MULTI-SOCKET CONNECTION DEVICE FOR ELECTRICITY SUPPLY

FIELD OF THE INVENTION

The present invention relates to a multi-socket connection device for distributing the power supply. More particularly, the present invention relates to a multi-socket connection device which is adapted to connect or disconnect the master sockets and the slave socket from the power supply.

BACKGROUND OF THE INVENTION

A group of electrical devices, each serving a different function, may desirably be linked to be switched on and off together at the same time, or after a pre-determined delay time. Examples of such a device are a personal computer, usually accompanied by a printer, a monitor, a modem and other related devices; and a home theater system, usually comprising a television set, speakers, a video player and other related devices.

The function of these devices are related to each other and these devices can therefore be switched on and off together as they are serving a common task. The devices can normally be divided into a master device and the accompanying slave devices. One of the examples is a home theater system. To exemplify from the home theater system, the television set would be the master device whereas the video player and the speakers are the slave devices. The slave devices are provided to extend or supplement the functions other than that the master device can serve.

As such, as a matter of convenience, a power distribution device is conventionally provided to connect all the slave devices' plugs to one main power supply outlet. The power distribution device inherently makes more sockets available to connect the electrical devices to the power supply. In relation to the power distribution device, the master device, once it is not used, would usually be left idle in the standby mode. The same would usually go with the other attached slave devices.

Although the electrical devices are left in the standby mode, it is known that said standby mode can still consume a fair bit of electrical energy. The electrical energy may be considered infinitesimal in comparison to that amount consumed while in operation. However, when the standby mode is left for a long period of time, if the period of time is multiplied with the number of electrical devices left in the same state, the electrical consumption would be quite significant and higher than initially expected. Moreover, to left these electrical devices in the standby mode while they are not in used will also shorten their service lives unnecessarily.

To reduce unnecessary wastage of electrical power, several power distribution devices that are equipped with a switching system therein to reduce the electricity consumption to a minimum while the master and slave devices are in the standby mode, have been manufactured and used in the household. However, the conventional ones are usually costly to be manufactured as it may require a number of transformers for the switching purpose. The frequent switching of the device may also contribute to the deterioration of the condition of the transformer. The device may not be conducive to function after a long duration of usage.

Therefore, a multi-socket connection device, which is capable to overcome the above-mentioned drawbacks that appear in the conventional electricity distribution devices, is very much needed.

SUMMARY OF THE INVENTION

Accordingly, to solve the disadvantages and drawbacks of the prior art, there is provided a set of electricity supply connection device, which essentially comprises a power plug top for connecting the device to the wall's permanent AC power supply, a master socket for connecting to a master device, at least a slave socket for connecting to a slave device, and a sensing and regulating circuitry member. The sensing and regulating circuitry member is comprised of a detection circuitry unit responsive to a transmitted activation signal, and a sensor and switching circuitry unit responsive to an electrical change of the master device via the master socket. In this proposed device,

the signal to be detected can be in the form of infra-red wave, or any electromagnetic wave. A controlling device of the master device preferably a wireless remote controller operable by a user is adaptable to send the signal. However, in cases whereby slave device(s) is (are) not in used, yet the main device (e.g. an air-conditioner with a remote controller) needs to be operated and switched to a more economical and lasting standby mode, a single master socket with sensing and regulating circuitry member only can be designed, if there is a commercial and market demand.

It is an object of the present invention to provide a detection circuitry unit that is adapted to connect or disconnect the AC power supply to the master socket once a transmitted activation signal is detected.

It is also an object of the present invention to provide a sensor and switching circuit unit is adapted to connect or disconnect the AC power supply to the slave socket when the electrical change is detected via the master socket.

It is further an object of the present invention to provide an electricity supply connection device which automatically connects or disconnects the master socket and the slave socket to the AC power supply with regards to the state of the sockets. The device helps save electricity and reduces cost of electrical consumption. The master device which is switched to standby can be modulated to use the minimum of electrical energy so that electricity could not be wasted unnecessarily.

It is further more an object of the present invention to provide a manual on / off switch or override switch to each group (master and slave) of sockets, or each socket (not drawn) so that they can be switched on to connect or off to disconnect the AC power supply (each socket accompany by a LED as indicator to indicate its operation status) directly and individually whenever necessary.

