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System and method for facilitating data communication

Abstract

According to various embodiments, a system for facilitating a data communication is provided. The system may comprise a host device; a human interface device; and a receiver device wirelessly connectable to the human interface device and detachably couplable to the host device. The human interface device may generate input data for a user input, generate control information associated with the input data, and transmit the input data and the control information to the receiver device. The receiver device may transmit the input data to the host device. The receiver device may transmit an acknowledgement packet to the human interface device if the control information indicates that an acknowledgement of receipt of the input data is required, and perform a task for establishing a new wireless connection if the control information indicates that an acknowledgement of receipt of the input data is not required.

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Background/Summary

TECHNICAL FIELD

(1) Various embodiments relate to a system and a method for facilitating a data communication.

BACKGROUND

(2) A computing device such as a desktop computer, a laptop computer, a tablet computer, etc. may interact with at least one human interface device such as a mouse, a keyboard, a key pad, etc. to allow a user to control or operate the computing device. The human interface device may be physically separated from the computing device (hereinafter, referred to as a "host device"). Such human interface device may beneficially increase flexibility of interactions between the user and the host device, as no wired connection is required with the host device.

(3) A communication link may be implemented to support a data communication between the human interface device and a receiver device, such as a dongle, which is detachably couplable to the host device. The human interface device may use the communication link to transmit input data for the user's input to the host device via the receiver device.

(4) FIG. **1** shows a sequence diagram showing interactions between a receiver device and a human interface device according to conventional technologies. As shown in FIG. **1**, the human interface device may transmit the input data to the receiver device. The receiver device may receive the input data from the human interface device and transmit an acknowledgement packet (indicated as "ACK" in FIG. **1**) for the input data to the human interface device. For example, the human interface device may transmit the input data to the receiver device at a predetermined time interval t (for example, 1 ms) whenever there is a change in the user's input.

(5) FIG. **2** shows an example slot configuration showing interactions between the receiver device and the human interface device according to conventional technologies. As shown in FIG. **2**, in each time slot (for example, TS(n)), the human interface device may transmit the input data to the receiver device. The receiver device may receive the input data from the human interface device and transmit the acknowledgement packet (indicated as "ACK" in FIG. **2**) for the input data to the human interface device.

(6) However, since the transmission of the acknowledgement packet occupies limited airtime provided to the receiver device, the receiver device may be unable to perform other radio activities once the input data is received from the human interface device.

SUMMARY

(7) According to various embodiments, a system for facilitating a data communication is provided. The system may comprise a host device; a human interface device; and a receiver device wirelessly connectable to the human interface device and detachably couplable to the host device. The human interface device is configured to generate input data for a user input on the human interface device, generate control information associated with the input data, and transmit the input data and the control information to the receiver device, wherein the control information indicates whether an acknowledgement of receipt of the input data is required. The receiver device is configured to receive the input data and the control information from the human interface device and transmit the input data to the host device, the host device is configured to receive the input data from the receiver device, and the receiver device is further configured to transmit an acknowledgement packet to the human interface device if the control information received from the human interface device indicates that an acknowledgement of receipt of the input data is required, and perform a task for establishing a new wireless connection for at least one of the receiver device and the human interface device if the control information received from the human interface device

indicates that an acknowledgement of receipt of the input data is not required.

(8) According to various embodiments, a method for facilitating a data communication is provided. The method may include: generating, by a human interface device, input data for a user input on the human interface device; generating, by the human interface device, control information associated with the input data, wherein the control information indicates whether an acknowledgement of receipt of the input data is required; transmitting the input data and the control information from the human interface device to a receiver device, wherein the receiver device is wirelessly connected to the human interface device and detachably coupled to a host device; transmitting the input data from the receiver device to the host device; transmitting an acknowledgement packet from the receiver device to the human interface device, if the control information received from the human interface device indicates that an acknowledgement of receipt of the input data is required; and performing, by the receiver device, a task for establishing a new wireless connection for at least one of the receiver device and the human interface device, if the control information received from the human interface device indicates that an acknowledgement of receipt of the input data is not required.

(9) Additional features for advantageous embodiments are provided in the dependent claims.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

(1) In the drawings, like reference characters generally refer to the same parts throughout the different views. The drawings are not necessarily to scale, emphasis instead generally being placed upon illustrating the principles of the invention. In the following description, various embodiments are described with reference to the following drawings, in which:

(2) FIG. **1** shows a sequence diagram showing interactions between a receiver device and a human interface device according to conventional technologies.

(3) FIG. **2** shows an example slot configuration showing interactions between a receiver device and a human interface device according to conventional technologies.

(4) FIG. **3** shows a block diagram of a system according to various embodiments.

(5) FIG. **4** shows a flowchart of a method according to various embodiments.

(6) FIG. **5** shows an example slot configuration showing interactions between a receiver device and a human interface device according to various embodiments.

(7) FIG. **6** shows another example slot configuration showing interactions between a receiver device and a human interface device according to various embodiments.

(8) FIG. **7** shows another flowchart of a method according to various embodiments.

(9) FIG. **8** shows another example slot configuration showing interactions between a receiver device and a human interface device according to various embodiments.

(10) FIG. **9** shows another example slot configuration showing interactions between a receiver device and a human interface device according to various embodiments.

(11) FIG. **10** shows a sequence diagram showing a method including interactions between a receiver device and a human interface device according to various embodiments.

(12) FIG. **11** shows another sequence diagram showing a method including interactions between a receiver device and a human interface device according to various embodiments.

(13) FIG. **12** shows another example slot configuration showing interactions between a receiver device and a human interface device according to various embodiments.

(14) FIG. **13** shows another sequence diagram showing a method including interactions between a receiver device and a human interface device according to various embodiments.

(15) FIG. **14** shows another example slot configuration showing interactions between a receiver device and a human interface device according to various embodiments.

(16) FIG. **15** shows another sequence diagram showing a method including interactions between a receiver device and a human interface device according to various embodiments.

DESCRIPTION

(17) Embodiments described below in context of the method are analogously valid for the system, and vice versa. Furthermore, it will be understood that the embodiments described below may be combined, for example, a part of one embodiment may be combined with a part of another embodiment.

(18) It will be understood that any property described herein for a specific device may also hold for any device described herein. Furthermore, it will be understood that for any device described herein, not necessarily all the components described must be enclosed in the device, but only some (but not all) components may be enclosed.

(19) It should be understood that the terms "on", "over", "top", "bottom", "down", "side", "back", "left", "right", "front", "lateral", "side", "up", "down" etc., when used in the following description are used for convenience and to aid understanding of relative positions or directions, and not intended to limit the orientation of any device, structure or any part of any device or structure. In addition, the singular terms "a", "an", and "the" include plural references unless context clearly indicates otherwise. Similarly, the word "or" is intended to include "and" unless the context clearly indicates otherwise.

(20) The term "coupled" (or "connected") herein may be understood as electrically coupled or as mechanically coupled, for example attached or fixed, or just in contact without any fixation, and it will be understood that both direct coupling or indirect coupling (in other words: coupling without direct contact) may be provided.

