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(54) BLUETOOTH DEVICE AS SECURITY ACCESS KEY

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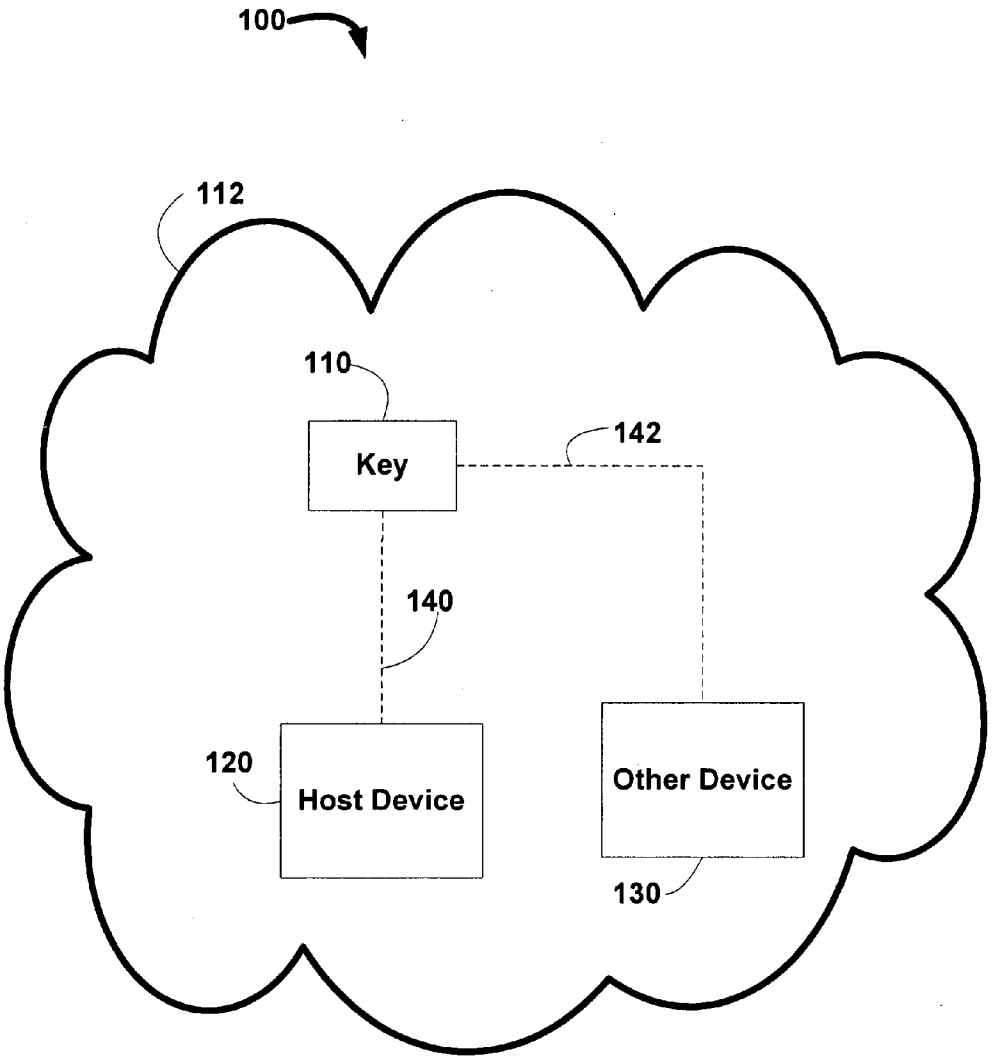
(57) **ABSTRACT**

This application is directed to a system for remotely directing a host device to perform an operation using a key. The key may include a communications circuitry for transmitting data, for example a key identifier or an instruction to perform an operation, within a personal area network created by the communications circuitry. When a host device is within the personal area network, the key may transmit data received by a transceiver on the host device. In response to receiving the data, the host device may perform an operation (e.g., an authentication operation). In some embodiments, the key may transmit data identifying an operation for the host device to perform. In some embodiments, the host device may store in memory key identification information and an associated operation which may be retrieved when the key is brought in proximity of the host device.



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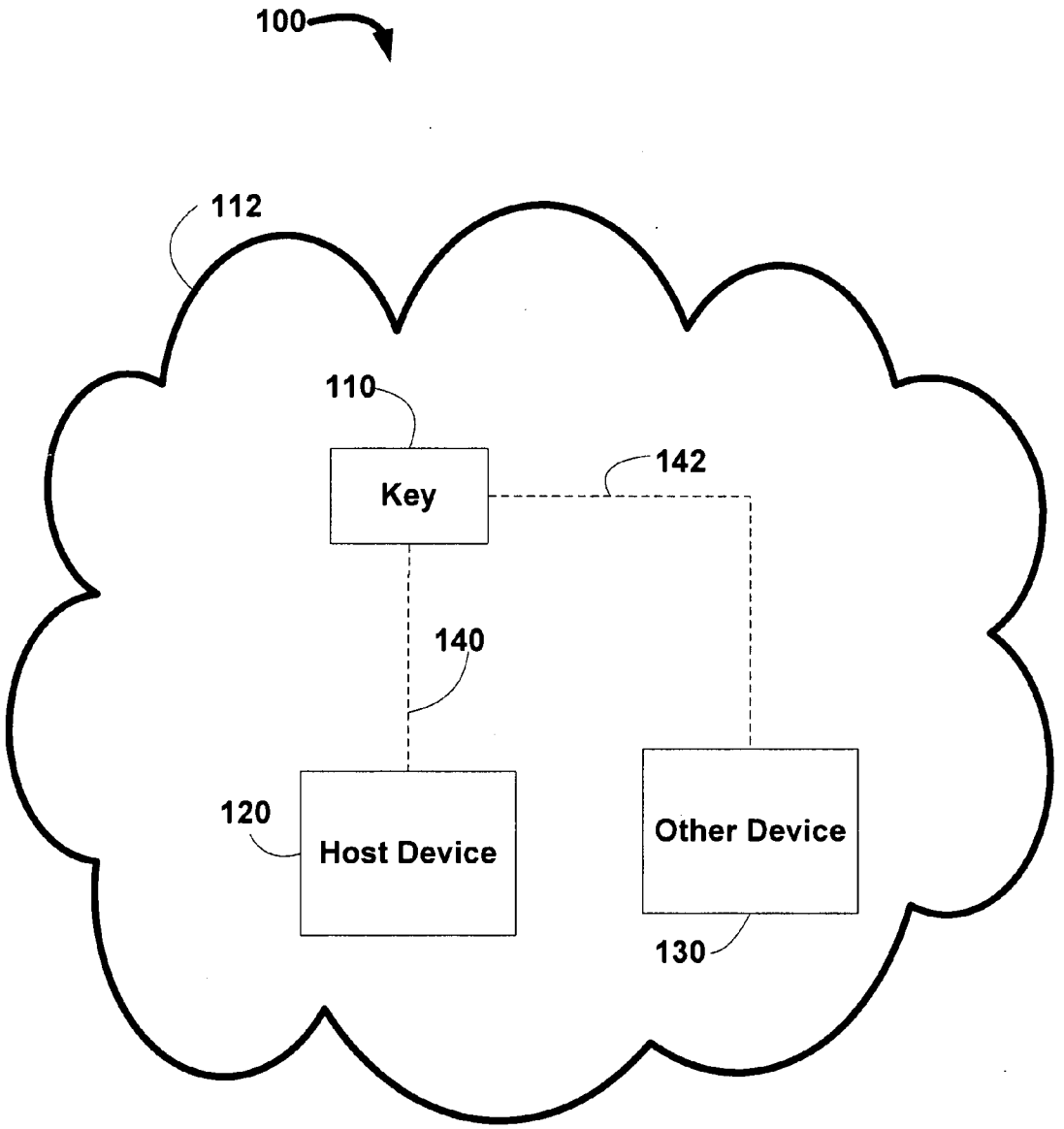

