GHz. Stations form ad-hoc networks which are known as piconets, each comprising a master station and up to seven slave stations. All stations are identical and capable of acting as master or slave as required. A station can take part in more than one piconet, thereby linking piconets and enabling communication over an extended range.

          One application for which use of Bluetooth is proposed is the connection of controller devices to host systems. A controller device, also known as a Human/machine Interface Device (HID), is an input device such as a keyboard, mouse, games controller, graphics pad or the like. Such HIDs do not typically require a link having high data throughput, but do require a very responsive link.

30           A Bluetooth system is more than capable of supporting the throughput requirements of HIDs. However, the degree of responsiveness required can be more difficult to achieve. An active Bluetooth link can offer a reasonably

responsive service, but this requires both setting up of the link and its maintenance even during periods of inactivity.

Two types of communication link supported in a Bluetooth network are Asynchronous ConnectionLess (ACL) links and Synchronous Connection  
5 Oriented (SCO) links. ACL links allow slaves to enter a 'park' mode and cease active communications, which also allows a number of other HIDs to maintain links with the master station without violating the Bluetooth rule that no more than seven slaves can be active at any one time. A slave has to be polled before it can submit a request to leave park mode and become active. SCO  
10 links require continuous operation by a slave, but there are only a limited number of SCO channels available.

Setting up a link requires a HID to join, as a slave, the piconet including the host system (which will typically act as piconet master, i.e. a base station). Joining the piconet requires two sets of procedures, namely 'inquiry' and  
15 'page'. Inquiry allows a would-be slave to find a base station and issue a request to join the piconet. Page allows a base station to invite slaves of its choice to join the net. Analysis of these procedures indicates that the time taken to join a piconet and then to be in a position to transfer user input to the master could be several tens of seconds.

20 It is possible for this procedure to be carried out once and for all when the host system is turned on. However, HIDs will normally be battery operated and it is therefore not acceptable for them to have to remain permanently switched on. In particular, for a HID to sign on to the piconet automatically when the host system is turned on it will either have to be regularly waking up  
25 to look for Bluetooth inquiry bursts, thereby consuming power, or it will need to be manually woken up by the user.

It is therefore more likely that a HID will remain inactive until it is woken up, either by being explicitly switched on or by a user attempting some form of input. Hence, the host system's Bluetooth master will need to run inquiry  
30 cycles periodically, which has two implications. The first is that because the inquiry phase is periodic rather than continuous, initial access time could be several tens of seconds. This could mean that it could take half a minute or

more from the time a user moves a mouse to a cursor moving on a screen. Secondly, the fact that an inquiry cycle takes place at all means that ACL links will be suspended during this cycle, for up to 10.24 seconds at a time. Although SCO links could be used, a HID using such a link could not cease  
5 transmissions during inactive periods.

It is therefore an object of the invention to address the problem of providing a responsive link between a HID and a host system which allows the HID to go to sleep during periods of inactivity.

10 According to a first aspect of the present invention there is provided a communications system comprising a primary station and at least one secondary station, wherein the primary station has means for broadcasting a series of inquiry messages, each in the form of a plurality of predetermined data fields arranged according to a first communications protocol, and means  
15 for adding to an inquiry message prior to transmission an additional data field for polling at least one secondary station, and wherein the or each polled secondary station has means for determining when an additional data field has been added to the plurality of data fields, for determining whether it has been polled from the additional data field and for responding to a poll when it has  
20 data for transmission to the primary station.

According to a second aspect of the present invention there is provided a primary station for use in a communications system comprising at least one secondary station, wherein means are provided for broadcasting a series of inquiry messages, each in the form of a plurality of predetermined data fields  
25 arranged according to a first communications protocol, and for adding to each inquiry message prior to transmission an additional data field for polling at least one secondary station.