(21) In order that the invention may be readily understood and put into practical effect, various embodiments will now be described by way of examples and not limitations, and with reference to the figures.

(22) FIG. **3** shows a block diagram of a system **100** according to various embodiments.

(23) As shown in FIG. **3**, the system **100** may include a host device **110**, a receiver device **120** and a human interface device **130** (also referred to as an "HID").

(24) The host device **110** may be a computing device configured to store and process data according to instructions. The host device **110** may include, but not be limited to, a mobile phone, a tablet computer, a laptop computer, a desktop computer, a head-mounted display and a smart watch. The host device **110** may include an input/output interface (also referred to as an "I/O interface") (not shown). The I/O interface may be configured to allow the host device **110** to communicate with an external device coupled to the host device **110**, for example, the receiver device **120**, to transmit and/or receive a signal.

(25) The human interface device **130** may be an electronic device which is used by a user and takes an input from the user to control and/or operate the host device **110**. The human interface device **130** may include, but not be limited to, a mouse, a keyboard, a key pad, a joystick, a touch pad, a trackball, and a pointing stick. The human interface device **130** may generate the input data for the user input on the human interface device **130**. For example, the user presses or touches one or more buttons, one or more keys, or any combination thereof, and the human interface device **130** may generate the input data for such user input. As another example, the user scrolls a wheel of the human interface device **130**, and the human interface device **130** may generate the input data for such user input. In some embodiments, the human interface device **130** may include a circuitry configured to convert the user input into a proper form of the input data.

(26) In some embodiments, the human interface device **130** may be physically separated from the host device **110**. In some embodiments, the human interface device **130** may be a wireless human interface device using a wireless communication link. The human interface device **130** may include a communication module (not shown) operable to transmit the input data to the receiver device **120** (as will be described below). The human interface device **130** may use the wireless communication

link to transmit the input data to the receiver device **120**. For example, the wireless communication link may include, but not be limited to a radio frequency (RF) radiation link and an infra-red radiation link. In some embodiments, the human interface device **130** may use a Human Interface Device (HID) protocol over the communication link. Although not shown, in some other embodiments, the human interface device **130** is configured to be connectable to the host device **110** via a wired link, for example, using an electrical cable.

(27) The receiver device **120** may be configured to be detachably couplable to the host device **110** and wirelessly connectable to the human interface device **130**. In some embodiments, the receiver device **120** may be detachably couplable to a port (not shown) of the host device **110**. The receiver device **120** may be operable to communicatively connect the human interface device **130** with the host device **110**. In some embodiments, the receiver device **120** may use the wireless communication link to receive the input data from the human interface device **130**. For example, the receiver device **120** may be a USB dongle including a USB connector at one end, and the port of the host device **110** may be a USB port compatible with the USB connector. The receiver device **120** may provide wireless connection functionalities between the host device **110** and the human interface device **130** while the USB connector of the receiver device **120** is plugged into the USB port of the host device **110**. The USB connector of the USB dongle and the USB port of the host device **110** may, for example, be a USB-A connector and a USB-A port, respectively, but are not limited thereto.

(28) In some embodiments, the human interface device **130** may generate the input data for the user input on the human interface device **130**. In some embodiments, the human interface device **130** may generate control information associated with the input data. The control information may indicate whether an acknowledgement of receipt of the input data is required. For example, the human interface device **130** may decide whether an acknowledgement of receipt of the input data is required, and generate the control information according to the decision. The human interface device **130** may transmit the input data and the control information to the receiver device **120**. In some embodiments, the receiver device **120** may receive the input data and the control information from the human interface device **130**.

(29) In some other embodiments, the control information may not necessarily be associated with the input data. For example, the control information may be associated with other information such as battery status information and/or DPI (dots per inch) setting information. As an example, the human interface device **130** may generate the control information associated with the battery status information, and transmit the control information to the receiver device **120**.

(30) In some embodiments, the receiver device **120** may transmit the input data to the host device **110**. The host device **110** may receive the input data from the receiver device **120**. In some other embodiments, the receiver device **120** may transmit the input data and the control information to the host device **110**. The host device **110** may receive the input data and the control information from the receiver device **120**.

(31) In some embodiments, the receiver device **120** may check the control information received from the human interface device **130**. If the control information received from the human interface device **130** indicates that an acknowledgement of receipt of the input data is required, the receiver device **120** may transmit an acknowledgement packet to the human interface device **130**. If the control information received from the human interface device **130** indicates that an acknowledgement of receipt of the input data is not required, the receiver device **120** may perform a task for establishing a new wireless connection for at least one of the receiver device **120** and the human interface device **130**.

(32) In some embodiments, the host device **110** may generate control data for controlling the human interface device **130**, and transmit the control data to the receiver device **120**. If the control information received from the human interface device **130** indicates that an acknowledgement of receipt of the input data is required, the receiver device **120** may transmit the control data with the

acknowledgement packet to the human interface device **130** to control the human interface device **130**.

(33) In some embodiments, the human interface device **130** may include a plurality of light sources (not shown) capable of selectively producing a plurality of lighting colours. The plurality of light sources may be housed in the human interface device **130**. The plurality of light sources may be capable of emitting light. In some embodiments, each light source of the plurality of light sources may be capable of selectively producing the plurality of lighting colours. Each light source of the plurality of light sources may produce the light in various lighting colours, for example, including red, green, blue, or any combinations thereof. For example, each light source of the plurality of light sources may include an RGB LED (red-green-blue light emitting diode).

(34) In some embodiments, the host device **110** may generate the control data including data for controlling each light source to produce at least one predetermined lighting colour among the plurality of lighting colours (for example, data about a lighting profile). The host device **110** may transmit the control data including the data about the lighting profile to the receiver device **120**. If the control information received from the human interface device **130** indicates that an acknowledgement of receipt of the input data is required, the receiver device **120** may transmit the control data including the data about the lighting profile with the acknowledgement packet to the human interface device **130** to control each light source of the human interface device **130**. Each light source of the human interface device **130** may produce at least one predetermined lighting colour among the plurality of lighting colours based on the received lighting profile.

(35) In some embodiments, the receiver device **120** may transmit the control data with the acknowledgement packet to the human interface device **130** at a predetermined time interval. For example, the predetermined time interval may be 250 µs, and a polling rate of the human interface device **130** may be 4000 Hz.

(36) In some embodiments, if a size of the control data exceeds a predetermined size, the receiver device **120** may inform the human interface device **130** of pending control data. The human interface device **130** may then extend the predetermined time interval, so as to enable the receiver device **120** to transmit the control data exceeding the predetermined size to the human interface device **130** during the extended time interval. For example, the extended time interval may be twice the predetermined time interval. As an example, the extended time interval may be 500 µs. In some embodiments, the human interface device **130** may return the extended time interval to the predetermined time interval, after receiving the control data exceeding the predetermined size from the receiver device **120**.

