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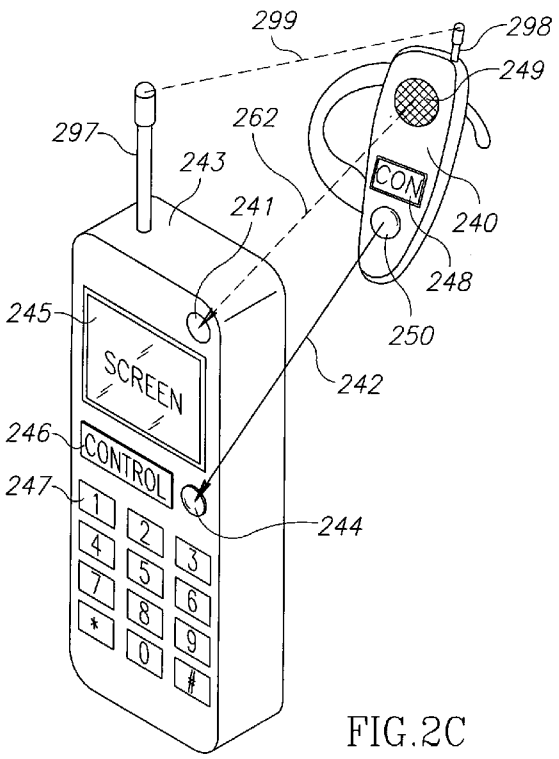


FIG.2C

(57) Abstract: An apparatus for performing a pairing process, comprising: a central unit having a first short range communication link interface being configured to receive a unique key for pairing when being configured to a key reception mode; and an at least one peripheral unit having a second short range interface configured to transmit a unique key for pairing to said central unit.

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APPARATUS AND METHOD FOR SIDEBAND SECURED PAIRING

BACKGROUND

The present invention relates to pairing of devices in general, and more particularly to method and system for secured pairing of devices that are usually connected over a radio link.

There is a variety of devices that are usually connected over a radio link but require a secured pairing. This kind of devices includes for example cordless phones, home security alarms, vehicles security alarms, Bluetooth devices for mobile phones and restaurants attendant systems.

A basic requirement for low-cost systems is secured link (especially for security alarm systems and cordless phones). The root-of-trust for any secured wireless link is a secret digital key which is used by both parties in order to encrypt/decrypt any secured traffic.

A basic difficulty of setting the root-of-trust is the need to load the key from one device to the other device during initial pairing.

Vehicle alarm systems are using a special controlled state to pair a remote controller to the security system (through conditioning it by vehicle initial state and a sequence of key presses on the remote control). This type of pairing is fail-safe in terms of false pairing but it is not safe as the pairing happens over radio link that is non-secured, the pairing process may be snooped by a listener that can detect the key and memorize it.

Similarly, other systems rely on printed serial number that is manually configured by the user during pairing. This type of pairing is safe as it does not rely on radio link, but it mandates that the secret number is available to the user if needed in the future for re-configuration needs, the chances that the secret number will be lost a few years after primary installation cannot be ignored. Further more manually configuration implies the use of relatively short keys, as people will typically avoid purchasing devices that require a cumbersome task of initial pairing.

The present disclosure addresses the need for secured pairing of devices that are usually connected over a radio link.

Thus, there is a need to provide a low-cost secured link that enables initial pairing of devices with a robust key.

SUMMARY

An aspect of an embodiment of the invention, relates to a apparatus and method for enabling a secured paring between a central unit and at least one peripheral unit. In many apparatuses that require pairing between a central unit and one or more peripheral units, there is usually an infrastructure that can serve a secured pairing. In many common apparatuses the peripheral unit includes a short range communication link interface, such as a LED, an audio interface or an Infra-Red (I/R) I/F. This is also true regarding the central unit. For example in a home alarm system the detectors usually include a LED unit that provides visual indication about the detector detection status. Cordless phone handset has an audio interface (speaker). Bluetooth unit usually includes a LED. These interfaces can be used either as is or with minor modification to transmit a unique key from the peripheral unit to the central unit. Using a short range communication link interface such as LED, audio or IR interface enables to transmit a long unique key for secured pairing and also eliminates the need to manually keep or memorize the unique key for a later process of pairing.

In an exemplary embodiment of the disclosed subject matter there is provided an apparatus to perform a pairing process, comprising:

a central unit having a first short range communication link interface for receiving a unique key for pairing when being configured to a key reception mode; and

an at least one peripheral unit having a second short range communication link interface for transmitting a unique key for pairing to said central unit.

In an exemplary embodiment of the disclosed subject matter, the apparatus further having a primary communication link between the central unit and the at least one peripheral unit, and wherein the primary communication link is used for initiating the paring process.

In an exemplary embodiment of the disclosed subject matter the at least one peripheral unit includes a storage unit for storing the unique key.

In an exemplary embodiment of the disclosed subject matter the storage unit is programmable.

In an exemplary embodiment of the disclosed subject matter the first or second short range communication link interface is LED or audio or IR interface (I/F).

In an exemplary embodiment of the disclosed subject matter the apparatus is a home alarm, the at least one peripheral unit is an alarm detector and wherein an indication LED I/F is configured to transmit the unique key for pairing.

In an exemplary embodiment of the disclosed subject matter the apparatus is a vehicle alarm apparatus, the at least one peripheral unit is a vehicle alarm remote control and wherein an indication LED I/F is for transmitting the unique key for pairing.

In an exemplary embodiment of the disclosed subject matter the apparatus is a cordless mobile phone system, the at least one peripheral unit is a mobile phone handset and wherein an indication LED I/F is configured to transmit the unique key for pairing.

In an exemplary embodiment of the disclosed subject matter the apparatus is a cordless phone, the at least one peripheral unit is a mobile phone handset and wherein an audio I/F is configured to transmit the unique key for pairing.

In an exemplary embodiment of the disclosed subject matter the at least one peripheral unit is a Bluetooth device.

In an exemplary embodiment of the disclosed subject matter the apparatus is a Bluetooth mobile phone apparatus, the at least one peripheral unit is a Bluetooth device and wherein a LED I/F is configured to transmit the unique key for pairing.

In an exemplary embodiment of the disclosed subject matter the apparatus is a Bluetooth mobile phone apparatus, the at least one peripheral unit is a Bluetooth device and wherein an audio I/F is configured to transmit the unique key for pairing.

In an exemplary embodiment of the disclosed subject matter there is provided a method for providing secured pairing between a central unit and at least one peripheral unit, comprising establishing a first short range communication link interface in said central unit; establishing a second short range communication link interface in said at least one peripheral unit; configuring said central unit to a key reception mode; and transmitting a unique key from said at least one peripheral unit to said central unit via said second short range communication link interface; and reception of said unique key by said central unit via said first short range communication link interface.