According to a third aspect of the present invention there is provided a secondary station for use in a communications system comprising a primary  
30 station, wherein means are provided for receiving an inquiry message broadcast by the primary station, the message being in the form of a plurality of predetermined data fields arranged according to a first communications

protocol and having added to it an additional data field for polling at least one secondary station, and wherein means are provided for determining when an additional data field has been added to the plurality of data fields, for determining whether it has been polled from the additional data field and for responding to a poll when it has data for transmission to the primary station.

According to a fourth aspect of the present invention there is provided a method of operating a communication system comprising a primary station and at least one secondary station, the method comprising the primary station broadcasting a series of inquiry messages, each in the form of a plurality of predetermined data fields arranged according to a first communications protocol, and adding to an inquiry message prior to transmission an additional data field for polling at least one secondary station, and further comprising the or each polled secondary station determining when an additional data field has been added to the plurality of data fields, determining whether it has been polled from the additional data field and responding to a poll when it has data for transmission to the primary station.

Embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawings, wherein:

Figure 1 is a diagram of an ad-hoc wireless network comprising two linked piconets;

Figure 2 is a block schematic diagram of a typical Bluetooth station;

Figure 3 is a chart illustrating the transmission of a train of inquiry access codes centred on a given frequency;

Figure 4 illustrates alternation between trains of inquiry messages over the duration of an inquiry broadcast;

Figure 5 illustrates the insertion of a packet of broadcast data within an existing transmission slot; and

Figure 6 is a flow chart illustrating a method of polling a HID in accordance with the present invention.

In the drawings the same reference numerals have been used to indicate corresponding features.



In the following description we consider particularly a system which utilises Bluetooth protocols for communication of messages between stations. As will be recognised, the general invention concept of polling HIDs via a broadcast channel used as part of the inquiry procedure is not restricted to Bluetooth devices and is applicable to other communications arrangements, in particular frequency hopping systems.

A basic Bluetooth network configuration is illustrated in Figure 1. Such a configuration would typically begin with two connected host devices, for example a portable PC and a cellular phone, and grow to include additional connected devices. A wide range of additional host devices may be included, for example wireless headsets, personal organisers and home entertainment equipment. The network comprises a plurality of stations 100,101 each included in such a host device, formed into two piconets 102a,102b. In general the networking components (i.e. the Bluetooth chip for a Bluetooth network) of all stations 100,101 will be implemented identically. However, it is only necessary that all stations 100,101 comprising the network are able to operate according to a compatible protocol.

The first piconet 102a is a point-to-multipoint network comprising four stations 100, a master 100 (A) and three slaves 101 (A1,A2,A3), with bidirectional communication channels 104 between the master 100 and each of the slaves 101. The second piconet 102b is a point-to-point network comprising a master 100 (B) and a slave 101 (B1). Communication between the piconets 102a,102b is enabled by the master A in the first piconet 102a also acting as a slave in the second piconet 102b and vice versa. It is not necessary for the link between the piconets 102a,102b to be between masters: it would be equally possible for the link to be between stations A3 and B1 or between A and B1, for example.

An example of a station 100 for use in a Bluetooth system is illustrated in more detail in Figure 2, and comprises two main sections. The first section is an analogue unit comprising a radio (RF) 202 having an antenna 204 for transmitting and receiving radio signals on the communication channel 104.

The second section is a digital controller unit 206, further comprising a link baseband controller (LC) 208, a microprocessor ( $\mu$ P) 210 and an interface unit (INT) 212.

The link controller 208 comprises means for performing baseband  
5 processing and execution of basic protocols close to the physical layer, for example implementing error correction coding, generating Automatic Repeat reQuests (ARQ) and performing audio coding. The microprocessor 210 manages the station 100, controlling data transfer between the interface unit 212 and the link controller 208. The interface unit 212 comprises hardware and  
10 software for interfacing the station 100 to a host device such as a portable PC or a cellular phone. The interfacing is performed via a link 214, which might include interfaces to a USB (Universal Serial Bus), external memory and other items as appropriate for the particular application.

