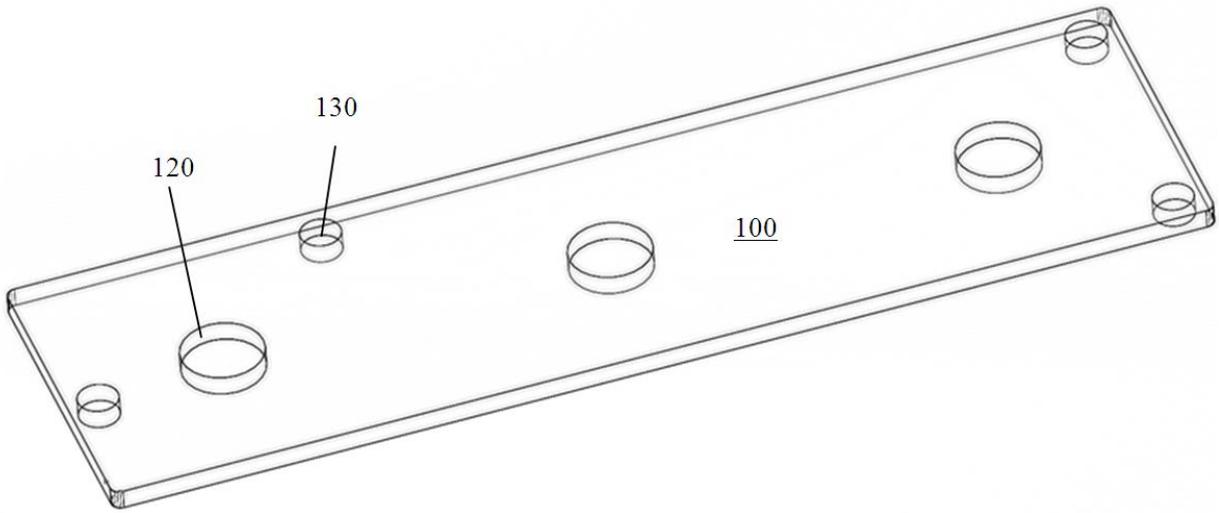


Abstract

This utility model relates to a portable and dismountable MIDI switching device, including: Receiving terminal device and control terminal device. The control terminal device is comprised of one top PCB, one bottom PMMA sheet, and one driving power; in the control terminal device, the bottom PMMA sheet sets multiple primary screw holes and sets multiple round through-holes with interval in the center; each round through-hole sets sucker to suck controller in dependant; the size of top PCB shall match with bottom PMMA sheet; the top PCB sets multiple secondary screw holes. The number and position of primary and secondary screw holes shall be matched. Every primary screw hole is connected to corresponding secondary screw hole by two-way hexagon Cu pillar to make two boards fixed and connected, and reserve gap for driving power storage. The advantage is: It is dismountable and portable, and small in size.

Attached Drawing



Claims

1. A portable and dismountable MIDI switching device, the characteristics are including:

5 Receiving terminal device;

 Control terminal device. The control terminal device is comprised of one top PCB, one bottom PMMA sheet (100), and one driving power; the driving power connects to top PCB; the top PCB stated is connected to wireless communication device of the control terminal device.

10 In the control terminal device,

 The bottom PMMA sheet (100) sets multiple primary screw holes (130) and sets multiple round through-holes (120) with interval in the center; each round through-hole (120) sets sucker (140) to suck controller in dependant;

 The size of top PCB shall match with bottom PMMA sheet (100); the top
15 PCB sets multiple secondary screw holes. The number and position of primary (130) and secondary screw holes shall be matched. Every primary screw hole (130) is connected to corresponding secondary screw hole by two-way hexagon Cu pillar (140) to make two boards fixed and connected, and reserve gap for driving power storage. Driving power is fixed to the reverse side of
20 top PCB.

2. For the portable and dismountable MIDI switching device stated in Claim 1, the characteristic is, the top PCB stated contains:

 Multiple LED driver modules; every LED driver module respectively connects to a corresponding LED button.

