

REMOTE CONTROL DEVICE DETERMINING INDOOR ENVIRONMENT TO SEND COMMAND TO AIR CONDITIONER

BACKGROUND OF THE INVENTION

[0001] 1. Technical Field

[0002] The present disclosure relates to air conditioner control technologies and, more particularly, to a remote control device determining an indoor environment to send a command to an air conditioner.

[0003] 2. Description of Related Art

[0004] Conventional air conditioner control technologies typically involve exercising automatic control with a built-in controller of an air conditioner. The automatic control is mainly exercised over temperature and air flow rate. The automatic control can be achieved by a user, using a remote controller attached to the air conditioner. The user manually switches between the other operation options of the air conditioner, such as heating, ventilation and dehumidifying, with the remote controller. Therefore, built-in automatic control options of conventional air conditioners are insufficient.

[0005] Furthermore, temperature sensors of conventional air conditioners determine an indoor temperature and are usually mounted on the air conditioners. The temperature sensed by the temperature sensor of an air conditioner does not necessarily equal the indoor temperature. Therefore, in practice, results of operation performed by the air conditioners in accordance with the sensed temperature seldom meet user needs. In addition, to be more comfortable, users usually set a lower target temperature than the user needed; as a result, the air conditioners have to operate harder and thus consume more power to the detriment of energy-efficiency and environmental protection.

BRIEF SUMMARY OF THE INVENTION

[0006] After a user has set a target temperature, conventional air conditioners reply upon their microcomputers; hence, the conventional air conditioners have few operation options and results of their operation also seldom meet what user needs, not to mention that they consume more power to the detriment of energy-efficiency and environmental protection. Therefore, to solve the aforesaid problems, the present disclosure is put forth.

[0007] It is an objective of the present disclosure to provide a remote control device determining an indoor environment to send a command to an air conditioner. The remote control device independently determines an indoor temperature and receives a command sent from a user with a remote controller sold with the air conditioner such that, after completion of self-evaluation performed by the remote control device, the remote control device sends a remote control signal to the air conditioner in order to exercise control over the air conditioner.

[0008] Another objective of the present disclosure is to provide a remote control device determining an indoor environment to send a command to an air conditioner. The remote control device has more self-control options than a built-in controller of conventional air conditioners and thus is more likely to meet user needs; hence, the remote control device reduces power consumption so as to enhance power-efficiency and achieve environmental protection.

[0009] In order to achieve the above and other objectives, the present disclosure provides a remote control device determining an indoor environment to send a command to an air conditioner. The remote control device comprises: a casing; a control unit disposed in the casing; a temperature sensor disposed in the casing and electrically connected to the control unit; an infrared receiver electrically connected to the control unit to receive a first infrared signal sent from a remote controller sold with the air conditioner; and an infrared emitter electrically connected to the control unit to emit a second infrared signal to an air

conditioner. The control unit exercises remote control over the air conditioner through the first infrared signal emitted from the remote controller sold with the air conditioner and received by the infrared receiver, by obtaining a currently preset temperature stored on the remote controller sold with the air conditioner through the first infrared signal, according to the currently preset temperature via the second infrared signal emitted from the infrared emitter. The control unit has a control logic executable by the control unit, and the control logic entails exercising remote control over the air conditioner according to temperature sensed by the temperature sensor, with the remote control involving, at least, controlling a cooling option and a heating option of the air conditioner, setting a target temperature option of the air conditioner, and controlling the start/shutdown of the air conditioner.

[0010] Therefore, according to the remote control device of the present disclosure, uses its own temperature sensor to independently determine an indoor temperature and receive a command sent from a user with a remote controller sold with an air conditioner. After completion of self-evaluation, the remote control device sends a remote control signal to the air conditioner in order to exercise control over the air conditioner. Furthermore, the remote control device of the present disclosure has more self-control options than a built-in controller of conventional air conditioners and thus meets user needs better. Therefore, the remote control device of the present disclosure consumes less power, so as to attain energy saving and achieve environmental protection.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0011] FIG. 1 is a front view of a remote control device according to the first preferred embodiment of the present disclosure;

[0012] FIG. 2 is a block diagram of the remote control device according to the first preferred embodiment of the present disclosure;

[0013] FIG. 3 is a schematic view of how to operate the remote control device

according to the first preferred embodiment of the present disclosure;

[0014] FIG. 4 is a block diagram of the remote control device according to the second preferred embodiment of the present disclosure; and

[0015] FIG. 5 is a schematic view of the structure of the remote control device of the present disclosure.

DETAILED DESCRIPTION OF THE INVENTION

[0016] Technical features of the present disclosure are hereunder illustrated by preferred embodiments, depicted by drawings, and described below.