(37) In some embodiments, the receiver device **120** may split the control data into a plurality of groups of the control data. For example, if a size of the control data exceeds a predetermined size, the receiver device **120** may split the control data into the plurality of groups of the control data, based on the size of the control data. The receiver device **120** may sequentially transmit each group of the plurality of groups of the control data to the human interface device **130**. In some embodiments, after receiving the plurality of groups of the control data, the human interface device **130** may consolidate the plurality of groups of the control data, and control one or more components of the human interface device **130** based on the control data.

(38) In some embodiments, if the control information received from the human interface device **130** indicates that an acknowledgement of receipt of the input data is not required, the receiver device **120** may perform one of scanning one or more available channels and broadcasting a signal about an identity of the receiver device **120**. In some embodiments, the receiver device **120** may alternatively perform scanning the one or more available channels and broadcasting the signal about the identity of the receiver device **120**.

(39) In some embodiments, the receiver device **120** may perform scanning the one or more available channels in a vicinity of the receiver device **120**. As an example, the receiver device **120** may periodically scan the one or more available channels. For example, the receiver device **120**

may scan one or more less busy channels. In some embodiments, the receiver device **120** may detect radio energy of the one or more available channels, for example RF channels. The receiver device **120** may compute an average of the detected radio energy. The receiver device **120** may then select an RF channel based on the computed average. For example, the receiver device **120** may select the RF channel with lower energy (which represent the less busy channel) than an RF channel that the receiver device **120** is currently using.

(40) In some embodiments, the receiver device **120** may detect the radio energy of the RF channels, using a method of RSSI (Received Signal Strength Indicator). In some embodiments, the RF channels may be programmed, and then the receiver device **120** may measure and evaluate a radio signal level for each RF channel as RSSI. Thereafter, the receiver device **120** may compute a moving average of each RF channel's RSSI, and select the RF channel with lower average value.

(41) In some embodiments, the receiver device **120** may broadcast the signal about the identity of the receiver device **120** to a vicinity of the receiver device **120**. In some embodiments, the human interface device **130** may pair to more than one receiver device, and/or the receiver device **120** may pair to more than one human interface device. In some embodiments, the system **100** may further include another receiver device **140** (not shown) and/or another human interface device **150** (not shown). The another receiver device **140** and/or the another human interface device **150** may detect the receiver device **120** by the broadcasted signal. The human interface device **130** may switch to another receiver device **140** (also referred to as a "primary (main) receiver device") detected in the vicinity, from the receiver device **120** (also referred to as a "secondary receiver device"). The another human interface device **150** (also referred to as a "primary (main) human interface device") may take control over the human interface device **130** (also referred to as a "secondary human interface device").

(42) In some embodiments, the system **100** may further include the another receiver device **140**. The another receiver device **140** may detect the receiver device **120** by the broadcasted signal. The another receiver device **140** may transmit a command for disconnecting the receiver device **120** from the human interface device **130** to the receiver device **120**. The receiver device **120** may receive the command from the another receiver device **140**, and disconnect from the human interface device **130**. In some embodiments, after the receiver device **120** disconnects from the human interface device **130**, the human interface device **130** may establish the new wireless connection with the another receiver device **140**.

(43) In some embodiments, the system **100** may further include the another human interface device **150**. The another human interface device **150** may detect the receiver device **120** by the broadcasted signal. The another human interface device **150** may transmit a command for a request for a connection to the receiver device **120**. The receiver device **120** may receive the command from the another human interface device **150**, and disconnect from the human interface device **130**. In some embodiments, after the receiver device **120** disconnects from the human interface device **130**, the receiver device **120** may establish the new wireless connection with the another human interface device **150**.

(44) In some embodiments, if the control information received from the human interface device **130** indicates that an acknowledgement of receipt of the input data is not required, the human interface device **130** may operate in a power saving mode to reduce radio energy to be consumed.

(45) Conventionally, the wireless communication link established between the receiver device **120** and the human interface device **130** for the data communication may often exhibit a high latency. As described above, the system **100** in accordance with various embodiments may utilise the airtime provided to the receiver device **120** to perform radio activities for establishing a better wireless connection. As such, in accordance with various embodiments, the receiver device **120** and/or the human interface device **130** may automatically establish the better wireless connection without the user's intervention, while the user uses the human interface device **130**.

(46) FIG. **4** shows a flowchart of a method **200** according to various embodiments. According to

various embodiments, the method **200** for facilitating a data communication is provided.

(47) In some embodiments, the method **200** may include a step **201** of generating, by a human interface device, input data for a user input on the human interface device.

(48) In some embodiments, the method **200** may include a step **202** of generating, by the human interface device, control information associated with the input data. In some embodiments, the control information may indicate whether an acknowledgement of receipt of the input data is required.

(49) In some embodiments, the method **200** may include a step **203** of transmitting the input data and the control information from the human interface device to a receiver device. In some embodiments, the receiver device is wirelessly connected to the human interface device.

(50) In some embodiments, the method **200** may include a step **205** of checking whether an acknowledgement of receipt of the input data is required or not required, from the control information received from the human interface device.

(51) In some embodiments, the method **200** may include a step **206** of transmitting an acknowledgement packet from the receiver device to the human interface device, if the control information received from the human interface device indicates that an acknowledgement of receipt of the input data is required.

(52) In some embodiments, the method **200** may include a step **207** of performing, by the receiver device, a task for establishing a new wireless connection for at least one of the receiver device and the human interface device, if the control information received from the human interface device indicates that an acknowledgement of receipt of the input data is not required.

(53) Although not shown in FIG. **4**, in some embodiments, the method **200** may further include a step of transmitting the input data from the receiver device to a host device. In some embodiments, the receiver device is detachably couplable to the host device.

(54) FIG. **5** shows an example slot configuration showing interactions between a receiver device **120** and a human interface device **130** according to various embodiments.

(55) As shown in FIG. **5**, in a time slot (for example, TS(n)), the human interface device **130** may transmit the input data and the control information to the receiver device **120**. The control information may indicate that an acknowledgement of receipt of the input data is required. The receiver device **120** may receive the input data and the control information from the human interface device **130**, and transmit the acknowledgement packet (indicated as "ACK" in FIG. **5**) to the human interface device **130**.

(56) As shown in FIG. **5**, in a next time slot (for example, TS(n+1)), the human interface device **130** may transmit the input data and the control information to the receiver device **120**. The control information may indicate that an acknowledgement of receipt of the input data is not required. The receiver device **120** may receive the input data and the control information from the human interface device **130**. The receiver device **120** may operate in a power saving mode to reduce radio energy to be consumed. The receiver device **120** may not transmit the acknowledgement packet to the human interface device **130**. In this manner, the transmission of the acknowledge packet may be omitted, for example, periodically, to reduce the radio energy to be consumed.

(57) For example, as shown in FIG. **5**, a time interval of each time slot may be 250 us and a polling rate of the human interface device **130** may be 4000 Hz, but not be limited thereto.

(58) FIG. **6** shows another example slot configuration showing interactions between a receiver device **120** and a human interface device **130** according to various embodiments.

(59) As shown in FIG. **6**, in a time slot (for example, TS(n)), the human interface device **130** may transmit input data and control information to the receiver device **120**. The control information may indicate that an acknowledgement of receipt of the input data is required. The receiver device **120** may receive the input data and the control information from the human interface device **130**, and transmit the acknowledgement packet (indicated as "ACK" in FIG. **6**) to the human interface device **130**.