The present invention consists of certain novel features and a combination of parts hereinafter fully described and illustrated in the accompanying drawings and

particularly pointed out in the appended claims; it being understood that various changes in the details may be without departing from the scope of the invention or sacrificing any of the advantages of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

For the purpose of facilitating an understanding of the invention, there is illustrated in the accompanying drawings the preferred embodiments from an inspection of which when considered in connection with the following description, the invention, its construction and operation and many of its advantages would be readily understood and appreciated.

FIG. 1 is a diagram showing the circuitry of the master and slave socket configurations.

FIG. 2 is a diagram showing the detection circuitry unit which comprises the infra-red receiver and the micro-controller (also referred as the timer).

FIG. 3 is a diagram showing the sensor and switching circuit of the present invention.

FIG. 4 is a block diagram showing AC inputs and DC outputs of the standard switching mode power supply converter circuitry unit (not drawn) which is adapted to convert the alternating current (AC) of the power supply into direct current (DC) supply.

DETAILED DESCRIPTION OF THE INVENTION

The present invention relates to an electricity supply connection device or preferably a set of electricity supply connection devices. More particularly, the present invention relates to a set of electricity supply connection devices adapted to connect or disconnect the alternating current (hereinafter called AC) power supply to a master socket (10) once a transmitted activation signal is detected, and adapted to connect or disconnect the AC power supply to at least one slave socket (20) when the electrical current change is detected via the master socket (10). Hereinafter, the set of electricity supply connection device shall be described according to the preferred embodiments of the present invention and by referring to the accompanying description and drawings. However, it is to be understood that limiting the description to the preferred embodiments of the invention and to the drawings is merely to facilitate discussion of the present invention and it is envisioned that those skilled in the art may devise various modifications without departing from the scope of the appended claim.

The electricity supply connection device of the present invention will be hereinafter described in greater detail. It is preferred that the electricity supply connection device generally comprises of a connector (preferably a plug top) for connecting the electricity supply connection device to the wall permanent AC power supply, a master socket (10) for connecting to a master device, at least a slave socket (20) for connecting to slave device(s), and a sensing and regulating circuitry member. It is appreciated that the slave sockets are connected in parallel manner in relation to the master socket (10).

The sensing and regulating circuitry member that essentially determines and manipulates the operation of the electricity supply connection device will be hereinafter described in greater detail. The sensing and regulating circuitry member is comprised of two circuits connected to a main circuit (80). The two circuits, each delivers a different function, are connected to each other via the main circuit.

Referring now to Figures 1 and 4, an AC power supply converter circuit (50) is connected to the main circuit (80) where the AC power supply is inputted through the converter (not shown).

Referring now to Figures 2 and 3, the two circuits which form the sensing and regulating circuitry member, are the detection circuitry unit (30) and the sensor and switching circuitry unit (40). The detection circuitry unit is responsive to a transmitted activation signal. A controlling device in relation with the master device may be used to switch on or off a master device, the activation signal emitted therefrom would be received by the detection circuitry unit (30) via a signal receiver (34). It is preferred that the controlling device may be a remote control which is operable to transmit the signal to activate or deactivate the master device. The signal receiver (34) may be adapted to receive any signal emitted by the controlling device to change the operation of the master device or to send any other form of instruction to the master device. It is also appreciated that the receiver (34) is adapted to receive signal in any form of an electromagnetic wave, or any other form of transmitting signal such as the infra-red and wireless protocol (Bluetooth and Wi-Fi).

The master device, according to the present invention, may be a television set, wherein the slave devices may be an audio device, a video player, an satellite TV decoder (such as Astro decoder), and any other accompanying devices. The master device may also be a personal computer, connected to a group of slave devices such as a printer, a monitor, a microphone, a speaker, a modem, and any other connectable devices to said computer. However, in the event of computer groups, the detection circuitry unit (30), is not applicable, as the computer groups do not require any remote controller to switch on the computer system. Other means that can replace the IR receiver but still maintain the operation of the detection circuitry unit (30) may be used. The master and slave device may consist of any group of electrical devices that may require to be linked together as to preferably be switched on and off together.

According to the most preferred embodiment of the present invention, with reference to Figure 2, the detection circuitry unit (30) is adapted to switch between a state of connecting or disconnecting the AC power supply to the master socket (10), said switching is initiated each time the transmitted activation signal is detected.