The Bluetooth inquiry procedure allows a would-be slave 101 to find a  
15 base station and issue a request to join its piconet. It has been proposed specifically to overcome problems caused by the frequency-hopping nature of Bluetooth and similar systems. The applicants have recognised that it is possible to piggy-back a broadcast channel on the inquiry messages issued by the master 100. The broadcast channel can be used to poll HIDs at regular  
20 intervals. However, at the air interface, the mechanism is entirely compatible with conventional Bluetooth systems.

To illustrate how this is implemented, we first consider how the Inquiry procedures themselves operate, with reference to Figures 3 and 4. When a Bluetooth unit wants to discover other Bluetooth devices, it enters a so-called  
25 inquiry substate. In this mode, it issues an inquiry message containing a General Inquiry Access Code (GIAC) or a number of optional Dedicated Inquiry Access Codes (DIAC). This message is repeated at several levels; first, it is repeated in a train A of 16 frequencies from a total of 32 making up the inquiry hopping sequence. The message is sent twice on two frequencies in  
30 even timeslots with the following, odd timeslots used to listen for replies on the two corresponding inquiry response hopping frequencies. Sixteen frequencies and their response counterparts can therefore be covered in 16 timeslots, or

10ms. The chart of Figure 3 illustrates the transmission of a single train on sixteen frequencies centred around  $f\{k\}$ , where  $f\{k\}$  represents the inquiry hopping sequence.

The next step is the repetition of the train a plurality of times. At the very  
5 least, as presently specified, this means 256 repetitions of the entire train. Finally, the train A is swapped for the train B consisting of the remaining 16 frequencies and the cycle repeated. As shown by Figure 4, the specification states that this switch must occur at least three times to ensure the collection of all responses in an error-free environment. This means that an inquiry  
10 broadcast could take at least 10.24 seconds.

A portable device that wants to be discovered by a Bluetooth master  
100 enters the inquiry scan substate. Here, it listens for a message containing the GIAC or DIACs of interest. It, too, operates in a cyclic way. It listens on a single hop frequency for an inquiry scan period which is long enough to cover  
15 the 16 inquiry frequencies used by the inquiry. On hearing an inquiry containing an appropriate IAC, the portable device enters a so-called inquiry response substate and issues a number of inquiry response messages to the master 100. The master 100 will then page the portable device, inviting it to join the piconet.

20 As mentioned above and shown in Figure 5, the applicants propose that the inquiry messages issued by the base station have an extra field 504 appended to them, capable of carrying a HID poll message. The extended field 504 may carry a header that signifies a HID poll to distinguish it from other applications of extended field information, such as context-aware services or  
25 broadcast audio (as disclosed in our co-pending United Kingdom patent applications 0015454.2 (applicant's reference PHGB 000084) and 0015453.4 (applicant's reference PHGB 000085) respectively). It will also carry the address of the HID being polled, and may also carry a small amount of information to the HID which might be used to provide supplementary  
30 information to a user (such as text on an LCD screen) or feedback (for example, motional feedback in games controllers). By adding the field to the end of the inquiry message, it will be appreciated that non-HID receivers can

ignore it without modification. In addition, by using a special DIAC to signify a HID poll, HID devices can be alerted to the presence of the forthcoming poll.

The presence of the extra data field 504 means that the guard space conventionally allowed at the end of a Bluetooth inquiry packet is reduced. However, this space is provided to give a frequency synthesiser time to change to a new hop frequency and will be generally unused otherwise, as current frequency synthesisers are capable of switching at speeds which do not need extension into the extra guard space. The standard inquiry packet is an ID packet (ID PKT) 502 of length 68 bits. Since it is sent in a half-slot, starting either on a slot boundary (SB) 506 or a half-slot boundary (HSB) 508, the guard space allocated is  $(625/2 - 68) = 244.5\mu\text{s}$  (625 $\mu\text{s}$  slot period, 1 Mbit/s signalling rate). Modern synthesisers can switch in much less time with figures of 100 $\mu\text{s}$  or lower considered routine by experts in the field. Hence a suitable size for the extra data field 504 could be 100 bits.