- 25 3. For the portable and dismountable MIDI switching device stated in Claim 2, the characteristic is, the top PCB stated also contains:

 Primary micro control module, which connects to multiple LED driver modules stated;

 USB charger and battery management modules, which respectively
30 connect to the primary micro control module, driving power and multiple

LED driver modules stated;

Primary wireless transmission module, which connects to primary micro control module, USB charger and battery management modules and receiving terminal device.

- 5 4. For the portable and dismountable MIDI switching device stated in Claim 3, the characteristic is, the receiving terminal device stated contains:

Secondary micro control module;

Power source and step-down circuit modules, which respectively connect to the secondary micro control module and external circuit source stated;

- 10 Secondary wireless transmission module; the wireless communication connects to the primary wireless transmission module on top PCB, and also respectively connects to the secondary micro control module, as well as power source and step-down circuit module.

- 15 5. For the portable and dismountable MIDI switching device stated in Claim 1, the characteristic is,

The bottom PMMA sheet (100) stated is a rectangular strip sheet.

6. For the portable and dismountable MIDI switching device stated in Claim 1, the characteristic is,

The driving power stated is 3.7V lithium battery.

Specifications

A portable and dismountable MIDI switching device

5 **Field of invention**

This utility model relates to a portable and dismountable MIDI switching device

Background of invention

10 Wireless Remote Channel-MIDI Switching Device is a kind of MIDI switching device by wireless connection. Aforesaid device is comprised of one control terminal and one rack receiving terminal. Users can issue switching signal to receiving terminal via wireless transmission by pressing multiple buttons on the control terminal, and after corresponding signal is received, the receiving terminal
15 will generate MIDI control switching signal in accordance with MIDI agreement, and switch among multiple operating plans of audio system under its control.

Aforesaid MIDI switching device still has the following insufficiencies: The control terminal is inconvenient to dismantle, the traction mode with dependent is unfavorable, and problems such as damaging music device, glue remaining and
20 appearance affecting exist; control terminal has no function to indicate current plan; size of receiving terminal is 483×88×362mm. The size is large, and inconvenient to carry.

Contents of utility model

25 This utility model aims to provide a portable and dismountable MIDI switching device, improve the connection mode between control terminal and its dependent so that it will not damage instrument, and also be convenient to dismount without trace.

In order to realize aforesaid purpose, this invention provides the following
30 technical plan:

A portable and dismountable MIDI switching device, the characteristics are including:

Receiving terminal device;

Control terminal device. The control terminal device is comprised of one top PCB, one bottom PMMA sheet, and one driving power; the driving power connects to top PCB; the top PCB stated is connected to wireless communication device of the control terminal device.

In the control terminal device,

the bottom PMMA sheet sets multiple primary screw holes and sets multiple round through-holes with interval in the center; each round through-hole sets sucker to suck controller in dependant;

The size of top PCB shall match with bottom PMMA sheet; the top PCB sets multiple secondary screw holes. The number and position of primary and secondary screw holes shall be matched. Every primary screw hole is connected to corresponding secondary screw hole by two-way hexagon Cu pillar to make two boards fixed and connected, and reserve gap for driving power storage. Driving power is fixed to the reverse side of top PCB.

For the portable and dismountable MIDI switching device stated above, in which, the top PCB stated contains:

Multiple LED driver modules; every LED driver module respectively connects to a corresponding LED button.

For the portable and dismountable MIDI switching device stated above, in which, the top PCB stated also contains:

Primary micro control module, which connects to multiple LED driver modules stated;

USB charger and battery management modules, which respectively connect to the primary micro control module, driving power and multiple LED driver modules stated;

Primary wireless transmission module, which connects to primary micro control module, USB charger and battery management modules and receiving

terminal device.

For the portable and dismountable MIDI switching device stated above, in which, the receiving terminal device stated contains:

Secondary micro control module;

5 Power source and step-down circuit modules, which respectively connect to the secondary micro control module and external circuit source stated;

Secondary wireless transmission module; the wireless communication connects to the primary wireless transmission module on top PCB, and also respectively connects to the secondary micro control module, as well as power
10 source and step-down circuit module.

For the portable and dismountable MIDI switching device stated above, in which,

The bottom PMMA sheet stated is a rectangular strip sheet.

15 For the portable and dismountable MIDI switching device stated above, in which,

The driving power stated is 3.7V lithium battery.