THE BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

The present disclosed subject matter will be understood and appreciated more fully from the following detailed description taken in conjunction with the drawings in which corresponding or like numerals or characters indicate corresponding or like components. Unless indicated otherwise, the drawings provide exemplary embodiments or aspects of the disclosure and do not limit the scope of the disclosure. In the drawings:

Fig. 1A is a schematic illustration of an alarm system in accordance with the prior art;

Fig. 1B is a schematic illustration of a cordless phone system in accordance with the prior art;

Fig. 2A is a schematic illustration of an alarm system in accordance with the disclosed subject matter;

Fig. 2B is a schematic illustration of a cordless phone system in accordance with the disclosed subject matter;

Fig. 2C is a visual illustration showing a Bluetooth link between a Bluetooth headset and a mobile phone in accordance with the disclosed subject matter;

Fig. 2D is a visual illustration showing an audio link between a cordless phone handset and a cordless phone base station in accordance with the disclosed subject matter; and

Fig. 3 is a flowchart describing the steps of a method for providing secured pairing in accordance with the disclosed subject matter.

DETAILED DESCRIPTION

All technical terms used herein have the same meaning as commonly understood by one skilled in the art pertaining to the invention and in the art of electronics.

The disclosed subject matter is described below with reference to flowchart illustrations and/or block diagrams of methods, apparatus (systems) and computer program products according to embodiments of the subject matter. It will be understood that each block of the flowchart illustrations and/or block diagrams, and combinations of blocks in the flowchart illustrations and/or block diagrams, can be implemented by computer program instructions. These computer program instructions may be provided to a processor of a general purpose computer, special purpose computer, or other programmable data processing apparatus to produce a machine, such that the instructions, which execute via the processor of the computer or other programmable data processing apparatus, create means for implementing the functions/acts specified in the flowchart and/or block diagram block or blocks.

The present invention will be understood and appreciated more fully from the following detailed description taken in conjunction with the drawings. Identical structures, elements or parts, which appear in more than one figure, are generally labeled with a same or similar number in all the figures in which they appear, wherein:

Fig. 1A is a schematic illustration of an alarm system 100A in accordance with the prior art. Fig. 1A shows a central control unit 103 that is connected with peripheral unit 113,116,119,122,125 through communication links 133,136,139,142,145 respectively. Peripheral unit 113,116,119,122,125 can be alarm detectors. The communication links 133,136,139,142,145 may be a wired or wireless connection. Each of the peripheral unit 113,116,119,122,125 may have a LED interface (I/F) 153,156,159,162,165 respectively. Typically the LED I/F 153,156,159,162,165 is used for providing visual indication that the alarm detector detected an event – a useful mean for tracking the system functionality and also useful for system calibration and adjustment. Typically the alarm detectors are based on passive detection, i.e. the alarm detector is receiving IR radiation from the environment and sends an alarm signal through the communication link when there is a detection of an intruder by the IR alarm detector.

In addition there is an input I/F 132 that is typically attached to the central control unit 103 or being a part of the central control unit 132 Input I/F 132 serves as an interface for providing the central control unit 103 with a specific key that identifies each of the five alarm

detectors. Typically, upon installation of the alarm system 100, the installer has to read a short unique key that is attached to each one of peripheral unit 113,116,119,122,125, and to provide these keys to the central control unit 103. There are many methods for providing the keys such as typing on a keyboard–like device, program a jumper etc. However it is obvious that this type of providing keys is restricted to short keys. Thus, a manufacturer cannot expect that an installer will type a key of 64 or more characters for each one of the detectors. Furthermore, in case of a need to reinstall the system, it is required that the keys will still be available. While the keys are not a part of the detector's HW, it is not guaranteed that the keys will be available for reinstallation if it will be required.

It should be noted that while the description of fig. 1A referred to a home alarm system 100, the same schematic illustration applies also to other systems that require a secure pairing. One example is a restaurant attendant system, where central control unit 103 is the control unit that is held by the restaurant employee and peripheral unit 113,116,119,122,125 are devices that are located at the attendant tables and serve for indicating the attendant on an event (food is ready etc.). Another example is a vehicle alarm system, where the central control unit 103 is the vehicle alarm control unit and peripheral unit 113, 116 are remote controllers that serve for activating/deactivating the vehicle alarm system and also for locking/unlocking functionality. Yet another example is a mobile phone communicating with a Bluetooth mobile phone apparatus headset.(hereinafter "Bluetooth headset"); In this case central control unit 203 represents the mobile phone, and peripheral unit 113 represents the Bluetooth headset (In the mobile-Bluetooth headset case there is typically only one peripheral unit).

Likewise Fig. 1B shows a schematic illustration of a cordless phone system 100B in accordance with the prior art. Cordless phone system 100B includes a base station 173 and three cordless phones 175,177 and 179. Each cordless phone 275 includes a speaker/microphone (hereinafter "speaker/microphone") I/F 181,183 and 185 respectively. The speaker/mic I/F is an I/F that typically exist in every cordless phone enabling to receive a user voice and hearing a far-end speaker. The cordless phone system 100B further includes an input I/F 182 that serves for the pairing process. The pairing process is typically performed by configuring the central unit to registration mode (by scrolling and navigating through digital menus by a user) and entering a few digits that serve as a unique key that uniquely identifies each peripheral unit. Practically, providing the unique key to base station 173 by manually typing a series of digits, limits the unique key length, as users cannot be expected to type a long series of digits.

Fig. 2A is a schematic illustration of an alarm system in accordance with the disclosed subject matter. Fig. 2A shows a central control unit 203 and a peripheral unit 213 connected via two communication links: a first communication link 233 (hereinafter also a primary communication link) that is equal to the communication link that was described with reference to fig. 1A and a second communication link 231 that is a LED connection that is supported by LED I/F 206 in the central control unit 203 and LED I/F 263 in peripheral unit 213. In an exemplary embodiment, second communication link 231, which may be for example a LED connection, serves for providing central control unit 203 with a unique key (private key that is unique to each detector). The key is stored in a key storage unit 265 which can be any type of memory component. Moreover, key storage unit 265 may be a programmable memory device, enabling to change the initial key which may be useful in cases where the user suspect a key leakage, or in systems that due to their high security requirements require to modify the key once in a while.

In accordance with the disclosed subject matter, when there are two communication links as shown in figure 2A, i.e. a first communication link 233 (also "primary communication link") and a second communication link 231, the process of pairing may be initiated by either the central control 203 unit (the more common case) or the peripheral unit 213 by usage of the first (primary) communication link 233 for transferring a "pairing request" command over the first communication link 233. This mode of initiating a pairing process is very efficient, as usually both devices, the central control 203 unit and the peripheral unit 213 maintain a continuous bidirectional communication channel over the first communication link 233. For example, in an alarm system, the central control unit 203 may transmit a "pairing request" command over an RF communication link, wherein this "pairing request" command, when received in the peripheral unit 213 (alarm detector), automatically puts the peripheral unit 231 in a mode of sending a unique key that is stored in a key storage unit 265 over the second communication link 231. In another embodiment the peripheral unit 213 may receive the pairing request over the primary communication link and notify the user that an approval should be provided in order to send a unique key over the second communication link 231.