In a typical embodiment, four of the 100 bits will be lost as trailer bits for the ID packet 502: this is a consequence of it being read by a correlator. Of the 96 bits remaining, applicant's preferred allocation is for 64 bits to be used as data and 32 bits as a 2/3 FEC (Forward Error Correction) checksum. Each inquiry burst thus contains 8 bytes of broadcast data, allowing space for several channels of key coded or digitised analogue inputs.

In order to achieve the desired responsiveness, and because the HID has been specifically addressed, the HID is allowed to respond, if desired, in the next-but-one half-slot with a packet of similar format, containing information corresponding to the user's input. As described above, the inquiry procedure involves the transmission of two sets of sixteen frequencies in trains of inquiry transmissions. The 16 frequencies used within a train can be considered as 16 polling channels, and therefore 16 devices can be polled every 10ms if desired. Other arrangements are possible, for example polling up to 32 devices every 20ms or up to 8 devices every 5ms. The arrangement of polling channels could also be flexible, with more rapid polling provided for devices which need a faster response time and vice versa.

Each device need only monitor a single frequency within a train, but must be able to track the train switches and frequency changes due to changing clock phase. It is assumed that an initial set up procedure synchronises the HID Bluetooth slave 101 to the Bluetooth master 100, as well  
5 as establishing the nature of the HID and the format it uses for uplink and downlink transmissions. At this time the HID is allocated a device address and a channel number corresponding to one of the sixteen channels within a train.

For fast polling, it is necessary for the Bluetooth master 100 to operate continuously. This interferes with the conventional mechanism for setting up  
10 two-way links. However, use of two radios operating in tandem, as disclosed in our co-pending United Kingdom patent application 0015452.6 (applicant's reference PHGB 000086), avoids this problem, thereby enabling the provision of fast access to the piconet and an unlimited two-way throughput capacity.

By polling every 10ms, with eight bytes per poll, a capacity of 800 bytes  
15 per second for sixteen devices is provided. In variations on the basic scheme described above this capacity could be lowered to permit the operation of conventional inquiry procedures, or to increase the number of HIDs that a host system 100 can support beyond sixteen.

In order to minimise their power consumption, HIDs are not obliged to  
20 respond to every poll if they have no information to offer. A watchdog timer could be provided in a HID to make it transmit at least once in a given period whilst it is nominally active. The period could for example be predetermined, determined by the host system or determined by negotiation between the host and each HID. HIDs failing to transmit within the determined period would then  
25 be removed from the master's list of active devices.

A method of polling a HID in accordance with the present invention is summarised in Figure 6. The method starts, at step 602, when the HID has data to transmit to the host system. The HID receives, at step 604, data from the extra field 504 then tests, at step 606, whether it has been polled by the  
30 host system. If it has not been polled, the HID returns to step 604 to receive the next extra field 504. If the HID has been polled, it transmits its data in the next-but-one half-slot, at step 608.

Since an inquiry mode is necessary to permit access to the host system's piconet, it must be provided in the conventional manner for at least some of the time. There are a range of strategies which may be employed.

5 A first strategy involves the operation of one radio in two modes, namely set up and polling. In set up mode the inquiry procedure operates as normal and the HIDs can establish contact with the host master 100 in the conventional manner. Once all HIDs have established themselves, the master radio switches to polling mode, in which the inquiry procedure now operates in polling mode only. This strategy is ideal for games machines since it achieves  
10 the fastest response when polling mode is operational, while opportunities for other controllers to join the piconet occur at well-defined times, such as between games.

A second strategy is more appropriate when the host system is a general purpose device, such as a PC, in which case opportunities must be  
15 provided for new devices to join at any time. In this case the master's radio can operate in modeless fashion, devoting some of its time to fast polling and other times to conventional inquiry operations. Alternate 10ms periods could be devoted to each operation to achieve a 50:50 ratio for example, with the ratio being able to be modified as desired. Such a system would still have a quick  
20 response to HIDs and the general inquiry operation, although possibly slower, would still operate as normal. The use of a special DIAC in a polling message should ensure that a slave 101 going through normal inquiry response procedures will not send an inquiry response packet in the space reserved for a fast poll response.