[0017] Referring to FIG. 1 through FIG. 3, a remote control device 10 which determines an indoor environment to send a command to an air conditioner according to the first preferred embodiment of the present disclosure essentially comprises a casing 11, a control unit 21, a temperature sensor 31, an infrared receiver 41 and an infrared emitter 51.

[0018] The control unit 21 is disposed in the casing 11.

[0019] The temperature sensor 31 is disposed in the casing 11 and electrically connected to the control unit 21.

[0020] The infrared receiver 41 is disposed in the casing 11 and electrically connected to the control unit 21 so as to receive a first infrared signal sent from an air conditioning remote controller 92.

[0021] The infrared emitter 51 is disposed in the casing 11 and electrically connected to the control unit 21 to emit a second infrared signal to an air conditioner 91. The infrared emitter 51 has a reflector 52. The reflector 52 confines the signal emitted from the infrared emitter 51 to a specific range of angles, for example, 120 degrees. Therefore, the reflector 52 places a limit on the reach of the signal such that the signal is concentrated, so as to render remote control more precise. However, the reflector 52 may be dispensed with, provided that the remote control is achieved.

[0022] The control unit 21 exercises remote control through the first infrared signal emitted from the remote controller 92 sold with the air conditioner 91 and received by the infrared receiver 41 and the second infrared signal emitted from the infrared emitter 51 to the air conditioner 91. The remote controller 92 is a remote controller sold with the air conditioner 91 when a user purchased the air conditioner 91 or a general-purpose remote controller. In practice, a user holds the remote controller 92 by hand to remotely control the infrared receiver 41 for the purpose to, for example, set a target temperature or start the air conditioner 91. The control unit 21 uses the second infrared signal emitted from the infrared emitter 51 to the air conditioner 91 to instruct a built-in controller of the air conditioner 91 to set a target temperature of the air conditioner 91 or start the air conditioner 91.

[0023] The control unit 21 has a control logic 22 executable by the control unit 21. The control logic 22 entails exercising remote control over the air conditioner 91 according to temperature sensed by the temperature sensor 31. The remote control involves, at the least, controlling the cooling/heating options of the air conditioner 91 and setting a target temperature option of the air conditioner 91. In practice, the control unit 21 controls the cooling/heating/ventilation options of the air conditioner 91. Therefore, compared with built-in controllers of conventional air conditioners, the remote control device 10 of the present disclosure is capable of exercising diversified remote control over air conditioners. Furthermore, with the control logic 22 being adjustable by a manufacturer, the manufacturer has more leeway to configure more options.

[0024] The structure and technical features of the remote control device in the first embodiment of the present disclosure are described above. The operation of the remote control device in the first embodiment of the present disclosure is described below.

[0025] Before use, it is necessary to configure the control unit 21 such that the configured control unit 21 conforms to the brand of the user's air conditioner, so as to ensure that the control signal emitted can control the air conditioner 91.

[0026] Referring to FIG. 3, the remote control device 10 is placed on the top of a table or desk, whereas the infrared emitter 51 faces the air conditioner 91 and thus facilitates remote control.

[0027] Afterward, the user uses the remote controller 92 sold with the air conditioner 91 to emit a remote control signal to the infrared receiver 41. For example, to start the air conditioner 91, the user presses a power button on the remote controller 92 so that the remote controller 92 not only sends a start signal but also sends a currently preset temperature and related data stored in the remote controller 92. Then, the infrared receiver 41 receives the remote control signal, which informs the control unit 21 of the user's intent to start the air conditioner 91 and currently preset requirements. The control logic 22 determines, according to an indoor temperature sensed by the temperature sensor 31, whether to enable one of the cooling/heating/ventilation options. Then, the infrared emitter 51 emits a corresponding remote control signal to the air conditioner 91 to thereby control the starting of the air conditioner 91 and control the air conditioner 91 to operate in accordance with the determined option. Afterward, the control unit 21 makes a change or no change to the control over the air conditioner 91 according to the control logic 22 and a current indoor temperature. To shut down the air conditioner 91, the user uses the remote controller 92 to press the power button on the infrared receiver 41 to thereby inform the control unit 21 of the user's intent to shut down the air conditioner 91, so as to emit a shutdown signal to the air conditioner 91, causing the air conditioner 91 to shut down.