Compared with existing technology, this invention has the following advantages: The main structure is that control terminal hardware connects mutually with two boards. The bottom is for fixation, and top is PCB; the two
20 boards are connected two-way hexagon Cu pillar to reserve gap for driving power storage. Suckers are set on bottom board. By suckers, the control terminal is attached to surface of the instruction. The convenience for dismantling reaches the best. Besides, the size is small and convenient to carry.

25 **Brief description of attached drawing**

Fig. 1 is the overall structural diagram for bottom PMMA sheet of this invention;

Fig. 2 is the overall structural diagram for suckers of this invention;

Fig. 3 is the overall structural diagram for two-way hexagon Cu pillar of this
30 invention;

Fig. 4 is the connection circuit diagram adopted by the primary control module in exemplary embodiment of this invention;

Fig. 5 is the connection circuit diagram adopted by the USB charger and battery management module in exemplary embodiment of this invention;

5 Fig. 6 is the connection circuit diagram adopted by battery voltage stabilizing module in exemplary embodiment of this invention;

Fig. 7 is the connection circuit diagram adopted by the primary wireless transmission module in exemplary embodiment of this invention;

10 Fig. 8 is the connection circuit diagram adopted by multiple LED driver module and corresponding LED buttons in exemplary embodiment of this invention;

Fig. 9 is the connection circuit diagram adopted by the secondary control module in exemplary embodiment of this invention;

15 Fig. 10 is the connection circuit diagram adopted by power source and step-down circuit module in exemplary embodiment of this invention;

Fig. 11 is the connection circuit diagram adopted by the secondary wireless transmission module in exemplary embodiment of this invention;

Detailed exemplary embodiment

20 Combining attached drawings, this invention is further expounded by explaining a favorable specific exemplary embodiment in details.

According to Fig. 1 ~3, this utility model relates to a portable and dismountable MIDI switching device, including: Receiving terminal device and control terminal device. The control terminal device is comprised of one top PCB, one bottom PMMA sheet 1, and one driving power; the driving power connects to top PCB; the top PCB stated is connected to wireless communication device of the control terminal device;

25 The bottom PMMA sheet 100 stated is a rectangular strip sheet made of materials such as acrylic. The body sets multiple primary screw holes 130. In this exemplary embodiment, the diameter of primary screw hole 130 is M3 and

number is 4. The distribution location will be reasonably selected according to layout of top PCB. Bottom PMMA sheet 1 sets multiple round through-holes 120 with interval in the center; In this exemplary embodiment, the diameter of round through-hole 120 is 25mm and number is 3, distributed evenly. Each round through-hole 120 sets sucker 140 to suck controller in dependant; The sucker 140 shall be fixed by 502 glue or other reliably way. The connection mode of sucker attachment is more flexible and ideal compared with existing technology such as bolts which may affect tone of music instrument, or velcro or double-sided adhesive tape which may remain residual glue; the size of top PCB shall match with bottom PMMA sheet 1; the top PCB sets multiple secondary screw holes. The number and position of primary 130 and secondary screw holes shall be matched. Every primary screw hole 130 is connected to corresponding secondary screw hole by two-way hexagon Cu pillar 140 to make two boards fixed and connected, and reserve gap for driving power storage. The space of the gap depends on length of copper pillar 140. In this exemplary embodiment, the driving power stated adopts 3.7V lithium battery. Therefore, the length of copper pillar 140 shall be the size which is capable to contain 3.7V lithium battery. The driving power is fixed to reverse side of Top PCB. Combining with gap, it helps prevent interference of PCB in tone of music instrument.

The top PCB stated also contains: Multiple LED driver modules respectively correspond to multiple indication plans. In this exemplary embodiment, four LED driver modules are set, and every LED driver module correspondingly connects to one LED button. The specific circuit 500 can be seen in Fig. 8. When the user presses any button, the corresponding LED light will turn on so that user can clearly see contents of indication under different lighting environment; the primary micro control module connects to multiple LED driver modules stated. In this exemplary embodiment, as shown in Fig. 4, the primary micro control module can adopt IAP15W413AS single chip microcomputer 200 of STC, while capacitance C6 is the power decoupling capacitance of the chip. In the figure, circuit marking 220 is the tripod programming interface of the main chip, and is