25 Allowing conventional inquiries in parallel with fast polling implies that, occasionally, there will be a slight pause in inquiry or fast polling to allow a new HID access to the host. This will probably not matter to the user since he will no longer be using old HIDs and will therefore not be aware of the temporary loss in responsiveness.

30 A third strategy is required when conventional Bluetooth data (or other) links are required, so as to support both a fast response for the polling mechanism and the data carrying capacity of conventional Bluetooth. This

requires the use of two radios, and the approach disclosed in our co-pending United Kingdom patent application 0015452.6 (applicant's reference PHGB 000086) can also be used here. Alternatively, one radio could operate as a conventional Bluetooth radio with the other permanently dedicated to fast polling.

From reading the present disclosure, other modifications will be apparent to persons skilled in the art. Such modifications may involve other features which are already known in the design, manufacture and use of fixed and portable communications systems and component parts thereof, and which may be used instead of or in addition to features already described herein. Although claims have been formulated in this application to particular combinations of features, it should be understood that the scope of the disclosure of the present application also includes any novel feature or any novel combination of features disclosed herein either explicitly or implicitly or any generalisation thereof, whether or not it relates to the same invention as presently claimed in any claim and whether or not it mitigates any or all of the same technical problems as does the present invention. The applicants hereby give notice that new claims may be formulated to such features and/or combinations of features during the prosecution of the present application or of any further application derived therefrom.

In the present specification and claims the word "a" or "an" preceding an element does not exclude the presence of a plurality of such elements. Further, the word "comprising" does not exclude the presence of other elements or steps than those listed.

## CLAIMS

1. A communications system comprising a primary station and at least one secondary station, wherein the primary station has means for  
5 broadcasting a series of inquiry messages, each in the form of a plurality of predetermined data fields arranged according to a first communications protocol, and means for adding to an inquiry message prior to transmission an additional data field for polling at least one secondary station, and wherein the  
10 or each polled secondary station has means for determining when an additional data field has been added to the plurality of data fields, for determining whether it has been polled from the additional data field and for responding to a poll when it has data for transmission to the primary station.

2. A primary station for use in a communications system comprising  
15 at least one secondary station, wherein means are provided for broadcasting a series of inquiry messages, each in the form of a plurality of predetermined data fields arranged according to a first communications protocol, and for adding to each inquiry message prior to transmission an additional data field for polling at least one secondary station.

20 3. A primary station as claimed in claim 2, characterised in that means are provided for adding the additional data field at the end of a respective inquiry message.

25 4. A primary station as claimed in claim 2 or 3, characterised in that means are provided for including an indication in one of the predetermined data fields, the indication denoting the presence of the additional data field.

30 5. A primary station as claimed in any one of claims 2 to 4, characterised in that the first communications protocol comprises Bluetooth messaging.



6. A primary station as claimed in any one of claims 2 to 5, characterised in that the additional data field comprises at least 64 bits of data.

5 7. A primary station as claimed in any one of claims 2 to 6, characterised in that first radio means are provided for broadcasting substantially continuously inquiry messages having the additional data field and second radio means are provided for handling other aspects of communication links with secondary stations.

10 8. A secondary station for use in a communications system comprising a primary station, wherein means are provided for receiving an inquiry message broadcast by the primary station, the message being in the form of a plurality of predetermined data fields arranged according to a first communications protocol and having added to it an additional data field for  
15 polling at least one secondary station, and wherein means are provided for determining when an additional data field has been added to the plurality of data fields, for determining whether it has been polled from the additional data field and for responding to a poll when it has data for transmission to the primary station.

20

9. A secondary station as claimed in claim 8, characterised in that the first communications protocol comprises Bluetooth messaging.

25 10. A secondary station as claimed in claim 8 or 9, characterised in that means are provided for responding to a poll after a predetermined interval has passed without transmission of data, whether or not the secondary station has data for transmission.