According to the most preferred embodiment of the present invention, the sensor and switching circuitry unit (40) is shown in Figure 3, connected to the main circuit (80) at the corresponding points. It is appreciated that the sensor and switching circuitry unit

(40) according to the present invention is responsive to an electrical change of the master device via the master socket (10). The sensor and switching circuit unit (40) is essentially adapted to switch between a state of connecting or disconnecting the AC power supply to the slave socket (20), wherein the switching is preferably initiated in accordance to the electrical change sensed on the electrical flow via the master socket. The electrical change may be a change of current flow, a change of the electrical power usage or any other electrical change that may be desired to initiate the connection or disconnection to the AC power supply.

The sensor and switching circuitry unit (40) may comprise a sensor that is adapted to detect any pre-determined electrical change which occurs on the master device at the master socket, in such a manner that the electrical change is desired to initiate the connection and disconnection of the slave device to the AC power supply via the slave socket (20).

To convert a power supply from the alternating current to a direct current, a power supply converter circuit as shown in Figures 1 and 4 is required to perform a full wave rectification. The power supply converter circuit (50) is shown connected to the input of the main circuit (80).

It is preferred that the connection device comprises a master socket (10) and a plurality of slave sockets (20). As shown in the Figure 1, in the master and slaves sockets configurations of the main circuit (80), there would preferably be a master socket and a plurality of slave sockets (any numbers). The master socket (10) is shown tagged by the master relay components (36 and 38) which are controlled by the detection circuitry unit (30). The rest of the slave sockets (20) are controlled by the slave relay components (46 and 48). The slave sockets (20) are preferably connected directly in parallel manner to the AC power supply outlet sharing same Earth line.

Referring again to Figure 1, it is appreciated that the master socket (10) is connected in parallel manner to a resistor and a Light Emitting Diode (LED) that is connected in series with the resistor. The LED may be automatically activated to indicate that the master socket (10) is connected to the AC power supply. The LED is automatically de-activated when the master socket (10) is disconnected from the AC power supply.

As the master socket (10) with its own LED indicator, the slave sockets (20) may also be provided with their own LED indicator as shown in Figure 1. A resistor in series with a Light Emitting Diode (LED) that correspond to the slave sockets (20), or a resistor in series with a Light Emitting Diode (LED) that correspond to connect to every individual slave socket (20) (not drawn), is connected in parallel manner with the slave socket(s), from the positive line to the neutral line.

Referring now to Figure 2, the detection circuitry unit (30) shown is comprised of a microcontroller (32), an infra-red receiver (34) for receiving an infra-red signal; and two master relay components (36 and 38) connected at the output of the detection circuitry unit (30). It is appreciated that the microcontroller (32) has five functional inputs and two functional outputs as can be seen in Figure 2. In accordance to the present invention, the infra-red (IR) receiver (34) receives the infra-red signal wherein the infra-red signal is the transmitted activation signal sent from the remote controller (controlling device) to the master device.

In accordance to the arrangement in the detection circuit (30) shown in Figure 2, the IR receiver (34) is connected to the direct current outlet at the positive end in series with a diode and a resistor, and a zener diode from the negative line. The other end of the IR receiver (34) is connected with a piece of capacitor to the negative line, and to one of the input of the microcontroller (32) in series with a resistor. Referring to the Figure 2 again, a portion of the inputs of the microcontroller (32) is connected to a plurality of capacitors to the direct current outlet at the negative end. One of the outputs is connected to the positive end with a resistor, a capacitor to the negative end, and feedback to the corresponding input, whereas the other output is connected via a resistor, a transistor (Q1) and a plurality of diodes, to the master relay components (36 and 38). A piece of the diodes is connected as a feedback diode to the master relay components (36 and 38) and one of the diodes would lead to a second intermediate operation point (62). As shown in Figure 1, the relay contact points of first master relay component (36) connects the positive end of the master socket (10) to a first intermediate operation point (60) whereas the relay contact point of second master relay component (38) connects the negative end of the master socket (10) to the neutral

line of the AC power supply.

According to the preferred embodiment of the invention, the microcontroller (32) is adapted to magnetize the two master relay components (36 and 38) if an initial infra-red signal is detected and received by the IR receiver (34). The relay contact points of two master relay components (36 and 38) upon magnetized would connect the master socket (10) to the AC power supply.