It should be noted that fig.2A is a schematic illustration that is applicable to many systems in accordance with the present disclosure. Central control unit 203 may be a vehicle alarm controller, a central unit of a home alarm system, a central unit of a restaurant attendant

system, a mobile phone in mobile Bluetooth headset system as well as many other systems that require a pairing procedure before starting communication,

It should be further noted that establishing the second short range communication link 231 may be accomplished as shown in Fig. 1A where each alarm detector already includes a LED I/F that is used for providing a visual notification on events of detection (indication LED I/F). The same LED I/F can easily and by low cost process be configured to transmit the key information to central control unit 203. On the central control unit 203 end, LED I/F 206 is used only for reception and thus it may be implemented by a simple CMOS detector or any other common low-cost light sensor. LED receivers examples are such as Vishay TSOP12xx, TSOP48xx and TSOP62xx product series. Sharp devices like: GP1UD26xK, GP1UD27xK and GP1UD28xK, where x is related to the modulation frequency. Hualian devices of HRMxx00 series, like the HRM3700 and HRM3800.

While fig. 2A (as well as fig. 1A) refers to a LED I/F, the present disclosure is not limited to LED I/F and the short range communication link 231, connection between the central control unit 203 and peripheral unit 213 may be implemented by other kinds of radiation, such as Infra Red (I/R) or such as audible signaling using a speaker. The term "short range communication link" should be construed as any wireless connection that has an effective range that does not exceed a few meters and therefore cannot be snooped by an unwanted listener that is in the distance that is more than a few meters.

Fig. 2B is a schematic illustration of cordless phone system 200B in accordance with the disclosed subject matter. Fig. 2B shows a base station 273 and a cordless phone 275 that has a speaker/mic I/F 282 and a key storage 293 the usual connection between base station 273 and cordless phone 275 is performed via communication link 287 (same as communication link 187 as described in fig. 1B) while for paring, providing base station with a key that is unique to cordless phone 275, a second link, audio link 285 is operated between microphone I/F 280 in base station 273 and speaker/mic I/F 282 in cordless phone 275. Short range communication link interface 285 can be an audio link. Short range communication link interface 285 may be using an already existing speaker/mic I/F 181 in fig. 1B. Using the short range communication link interface 285 provides a safe link to transmit a unique key from cordless phone 275 to base station 273, the usage of voice link is much safer against eavesdropping since a voice link cannot be traced but only from very short distances,

furthermore, the unique key is stored in key storage 293 and transferred by a non-human I/F, thus enabling the usage of long unique keys.

It should be noted that the present disclosure is not limited to any specific protocol or implementation for transferring a unique key from the peripheral unit (e.g 213, 275) to the central unit (e.g 203, 273). There are numerous protocols and implementations known in the art for performing such task. For example every simple T.V remote control is sending commands and data (that is the same digital content as sending a key. E.g. defining a password by the user for controlling access to T.V. programs) usually by I.R. protocol. Likewise, devices like answering machines are commonly controlled by audio command (wired or wireless). While transferring a key from one device to a second device by means of LED,I/R, audio or other types of wireless communication are well known in the art, and could be readily implemented by a person that is skilled in the art, it will not be described in the present disclosure.

Fig. 2C is a visual illustration showing a Bluetooth link between a Bluetooth headset 240 and a mobile phone 243 in accordance with the disclosed subject matter. Fig. 2C shows a Bluetooth headset 240 and a mobile phone 243. When a pairing process is required, Bluetooth headset 240 is configured to send a key by using control unit 248. It should be noted that control unit 248 may include a single button for transmitting a predefined fixed key or alternatively, control unit 248 may include a user I/F that enables a user to program a desired key and configure parameters, such as key length etc. Mobile phone 243 is configured to key reception mode by usage of control unit 246. A key transmission is performed through LED I/F 250 that transmits a predefined, or a programmed key that is received in LED sensor/receiver 244 in the Mobile phone. While most of Bluetooth devices include a LED, implementing a key transmission from a Bluetooth headset is a simple engineering task that requires very limited resources, as the LED I/F is already included in the headset. In another embodiment in accordance with the disclosed subject matter, the key is transmitted via an audio I/F from speaker 249 (already exist in Bluetooth headset 240) to microphone 241.

As mentioned with reference to figure 2A, the process of paring may be initiated over the primary communication link 299 (marked as 233 in figure 2A) that is an RF communication link between the Bluetooth antenna 298 and mobile phone antenna 297. When the user of the mobile phone wants to initiate a pairing process, the user will enter a certain command (e.g. by usage of keyboard 247 or control unit 246), the mobile phone 243 will transmit a "pairing request" command over RF link 299. The Bluetooth headset 240 receives the

"pairing request" command and either automatically transmits a unique key through LED communication link 242 (or through audio communication link 262) or alternatively provides an indication that a paring process was requested, in this case the user of the Bluetooth headset is required to approve/disapprove the transfer of the unique code to the mobile phone 243.

Fig. 2D is a visual illustration showing an audio link between a cordless mobile phone system handset (hereinafter "cordless phone handset" or mobile phone handset) and a cordless phone base station in accordance with the disclosed subject matter. Fig. 2D shows a cordless phone handset 251 and a cordless phone base-station 258. When a pairing process is required, cordless phone handset 251 is configured to send a key by using control unit 254. It should be noted that control unit 254 may include a single button for transmitting a predefined fixed key or alternatively, control unit 254 may include a user I/F that enables a user to program a desired key and configure parameters, such as key length etc. Cordless phone base-station 258 is configured to key reception mode by usage of control unit 259. A key transmission is performed over audio link 256 through speaker unit 253 that transmits a predefined, or a programmed audio key that is received in microphone 257 in cordless phone base-station 258. While cordless portable handset devices include a speaker unit 253, implementing a key transmission from a cordless phone handset is a simple engineering task that requires very limited resources, as the speaker unit is already included in the cordless phone handset.

As mentioned before with reference to figure 2A, the process of paring may be initiated over the primary communication link 296 (marked as 233 in figure 2A) that is an RF communication link between the cordless phone handset antenna 295 and cordless phone base-station antenna 294. When the user of the cordless phone wants to initiate a pairing process, the user will enter a certain command (e.g. by usage of control unit 259), the cordless phone base-station 258 will transmit a "pairing request" command over RF link 296. The cordless portable handset 251 receives the "pairing request" command and either automatically transmits a unique key through LED communication link 256 or alternatively provides an indication that a paring process was requested, in this case the user of the cordless phone is required to approve/disapprove the transfer of the unique code to the cordless phone base-station 258.