FIG. 1

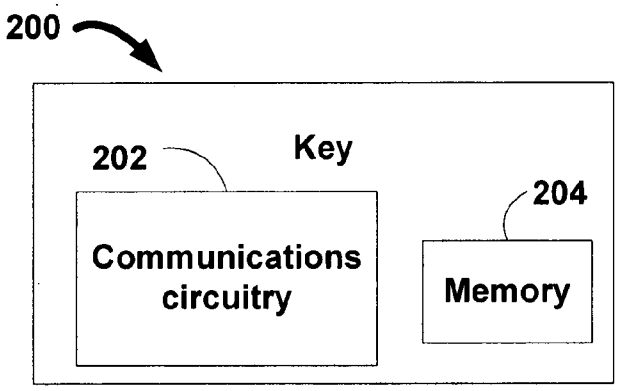

FIG. 2

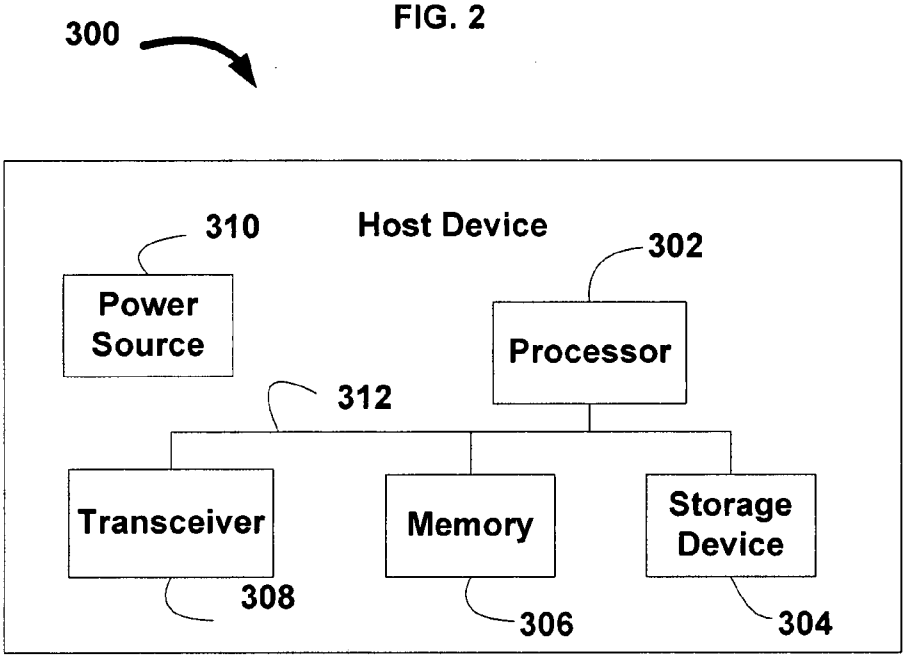

FIG. 3

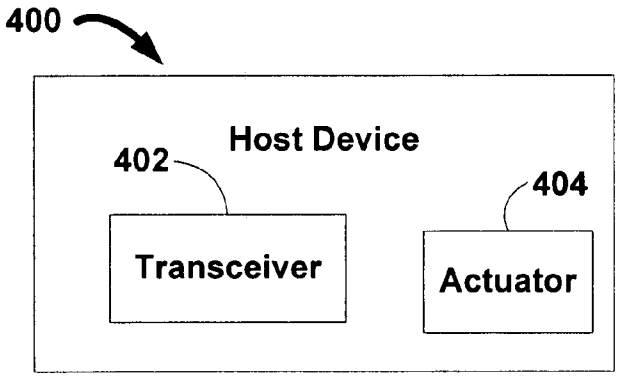

FIG. 4

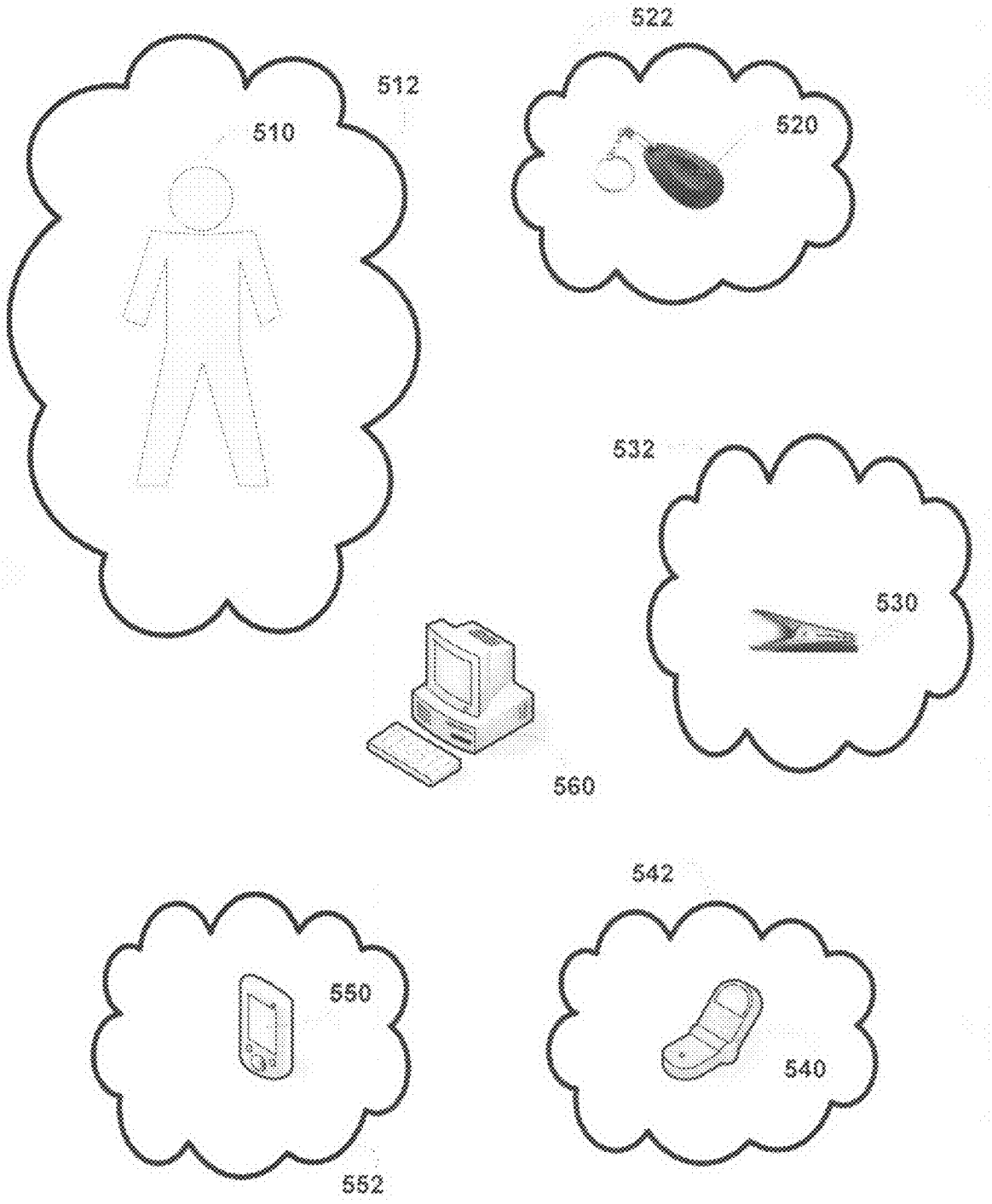

FIG. 5

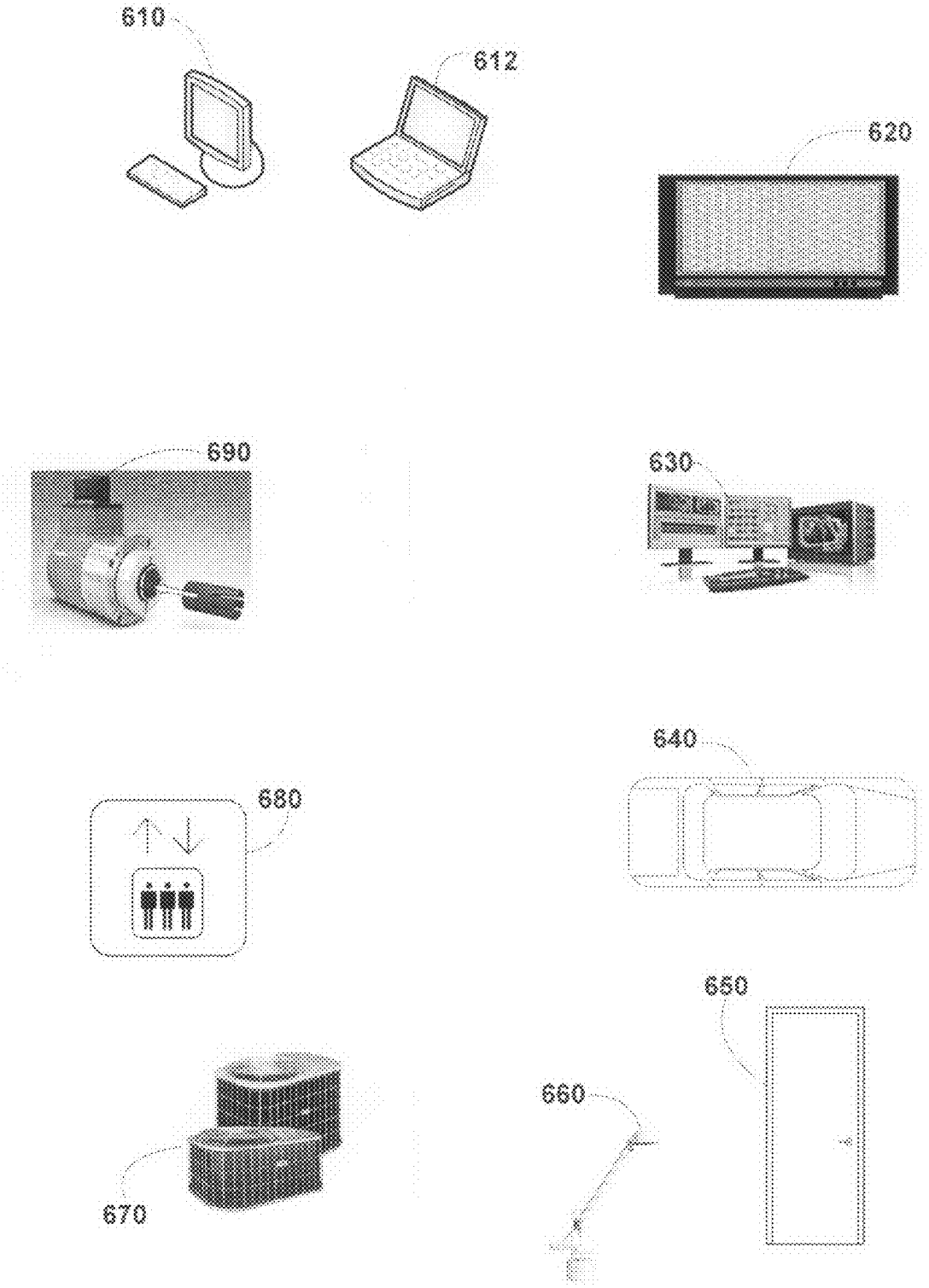

FIG. 6

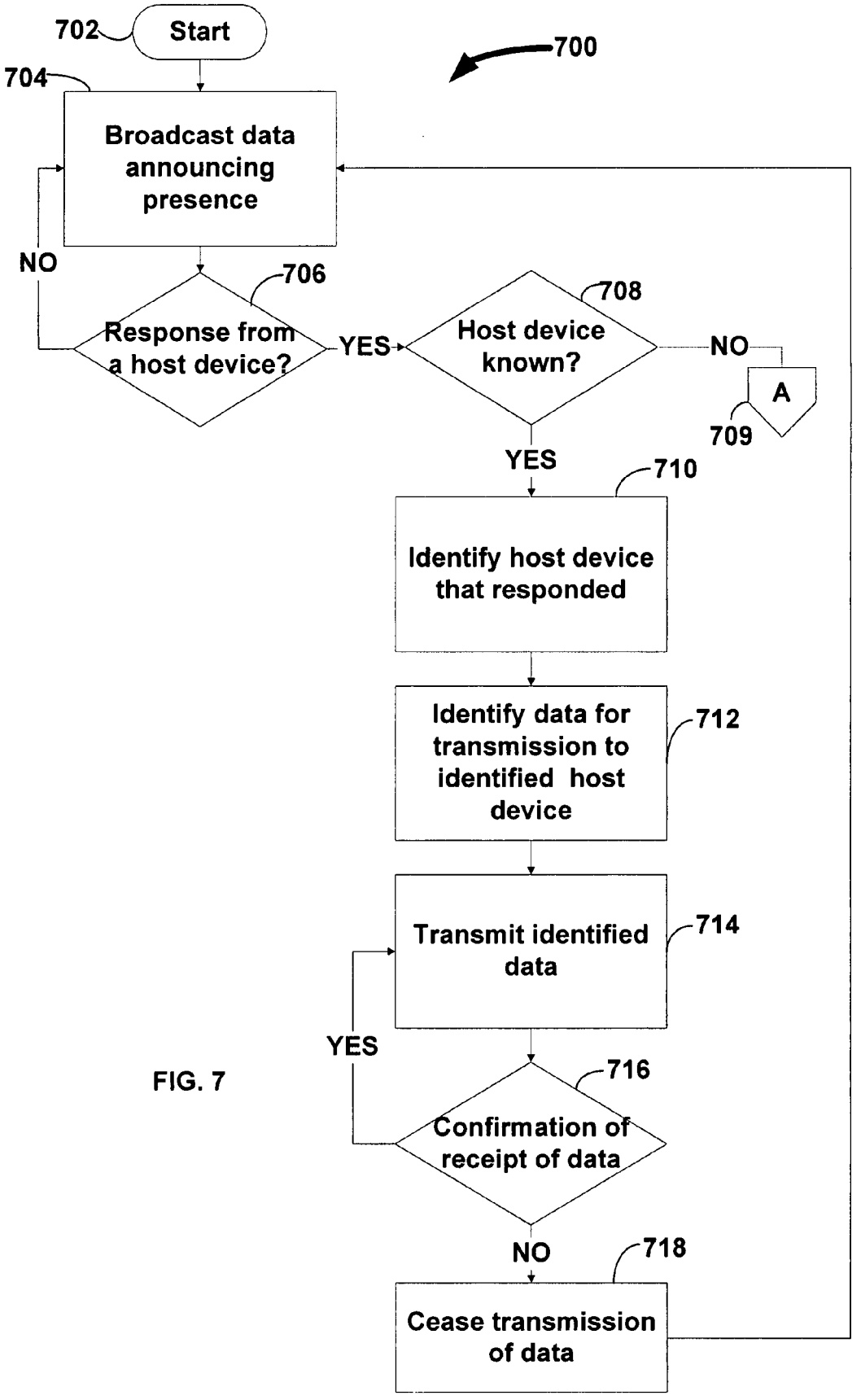
Start
702
700
704
Broadcast data announcing presence
NO
706
Response from a host device?
YES
708
Host device known?
NO
A
709
YES
710
Identify host device that responded
Identify data for transmission to identified host device
712
Transmit identified data
714
YES
716
Confirmation of receipt of data
NO
718
Cease transmission of data