(60) As shown in FIG. **6**, in a next time slot (for example, TS(n+1)), the human interface device **130** may transmit the input data and the control information to the receiver device **120**. The control information may indicate that an acknowledgement of receipt of the input data is not required. The receiver device **120** may receive the input data and the control information from the human interface device **130**. The receiver device **120** may not transmit the acknowledgement packet to the human interface device **130**, and may perform other radio activities, for example, a task for establishing a new wireless connection for at least one of the receiver device **120** and the human interface device **130**.

(61) For example, as shown in FIG. **6**, a time interval of each time slot may be 250 us and a polling rate of the human interface device **130** may be 4000 Hz, but not be limited thereto.

(62) FIG. **7** shows another flowchart of a method **200** according to various embodiments. According to various embodiments, the method **200** for facilitating a data communication is provided. In some embodiments, the method **200** of FIG. **7** may be combined with the steps **201**, **202** and **203** of the method **200** of FIG. **4**.

(63) In some embodiments, after the step **203** of FIG. **4**, the method **200** may include a step **204** of checking whether the receiver device receives the input data and the control information from the human interface device.

(64) In some embodiments, the method **200** may include a step **205** of checking whether an acknowledgement of receipt of the input data is required or not required from the control information received from the human interface device, if the receiver device receives the input data and the control information from the human interface device.

(65) In some embodiments, the method **200** may include a step **206** of transmitting an acknowledgement packet from the receiver device to the human interface device, if the control information received from the human interface device indicates that an acknowledgement of receipt of the input data is required.

(66) In some embodiments, the method **200** may include a step **207** of performing, by the receiver device, a task for establishing a new wireless connection for at least one of the receiver device and the human interface device, if the receiver device does not receive the input data and the control information from the human interface device or if the control information received from the human interface device indicates that an acknowledgement of receipt of the input data is not required.

(67) In some embodiments, the method **200** may include a step **208** of deciding, by the receiver device, whether to scan one or more available channels or broadcast a signal about an identity of the receiver device.

(68) In some embodiments, the method **200** may include a step **209** of scanning, by the receiver device, the one or more available channels, if the receiver device decides to scan the one or more available channels. In some embodiments, the receiver device may scan the one or more available channels in a vicinity of the receiver device. For example, the receiver device may scan for one or more less busy channels.

(69) In some embodiments, the method **200** may include a step **210** of broadcasting, by the receiver device, the signal about the identity of the receiver device, if the receiver device decides to broadcast the signal. In some embodiments, the receiver device may broadcast the identity of the receiver device to a vicinity of the receiver device, to communicate with another receiver device and/or another human interface device.

(70) FIG. **8** shows another example slot configuration showing interactions between a receiver device **120** and a human interface device **130** according to various embodiments. FIG. **9** shows another example slot configuration showing interactions between the receiver device **120** and the human interface device **130** according to various embodiments.

(71) As shown in FIG. **8**, in some embodiments, the human interface device **130** may request an acknowledgement of receipt of the input data to the receiver device **120** every other time slot.

(72) As shown in FIG. **8**, in a time slot (for example, TS(n−3)), the human interface device **130**

may transmit the input data (indicated as "I" in FIG. **8**) and the control information (indicated as "C" in FIG. **8**) to the receiver device **120**. The control information may indicate that an acknowledgement of receipt of the input data is required. The receiver device **120** may receive the input data and the control information from the human interface device **130**, and transmit the acknowledgement packet (indicated as "ACK" in FIG. **8**) to the human interface device **130**.

(73) As shown in FIG. **8**, in a next time slot (for example, TS(n−2)), the human interface device **130** may transmit the input data and the control information to the receiver device **120**. The control information may indicate that an acknowledgement of receipt of the input data is not required. The receiver device **120** may receive the input data and the control information from the human interface device **130**. The receiver device **120** may not transmit the acknowledgement packet to the human interface device **130**, and may broadcast a signal about an identity of the receiver device **120**.

(74) As shown in FIG. **8**, in a next time slot (for example, TS(n−1)), the human interface device **130** may transmit the input data and the control information to the receiver device **120**. The control information may indicate that an acknowledgement of receipt of the input data is required. The receiver device **120** may receive the input data and the control information from the human interface device **130**, and transmit the acknowledgement packet to the human interface device **130**.

(75) As shown in FIG. **8**, in a next time slot (for example, TS(n)), the human interface device **130** may transmit the input data and the control information to the receiver device **120**. The control information may indicate that an acknowledgement of receipt of the input data is not required. The receiver device **120** may receive the input data and the control information from the human interface device **130**. The receiver device **120** may not transmit the acknowledgement packet to the human interface device **130**, and may scan one or more available channels, for example, less busy channels.

(76) As shown in FIG. **8**, in a next time slot (for example, TS(n+1)), the human interface device **130** may transmit the input data and the control information to the receiver device **120**. The control information may indicate that an acknowledgement of receipt of the input data is required. The receiver device **120** may receive the input data and the control information from the human interface device **130**, and transmit the acknowledgement packet to the human interface device **130**.

(77) As shown in FIG. **8**, in a next time slot (for example, TS(n+2)), the human interface device **130** may transmit the input data and the control information to the receiver device **120**. The control information may indicate that an acknowledgement of receipt of the input data is not required. The receiver device **120** may receive the input data and the control information from the human interface device **130**. The receiver device **120** may not transmit the acknowledgement packet to the human interface device **130**, and may wait for a command from another receiver device **140** or another human interface device **150** (as will be described below with FIG. **9**).

(78) As shown in FIG. **8**, in a next time slot (for example, TS(n+3)), the human interface device **130** may transmit the input data and the control information to the receiver device **120**. The control information may indicate that an acknowledgement of receipt of the input data is required. The receiver device **120** may receive the input data and the control information from the human interface device **130**, and transmit the acknowledgement packet to the human interface device **130**.

(79) As shown in FIG. **8**, in a next time slot (for example, TS(n+4)), the human interface device **130** may transmit the input data and the control information to the receiver device **120**. The control information may indicate that an acknowledgement of receipt of the input data is not required. The receiver device **120** may receive the input data and the control information from the human interface device **130**. The receiver device **120** may not transmit the acknowledgement packet to the human interface device **130**, and may scan one or more available channels, for example, less busy channels.

(80) As shown in FIG. **9**, in the time slots (for example, TS(n−3) and TS(n−2)), the another receiver device **140** or the another human interface device **150** may listen for broadcasting. In the

time slot (for example, TS(n−2)), the another receiver device **140** or the another human interface device **150** may detect the receiver device **120** by the broadcasted signal. Thereafter, in the later time slot (for example, TS(n+2)), the another receiver device **140** or the another human interface device **150** may transmit the command to the receiver device **120**. For example, the another receiver device **140** may transmit a command for disconnecting the receiver device **120** from the human interface device **130** to the receiver device **120**. As another example, the another human interface device **150** may transmit a command for a request for a connection to the receiver device **120**.