Fig.3 shows a flowchart 300 describing the steps of a method for providing secured pairing in accordance with the disclosed subject matter. In order to enable pairing between a central unit (e.g. 203 in Fig. 2A) and a peripheral unit (e.g. 213 shown in Fig. 2A) it is required to store a unique key on peripheral unit (305). Storing a unique key on the peripheral unit can

be implemented by numerous means, such as flash memory, VLSI registers, ROM, RAM etc, it is readily understood by a person skilled in the art that electronically storing of a unique key is practically unlimited in length, thus the key may include hundreds bits of data and even more. Furthermore, optionally, the unique key may be stored in a programmable memory device, enabling modification of the unique key.

In order to enable a key transfer from central control unit 203, 273 to peripheral unit 213, a short range communication link interface 231, 285, is established between central control unit 203, 273 and peripheral unit 213 (310), in accordance with the present disclosure, the short range communication link is implemented by usage of existing short range communication link infrastructure. In many common systems that require secured paring there is an existing short range communication link infrastructure. For example – in a home alarm system there is typically a red LED (Light Emitting Diode) that is the used for indicating that the detector detects an event (presence of new object, movement etc.), the same LED and its driving circuit can be used as a short range communication link infrastructure for establishing a short range communication link between central control unit 203 and peripheral unit 213. In the central unit there are systems that include a camera that can be also used for implementing a receiving device for providing a short range communication link 231 between central control unit 203 and peripheral unit 213. In a restaurant attendant system, typically there are LED/light devices that are used for indicating the customer of a new event/notice. The same LED/light device can be used as a short range communication link infrastructure. In a vehicle alarm system there is typically a LED indicator on the remote control unit (peripheral unit) that can be used as a short range communication link infrastructure. It should be notes that when there is no short range communication link infrastructure at the central unit end, it is still very simple to implement a low cost reception unit.

It should be noted that the step of storing the unique key in the peripheral unit (305) may take place after a short range communication link 231 is implemented between central control unit 203 and peripheral unit 213 (310), and even, if a programmable key is used, after the central control unit 203 is configured to enter a key reception mode (315).

When a pairing process is required, the central unit (e.g. 203) is configured to enter a key reception mode (315) where the central unit is expecting to receive a unique key from the peripheral device via the short range communication link (e.g. 231).

In an exemplary embodiment in accordance with the disclosed subject matter, the process of pairing is initiated by notifying the peripheral unit on pairing process (pairing request) via the first communication link (318). It should be noted that this step is optional and subject to the existence of two communication links, i.e. a first communication link 233 and a second communication link 231

Upon configuration of the central control unit 203 to a key reception mode and setting the peripheral unit 213 to a key transmission mode, peripheral unit 213 transmits a unique key to the central control unit 203 via the short range communication link (320),

It should be noted that while the short-range communication link is very limited in range the risk of eavesdropping is minimal. For example when holding a Bluetooth device in the vicinity of a mobile phone for performing a pairing process, the Bluetooth LED transmission is not expected to be noticed beyond the range of one or two meters. Furthermore, the process of pairing can be done when booth devices are hidden from anybody's eyes for example by holding both devices under a table, within a handbag or in any other manner that prevents the possibility of eavesdropping.

When central control unit 203 is configured to key reception mode and peripheral unit 213 is transmitting a unique key, central control unit 203 receives the unique key and records the information (325), thus completing the process of pairing.

It should be appreciated that the above described methods and apparatus may be varied in many ways, including omitting or adding steps, changing the order of steps and the type of devices used. It should be appreciated that different features may be combined in different ways. In particular, not all the features shown above in a particular embodiment are necessary in every embodiment of the disclosed subject matter. Further combinations of the above features are also considered to be within the scope of some embodiments of the disclosed subject matter.

Section headings are provided for assistance in navigation and should not be considered as necessarily limiting the contents of the section.

It will be appreciated by persons skilled in the art that the present disclosure is not limited to what has been particularly shown and described hereinabove. Rather the scope of the present disclosure is defined only by the claims, which follow.

CLAIMS

1. An apparatus configured to perform a pairing process, comprising:

   a central unit having a first short range communication link interface configured to receive a unique key for pairing when being configured to a key reception mode; and

   an at least one peripheral unit having a second short range communication link interface configured to transmit a unique key for pairing to said central unit.

2. The apparatus according to claim 1, further having a primary communication link between the central unit and the at least one peripheral unit, and wherein the primary communication link is configured to initiate the paring process.
3. The apparatus according to claim 1, wherein the at least one peripheral unit includes a storage unit configured to store the unique key.
4. The apparatus according to claim 3, wherein the storage unit is programmable.
5. The apparatus according to claim 1, wherein the first or second short range communication link interface is LED or audio or Infra-Red (I/R) interface (I/F).
6. The apparatus according to claim 1, wherein the apparatus is a home alarm, the at least one peripheral unit is an alarm detector and wherein an indication LED I/F is configured to transmit the unique key for pairing.
7. The apparatus according to claim 1, wherein the apparatus is a vehicle alarm apparatus, the at least one peripheral unit is a vehicle alarm remote control and wherein an indication LED I/F is configured to transmit the unique key for pairing.
8. The apparatus according to claim 1, wherein the apparatus is a cordless mobile phone system, the at least one peripheral unit is a mobile phone handset and wherein an indication LED I/F is configured to transmit the unique key for pairing.
9. The apparatus according to claim 1, wherein the apparatus is a cordless phone, the at least one peripheral unit is a mobile phone handset and wherein an audio I/F is configured to transmit the unique key for pairing.
10. The apparatus according to claim 1, wherein the at least one peripheral unit is a Bluetooth device.

11. The apparatus according to claim 1, wherein the apparatus is a Bluetooth mobile phone apparatus, the at least one peripheral unit is a Bluetooth device and wherein a LED I/F is configured to transmit the unique key for pairing.

12. The apparatus according to claim 1, wherein the apparatus is a Bluetooth mobile phone apparatus, the at least one peripheral unit is a Bluetooth device and wherein an audio I/F is configured to transmit the unique key for pairing.

13. A method for pairing between a central unit and at least one peripheral unit, comprising:

establishing a first short range communication link interface in said central unit;

establishing a second short range communication link interface in said at least one peripheral unit;

configuring said central unit to a key reception mode;

transmitting a unique key from said at least one peripheral unit to said central unit via said second short range communication link interface; and

reception of said unique key by said central unit via said first short range communication link interface.

14. The method according to claim 13, wherein the at least one peripheral unit includes a storage unit configured to store the unique key.