used to write program realizing system and debugging. Program user can be customized as required. Two LED indicator lights D7 and D8 are set. During programming, the two LED lights will flash alternatively for reminding; USB charger and battery management module respectively connects to the primary micro control module, driving power and multiple LED driver modules. As shown in Fig. 5, in this exemplary embodiment, USB charger and battery management module 300 is set up around one battery management chip TP4057; port P1 is the socket of Micro_USB, two LED D1 and D2 are used respectively as indicators of battery charging and fully-charged; power voltage stabilizing circuit 400, through DC voltage reduction and stabilizing chip LM3671-33 of TI company shown in Fig. 6, stabilizes the lithium battery output varying with electric quantity to 3.3V so as to provide power to the entire control terminal system. In this exemplary embodiment, LM3671 output is connected to the public end of control terminal general switch SW1. Switch SW1 can select small size single-pole double-throw slide switch MTS-102; D3 is the power indicator of the system; the system monitors lithium battery voltage by circuit marking 210 in Fig. 4; resistance subdivision of R9 and R11 generates one main voltage input chip; when the voltage is lower than internal reference voltage of main chip, the low voltage indicator D4 will turn on; the primary wireless transmission module connects with the primary micro control module, USB charger and battery management module and receiving terminal device stated. In this exemplary embodiment, as shown in Fig. 7, the primary wireless transmission module can select the XB24-Z7PIT-004 XBee wireless transmission module of DIGI. This XBee module is based on Zigbee wireless protocol, and has advantages of large scope, low power consumption, and convenient ad-hoc network. In this embodiment, the default serial port pass-through mode is very convenient in actual use, and can be used by directly connecting with serial port; besides during wireless data transmitting process, two LED lights of D5 and D6 will flash alternatively. In order to further improve portability of control device, the control terminal master switch SW1 adopts small size single-pole double-throw slide switch MTS-102;

IAP15W413AS of STC is minimally 16-pin enclosed.

The receiving terminal device stated adopts PCB mode to compress the size from $483 \times 88 \times 362$ mm of standard rack device to about $51 \times 25 \times 30$ mm so that the entire two-end communication system can be stored and carried together, specifically including secondary micro control module for generation of MIDI switching signal. In this exemplary embodiment, as shown in Fig. 9, the secondary micro control module can adopt another IAP15F2K61S2 single chip microcomputer 600 of STC; in this figure, capacitance C5 is the power decoupling capacitance of the chip and circuit marking 620 is also the tripod programming interface of the main chip, and is used to write program realizing system and debugging. Program user can be customized as required. Two LED indicator lights D4 and D5 are set. During programming, the two LED lights will flash alternatively for reminding. The part marking 610 is MIDI output socket J2. 5-pin of J2 connects with output of master chip serial port 2; four-pin draws a resistance to 5V positive power source; 2-pin is grounded while a small capacitance C4 is connected in parallel between metal enclosure of socket and earth wire; power source and step-down circuit module 700, as shown in Fig. 10, respectively connects to secondary micro control module and external current source; J1 is 5V DC power source socket. The master power source input connects to public end of receiving terminal master switch SW1, and D3 is the power source indicator of the system. 5V power source provides power to master control chip and MIDI output socket, while power of XBee wireless module shall be supplied by 3.3V DC power source; therefore, the system reduces and stabilizes 5V voltage by one IAP15F2K61S2 linear voltage stabilizing chip of TI to 3.3V, and outputs to XBee wireless receiving and sending circuit marking 15; the secondary wireless transmission module, as shown in Fig. 11, also adopts XBee wireless module. The wireless communication connects to the primary wireless transmission module of top PCB stated; XBee wireless transmission module connects mutually with serial port of main chip by serial port pass-through mode; besides, during wireless data transmitting, LED D1 and D2

will flash alternatively. XBee wireless transmission module also respectively connects to the secondary micro control module and power source and step-down circuit module stated.

5 This exemplary embodiment adopts simpler and smaller device packaging and more reasonable arrangement strategy, i.e. place low devices during manufacturing just below XBee wireless module. Each resistance and capacitance is packaged by 0603 paster to further simplify PCB layout.