FIG. 7

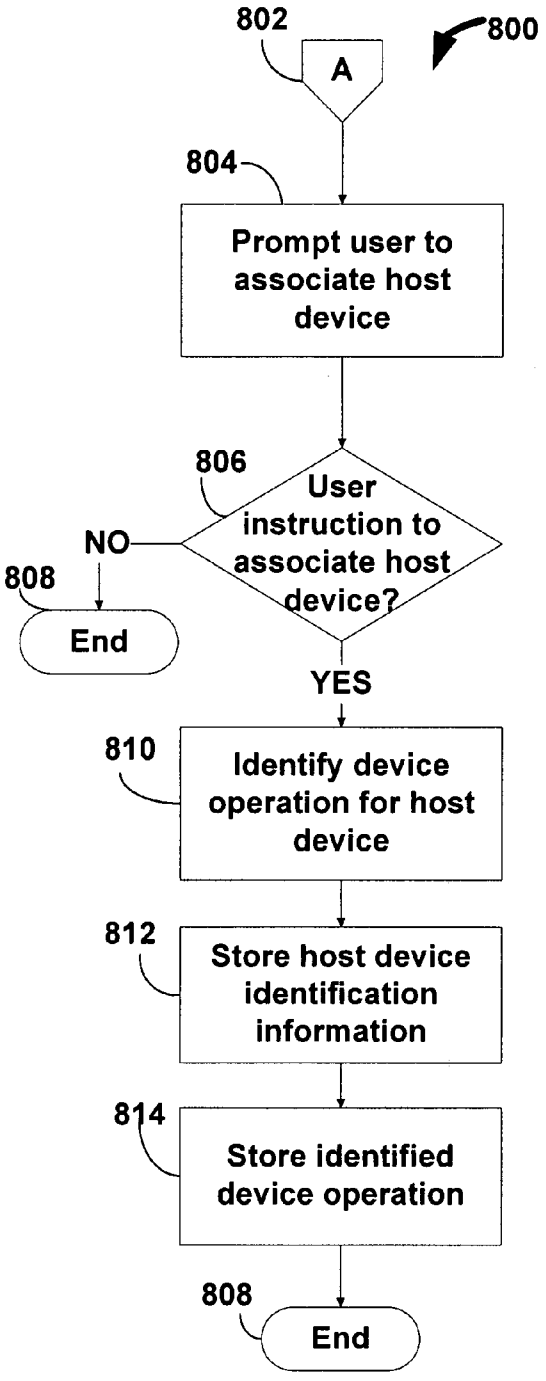

FIG. 8

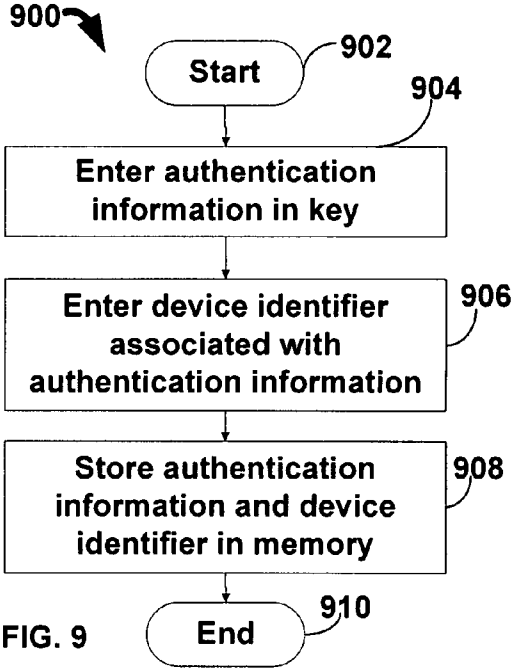

FIG. 9

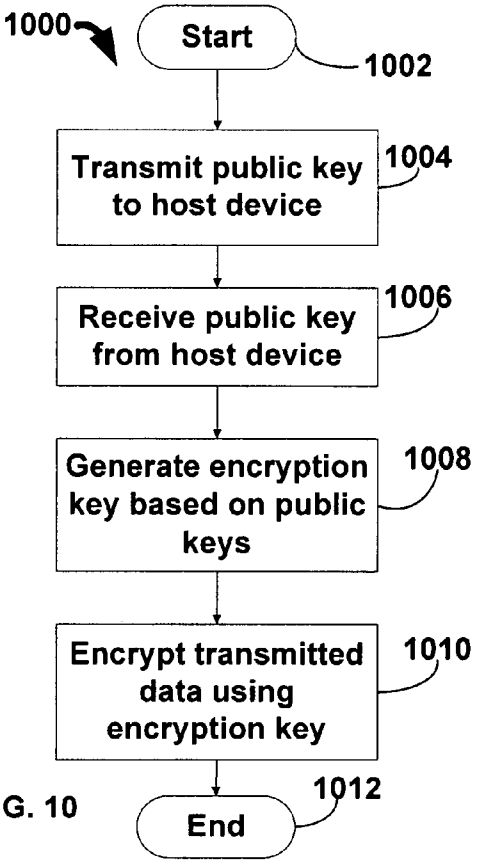

FIG. 10

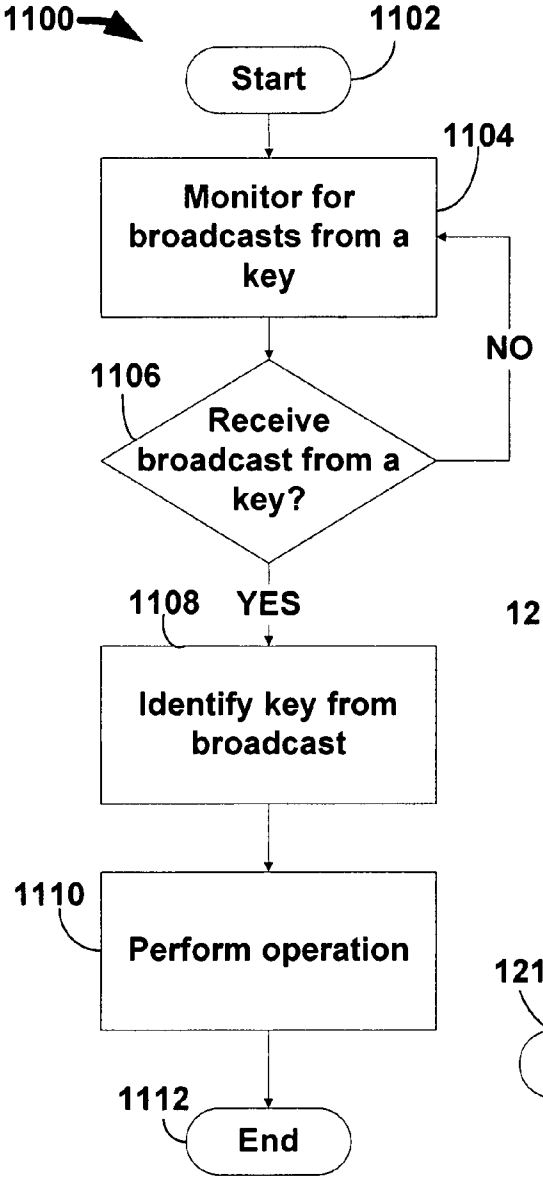
1100
1102
Start
1104
Monitor for broadcasts from a key
NO
1106
Receive broadcast from a key?
1108
YES
Identify key from broadcast
1110
Perform operation
1112
End

FIG. 11

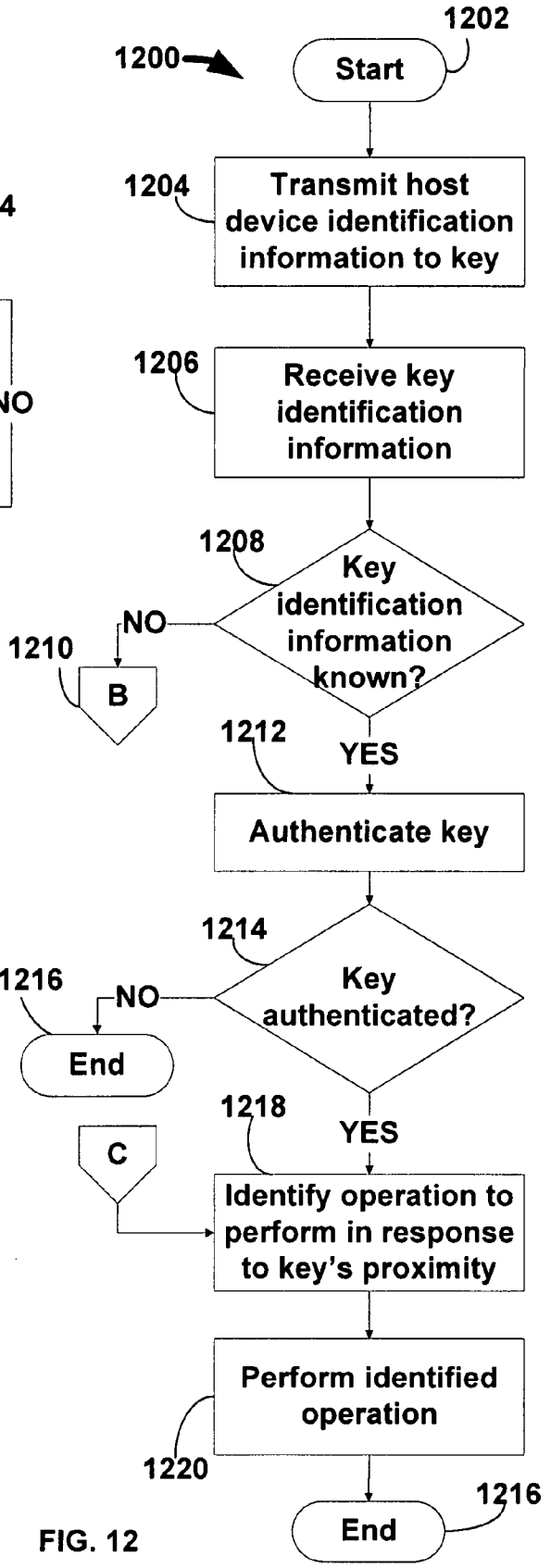
1200
1202
Start
1204
Transmit host device identification information to key
1206
Receive key identification information
1208
Key identification information known?
NO
1210
B
1212
YES
Authenticate key
1214
Key authenticated?
1216
NO
End
1218
YES
C
Identify operation to perform in response to key's proximity
Perform identified operation
1220
1216
End