15. The method according to claim 14, wherein the storage unit is programmable.

16. The method according to claim 15, wherein the first or second short range communication link interface is LED or audio or IR interface (I/F).

17. The method according to claim 13, wherein the at least one peripheral unit is an alarm detector and wherein an indication LED I/F is configured to transmit the unique key for pairing to the central unit of a home alarm system

18. The method according to claim 13, wherein the at least one peripheral unit is a vehicle alarm remote control and wherein an indication LED I/F is configured to transmit the unique key for pairing.

19. The method according to claim 13, wherein the at least one peripheral unit is a cordless phone handset, and wherein an indication LED I/F is configured to transmit the unique key for pairing.

20. The method according to claim 13, wherein the at least one peripheral unit is a cordless phone handset, and wherein an audio I/F is configured to transmit the unique key for pairing.

21. The method according to claim 13, wherein the at least one peripheral unit is a Bluetooth unit and wherein an indication LED I/F is configured to transmit the unique key for pairing.

22. The method according to claim 13, wherein the at least one peripheral unit is a Bluetooth unit and wherein an audio I/F is configured to transmit the unique key for pairing.

23. The method according to claim 13, further comprising transferring of a pairing request command by a primary communication link from the central unit to the at least one peripheral unit, or from the at least one peripheral unit to the central unit.

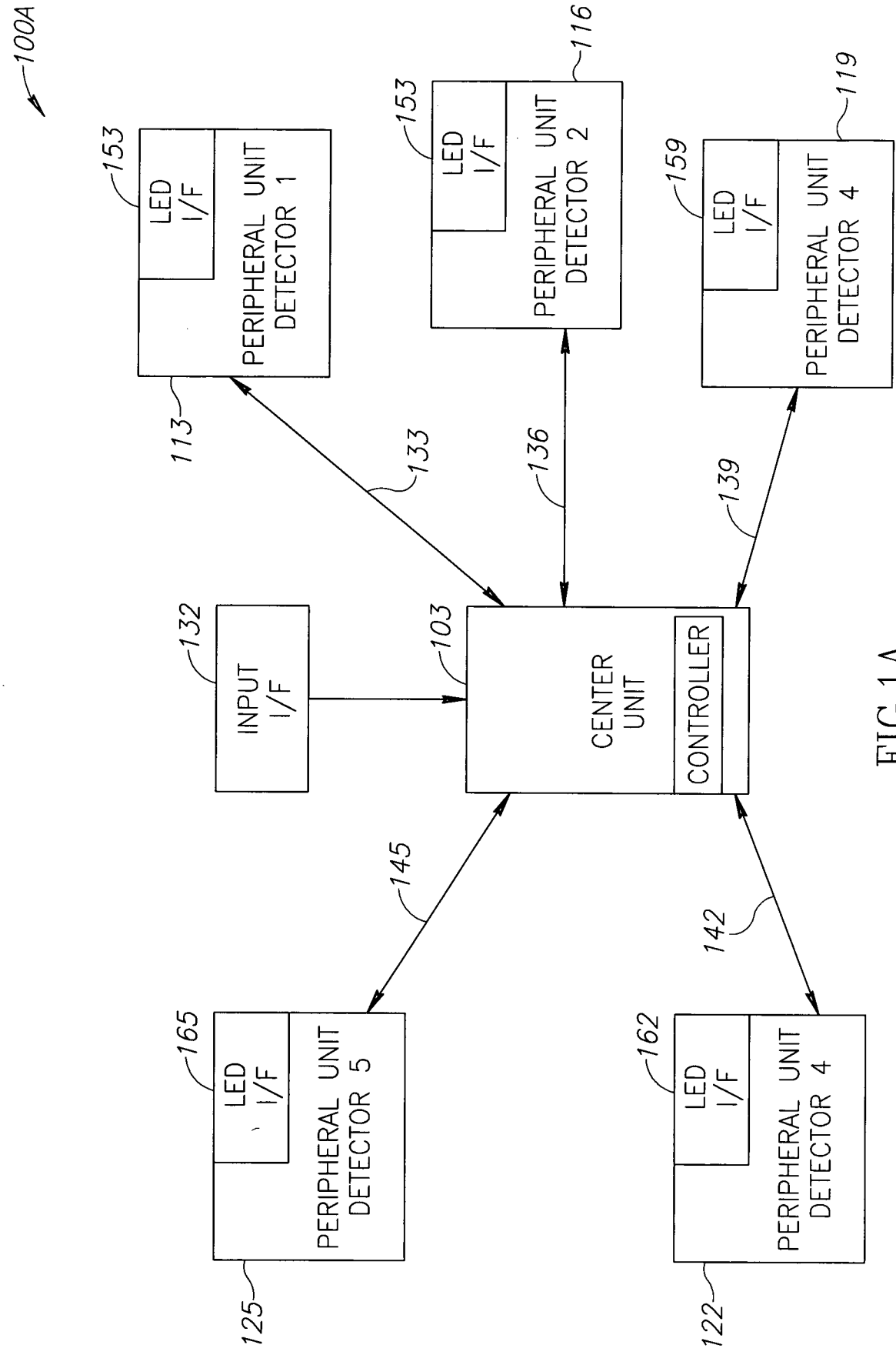


FIG.1A
(PRIOR ART)