10 Although the contents of this invention of utility model have been introduced in details through aforesaid preferential embodiment, aforesaid description shall not be deemed as restriction to this invention. After technicians in this field read aforesaid contents, multiple revisions and replacements made to this invention will be obvious. Thus, the protection scope of this invention shall be limited by attached claims.

Attached Drawings

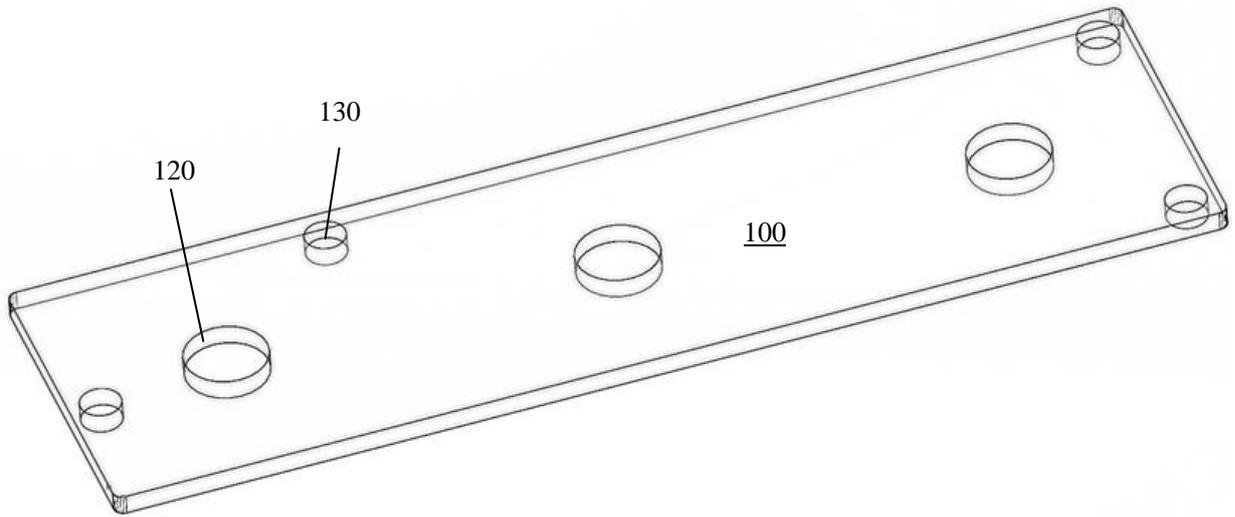


Fig. 1

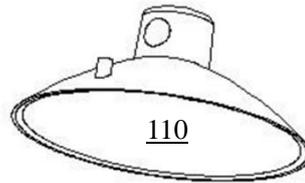


Fig. 2

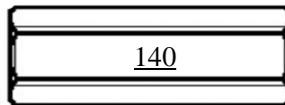


Fig. 3