FIG. 12

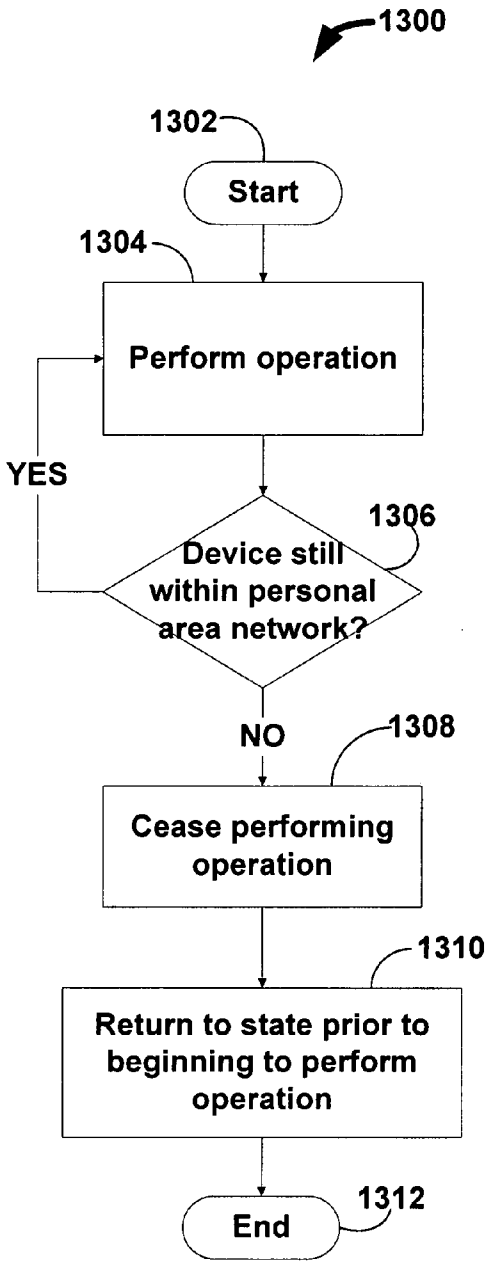
1300
1302
Start
1304
Perform operation
YES
1306
Device still within personal area network?
NO
1308
Cease performing operation
1310
Return to state prior to beginning to perform operation
End
1312

FIG. 13

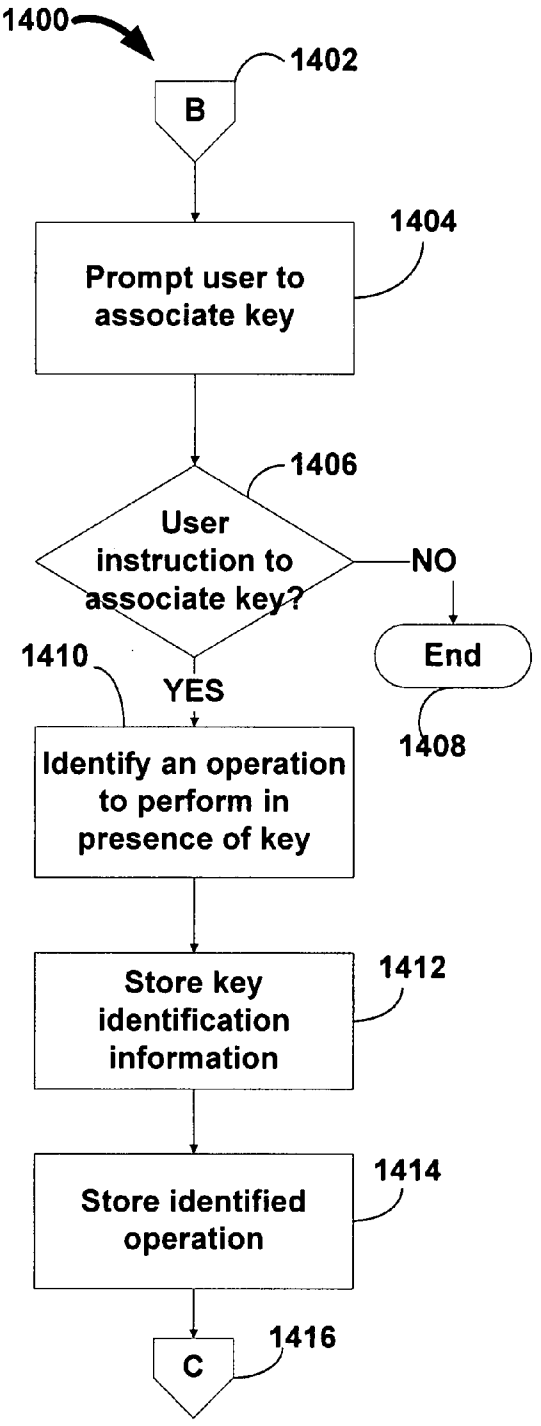
1400
B
1402
Prompt user to associate key
1404
User instruction to associate key?
1406
NO
End
1408
1410
YES
Identify an operation to perform in presence of key
Store key identification information
1412
Store identified operation
1414
C
1416

FIG. 14

BLUETOOTH DEVICE AS SECURITY ACCESS KEY

BACKGROUND OF THE INVENTION

[0001] This invention is directed to a key that uses a short range communications protocol to direct a host device to perform an operation.

[0002] To perform an operation with a device, whether an electronic device, mechanical device, or other device, users typically need to provide inputs on a user interface. In some cases, the user may provide inputs using a remote controller that directs the device to perform operations based on the user's inputs on the remote controller.

[0003] Whether the user input is provided directly on the device or remotely, the user must nevertheless press a key, or perform some other action for the device to perform an operation. The operation is not performed in response to the user approaching the device.

[0004] There is a need, therefore for a system by which a user can bring a key in a communications proximity with a host device and cause the host device to automatically perform an operation. In particular, there is a need for a system in which a user can bring a key in a communications proximity with an electronic device to cause the electronic device to automatically log in the user or load the user's profile.

SUMMARY OF THE INVENTION

[0005] A system that includes a key for remotely causing a host device to perform an operation is provided. In some embodiments, the key may be configured to cause a host device to automatically log in a user associated with the key, or load the user's profile.

[0006] A key that includes communications circuitry may be provided. Using the communications circuitry, the key may be configured to create a relatively short-range personal area network. The key may use any suitable communications protocol to create the personal area network including, for example, Wi-Fi communications (e.g., one of the 802.11 standards), Bluetooth, Nordic, high frequency systems (e.g., 900 MHz, 2.4 GHz, and 5.6 GHz communication systems), short-range radio circuitry (e.g., walkie-talkie type circuitry), infrared, and other relatively localized wireless communication protocols.

[0007] The key may be incorporated or integrated in any suitable device. For example, the key may be a key fob, a card (e.g., a credit card shaped device), a portable drive (e.g., a flash drive), a widget (e.g., a coin-sized object), or any other suitable device or object that may be unobtrusively carried in or clipped to a user's pocket, bag, or other possession. In some embodiments, the key may be inserted inside a user (e.g., surgically inserted under a user's skin). In some embodiments, the key or its functionality may be incorporated in an electronic device, for example in a cellular telephone, a mobile communications device, a pocket-sized personal computer (e.g., an iPAQ or a Palm Pilot) a personal media device (e.g., an iPod), a camera, a video recorder, a computer (e.g., a laptop computer), a key (e.g., car keys), a remote controller, or any other suitable electronic device.

[0008] A host device that includes a transceiver and an actuator may be provided. The transceiver may be configured to communicate with the communications circuitry of the key when the host device is within the personal area network created by the key. The actuator may be any suitable component operative to move the host device from a first position or state to a second position or state. For example, the actuator may include a motor, a switch (e.g., for turning a device or a function on or off, a processor (e.g., for performing an operation in response to instructions from software in an electronic device), or any other suitable actuator.

[0009] The host device may be any suitable device in which an operation may be performed when a key is brought in proximity of the host device. For example, the host device may include a computer, a cellular telephone, a mobile communications device, a personal media device, a set-top box, a television system, or any other suitable electronic device. In such cases, the operation may include for example, authenticating a user to the system (e.g., logging in the user), loading a user's settings (e.g., a user's preference profile), dialing a telephone number, opening a program (e.g., opening a user's e-mail software), activating a peripheral, activating a system coupled to the device (e.g., starting an automobile's engine), or any other suitable operation. As another example, the host device may include an automobile or other vehicle, a door or window, a gate or turnstile, a garage door, or any other device or system for which a key or pass is required. As still another example, the host device may include a light or light switch, curtains or shades, an elevator, a conveyer belt, a motorized device, or any other device that can be moved from a first position or state to a second position or state.

[0010] When a key is brought in proximity of a host device such that the host device is within the personal area network created by the key, the communications circuitry of the key and the transceiver of the host device may communicate data. In some embodiments, the key may broadcast identification information to the host devices in the personal area network (e.g., broadcast a unique identifier). In response to receiving the broadcast, the host device may transmit identification information to the key. Once the key has identified the host device within the personal area network, the key may transmit an instruction to the host device to perform an operation. For example, the key may direct the host device to automatically log in a user (e.g., the user associated with the key). In some embodiments, the user may specify the instruction sent to the host device by the key (e.g., using a user interface on the key or a base coupled to the key).

[0011] In some embodiments, after receiving a broadcast from the key, the host device may retrieve from memory an operation associated with the identified key. The host device may then perform the retrieved operation (e.g., after authenticating the key). In some embodiments, a user may set-up a host device to perform a particular operation when the host device is within the personal area network of the key using the user interface of the device.

[0012] In some embodiments, the host device may be configured to perform the specified operation so long as the host device is within the personal area network created by the key. The host device may periodically request a transmission from the key to determine whether the key is still sufficiently proximate to the device, or the key may periodically send transmissions to notify devices of its presence. When a host device is no longer within the personal area network of the key, the host device may cease to perform the operation. In some embodiments, the host device may return to its prior state (e.g., log the user off of the host device).

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The above and other features of the present invention, its nature and various advantages will be more apparent

upon consideration of the following detailed description, taken in conjunction with the accompanying drawings in which:

[0014] FIG. **1** is a simplified block diagram of a network system that includes a key, a host device and another device in accordance with one embodiment of the invention;

[0015] FIG. **2** is a simplified block diagram of an illustrative key in accordance with one embodiment of the invention;

[0016] FIG. **3** is a simplified block diagram of a host device or other device in accordance with one embodiment of the invention;

[0017] FIG. **4** is a block diagram of another host device in accordance with one embodiment of the invention;

[0018] FIG. **5** shows specific examples of where a key may be placed to create a personal area network in accordance with one embodiment of the present invention;

[0019] FIG. **6** shows specific examples of host devices in accordance with one embodiment of the present invention;

[0020] FIG. **7** shows a flowchart of an illustrative process for transmitting data with a key to a host device in accordance with one embodiment of the invention;

[0021] FIG. **8** shows a flow chart of an illustrative process for associating a host device with a key in accordance with one embodiment of the invention;

[0022] FIG. **9** shows a flow chart of an illustrative process for entering authentication information to be transmitted to a host device in accordance with one embodiment of the invention;

[0023] FIG. **10** a shows a flow chart of an illustrative process for creating a secure communications link between a key and a host device in accordance with one embodiment of the invention;

[0024] FIG. **11** shows a flow chart of an illustrative process for performing an operation with a host device when a key is placed in proximity of the host device in accordance with one embodiment of the invention;

[0025] FIG. **12** shows a flowchart of an illustrative process for authenticating a key and performing an operation with a host device in accordance with one embodiment of the invention;

[0026] FIG. **13** shows a flowchart of an illustrative process for performing an operation when a host device is within the personal area network created by a key in accordance with one embodiment of the invention; and

[0027] FIG. **14** shows a flow chart of an illustrative process for associating a key with a host device in accordance with one embodiment of the invention.