[0028] Therefore, the remote control device 10 of the present disclosure independently determines an indoor temperature regardless of the location of the air conditioner 91 and controls the air conditioner 91 by receiving a command sent from the user to the remote controller 92, performing self-evaluation, and then sending a remote control signal to the air conditioner 91. The remote control device 10 of the present disclosure has more self-control options than a built-in controller of conventional air

conditioners, for example, self-determining whether to switch from the cooling option to the heating option or ventilation option, and thus is more likely to meet user needs; hence, the remote control device 10 of the present disclosure reduces power consumption so as to enhance power-efficiency and achieve environmental protection.

[0029] Referring to FIG. 4, a remote control device 10' determining an indoor environment to send a command to an air conditioner is provided in the second preferred embodiment of the present disclosure. The second preferred embodiment is distinguished from the first preferred embodiment by the following technical features.

[0030] In the second preferred embodiment of the present disclosure, the infrared receiver 41', the infrared emitter 51' and the control unit 21' have a wireless unit W1' each and are wirelessly, electrically connected by the wireless units W1'. Therefore, the control unit 21' can still receive a signal received by the infrared receiver 41'. The infrared emitter 51' emits an intended signal. Therefore, the infrared receiver 41' and the infrared emitter 51' are appropriately positioned without being subjected to any position-related limit (for example, a conventional infrared emitter is usually disposed in a casing (not shown) and thus subjected to a limit arising from the location of the casing.)

[0031] In the second preferred embodiment, the remote control device 10' further comprises a humidity sensor 35' electrically connected to the control unit 21'. The control logic 22' further entails exercising remote control over the air conditioner according to humidity sensed by the humidity sensor 35'. The remote control involves controlling a dehumidifying option of the air conditioner. To be appropriately mounted in place, the humidity sensor 35' is either disposed in the casing or wirelessly, electrically connected.

[0032] In the second preferred embodiment, the remote control device 10' is not only convenient to be mounted in place, but is also advantageous in that the control logic 22' further entails controlling the dehumidifying option of the air conditioner by the control unit 21'. Hence, the second preferred embodiment has more control options than the first

preferred embodiment.

[0033] The other structural features and achievable advantages of the second preferred embodiment are substantially identical to those of the first preferred embodiment and thus are, for the sake of brevity, not described herein.

[0034] The infrared receiver 41 and the infrared emitter 51 in the first and second preferred embodiments are disposed in the casing 11 or wirelessly, electrically connected.

[0035] However, as shown in FIG. 5, in a variant embodiment, the infrared receiver 41 and the infrared emitter 51 are each electrically connected to the control unit 21 by a physical wire rather than disposed in the casing 11. Still, the infrared receiver 41 and the infrared emitter 51 are appropriately positioned.

WHAT IS CLAIMED IS:

1. A remote control device determining an indoor environment to send a command to an air conditioner, the remote control device comprising:

a casing;

a control unit disposed in the casing;

a temperature sensor disposed in the casing and electrically connected to the control unit;

an infrared receiver electrically connected to the control unit to receive a first infrared signal sent from a remote controller sold with an air conditioner; and

an infrared emitter electrically connected to the control unit to emit a second infrared signal to the air conditioner;

wherein the control unit exercises remote control over the air conditioner through the first infrared signal emitted from the remote controller sold with the air conditioner and received by the infrared receiver, by obtaining a currently preset temperature stored on the remote controller sold with the air conditioner through the first infrared signal, according to the currently preset temperature via the second infrared signal emitted from the infrared emitter;

wherein the control unit has a control logic executable by the control unit, and the control logic entails exercising remote control over the air conditioner according to temperature sensed by the temperature sensor, with the remote control involving, at least, controlling a cooling option and a heating option of the air conditioner, setting a target temperature option of the air conditioner, and controlling a start and a shutdown of the air conditioner.

2. The remote control device determining an indoor environment to send a command to an air conditioner according to claim 1, wherein the infrared receiver and the infrared emitter are disposed on the casing.

3. The remote control device determining an indoor environment to send a command to

an air conditioner according to claim 1, wherein the infrared receiver and the infrared emitter are not disposed on the casing but are each electrically connected to the control unit by a physical wire.

4. The remote control device determining an indoor environment to send a command to an air conditioner according to claim 1, wherein the infrared receiver, the infrared emitter and the control unit have a wireless unit each and are wirelessly, electrically connected by the wireless units.

5. The remote control device determining an indoor environment to send a command to an air conditioner according to claim 1, further comprising a humidity sensor electrically connected to the control unit, wherein the control logic entails exercising remote control over the air conditioner according to humidity sensed by the humidity sensor, with the remote control involving controlling a dehumidifying option of the air conditioner.

6. The remote control device determining an indoor environment to send a command to an air conditioner according to claim 1, wherein the infrared emitter has a reflector for confining the signal emitted from the infrared emitter to a specific range of angles.