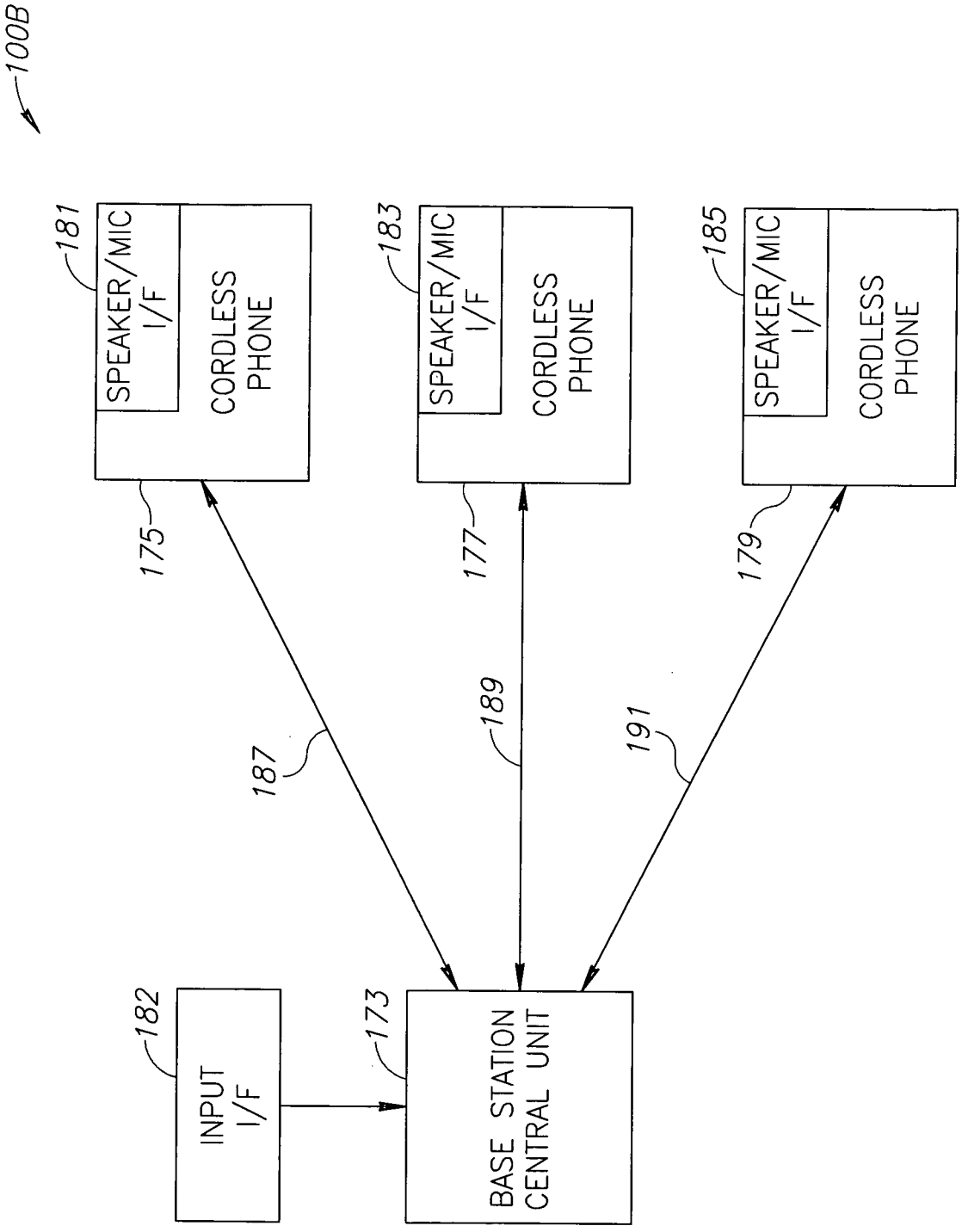


FIG.1B
(PRIOR ART)

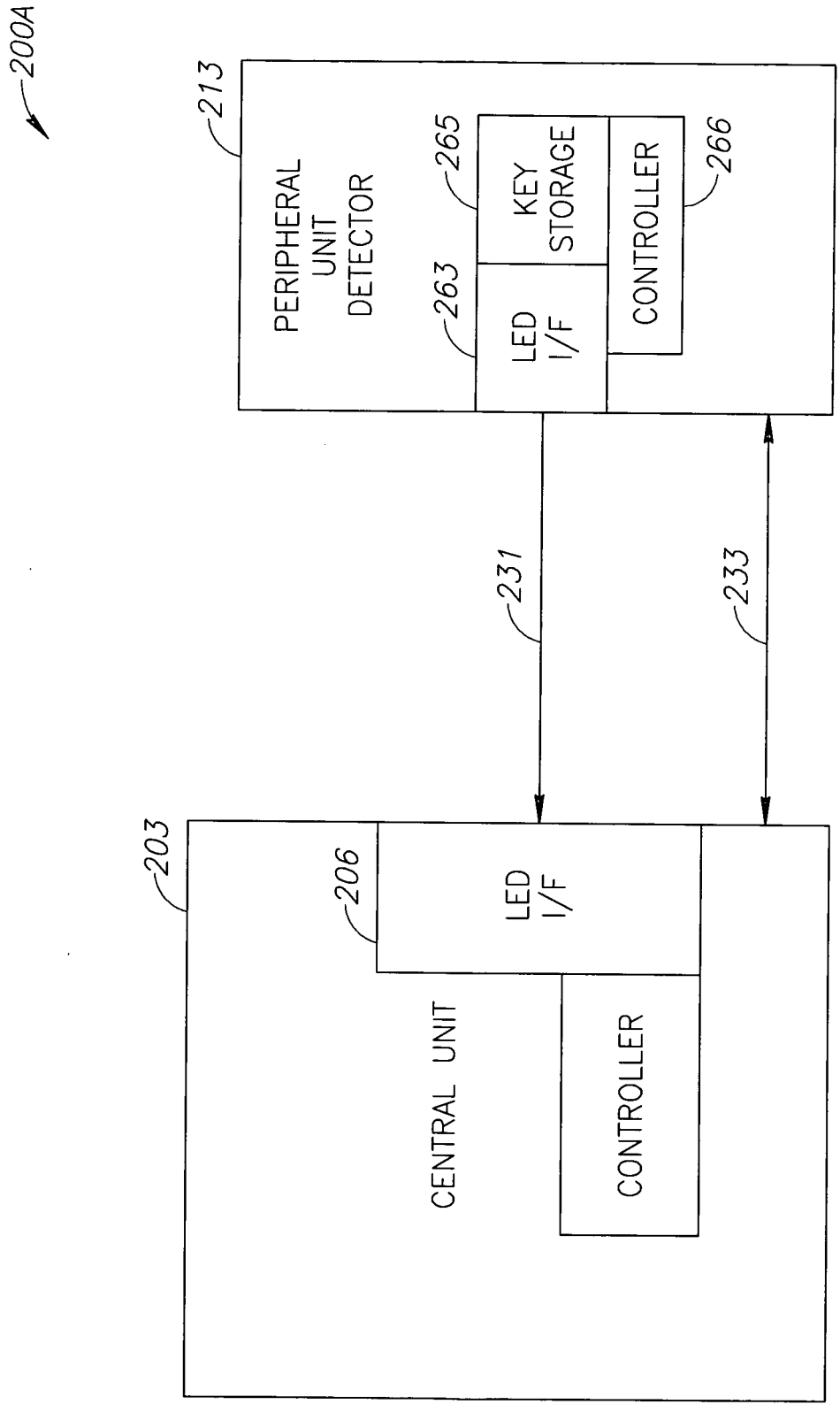

200A
213
PERIPHERAL UNIT DETECTOR
265
KEY STORAGE
266
CONTROLLER
263
LED I/F
231
233
203
206
LED I/F
CENTRAL UNIT
CONTROLLER