DETAILED DESCRIPTION

[0028] FIG. **1** is a simplified block diagram of a network system in accordance with one embodiment of the invention. System **100** may include key **110**, host device **120** and other device **130**. In some embodiments, system **100** may include a plurality of keys **110** and host and other devices **120** and **130**. To avoid overcomplicating the drawing, only one of each is shown.

[0029] Key **110** may include circuitry providing communications network **112**, which may be a relatively short-range communications network. Using network **112**, key **110** may be capable of performing wireless communication with a relatively short-range wireless communication protocol such as Wi-Fi (e.g., a 802.11 protocol), Bluetooth®, high frequency systems (e.g., 900 MHz, 2.4 GHz, and 5.6 GHz communication systems), infrared, other relatively localized wireless communication protocol, or any combination thereof. Devices located within communications protocol network **112** may wirelessly communicate over a local wireless communication path such as paths **140** and **142**. As defined herein, a local wireless communication path enables wireless communication using a short-range communications protocol. When a device (e.g., host device **120**) is not within network **112**, that device may be out of range and not able to wirelessly communicate with key **110**.

[0030] In one embodiment, the short range communications circuitry may be integrated within the packaging of key **110** (e.g., integrated into a printed circuit board of the device), or in other embodiments, may be included in an accessory device that is docked or connected to device **110**. The accessory device may be, for example, a relatively unobtrusive device that provides device **110** with short-range communicating functionality. Examples of key **110** may include, for example, a media player such as an iPod available by Apple Computer Inc., of Cupertino, Calif., a key fob, a cellular telephone, pocket-sized personal computers such as an iPAQ Pocket PC available by Hewlett Packard Inc., of Palo Alto, Calif., personal digital assistants (PDAs), a desktop computer, a laptop computer, and any other device capable of communicating wirelessly (with or without the aid of a wireless enabling accessory system). In some embodiments, key **110** may be incorporated in an article of clothing, a wallet, a briefcase, a bag, a shoe, or any other item that a user may typically carry or wear. In some embodiments, key **110** may be inserted inside a user's body (e.g., surgically inserted under a user's skin).

[0031] Host device **120** and other device **130** may include transceiver circuitry for wirelessly coupling to key **110**. In some embodiments, host device **120** or other device **130** may require the user to initially set up communications links **140** and **142** with key **110**. For example, the user may pair key **110** with host device **120** and other device **130**.

[0032] Host device **120** and other device **130** may be any device or system that may be moved from at least a first position or state to a second position or state. In some embodiments, host device **120** and other device **130** may be any device or system with which a user may access personalized settings or information. For example, host device **120** or other device **130** may include a computer, a workstation, a cellular telephone, a mobile communications device, a personal media device, a set-top box, a television system, or any other suitable electronic device.

[0033] In some embodiments, host device **120** and other device **130** may be any device or system that can be moved to at least two different positions or states (e.g., on/off or open/closed). For example, host device **120** or other device **130** may include a light or light switch, curtains or shades, an elevator, a conveyer belt, a motorized device, or any other device or system that may be moved from at least a first to a second position or state. As another example, host device **120** or other device **130** may include an automobile or other vehicle, a door or window (e.g. with a lock), a gate or turnstile, a garage door, or any other device or system for which a key or pass is required.

[0034] FIG. **2** is a simplified block diagram of an illustrative key in accordance with one embodiment of the invention. Key **200** may include communications circuitry **202** and memory **204**. Communications circuitry **202**, or sometimes referred to herein as personal area network circuitry or short-range communications circuitry, may enable key **200** to function as a

host for a personal area network. That is, communications circuitry **202** may enable key **200** to wirelessly communicate with one or more devices using a short range communications protocol. For example, communications circuitry **202** may support Wi-Fi communications (e.g., one of the 802.11 standards), Bluetooth, Nordic, high frequency systems (e.g., 900 MHz, 2.4 GHz, and 5.6 GHz communication systems), short-range radio circuitry (e.g., walkie-talkie type circuitry), infrared, and other relatively localized wireless communication protocols.

[0035] Using one or more supported communication protocols, communications circuitry **202** may be configured to create a network for transferring data to and from other devices. The data transferred from key **200** may include, for example, authentication information, identification information, a command or instruction to perform an operation with a host device, an identifier for a user profile or for user preferences, files or other data, or any combination thereof. Communications circuitry **202** may be configured to provide host device-specific data, for example in response to identifying the host device to which key **200** communicates or is "paired" in the network.

[0036] Memory **204** may include one or more different types of memory which may be used for performing device functions. For example, memory **204** may include cache, Flash, ROM, and/or RAM. Memory may be specifically dedicated to storing firmware. Memory **204** may be provided for storing firmware for device applications (e.g., operating system, user interface functions, and processor functions). Memory **204** may store data for pairing itself or communicating with one or more devices (e.g., a host device) using a communications protocol supported by communications circuitry **202**.

[0037] In some embodiments, memory **204** may be configured to store data transmitted by communications circuitry **202** (e.g., authentication information, identification information, an instruction to perform an operation with a host device, an identifier for a user profile or for user preferences, or user profile or user preference data) to a host device to which key **200** is paired. In embodiments in which memory **204** stores a user profile or user preference information, key **200** may be operative to transmit the user profile or user preference information to a host device when the host device is within the network of the key. In some embodiments, memory **204** may instead or in addition store files or other data used by the user (e.g., files stored on the user's desktop, or recent files accessed by the user), and transfer the files or other data when a host device is within the network of the key. With this approach, each user may access a host device with their preferences without requiring the host device to connect to a server to identify and load the proper preferences. This may allow a user to access personal information using a host device even when the host device is not connected to a server (e.g., when the host device is offline, for example a laptop computer in an airplane or in a tunnel).

[0038] In some embodiments, memory **204** may store a communications protocol for pairing key **200** with host devices. Memory **204** may host a database of the host devices to which key **200** was paired, for example, using a serial number or other identifier for the host device. Memory **204** may store instructions that key **200** can transmit to cause each host device to perform one or more operations. For example, if the host device is a computer, memory **204** may store authentication information for key **200** to automatically log the user into the computer. As another example, if the host device is an elevator, memory **204** may store an instruction to call an elevator to go to a particular floor. As still another example, if the host device is a vehicle, memory **204** may store an instruction to unlock the vehicle and to start the vehicle's engine, radio, navigation system, other vehicle function, or any combination thereof. As a final example, if the host device is a light or door, memory **204** may store an instruction to turn the light on, or open or unlock the door.

[0039] Any number of approaches may be used to store the required information in memory **204**. In some embodiments, when key **200** is first paired with a host device, the host device may provide the information to key **200** for storing in memory **204**. For example, the host device may automatically provide the information when the host device and key **200** are paired. As another example, the user of the host device may direct the host device to provide particular information to key **200**. This approach may be used, for example, to allow the user to select the operation or operations that key **200** will direct a particular host device to perform (e.g., the key may cause an automobile to turn on the media system, activate the navigation system, or turn on the engine).

[0040] In some embodiments, the user may set up key **200** to perform particular operations. For example, key **200** may include a display and user interface allowing the user to set up the operation of the key. As another example, key **200** may be coupled to a base or docking station through which the user may set up key **200**. The base may be a standalone device having a display and a user interface, a host device with a display and a user interface, or any other suitable device by which a user may set up key **200**. In some embodiments, the user may wirelessly set up one or more keys using the base.

[0041] In some embodiments, key **200** may also include a power supply, a user interface and a display. Key **200** may also include a processor distinct from communications circuitry **202**. The processor can control the operation of some or all of the functions and components included in key **200**. For example, the processor may drive the display and process inputs received from the user interface. In some embodiments, key **200** may include some form of a limited interface such as, for example, an ON/OFF switch. In some embodiments, key **200** may include an interface that the user must select to transmit data from key **200** (e.g., a transmit or broadcast switch).

[0042] The user interface may allow a user to interact with key **200**. For example, the user input device can take a variety of forms, such as a button, keypad, dial, a click wheel, or a touch screen. The user interface may include a multi-touch screen such as that described in U.S. Pat. No. 6,323,846, which is incorporated by reference herein in its entirety. The user interface may emulate a rotary phone or a multi-button keypad, which may be implemented on a touch screen or the combination of a click wheel or other user input device and a screen. A more detailed discussion of such a rotary phone interface may be found, for example, in U.S. patent application Ser. No. 11/591,752, filed Nov. 1, 2006, entitled "Touch Pad with Symbols based on Mode," which is incorporated by reference herein in its entirety.

[0043] Key **200** may be any suitable device that includes at least communications circuitry **202** and memory **204**. Because key **200** may require so few elements, and these elements may be very small in size, key **200** may be a very small device. For example, key **200** may include, or be integrated in, a key fob, a card (e.g., a credit card shaped device),

a portable drive (e.g., a flash drive), a widget (e.g., a coin-sized object), or any other suitable device or object that may be unobtrusively carried in a user's pocket, purse or bag. In some embodiments, key **200** may include a clip or other connecting mechanism for attaching key **200** to an object that the user typically carries. For example, key **200** may be clipped or attached to a user's wallet, cellular telephone, personal media device (e.g., an iPod), wired headset, wireless headset, watch, bag, belt, article of clothing, or any other suitable object. In some embodiments, key **200** may be inserted inside a user (e.g., surgically inserted under a user's skin).

[0044] In some embodiments, key **200** or its functionality may be incorporated in an electronic device. For example, key **200** may be incorporated in a cellular telephone, a mobile communications device, a pocket-sized personal computer (e.g., an iPAQ or a Palm Pilot) a personal media device (e.g., an iPod), a camera, a video recorder, a computer (e.g., a laptop computer), a key (e.g., car keys), a remote controller, or any other suitable electronic or personal device. Key **200**, or the device in which key **200** or its functionality is incorporated may be sized to fit relatively easily into a pocket or hand of the user, and may be taken practically anywhere the user travels.

[0045] FIG. **3** is a simplified block diagram of a host device or other device in accordance with one embodiment of the invention. Host device **300** may include processor **302**, storage device **304**, memory **306**, transceiver **308**, power supply **310** and bus **312**. Processor **302** can control the operation of the functions and components of device **300**.

[0046] Storage device **304** may include one or more storage mediums, including for example, a hard-drive, flash memory, permanent memory such as ROM, semi-permanent memory such as RAM, or cache. Storage device **304** may store media (e.g., music and video files), software (e.g., for implementing functions on device **300**), preference information (e.g., media playback preferences), lifestyle information (e.g., food preferences), exercise information (e.g., information obtained by exercise monitoring equipment), transaction information (e.g., information such as credit card information), wireless connection information (e.g., information that may enable device **300** to establish a wireless connection), subscription information (e.g., information that keeps tracks of podcasts or television shows or other media a user subscribes to), contacts information (e.g., telephone numbers and email address), calendar information, and any other suitable data.