(81) As shown in FIG. **9**, a broadcast message communication may be carried out once every certain number of time slots, according to a fixed offset. The fixed offset may refer to a transmission interval of the broadcast message communication. In some embodiments, as shown in FIG. **9**, a first time slot (for example, TS(n−3)) may be used for an acknowledgement, a second time slot (for example, TS(n−2)) may be used to send a broadcast message, a third time slot (for example, TS(n−1)) may be used for an acknowledgement, a fourth time slot (for example, TS(n)) may be used to scan the RSSI for one or more available channels, a fifth time slot (for example, TS(n+1)) may be used for an acknowledgement, a sixth time slot (for example, TS(n+2)) may be used to receive a broadcast message, a seventh time slot (for example, TS(n+3)) may be used for an acknowledgement, and an eighth time slot (for example, TS(n+4)) may be used to scan the RSSI for one or more available channels. In FIG. **9**, the fixed offset value may be four (4) (i.e. a difference between the second time slot (for example, TS(n−2)) and the sixth time slot (for example, TS(n+2))), which means that the broadcast message communication is carried out once every four (4) time slots.

(82) FIG. **10** shows a sequence diagram showing a method **300** including interactions between a receiver device **120** and a human interface device **130** according to various embodiments. According to various embodiments, the method **300** for facilitating a data communication is provided.

(83) As shown in FIG. **10**, in some embodiments, the method **300** may include a step **301** of which the receiver device **120** and the human interface device **130** are connected.

(84) In some embodiments, the method **300** may include a step **302** of which the receiver device **120** broadcasts the receiver device's **120** presence.

(85) In some embodiments, the method **300** may include a step **303** of which the another receiver device **140** is plugged in. For example, a user may plug the another receiver device **140** in the host device **110** or other computing device.

(86) In some embodiments, the method **300** may include a step **304** of which the another receiver device **140** listens for broadcasting.

(87) In some embodiments, the method **300** may include a step **305** of which the another receiver device **140** detects the receiver device **120** by the broadcasted signal.

(88) In some embodiments, the method **300** may include a step **306** of which the another receiver device **140** transmits a command for disconnecting the receiver device **120** from the human interface device **130** to the receiver device **120**.

(89) In some embodiments, the method **300** may include a step **307** of which the receiver device **120** disconnects from the human interface device **130**. In some embodiments, the receiver device **120** may stop accepting a request for a connection from the human interface device **130**.

(90) In some embodiments, the method **300** may include a step **308** of which the another receiver device **140** starts a connection with the human interface device **130**.

(91) In some embodiments, the method **300** may include a step **309** of which the human interface device **130** starts a connection with the another receiver device **140**.

(92) In some embodiments, the steps **308** and **309** may be commenced at the same time. In some other embodiments, the step **308** may be commenced earlier than the step **309**. In some other embodiments, the step **309** may be commenced earlier than the step **308**.

(93) In some embodiments, the method **300** may include a step **310** of which the another receiver device **140** and the human interface device **130** may be connected.

(94) FIG. **11** shows another sequence diagram showing a method **400** including interactions between a receiver device **120** and a human interface device **130** according to various embodiments. According to various embodiments, the method **400** for facilitating a data communication is provided.

(95) As shown in FIG. **11**, in some embodiments, the method **400** may include a step **401** of which the receiver device **120** and the human interface device **130** are connected.

(96) In some embodiments, the method **400** may include a step **402** of which the receiver device **120** broadcasts the receiver device's **120** presence.

(97) In some embodiments, the method **400** may include a step **403** of which the another human interface device **150** is turned on. For example, a user may turn on the another human interface device **150**.

(98) In some embodiments, the method **400** may include a step **404** of which the another human interface device **150** listens for broadcasting.

(99) In some embodiments, the method **400** may include a step **405** of which the another human interface device **150** detects the receiver device **120** by the broadcasted signal.

(100) In some embodiments, the method **400** may include a step **406** of which the another human interface device **150** transmits a command for a request for a connection to the receiver device **120**.

(101) In some embodiments, the method **400** may include a step **407** of which the receiver device **120** disconnects from the human interface device **130**. In some embodiments, the receiver device **120** may stop accepting a request for a connection from the human interface device **130**.

(102) In some embodiments, the method **400** may include a step **408** of which the human interface device **130** switches to a standby mode.

(103) In some embodiments, the method **400** may include a step **409** of which the another human interface device **150** starts a connection with the receiver device **120**.

(104) In some embodiments, the method **400** may include a step **410** of which the another human interface device **150** and the receiver device **120** may be connected.

(105) FIG. **12** shows another example slot configuration showing interactions between a receiver device **120** and a human interface device **130** according to various embodiments.

(106) As shown in FIG. **12**, in a time slot (for example, TS(n)), the human interface device **130** may transmit the input data and the control information to the receiver device **120**. The control information may indicate that an acknowledgement of receipt of the input data is required. The receiver device **120** may receive the input data and the control information from the human interface device **130**. The receiver device **120** may then transmit the acknowledgement packet (indicated as "ACK" in FIG. **12**) and control data for controlling the human interface device **130** to the human interface device **130**.

(107) For example, as shown in FIG. **12**, a time interval of each time slot may be 250 us and a polling rate of the human interface device **130** may be 4000 Hz, but not be limited thereto.

(108) FIG. **13** shows another sequence diagram showing a method **500** including interactions between a receiver device **120** and a human interface device **130** according to various embodiments. According to various embodiments, the method **500** for facilitating a data communication is provided.

(109) As shown in FIG. **13**, in some embodiments, the method **500** may include a step **501** of which the host device **110** transmits control data for controlling the human interface device **130** to the receiver device **120**.

(110) In some embodiments, although not shown, the receiver device **120** may split the control data into a plurality of groups of the control data, for example three (3) groups of the control data (hereinafter, referred to as a "first group of the control data", a "second group of the control data" and a "third group of the control data"). In some embodiments, the receiver device **120** may split

the control data into the plurality of groups of the control data, if a size of the control data exceeds a predetermined size.

(111) In some embodiments, the method **500** may include a step **502** of which the human interface device **130** transmits input data and control information to the receiver device **120**. In some embodiments, the control information may indicate whether an acknowledgement of receipt of the input data is required. For example, the control information may indicate that an acknowledgement of receipt of the input data is required.

(112) In some embodiments, the method **500** may include a step **503** of which the receiver device **120** transmits an acknowledgement packet and the first group of the control data to the human interface device **130**).

(113) In some embodiments, the method **500** may include a step **504** of which the human interface device **130** transmits input data and control information to the receiver device **120**. In some embodiments, the control information may indicate whether an acknowledgement of receipt of the input data is required. For example, the control information may indicate that an acknowledgement of receipt of the input data is required.

(114) In some embodiments, the method **500** may include a step **505** of which the receiver device **120** transmits an acknowledgement packet and the second group of the control data to the human interface device **130**.

(115) In some embodiments, the method **500** may include a step **506** of which the human interface device **130** transmits input data and control information to the receiver device **120**. In some embodiments, the control information may indicate whether an acknowledgement of receipt of the input data is required. For example, the control information may indicate that an acknowledgement of receipt of the input data is required.