30 11. A method of operating a communication system comprising a primary station and at least one secondary station, the method comprising the primary station broadcasting a series of inquiry messages, each in the form of a plurality of predetermined data fields arranged according to a first

communications protocol, and adding to an inquiry message prior to transmission an additional data field for polling at least one secondary station, and further comprising the or each polled secondary station determining when an additional data field has been added to the plurality of data fields, 5 determining whether it has been polled from the additional data field and responding to a poll when it has data for transmission to the primary station.

12. A method as claimed in claim 11, characterised in that not all inquiry messages have an additional data field for polling a secondary station 10 added to them.

13. A communication system constructed and arranged to operate substantially as hereinbefore described with reference to and as shown in the accompanying drawings. 15

14. A primary station constructed and arranged to operate substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

20 15. A secondary station constructed and arranged to operate substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

25 16. A method of operating a communication system substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

## ABSTRACT

**COMMUNICATION SYSTEM**

5           A communications system comprises a primary station and at least one  
secondary station. The primary station is arranged to broadcast a series of  
inquiry messages, each in the form of a plurality of predetermined data fields  
arranged according to a first communications protocol such as Bluetooth. In  
10 additional data field for polling one or more secondary stations, which can  
respond to the poll if they have data for transmission. This system provides  
secondary stations with a rapid response time without the need for a  
permanently active communication link.

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(Figure 1)

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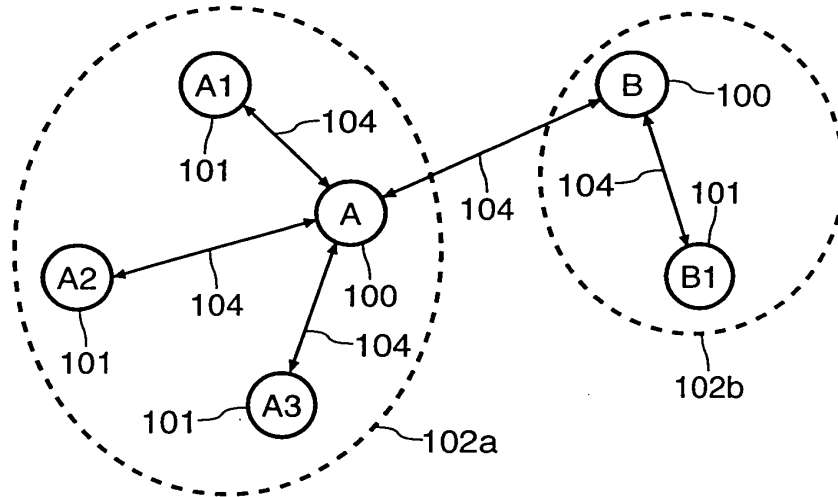