[0047] In some embodiments, storage device **304** may store authentication information for a user to enter prior to accessing the functionality of the device. For example, storage device **304** may store username and password combinations, or algorithms and keys for authenticating a string entered by the user (e.g., using a RSA algorithm). Storage device **304** may store data for pairing itself or communicating with one or more devices (e.g., key **200**, FIG. **2**) using a short-range communications protocol.

[0048] Memory **306** may include one or more different types of memory which may be used for performing device functions. For example, memory **306** may include cache, Flash, ROM, and/or RAM. Memory may be specifically dedicated to storing firmware. For example, memory **306** may be provided for storing firmware for device applications (e.g., operating system, user interface functions, and processor functions).

[0049] Transceiver **308** may enable device **300** to wirelessly communicate with one or more keys (e.g., key **200**, FIG. **2**) using a short range communications protocol. For example, transceiver **308** may support Wi-Fi communications (e.g., one of the 802.11 standards), Bluetooth, Nordic, high frequency systems (e.g., 900 MHz, 2.4 GHz, and 5.6 GHz communication systems), infrared, short-range radio circuitry (e.g., walkie-talkie type circuitry), and other relatively short-range wireless communication protocols.

[0050] Bus **312** may provide a data transfer path for transferring data to, from, or between processor **302**, storage device **304**, memory **306** and transceiver **308**. In some embodiments, a coder/decoder (CODEC) may be included to convert digital audio signals into an analog signal, which may be provided to an output port (not shown).

[0051] Power supply **310** may provide power to the components of device **300**. In some embodiments, power supply **310** may be coupled to a power grid (e.g., a personal computer). In some embodiments, power supply **310** may include one or more batteries for providing power in a portable device. As another example, power supply **310** may be configured to generate power in a portable device from a natural source (e.g., solar power using solar cells).

[0052] In some embodiments, device **300** may include a display and a user interface. The display and user interface may include some or all of the features discussed above in connection with the display and user interface of key **200**.

[0053] In some embodiments, device **300** may be an electronic device in which a user may provide identifier information to receive authorization to access the device, or to access or load the user's personal information. Device **300** may include, for example, a computer, a cellular telephone, a mobile communications device, a personal media device, a set-top box, a television system, or any other suitable electronic device.

[0054] FIG. **4** is a simplified block diagram of another host device in accordance with one embodiment of the invention. Host device **400** includes transceiver **402** and actuator **404**. Transceiver **402** may enable device **400** to wirelessly communicate with one or more keys (e.g., key **200**, FIG. **2**) using a short range communications protocol. Transceiver **402** may include one or more of the features described above in connection with transceiver **308** (FIG. **3**).

[0055] Actuator **404** may be any suitable component operative to move device **400** from a first position or state to a second position or state. For example, actuator **404** may include a motor that is configured to move an element within device **400**. As another example, actuator **404** may include a motor that is configured to move device **400**. In some embodiments, actuator **404** may include a switch, for example for turning a device or a function on or off (e.g., a light switch, a door lock, or an air conditioner or heater). In some embodiments, actuator **404** may be processor for performing operations in response to instructions from firmware or software. For example, actuator **404** may be a processor that performs a particular function or operation under the control of a software program. The function or operation may include, for example, authenticating a user to the system (e.g., logging in the user), loading a user's settings (e.g., a user's preference profile), dialing a telephone number, opening a program (e.g., opening a user's e-mail software), activating a peripheral, activating a system coupled to the device (e.g., starting an automobile's engine), or any other suitable operation.

[0056] The key according to embodiments of this invention may be integrated in a number of devices or objects, several of which are described in more detail below. As discussed in

connection with FIGS. **1** and **2**, a key may be in communication with a host device when the host device is within communications network **112** (FIG. **1**). Specific examples of where a key may be placed to create a personal area network are shown in FIG. **5**.

[0057] FIG. **5** shows person **510**, key fob **520**, clip **530**, mobile telephone **540**, and personal media device **550**, each of which may harbor a key that creates personal area networks **512**, **522**, **532**, **542** and **552**, respectively. When the key of any of these locations comes in proximity of a host device, such that the host device is within the personal area network of the key, the host device may perform an operation. In the example of FIG. **5**, host device **560** is a computer into which the user associated with the key may be automatically logged in when host device **560** is within the personal area network of the key. In some embodiments, host device **560** may log out the user or lock the computer when host device **560** is no longer within the personal area network of the key.

[0058] By virtue of the presence of a key, a personal area network may exist about person **510**. In this example, the person may keep the key his or her pocket(s), or alternatively, the key may be kept substantially near the person such as an accessory item (e.g., handbag, backpack, or purse). In some embodiments, the key may be integrated with clothing or an accessory item, providing functional fashion having device operation capabilities. In some embodiments, the key may be embedded under a user's skin (e.g., surgically implanted).

[0059] As defined herein, integration of a key refers to placing the key within or attached to an item, or incorporating the key into the item such that it appears to be part of the item. In some embodiments, a key may be integrated in any of key fob **520**, object with clip **530** (e.g., a clip configured to be attached to an article of clothing or accessory), mobile telephone **540**, and personal media device **550** using any suitable approach.

[0060] The host device or other devices according to embodiments of this invention may be configured to perform any suitable operation when the key is placed in proximity of the host device such that the personal area network of the key encloses the host device. As discussed in FIGS. **3** and **4**, a host device may perform any suitable operation in response to receiving a signal from the key. Specific examples of host devices and the operations performed in response to entering the network created by are shown in FIG. **6**.

[0061] FIG. **6** shows computer **610**, laptop **612**, television system **620**, multimedia system **630**, automobile **640**, door **650**, lamp **660**, heating and/or air conditioning system **670**, elevator **680**, and motor **690**. The devices and systems of FIG. **6** may be configured to perform various operations when a key is placed in proximity of the device or system such that the device or system is within the network created by the key. For example, computer **610** and laptop **612** may be configured to automatically log the user associated with the key into the computer system. As another example, computer **610** and laptop **612** may automatically load a user's profile or preferences when the key is brought in proximity of the system. In some embodiments, the key alone may be sufficient to perform the operation with computer **610** or laptop **612**. In some embodiments, however, the user may be required to enter private information in addition to having the key present to perform an operation (e.g., a password for a more secure login to the computer). In some embodiments (e.g., if the key has a user interface), the user may provide login data to the key for transmission to computer **110** or **112**.

[0062] Television system **620** may be configured to automatically load a user's profile or preferences when a key associated with the user is brought in proximity of system **620**. As another example, system **620** may be configured to automatically log in the user associated with the key (e.g., to automatically load the user's pin for ordering PPV programs and on-demand content, and setting-up recordings). Similarly, media system **630** may be configured to automatically load the user profile or preferences of the user associated with the key, or login the user associated with the key (e.g., load the user's music preferences or load the user's playlists).

[0063] Automobile **640** may be configured to perform any of a number of operations when a key is brought in proximity of the automobile. For example, automobile **640** may unlock one or more of its doors when the key is brought in proximity of the automobile. As another example, automobile **640** may automatically start its engine. As still another example, automobile **640** may automatically turn on the heating or air conditioning system of the automobile. As another example, automobile **640** may automatically activate a navigation system (e.g., a GPS system) or a media system. In some embodiments (e.g., if the key has a user interface), the user may select with the key one or more particular operations for automobile **640** to perform, and direct the key to transmit the user's selections to the automobile.

[0064] Door **650** may be any suitable door or gate for preventing ingress and egress. For example, door **650** may be the door to a home, office, or other building. As another example, door **650** may be a garage door or other door or gate for preventing vehicles from passing. As still another example, door **650** may be a gate or a turnstile (e.g., for accessing public transportation, a stadium, or an office building). When a key is brought in proximity of door **650**, the door may be configured to unlock or lock automatically. For example, a door may unlock when a key is brought in proximity of the door, and lock as soon as the door is no longer within the network created by the key. As another example, the door may switch from locked to unlocked and back each time the door enters the network created by the key. In some embodiments, door **650** may automatically open or close when a key is brought in proximity to door **650** (e.g., automatically open a door for a handicapped person in the presence of the key). In some embodiments, the user may enter an input on the key or door, in addition to bringing the key in proximity of door **650**.

[0065] Lamp **660** may be any suitable light source for a user. For example, lamp **660** may be a floor, wall, or ceiling lamp. As another example, lamp **660** may be curtains or shades that may be opened to allow light to pass. Lamp **660** may be configured to be turned on or off when a key is brought in proximity of the lamp. For example, as long as lamp **660** is within the network created by the key, lamp **660** may be turned on. As another example, lamp **660** may be configured to be turned on a particular level (e.g., dim lights) when the key is brought in proximity of lamp **660**. In some embodiments (e.g., if the key has a user interface), the user may select with the key whether to turn lamp **660** on or off, or select the intensity for the lamp, and direct the key to transmit the selection to lamp **660**.

[0066] Heating and/or air conditioning system **670** may be any suitable system for heating or cooling air, for example in a building or vehicle. Heating and/or air conditioning system **670** may be configured to discharge air at a particular temperature when the key is brought in proximity of heating and/or air conditioning system **670**. In some embodiments,

the key may direct heating and/or air conditioning system **670** to bring the temperature to a specific temperature (e.g., the key may transmit data that specifies a temperature). In some embodiments (e.g., if the key has a user interface), the user may select with the key a temperature, fan speed, or other setting, and direct the key to transmit the selection to system **670**.

[0067] Elevator **680** may be any suitable elevator. When a key is brought in proximity of elevator **680**, for example on a floor that is served by elevator **680**, the elevator may automatically be called to the floor of the key. In some embodiments, the key may transmit floor request information for the elevator to automatically select the floor to which the elevator will move. For example, the key may transmit data for two floors, the exit floor and the destination floor (e.g., an office floor or an apartment floor). When the elevator receives the transmission from the key, it may first determine the floor from which the key transmitted. If the floor is one of the ground floor and the destination floor, the elevator may automatically select the other floor. If the floor is neither the ground floor nor the destination floor, the elevator may select both and prompt the user to confirm the selection of one or the other, or the elevator may not select any floor. In some embodiments (e.g., if the key has a user interface), the user may select a floor with the key, and direct the key to transmit the selection to the elevator.

[0068] Motor **690** may be any suitable motor, engine or actuator that is present in any device or system. For example, motor **690** may be part of a vehicle, a security system, or any other suitable device or system. When a key is brought in proximity of motor **690**, motor **690** may be configured to turn on or off, rotate or actuate at a specific speed in a specific direction, or accelerate or decelerate at a specific rate. In some embodiments (e.g., if the key has a user interface), the user may select with the key a particular action for motor **690** to perform, and direct the key to transmit the selected action to motor **690**.