(116) In some embodiments, the method **500** may include a step **507** of which the receiver device **120** transmits an acknowledgement packet and the third group of the control data to the human interface device **130**.

(117) In some embodiments, the method **500** may include a step **508** of which the human interface device **130** consolidates the first group, the second group and the third group of the control data. Although not shown, the human interface device **130** may control one or more components of the human interface device **130**, for example, each light source of the plurality of light sources, based on the consolidated control data.

(118) In some embodiments, the method **500** may include a step **509** of which the human interface device **130** transmits input data and control information to the receiver device **120**. In some embodiments, the control information may indicate whether an acknowledgement of receipt of the input data is required. For example, the control information may indicate that an acknowledgement of receipt of the input data is required.

(119) In some embodiments, the method **500** may include a step **510** of which the receiver device **120** transmits an acknowledgement packet to the human interface device **130**.

(120) In some embodiments, transmitting the control data with the acknowledgement packet from the receiver device **120** to the human interface device **130** may be performed at a predetermined time interval. For example, as shown in FIG. **13**, the predetermined time interval may be 250 μs, but not be limited thereto.

(121) FIG. **14** shows another example slot configuration showing interactions between a receiver device **120** and a human interface device **130** according to various embodiments.

(122) As shown in FIG. **14**, in a time slot (for example, TS(n)), the human interface device **130** may transmit the input data and the control information to the receiver device **120**. The control information may indicate that an acknowledgement of receipt of the input data is required. The receiver device **120** may receive the input data and the control information from the human interface device **130**.

(123) In some embodiments, if a size of control data received from the host device **110** exceeds a

predetermined size, the receiver device **120** may inform the human interface device **130** of pending control data. The human interface device **130** may extend the predetermined time interval, so as to enable the receiver device **120** to transmit the control data exceeding the predetermined size to the human interface device **130** during the extended time interval. For example, as shown in FIG. **14**, the human interface device **130** may extend the predetermined time interval to 500 μs. The receiver device **120** may then transmit the acknowledgement packet (indicated as "ACK" in FIG. **14**) and the control data for controlling the human interface device **130** to the human interface device **130** during the extended time interval.

(124) FIG. **15** shows another sequence diagram showing a method **600** including interactions between a receiver device **120** and a human interface device **130** according to various embodiments. According to various embodiments, the method **600** for facilitating a data communication is provided.

(125) As shown in FIG. **15**, in some embodiments, the method **600** may include a step **601** of which the host device **110** transmits control data for controlling the human interface device **130** to the receiver device **120**.

(126) In some embodiments, the method **600** may include a step **602** of which the human interface device **130** transmits input data and control information to the receiver device **120**. In some embodiments, the control information may indicate whether an acknowledgement of receipt of the input data is required. For example, the control information may indicate that an acknowledgement of receipt of the input data is required.

(127) In some embodiments, if a size of the control data exceeds a predetermined size, the receiver device **120** may not be able to transmit the control data to the human interface device **130** during a predetermined time interval. As an example, the predetermined time interval may be 250 μs. In this regard, the receiver device **120** may inform the human interface device **130** of pending control data.

(128) In some embodiments, the method **600** may include a step **603** of which the receiver device **120** transmits an acknowledgement packet to the human interface device **130** and informs the human interface device **130** of the pending control data.

(129) In some embodiments, the method **600** may include a step **604** of which the human interface device **130** transmits input data and control information to the receiver device **120**. In some embodiments, the control information may indicate whether an acknowledgement of receipt of the input data is required. For example, the control information may indicate that an acknowledgement of receipt of the input data is required. In the step **604**, the human interface device **130** extends the predetermined time interval.

(130) In some embodiments, the method **600** may include a step **605** of which the receiver device **120** changes to the extended time interval.

(131) In some embodiments, the method **600** may include a step **606** of which the receiver device **120** transmits an acknowledgement packet and the control data to the human interface device **130** during the extended time interval. As an example, the extended time interval may be 500 μs.

(132) In some embodiments, the method **600** may include a step **607** of which the human interface device **130** returns the extended time interval, for example, 500 μs, to the predetermined time interval, for example, 250 μs.

(133) In some embodiments, the method **600** may include a step **608** of which the human interface device **130** transmits input data and control information to the receiver device **120**. In some embodiments, the control information may indicate whether an acknowledgement of receipt of the input data is required. For example, the control information may indicate that an acknowledgement of receipt of the input data is required.

(134) In some embodiments, the method **600** may include a step **609** of which the receiver device **120** returns the extended time interval, for example, 500 μs, to the predetermined time interval, for example, 250 μs.

(135) In some embodiments, the method **600** may include a step **610** of which the receiver device

120 transmits an acknowledgement packet (for example, without control data) to the human interface device **130** during the predetermined time interval, for example, 250 μs. The following examples pertain to further embodiments.

(136) Example 1 is a system for facilitating a data communication, comprising: a host device; a human interface device; and a receiver device wirelessly connectable to the human interface device and detachably couplable to the host device; wherein the human interface device is configured to generate input data for a user input on the human interface device, generate control information associated with the input data, and transmit the input data and the control information to the receiver device, wherein the control information indicates whether an acknowledgement of receipt of the input data is required, the receiver device is configured to receive the input data and the control information from the human interface device and transmit the input data to the host device, the host device is configured to receive the input data from the receiver device, and the receiver device is further configured to transmit an acknowledgement packet to the human interface device if the control information received from the human interface device indicates that an acknowledgement of receipt of the input data is required, and perform a task for establishing a new wireless connection for at least one of the receiver device and the human interface device if the control information received from the human interface device indicates that an acknowledgement of receipt of the input data is not required.

(137) In example 2, the subject-matter of example 1 may further include: the host device is configured to transmit control data for controlling the human interface device to the receiver device, and if the control information received from the human interface device indicates that an acknowledgement of receipt of the input data is required, the receiver device is configured to transmit the control data with the acknowledgement packet to the human interface device.

(138) In example 3, the subject-matter of example 2 may further include: the receiver device is configured to transmit the control data with the acknowledgement packet to the human interface device at a predetermined time interval.

(139) In example 4, the subject-matter of example 3 may further include: if a size of the control data exceeds a predetermined size, the receiver device is configured to inform the human interface device of the control data, and the human interface device is configured to extend the predetermined time interval, so as to enable the receiver device to transmit the control data exceeding the predetermined size to the human interface device during the extended time interval.

(140) In example 5, the subject-matter of example 4 may further include: the human interface device is further configured to return the extended time interval to the predetermined time interval, after receiving the control data exceeding the predetermined size.

(141) In example 6, the subject-matter of any one of examples 2 to 5 may further include: the receiver device is configured to split the control data into a plurality of groups of the control data, and sequentially transmit each group of the plurality of groups of the control data to the human interface device.

(142) In example 7, the subject-matter of any one of examples 2 to 5 may further include: the human interface device includes a plurality of light sources, and each light source of the plurality of light sources is capable of selectively producing a plurality of lighting colours, and the control data includes data for controlling the each light source to produce at least one predetermined lighting colour among the plurality of lighting colours.