Conversely, the microcontroller (32) may also be adapted to de-magnetize the two master relay components (36 and 38) and disconnect the master socket (10) from the power supply when the subsequent infra-red signal is received. It is preferred that the initial infra-red signal corresponds to the signal emitted to activate the master socket and the following infra-red signal corresponds to the signal emitted to switch off the master device. It is also appreciated if the initial and the subsequent infra-red signals each correspond to a different instruction that may be predetermined according to the preferred embodiment.

It is also preferred that at the IR receiver (34), the output of the IR receiver is connected to a timer integrated circuit (IC) (preferably the 555 model) which is here before referred as the microcontroller (32). The timing segment is pre-determined (preferably 10 seconds or any other value, but for easier reference, hereinafter define as 10 seconds). When the IR receiver (34) detects the IR signal, the IR receiver (34) will send an input signal to the timer (32). The timer (32) produces a sourcing current for a pre-determined time (preferable 10 seconds) to the transistor (Q1). The current will therefore flow through the transistor (Q1) and therefore activating the master relay components (36 and 38). With the master relay components (36 and 38) magnetized, the master socket is then in the “ON” state for a pre-determined time (preferable 10 seconds).

It is also preferred that, in the event of this present shown circuit, whereby the microcontroller is limited to a timer IC only, it will not respond to de-magnetize the relay components (36 and 38) if the subsequent IR signal is received. The duty of this timer IC is designed to hold the relays (36 and 38) for a predetermined time (preferably 10 seconds) each time it receives a transmitted IR signal. The task of

holding or releasing of these two relay component (36 and 38) will then be handed over to the sensor and switching circuitry unit (40) for manipulation, via operation point (62).

Referring now to Figure 3, the sensor and switching circuitry unit (40) is essentially comprised of a first op-amplifier (42), a second op-amplifier (44), a pair of first and second slave relay components (46 and 48), a variable resistor (45) and other electrical components and units connected thereof. It is preferred that the sensor and switching circuit (40) is adapted to detect the amount of current supplied through the first intermediate operation point (60). From the detection, the sensor and switching circuit (40) connects or disconnects the slave socket (20) from the AC power supply.

As shown in Figure 3, the upper input of the first op-amplifier (42) is shown connected to the first intermediate operation point (60) via a resistor. The lower input of the first op-amplifier (42) is shown connected to the negative line of the DC outlet, and via a resistor (R1) to the first intermediate operation point (60). The variable resistor (45) is connected in a feedback manner to the upper input of the first op-amplifier (42) from the output of the first op-amplifier (42).

It is also shown in Figure 3 that the output of the first op-amplifier (42) is connected via a plurality of electrical components to the upper input of the second op-amplifier (44). It is further shown that a resistor connected from positive line is series with a LED to the negative line of the DC outlet, and the lower input of the second op-amplifier (44) is connected to the point in between the resistor & LED.

Still referring to Figure 3, it is further shown that a feedback resistor is connected in between the upper input and the output, at the second op-amplifier (44). It is also shown that the output of the second op-amplifier (44) is connected to a resistor and a transistor (Q2) and then the collector of the transistor (Q2) is connected to the second intermediate operation point (62). The output of the second op-amplifier (44) is further connected to a diode and series with three resistors, a capacitor is also connected to the negative line from a point in between the first two resistors. The last resistor is connected to the negative line whilst a point in between second & last resistor is further connected to the base of a transistor (Q3), and the collector of said transistor

(Q3) is connected to a pair of slave relay components (46 and 48).

The relay contact points of the first slave relay component (46) is adapted to connect the positive end of the slave socket (20) to the positive line of the AC power outlet. Whilst the relay contact points of the second slave relay component (48) is adapted to connect the negative end of the slave socket (20) to the neutral line of the AC power outlet, as illustrated in Figure 1.

It is adapted in the sensor and switching circuitry unit (40) that a state, where the first op-amplifier (42) which connected to the intermediate operation point (60) will measure the voltage across the resistor (R1) and decide whether it is loaded or not, if detected, the first op-amplifier (42) will produce an output signal to the second op-amplifier (44). This output signal, after rectifying, must be higher then the preset comparator voltage Vdc of the second amplifier (44). This is vital for the second op-amplifier (44) to magnetize the pair of slave relay components (46 and 48), and such action will connect the relay contact points of the slave socket (20) to the AC power supply.