[0069] In some embodiments, a plurality of keys may create personal area networks in which a host device is present. For example, a classroom may include many students, each with their own laptop computers, and each with their own key. Each student's key may create a personal area network that includes all of the laptop computers present in the classroom. Each laptop, and more generally speaking each host device, may determine which key to communicate with in any suitable manner. In some embodiments, the host device may identify the key that transmits a signal exceeding a threshold signal strength, and communicate with the identified key. In some embodiments, the host device may identify the key that transmits a signal with the highest signal strength (e.g., the closest key to the host device). The measure of signal strength may be absolute (e.g., the key with the highest actual data transfer rate), or may be relative to each key's capabilities (e.g., the key with the highest ratio of actual data transfer rate to maximum data transfer rate). In some embodiments, the host device may prompt the user to select a particular key (e.g., provide a selectable list of available keys in a pop-up menu). In some embodiments, the host device may automatically select the key that has previously communicated with the host device (e.g., the laptop computer communicates in class with the same key that the laptop computer communicates with in the user's dorm room).

[0070] A host device may be configured to perform an operation when it is within the personal area network created by a key using a number of different approaches. In some embodiments, the key may transmit instructions to perform one or more specific operations to the host device. For example, once the key has been paired with the host device (e.g., authenticated to the host device), the key may direct the host device to perform an operation. In some embodiments, the host device instead may itself identify the operation to perform when it is within the personal area network of a key. For example, the host device may identify the key, and retrieve from memory one or more operations that are associated with the identified key. Both of these approaches will be discussed in more detail in the following flow charts. In addition, the following flow charts refer to a number of processes that can be performed by keys and host devices in accordance with some embodiments of the invention.

[0071] FIG. **7** shows a flowchart of an illustrative process for transmitting data with a key to a host device in accordance with one embodiment of the invention. Process **700** begins at step **702**. At step **704**, the key broadcasts data, for example to notify other devices of the personal area network created by the key. For example, communications circuitry **202** of key **200** (FIG. **2**) may transmit or broadcast identification information in the personal area network created by communications circuitry **202**.

[0072] In some embodiments, the key may perform only this step. For example, this approach may be used in embodiments where the host device retrieves from memory, based on the identification information, the operation to perform. In such an embodiment, process **700** would then terminate. In some embodiments, however, the key may perform additional steps. These steps will be described below as part of process **700**. It will be understood, however, that in some embodiments, process **700** may terminate after step **704**.

[0073] At step **706**, the key determines whether a host device is present within the personal area network. For example, communications circuitry **202** may determine whether any transmissions are received from a host device. If the key determines that no host device is present within the personal area network, process **700** returns to step **704** and continues to broadcast data.

[0074] If, at step **706**, the key instead determines that a host device is present within the personal area network, process **700** may move to step **708**. In some embodiments, process **700** may also move to step **704**, and continue to broadcast data for other host devices within the personal area network. At step **708**, the key determines whether the host device that responded at step **706** is known. For example, the key may determine whether identifier information provided by the host device matches identifier information stored in memory **204** (FIG. **2**). If the key determines that the host device is unknown, process **700** moves to step **709**, which calls process **800** (FIG. **8**), discussed in more detail below.

[0075] If, at step **708**, the key instead determines that the host device is known, process **700** moves to step **710**. At step **710**, the key identifies the host device that responded. For example, communications circuitry **202** may compare identification information provided by the host device with the identification information of known host devices stored in memory **204**.

[0076] At step **712**, the key identifies the data to transmit to the identified host device. For example, communications circuitry **202** may retrieve from memory **202** the data for transmission that is associated with the identified host device (e.g., data stored in a database field with the host device identifier).

The identified data may include authentication information (e.g., login information), instructions to perform an operation (e.g., instructions to start an engine), parameters for performing an operation (e.g., an elevator floor), a user's working documents (e.g., files), or any other suitable data.

[0077] At step **714**, the key transmits the data identified at step **712**. For example, communications circuitry **202** may transmit the identified data to the host device using any suitable communications protocol. In some embodiments, the data transmission may be encrypted. At step **716**, the key determines whether the host device confirmed receipt of the transmitted data. For example, communications circuitry **202** may request a checksum or other data from host device confirming that the host device in fact received the transmitted data. If the key determines that the host device did not confirm receipt of the transmitted data, process **700** moves back to step **714** and transmits the identified data again.

[0078] If, at step **716**, the key instead determines that the host device received the transmitted data, process **700** moves to step **718**. At step **718**, the key ceases to transmit the identified data. For example, communications circuitry **202** may halt transmissions of authentication information. In some embodiments, the key may re-transmit the identified data at different intervals (e.g., if the host device requests a new transmission of authentication data). Process **700** then returns to step **704**, where communications circuitry **202** broadcasts data identifying the key in the personal area network.

[0079] FIG. **8** shows a flow chart of an illustrative process for associating a host device with a key in accordance with one embodiment of the invention. Process **800** begins at step **802**. In some embodiments, step **802** may correspond to step **709** of process **700** (FIG. **7**). At step **804**, the key prompts the user to associate the identified host device with the key. For example, a display on the key may display a prompt asking the user if the user would like to pair the identified host device with the key. The display may indicate that the user may enter a selection using a user interface of the key.

[0080] At step **806**, the key determines whether the user provided an instruction to associate the host device with the key. For example, a processor in the key may determine whether the user provided an input using the user interface. In addition, the processor may determine whether the input provided by the user was YES or NO. If the key determines that the user provided no instruction to associate the device with the key, or an instruction not to associate the device with the key, process **800** moves to step **808** and ends.

[0081] If, at step **806**, the key instead determines that the user provided an instruction to associate the device with the key, process **800** moves to step **810**. At step **810**, the key identifies a device operation to be performed by the host device. For example, the key may select a default or standard operation that is performed by the host device (e.g., turning a light on or off). As another example, the user may enter a device operation using the user interface of the key. In some embodiments, the display may provide a confirmation of the selected device operation.

[0082] At step **812**, the key stores host device identification information. For example, a host device identifier may be stored in memory **204** (FIG. **2**). At step **814**, the key stores the identified device operation. For example, the device operation may be stored in memory **204** (e.g., associated with the host device identifier in a suitable data structure). Process **800** then ends at step **808**.

[0083] FIG. **9** shows a flow chart of an illustrative process for entering authentication information to be transmitted to a host device in accordance with one embodiment of the invention. This process may be used to initially load the user's authentication information in the key for transmission to a host device. In some embodiments, the user may perform this process only once, when the key is first set up, and the key subsequently automatically provides the required authentication information to devices in the key's personal area network. Process **900** starts at step **902**. At step **904**, the user enters authentication information for transmission to a host device. For example, the user may enter a username and password combination. As another example, the user may enter a unique identifier. As still another example, the user may enter a seed that is used to generate an identifier using a mathematical algorithm (e.g., an RSA algorithm).

[0084] At step **906**, the user enters a device identifier to be associated with the authentication information. For example, the user may enter a unique identifier for a device. As another example, the user may enter an IP address or other network address for the device. As still another example, the user may select the device from a menu.

[0085] The user may enter data in the key using any suitable approach. For example, the user may enter data using an user interface of the key. As another example, the user may enter data using a base having an user interface, and couple the key to the base to transfer the data to the key. In some embodiments, the user may view inputs using a display integrated in the key or in the base.

[0086] At step **908**, the key stores the authentication information and device identifier. For example, the key may store the authentication information and device identifier in memory **204** (FIG. **2**). Process **900** then ends at step **910**.

[0087] In the preceding discussion, process **900** was described in the context of entering authentication information in the key for transmission to a host device. It will be understood, however, that that any suitable data, for example a device operation, may be entered in the key for transmission to a host device using process **900**.

[0088] FIG. **10** shows a flow chart of an illustrative process for creating a secure communications link between a key and a host device in accordance with one embodiment of the invention. Process **1000** starts at step **1002**. At step **1004**, the key transmits its public key to the host device. For example, communications circuitry **202** (FIG. **2**) may retrieve the private key from memory **204** (FIG. **2**) for transmission to the host device. At step **1006**, the key receives a public key from the host device. For example, communications circuitry **202** may receive a transmission of the public key from the host device. At step **1008**, the key generates an encryption key based on the public key received from the host device and on the private key of the key. For example, a processor in the key may perform an operation on the public key of step **1006** and on the private key of the key to generate an encryption key (e.g., using an RSA algorithm).

[0089] At step **1010**, the key encrypts its transmissions using the encryption key generated at step **1008**. For example, communications circuitry **202** may transmit encrypted data to the host device. Process **1000** then ends at step **1012**. Although process **1000** was described as using private and public keys (e.g., used for example in the RSA algorithm), any other approach may be used to generate an encryption key to encrypt data transmitted from the key to the host device.

[0090] FIG. **11** shows a flow chart of an illustrative process for performing an operation with a host device when a key is placed in proximity of the host device in accordance with one embodiment of the invention. Process **1100** begins at step **1102**. At step **1104**, the host device monitors for broadcasts from a key. For example, transceiver **308** (FIG. **3**) or transceiver **402** (FIG. **4**) may monitor incoming communications to identify broadcasts from keys. At step **1106**, the host device determines whether a broadcast from a key has been received. For example, transceiver **308** may determine whether an incoming transmission is from a key (e.g., whether a transmission uses a particular protocol, or has specific identifying information). If the host device determines that no broadcast has been received from a key, process **1100** returns to step **1104** and continues to monitor incoming communications.

[0091] If, at step **1106**, the host device determines that a broadcast from a key has been received, process **1100** moves to step **1108**. At step **1108**, the host device identifies the key from the broadcast data. For example, processor **302** (FIG. **3**) may compare the data provided in the broadcast with identification data for various keys stored in storage device **304** (FIG. **3**) or memory **306** (FIG. **3**). Processor **302** may determine, for example, that a key identifier transmitted in the broadcast data is the same as that for a known key stored in storage device **304** or memory **306**. In some embodiments, if transmissions from many keys are received, processor **302** may identify and select any particular key (e.g., the key with the strongest signal strength, or a key that has been previously used with host device **300**, FIG. **3**).

[0092] At step **1110**, the host device performs an operation in response to identifying the key. For example, transceiver **308** may receive instructions from the key to perform a particular operation (e.g., log a user into the host device). As another example, processor **302** may retrieve from storage **304** or memory **306** an operation associated with the identified key, and perform the retrieved operation. Process **1100** then ends at step **1112**.

[0093] FIG. **12** shows a flowchart of an illustrative process for authenticating a key and performing an operation in accordance with one embodiment of the invention. Process **1200** begins at step **1202**. At step **1204**, the host device transmits host device identification information to a key. For example, transceiver **308** (FIG. **3**) or transceiver **402** (FIG. **4**) may transmit host device identification information in response to receiving a communication from a key (i.e., indicating that the host device is within the personal area network created by the key). Process **302** (FIG. **2**) may retrieve host device identification information from storage device **304** (FIG. **3**) or memory **306** (FIG. **3**), and provide the information to transceiver **308** for transmission.

[0094] At step **1206**, the host device receives key identification information from the key. For example, transceiver **308** may receive a transmission from the key. Processor **302** may process the transmission and extract key identification information. At step **1208**, the host device determines whether the key identification information is known. For example, processor **302** may compare the received key identification information with identification information stored in storage device **304** or memory **306**. If the host device determines that the key identification information is not known, process **1200** moves to step **1210**, which calls process **1400** (FIG. **14**), discussed in more detail below.