(143) In example 8, the subject-matter of any one of examples 1 to 5 may further include: if the control information received from the human interface device indicates that an acknowledgement of receipt of the input data is not required, the receiver device is configured to perform one of scanning one or more available channels and broadcasting a signal about an identity of the receiver device.

(144) In example 9, the subject-matter of example 8 may further include: the receiver device is configured to perform scanning the one or more available channels in a vicinity of the receiver

device, detect radio energy of the one or more available channels, compute an average of the detected radio energy, and select a channel based on the computed average.

(145) In example 10, the subject-matter of example 8 may further include: the system further comprises another receiver device, wherein the another receiver device is configured to detect the receiver device by the broadcasted signal, and transmit a command for disconnecting the receiver device from the human interface device to the receiver device, and the receiver device is configured to receive the command and disconnect from the human interface device.

(146) In example 11, the subject-matter of example 10 may further include: after the receiver device disconnects from the human interface device, the human interface device is configured to establish the new wireless connection with the another receiver device.

(147) In example 12, the subject-matter of example 8 may further include: the system further comprises another human interface device, wherein the another human interface device is configured to detect the receiver device by the broadcasted signal, and transmit a command for a request for a connection to the receiver device, and the receiver device is configured to receive the command and disconnect from the human interface device.

(148) In example 13, the subject-matter of example 12 may further include: after the receiver device disconnects from the human interface device, the receiver device is configured to establish the new wireless connection with the another human interface device.

(149) In example 14, the subject-matter of any one of examples 1 to 13 may further include: if the control information received from the human interface device indicates that an acknowledgement of receipt of the input data is not required, the human interface device is configured to operate in a power saving mode.

(150) In example 15, the subject-matter of any one of examples 3 to 5 may further include: the predetermined time interval is 250 μs.

(151) Example 16 is a method for facilitating a data communication, the method comprising: generating, by a human interface device, input data for a user input on the human interface device; generating, by the human interface device, control information associated with the input data, wherein the control information indicates whether an acknowledgement of receipt of the input data is required; transmitting the input data and the control information from the human interface device to a receiver device, wherein the receiver device is wirelessly connected to the human interface device and detachably coupled to a host device;

(152) transmitting the input data from the receiver device to the host device; transmitting an acknowledgement packet from the receiver device to the human interface device, if the control information received from the human interface device indicates that an acknowledgement of receipt of the input data is required; and performing, by the receiver device, a task for establishing a new wireless connection for at least one of the receiver device and the human interface device, if the control information received from the human interface device indicates that an acknowledgement of receipt of the input data is not required.

(153) In example 17, the subject-matter of example 16 may further include: transmitting control data for controlling the human interface device from the host device to the receiver device; and transmitting the control data with the acknowledgement packet from the receiver device to the human interface device, if the control information received from the human interface device indicates that an acknowledgement of receipt of the input data is required.

(154) In example 18, the subject-matter of example 17 may further include: transmitting the control data with the acknowledgement packet from the receiver device to the human interface device is performed at a predetermined time interval.

(155) In example 19, the subject-matter of example 18 may further include: if a size of the control data exceeds a predetermined size, informing, by the receiver device, the human interface device of the control data; and extending, by the human interface device, the predetermined time interval, so as to enable the receiver device to transmit the control data exceeding the predetermined size to the

human interface device during the extended time interval.

(156) In example 20, the subject-matter of example 19 may further include: returning, by the human interface device, the extended time interval to the predetermined time interval, after receiving the control data exceeding the predetermined size.

(157) In example 21, the subject-matter of any one of examples 17 to 20 may further include: splitting, by the receiver device, the control data into a plurality of groups of the control data; and sequentially transmitting each group of the plurality of groups of the control data from the receiver device to the human interface device.

(158) In example 22, the subject-matter of any one of examples 17 to 20 may further include: the human interface device includes a plurality of light sources, and each light source of the plurality of light sources is capable of selectively producing a plurality of lighting colours, and the control data includes data for controlling the each light source to produce at least one predetermined lighting colour among the plurality of lighting colours.

(159) In example 23, the subject-matter of any one of examples 16 to 20 may further include: if the control information received from the human interface device indicates that an acknowledgement of receipt of the input data is not required, performing, by the receiver device, one of scanning one or more available channels and broadcasting a signal about an identity of the receiver device.

(160) In example 24, the subject-matter of example 23 may further include: performing, by the receiver device, scanning the one or more available channels in a vicinity of the receiver device; detecting, by the receiver device, radio energy of the one or more available channels; computing, by the receiver device, an average of the detected radio energy; and selecting, by the receiver device, a channel based on the computed average.

(161) In example 25, the subject-matter of example 23 may further include: detecting, by another receiver device, the receiver device by the broadcasted signal; transmitting, by the another receiver device, a command for disconnecting the receiver device from the human interface device to the receiver device; and disconnecting the receiver device from the human interface device.

(162) In example 26, the subject-matter of example 25 may further include: after the receiver device disconnects from the human interface device, establishing the new wireless connection between the human interface device and the another receiver device.

(163) In example 27, the subject-matter of example 23 may further include: detecting, by another human interface device, the receiver device by the broadcasted signal; transmitting, by the another human interface device, a command for a request for a connection to the receiver device; and disconnecting the receiver device from the human interface device.

(164) In example 28, the subject-matter of example 27 may further include: after the receiver device disconnects from the human interface device, establishing the new wireless connection between the receiver device and the new human interface device.

(165) In example 29, the subject-matter of any one of examples 16 to 28 may further include: if the control information received from the human interface device indicates that an acknowledgement of receipt of the input data is not required, controlling the human interface device to operate in a power saving mode.

(166) In example 30, the subject-matter of any one of examples 18 to 20 may further include: the predetermined time interval is 250 µs.

(167) While embodiments of the invention have been particularly shown and described with reference to specific embodiments, it should be understood by those skilled in the art that various changes in form and detail may be made therein without departing from the spirit and scope of the invention as defined by the appended claims. The scope of the invention is thus indicated by the appended claims and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced. It will be appreciated that common numerals, used in the relevant drawings, refer to components that serve a similar or the same purpose. As used herein, the singular forms "a", "an" and "the" are intended to include the plural forms as well, unless the

context clearly indicates otherwise. It will be further understood that the terms "comprises" and/or "comprising." when used in this specification, specify the presence of stated features, integers, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components, and/or groups thereof. Unless specifically stated otherwise, the term "some" refers to one or more. Combinations such as "at least one of A, B, or C," "one or more of A, B, or C," "at least one of A, B, and C," "one or more of A, B, and C," and "A, B, C, or any combination thereof" include any combination of A, B, and/or C, and may include multiples of A, multiples of B, or multiples of C. Specifically, combinations such as "at least one of A, B, or C," "one or more of A, B, or C," "at least one of A, B, and C," "one or more of A, B, and C," and "A, B, C, or any combination thereof" may be A only, B only, C only, A and B, A and C, B and C, or A and B and C, where any such combinations may contain one or more member or members of A, B, or C. All structural and functional equivalents to the elements of the various aspects described throughout this disclosure that are known or later come to be known to those of ordinary skill in the art are expressly incorporated herein by reference and are intended to be encompassed by the claims. Moreover, nothing disclosed herein is intended to be dedicated to the public regardless of whether such disclosure is explicitly recited in the claims. The words "module," "mechanism," "element," "device," and the like may not be a substitute for the word "means." As such, no claim element is to be construed as a means plus function unless the element is expressly recited using the phrase "means for."