It is also adapted in the sensor and switching circuitry unit (40) that conversely a state, where the first op-amplifier (42) which connected to the intermediate operation point (60), failed to measure the load current across the resistor. As a result, the first op-amplifier (42) output voltage will drops bellow the comparator voltage of the second op-amplifier (44), so that the second op-amplifier (44) de-magnetizes the pair of slave relay components (46 and 48), and the relay contact points of the slave socket (20) is caused to be disconnected from the AC power supply.

According to the method that is implemented in the electricity supply connection device of the most preferred embodiment, in the sensor and switching circuit (40), the first op-amplifier (42) which is connected to the first intermediate operation point (60) (indicated as J-A in Figure 2 and 3) will measure the voltage across the resistor (R1), it will then determine whether the load in the master socket (10) is active (on) or non-

active (off). If it is active (on), then the passive components of the first op-amplifier (42) output will then convert the signals, which are directly proportional to the load current, into DC voltage (Vdc) to the second op-amplifier (44). The second op-amplifier (44) is configured as a precision voltage comparator with hysteresis, while the LED is adapted as an indicator and voltage comparator to the circuit (40). It compares Vdc of the LED voltage with the upper input of the second op-amplifier (44) to decide whether or not, according to the strength of its load current, to activate the second op-amplifier (44) output. When the incoming voltage of the second op-amplifier is higher than the Vdc of reference comparator (LED), the second op-amplifier (44) output will then trigger its transistors (Q2 & Q3). The transistor (Q2) which handle the master relay components (36 and 38) will activated to hold the master relay components (36 and 38) immediately through the second operation point (62). While the transistor (Q3), after a few seconds delay (decided by the RC values of its base input), will magnetize the slave relay components (46 and 48). The relay contact points of the slave relay components (46 and 48) will in turn activate to connect the slave sockets (20) to the AC power supply.

Conversely, the master socket (10) will be turned off from the power supply when the turning on / off infra-red signal is received to shut down the master device. It is because the first op-amplifier (42) cannot sense the adequate load current across the resistor (R1), which vitally controls the second op-amplifier (44) to energize slave relay components (46 and 48) and holds the master relay components (36 and 38). With the master relay components (36 and 38) de-magnetized, the master socket (10) will then be shut off from the power supply. The slave relay components (46 and 48) are also de-magnetized as the same result, they will finally be shut off from the AC power supply after the pre-determined duration.

While in the foregoing specification this invention has been described in relation to certain preferred embodiments thereof and many details have been set forth for purpose of illustration, it will be apparent to those skilled in the art that the invention is susceptible to additional embodiments and that certain of the details described herein can be varied considerably without departing from the basic principles of the invention.

One of the most obvious variations of the present invention may be that the relay components (36, 38, 46 and 48) can be all replaced with the power AC TRIACs, just with some alteration (not drawn) at the outputs of the microcontroller/timer IC (32) and second op-amplifier (44).

Another one of the most obvious variations of the present invention may that the op-amplifier (44) outputs a few groups (not drawn) of identical switching circuitry as what transistor (Q3) handles, but with their timer RC value changed, so that they can switch on and off their own relay components, hence control each of their own slave sockets independently with different on / off timers.

It is also another one of the most obvious variations of the present invention may that all the relay switching transistors (Q1, Q2, Q3, & other additional transistors as mentioned above, if any) be alternately replaced by a single relay driver IC only.

It is yet another one of the most obvious variations of the present invention may that protection components & circuits like fuses, overload circuit breakers, surge varistors, gas arrestors, surge protectors, etc., can be added to the circuitry for safety purposes.

It is again another significant variations that other signal lines connectors like telephone jets & TV antenna sockets, added with protectors, can also be integrated into this invention for different models & market demands.

It is again another very significant variations that the appearances and outlooks of the sockets may be designed in any forms and at any stylist shapes, not necessarily in rectangular form as proposed in the drawings.

CLAIMS

1. An electricity supply connection device comprising:
a connector for connecting the connection device to an alternating current (AC) power supply;

a master socket (10) for connecting to a master device;

at least one slave socket (20) for connecting to a slave device, the slave socket is connected in parallel to the master socket (10); and

a sensing and regulating circuitry member;

characterized in that the sensing and regulating member further comprises:
a detection circuitry unit (30) responsive to a transmitted activation signal, the signal is in the form of an electromagnetic wave, the signal is sent by a controlling device of the master device, whereby the detection circuitry unit (30) operates to connect or disconnect the AC power supply to the master socket (10) once a transmitted activation signal is detected; and

a sensor and switching circuitry unit (40) responsive to an electrical change of the master device via the master socket (10), whereby the sensor and switching circuit unit (40) operates to connect or disconnect the AC power supply to the slave socket (20) when the electrical change is detected via the master socket (10).