FIG. 1

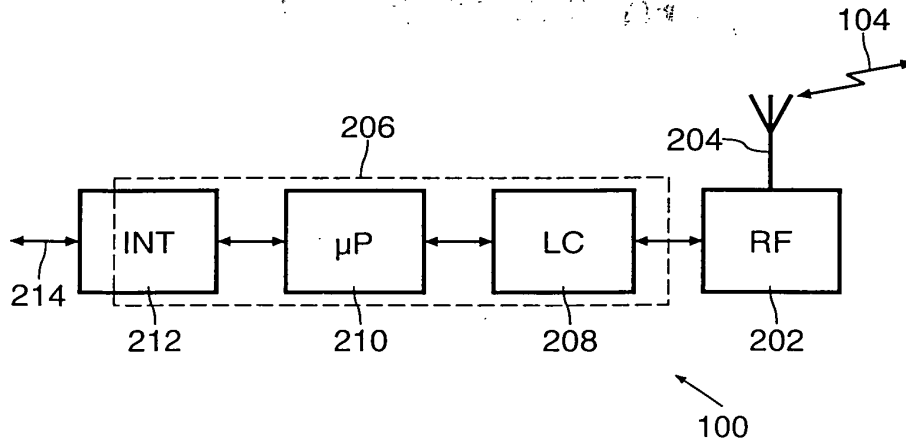


FIG. 2

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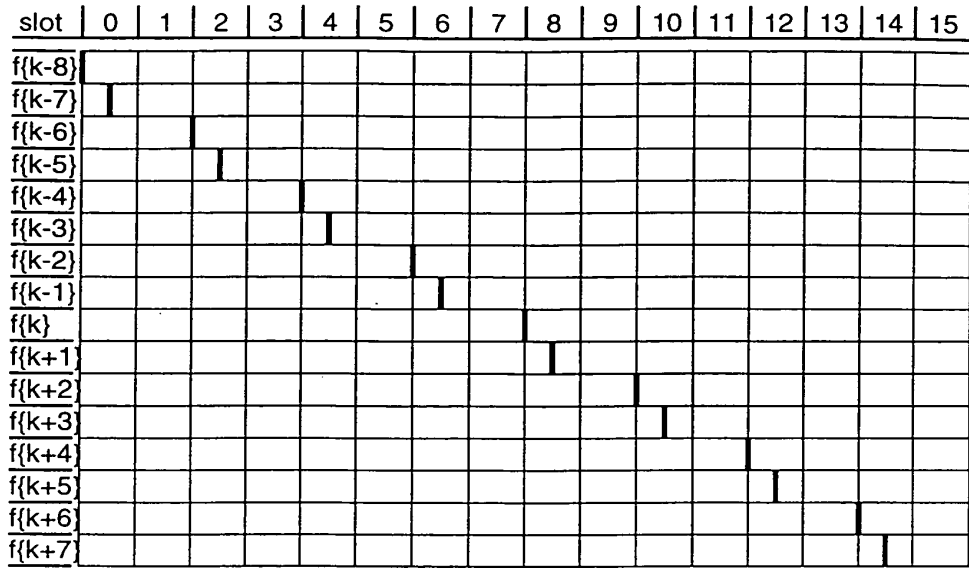


FIG. 3

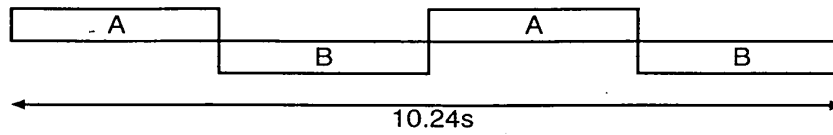


FIG. 4

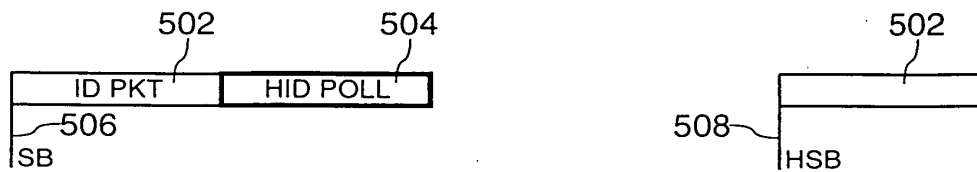


FIG. 5

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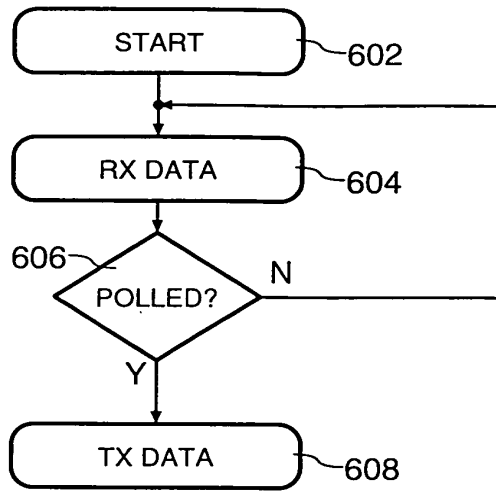


FIG. 6

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