Claims

1. A system for facilitating a data communication, the system comprising: a host device; a human interface device; and a receiver device wirelessly connectable to the human interface device and detachably couplable to the host device; wherein the human interface device is configured to generate input data for a user input on the human interface device, generate control information associated with the input data, and transmit the input data and the control information to the receiver device, wherein the control information indicates whether an acknowledgement of receipt of the input data is required, the receiver device is configured to receive the input data and the control information from the human interface device and transmit the input data to the host device, the host device is configured to receive the input data from the receiver device, and the receiver device is further configured to transmit an acknowledgement packet to the human interface device if the control information received from the human interface device indicates that an acknowledgement of receipt of the input data is required, and perform a task for establishing a new wireless connection for at least one of the receiver device and the human interface device if the control information received from the human interface device indicates that an acknowledgement of receipt of the input data is not required.

2. The system according to claim 1, wherein the host device is configured to transmit control data for controlling the human interface device to the receiver device, and if the control information received from the human interface device indicates that an acknowledgement of receipt of the input data is required, the receiver device is configured to transmit the control data with the acknowledgement packet to the human interface device.

3. The system according to claim 2, wherein the receiver device is configured to transmit the control data with the acknowledgement packet to the human interface device at a predetermined time interval.

4. The system according to claim 3, wherein if a size of the control data exceeds a predetermined size, the receiver device is configured to inform the human interface device of the control data, the human interface device is configured to extend the predetermined time interval, so as to enable the receiver device to transmit the control data exceeding the predetermined size to the human interface device during the extended time interval, and wherein the human interface device is further

configured to return the extended time interval to the predetermined time interval, after receiving the control data exceeding the predetermined size.

5. The system according to claim 2, wherein the receiver device is configured to split the control data into a plurality of groups of the control data, and sequentially transmit each group of the plurality of groups of the control data to the human interface device.

6. The system according to claim 2, wherein the human interface device includes a plurality of light sources, and each light source of the plurality of light sources is capable of selectively producing a plurality of lighting colours, and the control data includes data for controlling the each light source to produce at least one predetermined lighting colour among the plurality of lighting colours.

7. The system according to claim 1, wherein if the control information received from the human interface device indicates that an acknowledgement of receipt of the input data is not required, the receiver device is configured to perform one of scanning one or more available channels and broadcasting a signal about an identity of the receiver device.

8. The system according to claim 7, wherein the receiver device is configured to perform scanning the one or more available channels in a vicinity of the receiver device, detect radio energy of the one or more available channels, compute an average of the detected radio energy, and select a channel based on the computed average.

9. The system according to claim 7 further comprising another receiver device, wherein the another receiver device is configured to detect the receiver device by the broadcasted signal, and transmit a command for disconnecting the receiver device from the human interface device to the receiver device, and the receiver device is configured to receive the command and disconnect from the human interface device, wherein after the receiver device disconnects from the human interface device, the human interface device is configured to establish the new wireless connection with the another receiver device.

10. The system according to claim 7 further comprising another human interface device, wherein the another human interface device is configured to detect the receiver device by the broadcasted signal, and transmit a command for a request for a connection to the receiver device, and the receiver device is configured to receive the command and disconnect from the human interface device, wherein after the receiver device disconnects from the human interface device, the receiver device is configured to establish the new wireless connection with the another human interface device.

11. A method for facilitating a data communication, the method comprising: generating, by a human interface device, input data for a user input on the human interface device; generating, by the human interface device, control information associated with the input data, wherein the control information indicates whether an acknowledgement of receipt of the input data is required; transmitting the input data and the control information from the human interface device to a receiver device, wherein the receiver device is wirelessly connected to the human interface device and detachably coupled to a host device; transmitting the input data from the receiver device to the host device; transmitting an acknowledgement packet from the receiver device to the human interface device, if the control information received from the human interface device indicates that an acknowledgement of receipt of the input data is required; and performing, by the receiver device, a task for establishing a new wireless connection for at least one of the receiver device and the human interface device, if the control information received from the human interface device indicates that an acknowledgement of receipt of the input data is not required.

12. The method according to claim 11 further comprising: transmitting control data for controlling the human interface device from the host device to the receiver device; and transmitting the control data with the acknowledgement packet from the receiver device to the human interface device, if the control information received from the human interface device indicates that an acknowledgement of receipt of the input data is required.

13. The method according to claim 12, wherein transmitting the control data with the

acknowledgement packet from the receiver device to the human interface device is performed at a predetermined time interval.

14. The method according to claim 13 further comprising: if a size of the control data exceeds a predetermined size, informing, by the receiver device, the human interface device of the control data; extending, by the human interface device, the predetermined time interval, so as to enable the receiver device to transmit the control data exceeding the predetermined size to the human interface device during the extended time interval; and returning, by the human interface device, the extended time interval to the predetermined time interval, after receiving the control data exceeding the predetermined size.

15. The method according to claim 12 further comprising: splitting, by the receiver device, the control data into a plurality of groups of the control data; and sequentially transmitting each group of the plurality of groups of the control data from the receiver device to the human interface device.

16. The method according to claim 12, wherein the human interface device includes a plurality of light sources, and each light source of the plurality of light sources is capable of selectively producing a plurality of lighting colours, and the control data includes data for controlling the each light source to produce at least one predetermined lighting colour among the plurality of lighting colours.

17. The method according to claim 11 further comprising: if the control information received from the human interface device indicates that an acknowledgement of receipt of the input data is not required, performing, by the receiver device, one of scanning one or more available channels and broadcasting a signal about an identity of the receiver device, and/or controlling the human interface device to operate in a power saving mode.

18. The method according to claim 17 further comprising: performing, by the receiver device, scanning the one or more available channels in a vicinity of the receiver device; detecting, by the receiver device, radio energy of the one or more available channels; computing, by the receiver device, an average of the detected radio energy; and selecting, by the receiver device, a channel based on the computed average.

19. The method according to claim 17 further comprising: detecting, by another receiver device, the receiver device by the broadcasted signal; transmitting, by the another receiver device, a command for disconnecting the receiver device from the human interface device to the receiver device; disconnecting the receiver device from the human interface device; and after the receiver device disconnects from the human interface device, establishing the new wireless connection between the human interface device and the another receiver device.

20. The method according to claim 17 further comprising: detecting, by another human interface device, the receiver device by the broadcasted signal; transmitting, by the another human interface device, a command for a request for a connection to the receiver device; disconnecting the receiver device from the human interface device; and after the receiver device disconnects from the human interface device, establishing the new wireless connection between the receiver device and the new human interface device.