2. An electricity supply connection device as recited in claim 1, wherein the connector comprises a power supply converter circuit (50).

3. An electricity supply connection device as recited in claim 1, wherein the detection circuitry unit (30) comprises a microcontroller (32) having five functional inputs and two functional outputs; an infra-red receiver (34) for receiving an infra-red signal as the transmitted activation signal sent from the controlling device of the master device; and two master relay components (36 and 38) connected at the output of the detection circuitry unit (30).

4. An electricity supply connection device as recited in claim 1, wherein controlling

device is a remote controller which is operable to transmit the signal to activate or deactivate the master device.

5. An electricity supply connection device as recited in claim 3, wherein the infra-red receiver (34) is connected from the direct current outlet at the positive end in series with a diode and a resistor, and a zener diode from the negative line, the output of the receiver (34) is then connected with a piece of capacitor to the negative line, and in series with a resistor to the input of the microcontroller (32).

6. An electricity supply connection device as recited in claim 3, wherein a portion of the inputs of the microcontroller (32) is connected to a plurality of capacitors to the direct current outlet at the negative end, and one of the outputs is connected to the positive end with a resistor, and in feedback manner to the corresponding input, and the other output is connected to a resistor, a transistor (Q1) and a plurality of diodes, such that a piece of the diodes in connected as a feedback diode to the master relay components (36 and 38) and another of the diodes leads to a second intermediate operation point (62), and the relay contact points of first master relay component (36) connects the positive end of the master socket (10) to a first intermediate operation point (60) whilst the relay contact points of second master relay component (38) connects the negative end of the master socket (10) to the neutral line of the AC power supply .

7. An electricity supply connection device as recited in claim 1, wherein the master socket (10) is connected in parallel manner to a resistor and a Light Emitting Diode (LED) activated for indicating that the master socket (10) is connected to or disconnected from the AC power supply.

8. An electricity supply connection device as recited in claim 1, wherein the slave socket (20) is connected in parallel manner with a resistor and a Light Emitting Diode (LED) activated for indicating that the slave socket (20) is connected to or disconnected from the AC power supply.

9. An electricity supply connection device as recited in claim 6, wherein the microcontroller (32) is adapted to magnetize the two master relay components (36 and 38) and connect the master socket (10) to the AC power supply if an initial infra-red signal is received, and is adapted to de-magnetize the two master relay components (36 and 38) and disconnect the master socket (10) from the power supply when the turning on/off infra-red signal is received; and the initial turning on/off infra-red signal corresponds to the signal emitted to activate the master socket (10), and the following turning on/off infra-red signal corresponds to the signal emitted to switch off the master device.

10. An electricity supply connection device as recited in claim 3, wherein if the infra-red receiver (34) receives an initial transmitted infra-red signal, said receiver (34) transmits an input signal via the corresponding input to the microcontroller (32), the microcontroller (32) will then produce a sourcing current to the transistor (Q1) connected therewith, the current which flows through the transistor (Q1) magnetizes the pair of master relay components (36 and 38).

11. An electricity supply connection device as recited in claim 10, wherein the micro-controller (32) is a timer integrated circuit (IC), the timing segment is predetermined at the timer IC, such that the master socket (10) is connected to the AC power supply substantially according to the timing segment.

12. An electricity supply connection device as recited in claim 10, wherein if the infra-red receiver (34) receives a following transmitted infra-red signal to said initial transmitted infra-red signal, said receiver (34) will transmit an input signal via the corresponding input to the microcontroller (32), the microcontroller (32) will then stop producing the sourcing current to the transistor (Q1) connected therewith, and the pair of master relay components (36 and 38) is de-magnetized.

13. An electricity supply connection device as recited in claim 11, wherein the micro-controller (32) is a timer integrated circuit (IC), characterized in that the timer IC is adapted to hold the master relay components (36 and 38) for a predetermined time when the IR signal is received, and subsequently the sensor and switching circuitry

unit (40) is adapted to hold or release the master relay components (36 and 38) via the second intermediate operation point (62).