[0095] If, at step **1208**, the host device instead determines that the key identification information is known (e.g., the key identification information was previously stored in storage device **304** or memory **306**), process **1200** moves to step **1212**. At step **1212**, the host device authenticates the key. For example, processor **302** may receive authentication information from the key that processor **302** can compare to data stored for the key in storage device **304** or memory **306**. Authentication information may include, for example, a username and password combination, a code, a string created based on a secret seed and a known algorithm (e.g., an RSA-based string), or any other suitable information.

[0096] At step **1214**, the host device determines whether the key is authenticated. For example, processor **302** may determine whether the authentication information provided by the key was consistent with the information stored in storage device **304** or memory **306**. If the host device determines that the key is not authenticated, process **1200** moves to step **1216** and terminates.

[0097] If, at step **1214**, the host device instead determines that the key is authenticated, process **1200** moves to step **1218**. In some embodiments, process **1200** may go straight to step **1218** from step **1212**, and skip steps **1214** and **1216**. Such an approach may be used, for example, when the identification information transmitted by the key is sufficient to serve as authentication information (e.g., the identification information is sufficiently secret).

[0098] At step **1218**, the host device identifies one or more operations to perform in response to the key's proximity (i.e., the host device is within the personal area network of the key). For example, processor **302** may identify a process to perform from data stored in storage device **304** or memory **306** that is associated with the key. As another example, transceiver **308** may receive an instruction from the key identifying one or more operations to perform.

[0099] At step **1220**, the host device performs one or more operations identified at step **1218**. For example, processor **302** may direct the components of the host device to perform the one or more operations. As another example, actuator **404** (FIG. **4**) may perform an operation. The operations may be any suitable action that the device is operative to perform. Some operations may include, for example, logging a user into the host device, loading a user's profile, preferences or files, activating a switch, calling a device or system (e.g., placing a call with a telephone, or calling an elevator), or any other suitable operation. Process **1200** then ends at step **1216**.

[0100] FIG. **13** shows a flowchart of an illustrative process for performing an operation when a host device is within the personal area network created by a key in accordance with one embodiment of the invention. Process **1300** begins at step **1302**. At step **1304**, the host device performs an operation. For example, processor **302** (FIG. **3**) may direct one or more components of the host device to perform an operation described above in step **1220** of process **1200** (FIG. **12**). At step **1306**, the host device determines whether the device is still within the personal area network created by the key. For example, transceiver **308** (FIG. **3**) or transceiver **402** (FIG. **4**) may monitor incoming communications and determine whether it continues to receive communications from the key. As another example, transceiver **308** or transceiver **402** may ping the key and monitor communications for a return communication. If the host device determines that the it is still within the personal area network created by the key, process **1300** returns to step **1304** and continues to perform the operation.

[0101] If, at step **1306**, the host device instead determines that the host device is no longer within the personal area network of the key, process **1300** moves to step **1308**. At step **1308**, the host device ceases performing the operation. For example, processor **302** may direct the components of the host device to stop operating. At step **1310**, the host device returns to its state prior to beginning to perform the operation. For example, processor **302** may direct one or more components of the host device to return to their previous states (e.g., turn back a switch). Process **1300** then ends at step **1312**.

[0102] In some embodiments, process **1300** may terminate after step **1308** and skip step **1310**. In some embodiments, step **1310** may be skipped based on the operation that was performed. For example, if the operation was to log a user into the host device, or load a user's preferences or profile, step **1310** may serve to log the user out of the system and/or delete the user's files or other personal information. As another example, if the operation was to turn on a vehicle's engine, step **1310** would serve to turn the vehicle off. As still another example, if the operation was to turn on a light or set-up air conditioning or heating, step **1310** may not be used (e.g., the user is still within his home, but not in near proximity to the light switch).

[0103] FIG. **14** shows a flow chart of an illustrative process for associating a key with a host device in accordance with one embodiment of the invention. Process **1400** begins at step **1402**. In some embodiments, step **1402** may correspond to step **1210** of process **1200** (FIG. **12**). At step **1404**, the host device prompts the user to associate a key with the host device. For example, the host device, using transceiver **308** (FIG. **3**) or transceiver **402** (FIG. **4**), may determine that the host device is within the personal area network of a key. Processor **302** (FIG. **3**) may direct a display to provide a prompt for the user. The user may associate the key in any suitable manner. For example, the user may select a key displayed on the host device. As another example, the user may enter identification information (e.g., a unique identifier or an IP address) for the key using an user interface.

[0104] At step **1406**, the host device determines whether the user has provided an instruction to associate a key. For example, processor **302** may determine whether the user provided an input using the user interface. If the host device determines that the user has not provided any input, or that the user has instructed the host device not to associate the key, process **1400** moves to step **1408** and ends.

[0105] If, at step **1406**, the host device instead determines that the user has provided an instruction to associate the key with the host device, process **1400** moves to step **1408**. At step **1408**, the host device identifies an operation to perform when the host device is within the personal area network of the key. For example, processor **302** may automatically select an operation to perform (e.g., turn a light switch on). In some embodiments, the host device may provide a default operation that is selected in the absence of additional instructions from the user. In some embodiments, the user may specify the operation to perform (e.g., using the user interface).

[0106] At step **1412**, the host devices stores the key's identification information. For example, processor **302** may direct storage device **304** (FIG. **3**) or memory **306** (FIG. **3**) to store the key's identification information. At step **1414**, the host device stores the operation identified at step **1410**. For example, processor **302** may store the identified operation in storage device **304** or memory **306**. The host device may use any suitable data structure to store one or more keys' identification information, associated operations to perform, and other key-related data. For example, a database in which each key is associated with identifier information and one or more operations associated with the key may be stored in storage device **304** or memory **306**. Process **1400** then ends at step **1416**, which may be step **1218** of process **1200** (FIG. **12**).

[0107] In some embodiments, process **1400** may skip steps **1410** and **1414**. For example, in approaches where the key directs the host device to perform an operation, the host device may not associate an operation with the key. Instead, each time the key is paired with the host device, the key transmits specific instructions to the host device. This approach may provide benefits when a key is used to cause a plurality of host devices to operate, as the user need only modify the data transmitted by the key using the key's interface to modify the operation of one or more host devices.

[0108] The above described embodiments of the present invention are presented for purposes of illustration and not of limitation, and the present invention is limited only by the claims which follow.

What is claimed is:

1. A system for directing a host device to perform an operation, comprising:

a key comprising communications circuitry operative to automatically transmit an instruction; and

a host device operative to receive the instruction and perform an authentication operation when the key is brought in a communications proximity of the host device.

2. The system of claim **1**, wherein the communications circuitry is operative to create a personal area network using a short range communications protocol.

3. The system of claim **2**, wherein the short range communications protocol is one of Wi-Fi, Bluetooth, Nordic, high frequency transmission, short-range radio circuitry and infrared.

4. The system of claim **1**, wherein the key is operative to automatically broadcast identification information.

5. The system of claim **1**, wherein the host device is operative to transmit identification information to the key.

6. The system of claim **5**, wherein the key is operative to identify a subsequent operation to be performed by the host device in response to receiving the identification information.

7. The system of claim **6**, wherein the communications circuitry is operative to transmit an instruction for the host device to perform the identified operation.

8. The system of claim **1**, wherein the host device is operative to cease to perform the authentication operation when the key is not in proximity of the host device.

9. The system of claim **1**, wherein the key is integrated in one of a key fob, a card, a portable drive, a surgically inserted object, a cellular telephone, a mobile communications device, a pocket-sized personal computer, a personal media device, a camera, a video recorder, a computer, and a remote controller.

10. The system of claim **1**, wherein the host device is one of a computer, a cellular telephone, a mobile communications device, a personal media device, a set-top box, a television system, a vehicle, a door or window, a gate, a turnstile, a light, curtains, shades, an elevator, a conveyer belt, and a motor.

11. A system for providing access to a restricted-access device, comprising:

a key comprising communications circuitry; and

a host device comprising a processor, wherein the processor is operative to:

automatically identify the key when the key is brought in proximity of the host device;
automatically authenticate the key;
identify an operation associated with the key; and
perform the identified operation.

12. The system of claim **11**, wherein the processor is operative to store associations of keys and operations in memory.

13. For use in connection with a host device having key engagement and key disengagement modes, a key comprising circuitry operative to:
engage the host device when within wireless communications range of the host device;
when engaged with the host device, transmit data that causes the host device to automatically enter into the key engagement mode; and
disengage the host device when not within wireless communications range of the host device, thereby causing the host device to enter into the key disengagement mode.

14. The key of claim **13**, wherein the circuitry is operative to periodically transmit the data

15. The key of claim **13**, wherein the key engagement mode is a security unlock mode and the key disengagement mode is a security lock mode.

16. The key of claim **13**, wherein the circuitry is operative to use a short range communications protocol to engage the host device.

17. The key of claim **13**, wherein the circuitry is operative to receive data from the host device.

18. A host device for performing an operation when the host device is within a personal area network created by a key, the host device comprising a transceiver, memory and a processor, the processor operative to:
determine that the host device is within the personal area network created by the key; and
in response to determining that the host device is within the personal area network of the key, automatically perform an authentication operation.

19. The host device of claim **18**, wherein the processor is further operative to:
receive an instruction from the key identifying a subsequent operation to perform; and
perform the identified subsequent operation.

20. The host device of claim **18**, wherein the processor is further operative to:
identify the key;
retrieve from memory a subsequent operation to perform associated with the key; and
perform the retrieved subsequent operation.

21. The host device of claim **18**, wherein the processor is further operative to:
determine that the host device is no longer within the personal area network; and
in response to determining that the host device is no longer in the personal area network, cease performing the authentication operation.

22. A method for directing a host device to perform an operation when the host device is within a personal area network created by a key, comprising:
creating a personal area network with a key;
determining that a host device is within the personal area network;
providing access to the host device when the host device is determined to be within the personal area network;
directing the host device to automatically perform an operation when the host device is determined to be within the personal area network; and
locking access to the host device when the host device is determined not to be within the personal area network.

23. The method of claim **22**, further comprising:
identifying a host device within the personal area network; and
transmitting an instruction from the key to the host device to perform an operation.

24. The method of claim **22**, further comprising:
identifying the key creating the personal area network;
retrieving an operation associated with the identified key; and
performing the retrieved operation.

25. The method of claim **22**, further comprising:
determining that the host device is no longer in the network; and
in response to determining that the host device is no longer in the network, ceasing to perform the operation.

26. A host device for loading a user's profile when the host device is within a personal area network created by a user's key, the host device comprising a transceiver, memory and a processor, the processor operative to:
determine that the host device is within the personal area network created by the key;
in response to determining that the host device is within the personal area network of the key, automatically authenticate the key;
direct the transceiver to receive a user profile transmitted by the key; and
load the received user profile.

27. The host device of claim **26**, wherein the user profile comprises at least one user preference.

28. The host device of claim **26**, wherein the user profile comprises at least one file.

29. A method for loading a user's profile on a host device from a key, comprising:
creating a personal area network with the key;
determining that the host device is within the personal area network;
directing the host device to automatically authenticate the key;
transmitting a user profile associated with the key to the host device; and
directing the host device to load the transmitted user profile.

30. The method of claim **29**, wherein transmitting a user profile associated with the key to the host device further comprises transmitting at least one user preference to the host device.

31. The method of claim **29**, wherein transmitting a user profile associated with the key to the host device further comprises transmitting at least one file.

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