FIG.2A

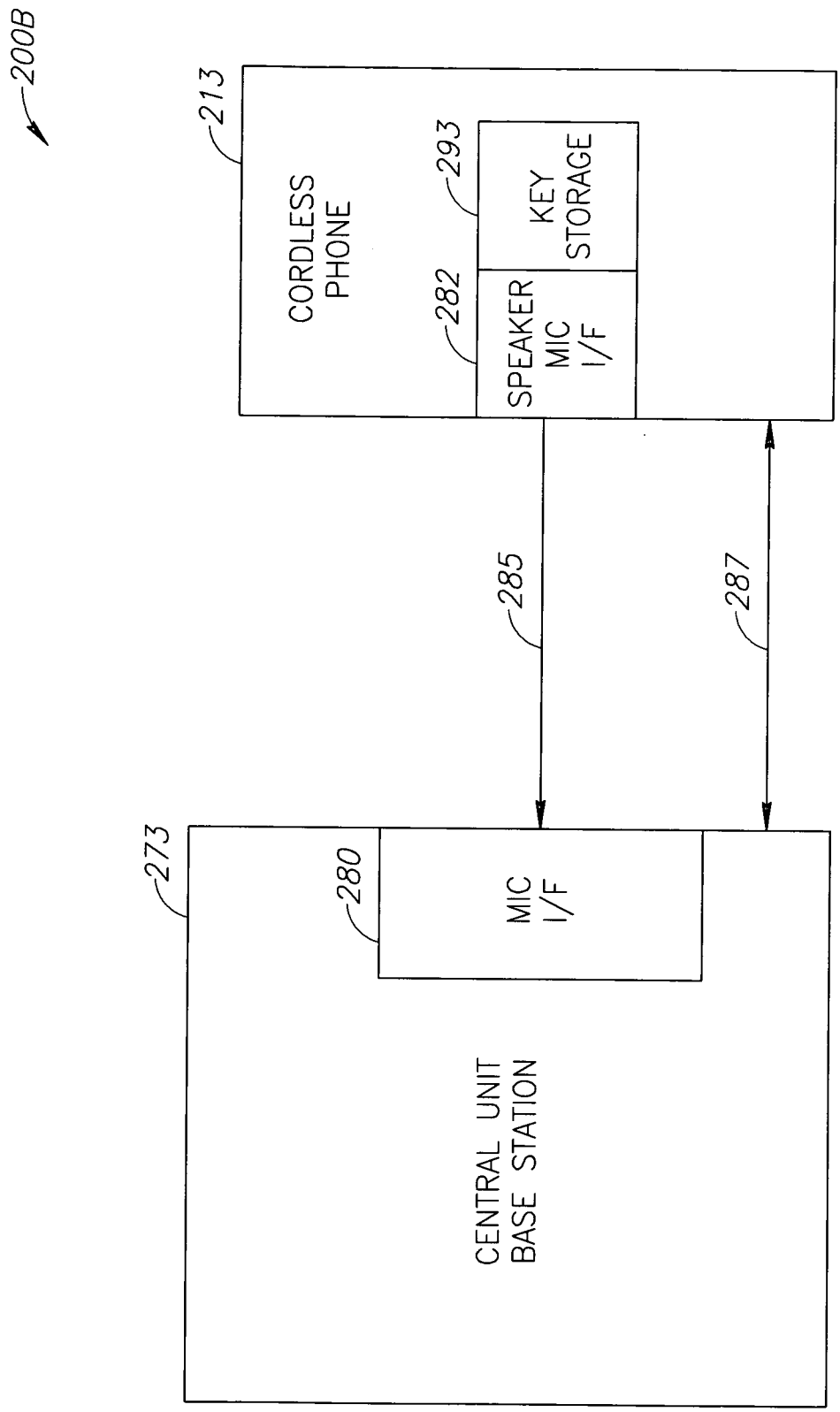

200B
213
CORDLESS PHONE
293
KEY STORAGE
282
SPEAKER MIC I/F
285
287
273
280
MIC I/F
CENTRAL UNIT BASE STATION

FIG.2B

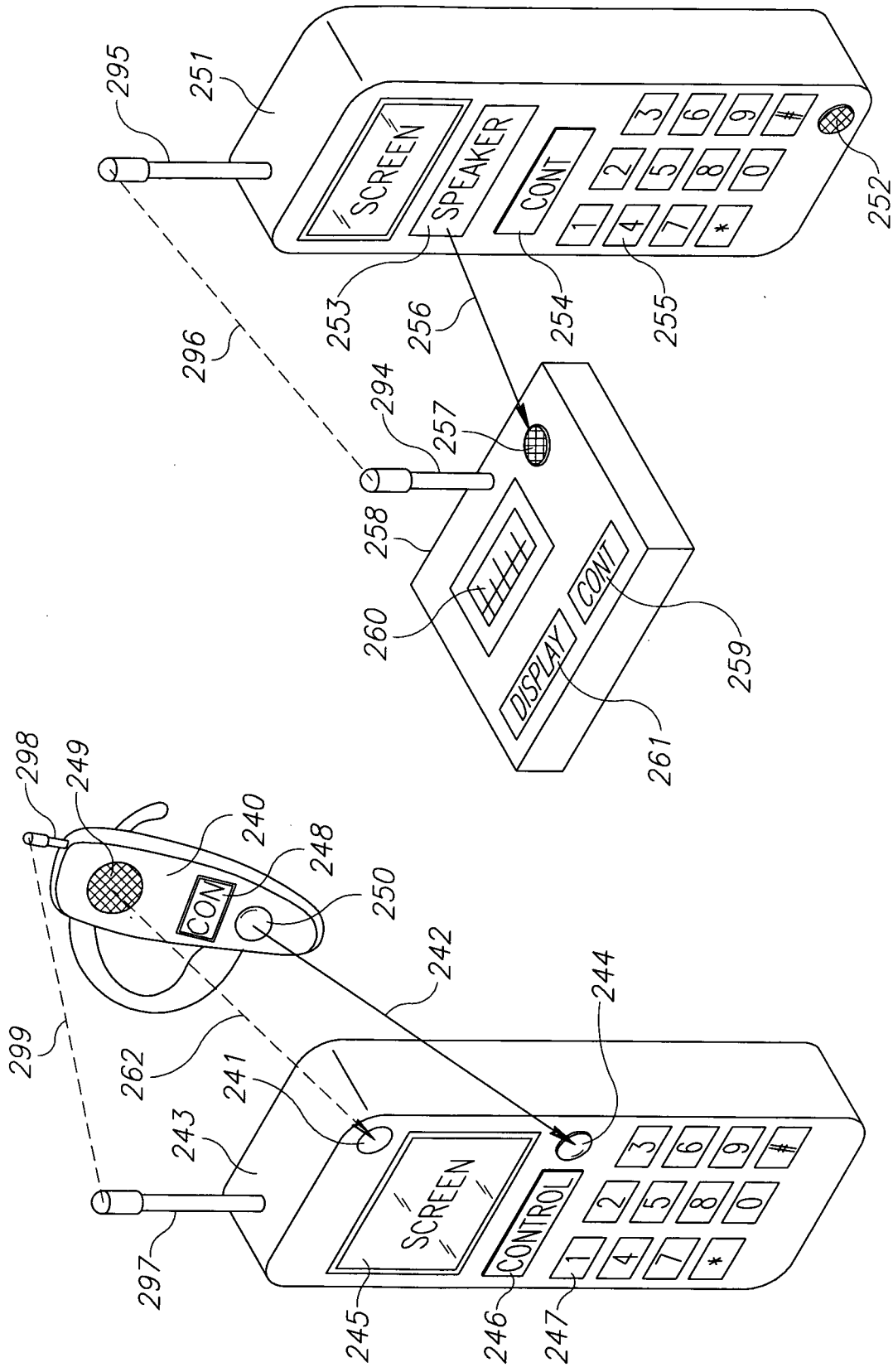

295
251
SCREEN
SPEAKER
CONT
3
6
9
#
2
5
8
0
1
4
7
*
252
253
256
254
255
296
294
257
258
260
DISPLAY
CONT
259
261
298
249
240
248
CON
250
242
244
299
262
241
243
SCREEN
CONTROL
297
245
246
247

FIG.2D

FIG.2C

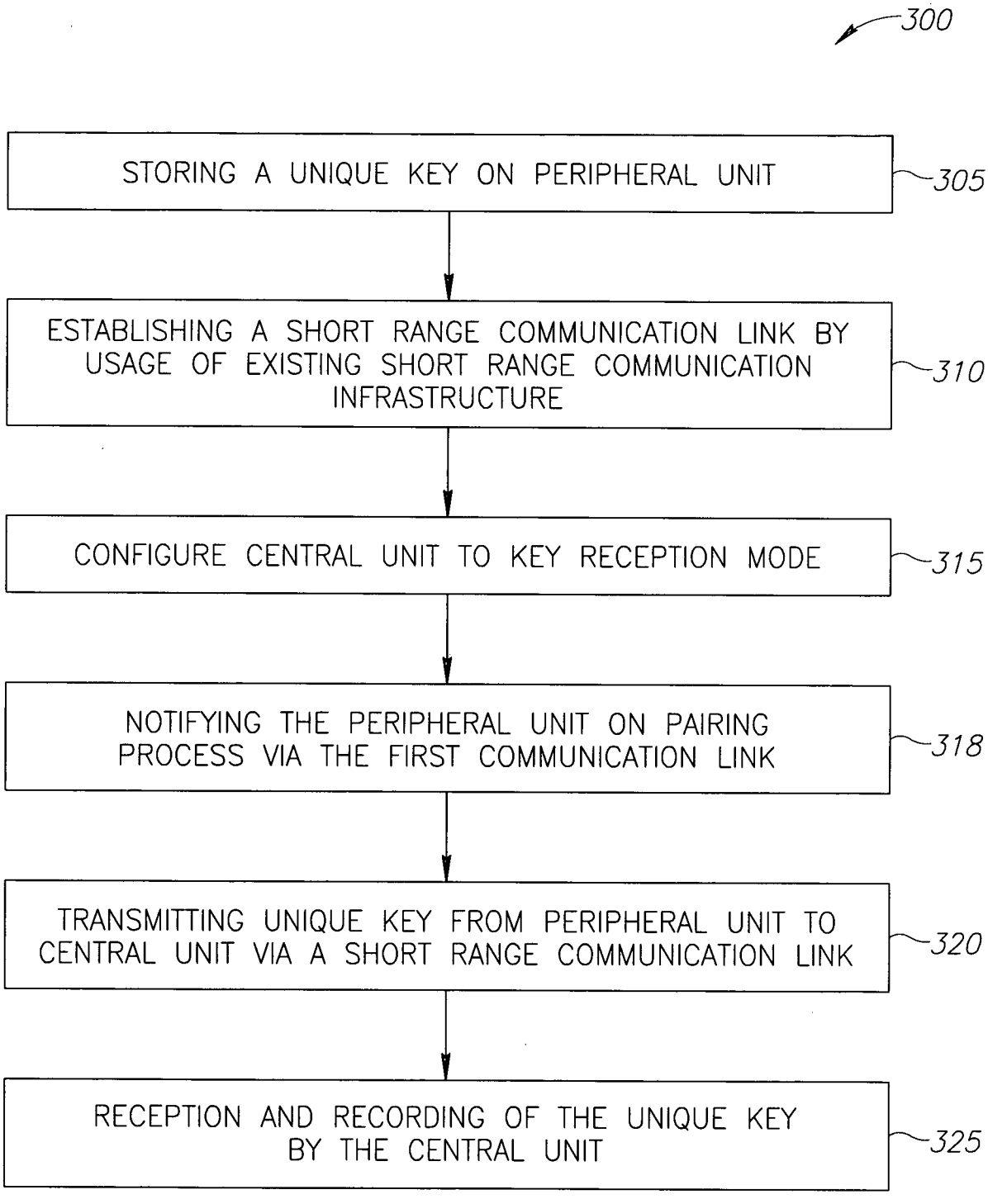

300
STORING A UNIQUE KEY ON PERIPHERAL UNIT
305
ESTABLISHING A SHORT RANGE COMMUNICATION LINK BY USAGE OF EXISTING SHORT RANGE COMMUNICATION INFRASTRUCTURE
310
CONFIGURE CENTRAL UNIT TO KEY RECEPTION MODE
315
NOTIFYING THE PERIPHERAL UNIT ON PAIRING PROCESS VIA THE FIRST COMMUNICATION LINK
318
TRANSMITTING UNIQUE KEY FROM PERIPHERAL UNIT TO CENTRAL UNIT VIA A SHORT RANGE COMMUNICATION LINK
320
RECEPTION AND RECORDING OF THE UNIQUE KEY BY THE CENTRAL UNIT
325

FIG.3

INTERNATIONAL SEARCH REPORT

International application No
PCT/IL2010/000990

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04W12/04 H04L29/06
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H04W H04L B60R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, COMPENDEX, INSPEC, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 940 115 A2 (INTEL CORP [US]) 2 July 2008 (2008-07-02) paragraphs [0012] - [0027]; figures 1a,1b,2	1-23
X	EP 1 239 630 A2 (ERICSSON TELEFON AB L M [SE]) 11 September 2002 (2002-09-11) paragraphs [0020], [0024], [0025], [0033], [0034]; figure 2	1-23
X	WO 99/41876 A1 (ERICSSON TELEFON AB L M [SE]) 19 August 1999 (1999-08-19) page 6, lines 9-25 page 8, line 15 - page 9, line 13 page 10, lines 1-5 page 10, line 19 - page 12, line 2 figures 1,4	1-23

-/--

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
28 March 2011	04/04/2011

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Ghomrasseni, Z

INTERNATIONAL SEARCH REPORT

International application No
PCT/IL2010/000990

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
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