14. An electricity supply connection device as recited in any one of the claims 3 to 13, wherein the electrical components and units included in the detection circuitry unit (30) are arranged and connected as shown in Figure 2.

15. An electricity supply connection device as recited in claim 1, wherein the sensor and switching circuitry unit (40) comprises a first op-amplifier (42), a second op-amplifier (44), a pair of first and second slave relay components (46 and 48), a variable resistor (45) and other electrical components and units connected thereof, such that the sensor and switching circuit (40) is adapted to detect the amount of voltage supplied through the first intermediate operation point (60) and from the detection, connects or disconnects the slave socket (20) from the AC power supply.

16. An electricity supply connection device as recited in claim 15, wherein the upper input of the first op-amplifier (42) is connected to the first intermediate operation point (60) via a resistor, whereas the lower input of the first op-amplifier (42) is connected to the negative line of the direct current outlet and in a parallel manner thereof, via a resistor (R1) to the first intermediate operation point (60).

17. An electricity supply connection device as recited in claim 16, wherein the variable resistor (45) is connected in a feedback manner to the upper input of the first op-amplifier (42), from the output of the first op-amplifier (42).

18. An electricity supply connection device as recited in claim 17, wherein the output of the first op-amplifier (42) connects to the upper input of the second op-amplifier (44) via a plurality of electrical components.

19. An electricity supply connection device as recited in claim 18, wherein a resistor and a Light Emitting Diode (LED) are connected in series from the positive line to the negative line of the DC outlet, the lower input of the second op-amplifier (44) is then connected to the point in between the resistor and LED, the LED is always lighted on

as an indicator and also serves as a comparator to the sensor and switching circuitry unit (40), which will then operates to connect the slave socket (20) to the AC power supply.

20. An electricity supply connection device as recited in claim 19, wherein the output of the second op-amplifier (44) is connected to a resistor and a transistor (Q2) and then the collector of the transistor (Q2) is connected to the second intermediate operation point (62).

21. An electricity supply connection device as recited in claim 20, wherein a resistor is connected in between the upper input and the output, in feedback manner to the second op-amplifier (44).

22. An electricity supply connection device as recited in claim 21, wherein the output of the second op-amplifier (44) is further connected to a diode and series with three resistors, a capacitor is connected from a point in between the first two resistors to the negative line, the last resistor is connected to the negative line whilst a point in between second & last resistor is further connected to the base of a transistor (Q3), in which the collector of said transistor (Q3) is connected to a pair of slave relay components (46 and 48).

23. An electricity supply connection device as recited in claim 22, wherein the relay contact points of the first slave relay component (46) connects the positive end of the slave socket (20) to the live line of the AC outlet whilst the relay contact points of the second slave relay component (48) connects the negative end of the slave socket (10) to the neutral line of the AC outlet.

24. An electricity supply connection device as recited in claim 23, wherein if the resistor (R1) connected through the first intermediate operation point (60) senses higher current load, the first op-amplifier (42) will produce an output signal to the second op-amplifier (44), after rectification, if its voltage Vdc is higher than the comparator voltage, the second op-amplifier (44) will output a source current to the two transistors (Q2 & Q3), one transistor (Q3) will magnetize the pair of slave

relay components (46 and 48), and the contact points of these slave relay components will connect the slave socket (20) to the AC power supply, whereby at the same time, the second transistor (Q2) will get hold of the earlier magnetized pair of master relay components (36 and 38) via second operation point (62).

25. An electricity supply connection device as recited in any one of claim 15 to 22, wherein if the output signal voltage Vdc of the first op-amplifier (42) is lower than the comparator voltage of the second op-amplifier (44), the second op-amplifier (44) will stop output a source current to the transistor (Q3), which will de-magnetizes the pair of slave relay components (46 and 48), and disconnect the slave socket (20) from the AC power supply.

26. An electricity supply connection device as recited in claim 1, wherein the lower input of the first op-amplifier (42) connected to the first intermediate operation point (60) via a resistor (R1), acts as an adjustable current sensor with the feedback variable resistor (45), such that when the output signal voltage Vdc of the first op-amplifier (42) is higher than the pre-determined comparator voltage of the second op-amplifier (44), the second op-amplifiers (44) correspondingly operates to magnetize the slave relay components (46 and 48); and such that when the output signal voltage Vdc of the first op-amplifier (42) is lower than the pre-determined comparator voltage of the second op-amplifier (44), the second op-amplifier (44) correspondingly operates to de-magnetize the slave relay components (46 and 48).

27. An electricity supply connection device as recited in any one of the claims 15 to 26, wherein the electrical components and units included in the sensor and switching circuitry unit (40) are arranged and connected as shown in Figure 3.

28. An electricity supply connection device as recited in claim 1, wherein the connector is connected to the wall’s permanent AC power supply, an extension socket, or a functional device socket extended out from the wall’s permanent AC power supply.

29. An electricity supply connection device as recited in claim 1, wherein the connector is a power plug top with 3-core wires.

30. An electricity supply connection device as recited in claim 1, wherein the designated incoming AC source power supply is then connected to a converter circuit (50), a sensor and switching circuit (40), a detection circuitry unit (30), and in conjunction with the master socket (10) and the slave socket(s) (20) therewith in an arrangement as shown in Figure 1

31. A method for manipulating the operation in an electricity supply connection device comprising the steps of:

receiving an initial transmitted activation signal emitted from any one of a controlling device or an infra-red remote controller;

transmitting an input from this signal receiver (34) to the microcontroller (32), magnetizing a pair of master relay components (36 and 38) in accordance to the microcontroller's output for a pre-determined time, wherein contact pins of master relay components (36 and 38) are connected to both ends of the master socket (10); and connecting the other ends of the contact pins to the AC power supply, wherein a master electrical device will be switched to a standby mode for a pre-determined time period,

wherein if within this pre-determined time period, the master electrical device receives another activation or channel selection signal from the controlling device or the remote controller of the master device, the master electrical device will be turned on;

if within this pre-determined time period, the master electrical device does not receive another activation or channel selection signal from the controlling device or the remote controller of the master device, the master socket (10) will be turned off automatically;

if within this pre-determined time period, the master electrical device receives a wrong activation or channel selection signal from the different controlling device or remote controller which is not belong to the said master device, the timer circuit (30) will prolong its pre-determined timer but will turn off the master socket (10) again automatically when the timer period elapsed;

if the master electrical device has already turned on, the sensor and switching circuit

(40) will then detected a higher flow of voltage (current) through the resistor (R1) connected to the master socket (10), and hence will magnetize a pair of slave relay components (46 and 48), wherein the contacts pins of the pair of slave relay components (46 and 48) are connected to both ends of the slave socket (20), and connecting the other ends of the contact pins to the life and neutral lines of AC power supply, whereby at the same time, the sensor and switching circuit (40) will also trigger to withhold the earlier magnetized relay components (36 and 38) through the operation point (62); and the contact points of these two pair of relay components (36 and 38, and 46 and 48) will remain intact as long as the sensor and switching circuit (40) maintains a higher load current than the pre-determined value;

if the master electrical device receives a following transmitted switching-off signal from the master device remote controller, whereby this switching-off signal will trigger to turn off the master device, which will hence drops its load current bellow the pre-determined value, the sensor op-amplifier (44) will then de-activate the corresponding output transistors (Q2 & Q3), one transistor (Q2) will release the pair of master relay components (36 and 38) via the second intermediate operation point (62), and disconnecting the master socket (10) from the power supply, and the other transistor (Q3), after a short timer delay, release the pair of slave relay components (46 and 48), and the pair of slave relay components (46 and 48) will then disconnect the slave socket (20) from the AC power supply.

32. A method as recited in claim 30, wherein in the step of connecting the master socket (10) to AC power supply, the microcontroller (32) is a timer integrated circuit (IC), the timing segment is predetermined at the timer IC, such that the master socket (10) is connected to the AC power supply substantially according to the timing segment.

33. A method as recited in claim 30, wherein in the step of disconnecting the master socket (10) from the AC power supply, the op-amplifier (44) is the de-activating segment, whereby it releases the holding of the corresponding transistor (Q2), via the second intermediate operation point (62), to the pair of master relay components (36 and 38), such that the master socket (10) is disconnected from the AC power supply substantially according to the op-amplifier (44) segment.

34. A method as recited in claim 30, wherein in the step of connecting the slave socket (20) to the AC power supply, the slave socket (20) is connected to the AC power supply after a pre-determined duration.

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35. A method as recited in claim 30, wherein in the step of disconnecting the slave socket (20) from the AC power supply, the slave socket (20) is disconnected from the AC power supply after a pre-determined duration.