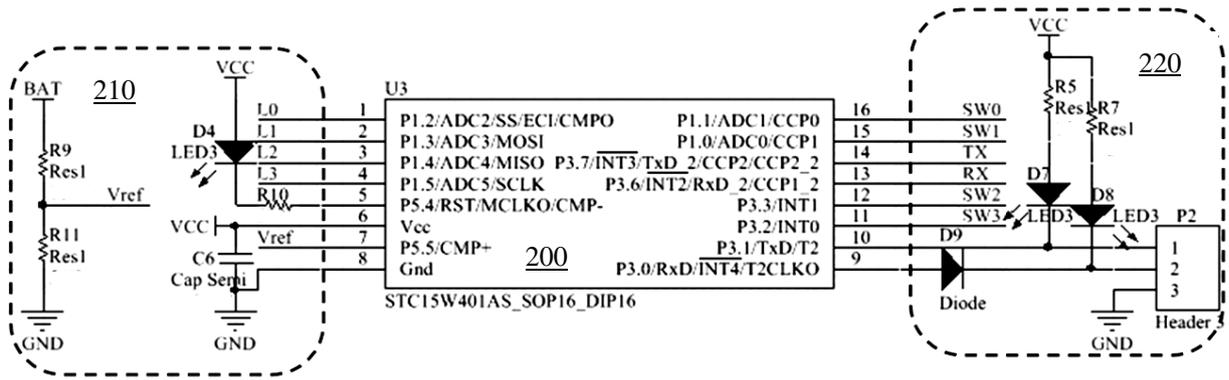


Fig. 4

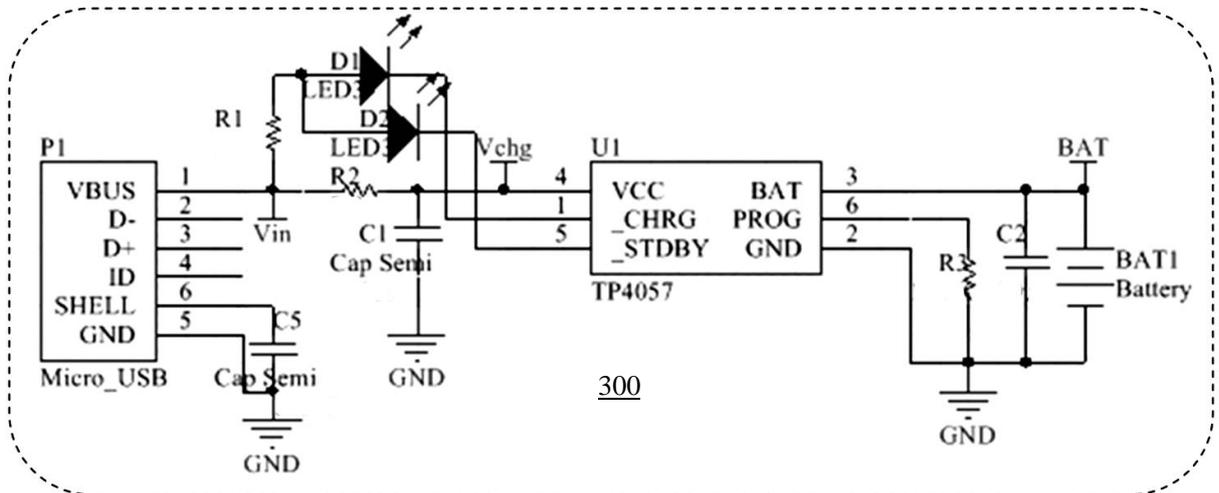


Fig. 5

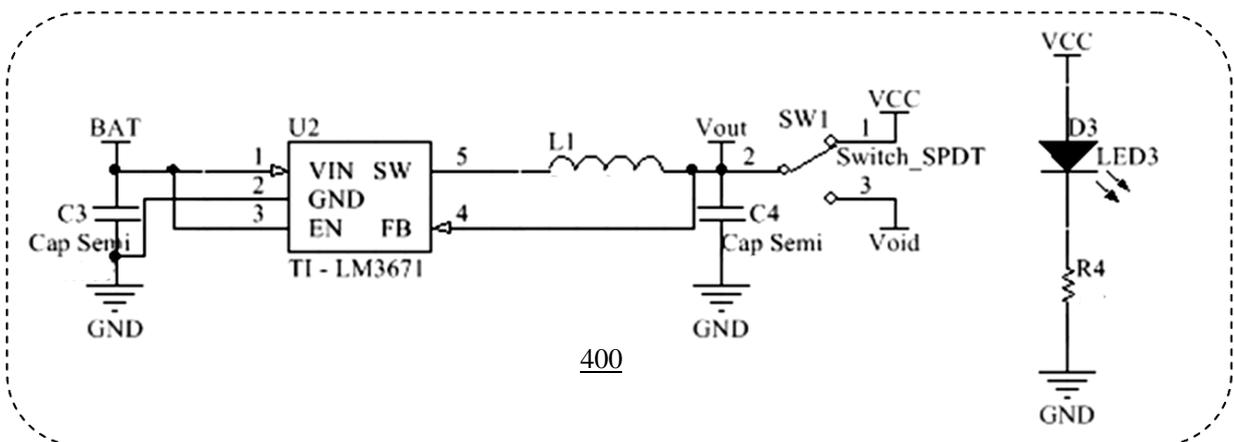


Fig. 6

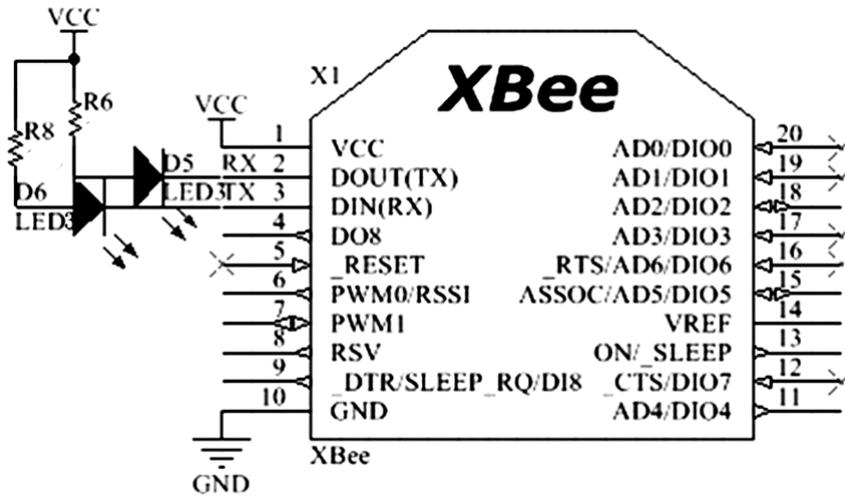


Fig. 7

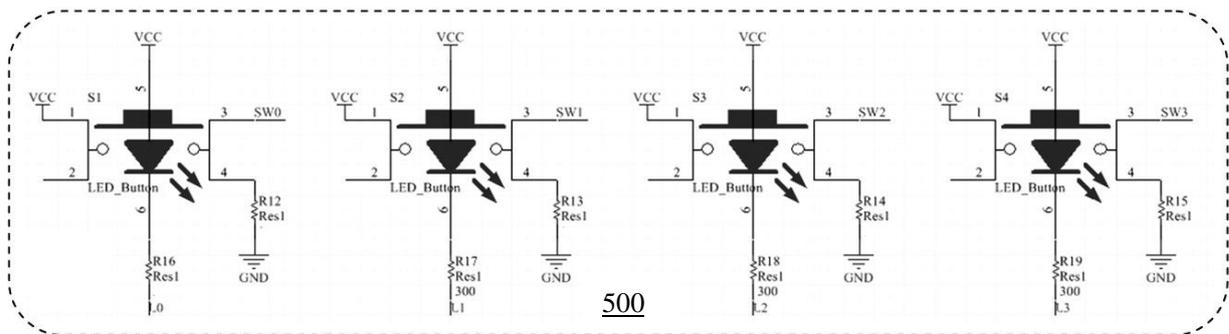


Fig. 8

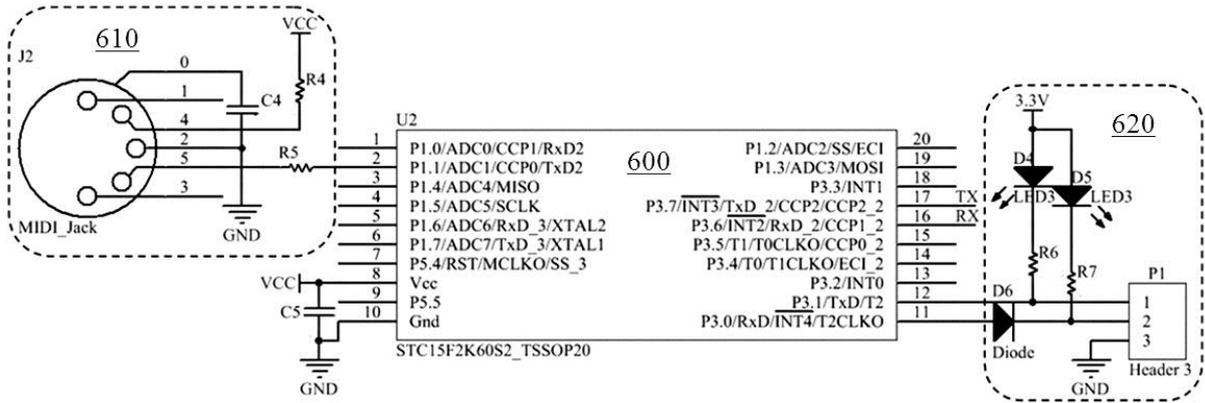


Fig. 9

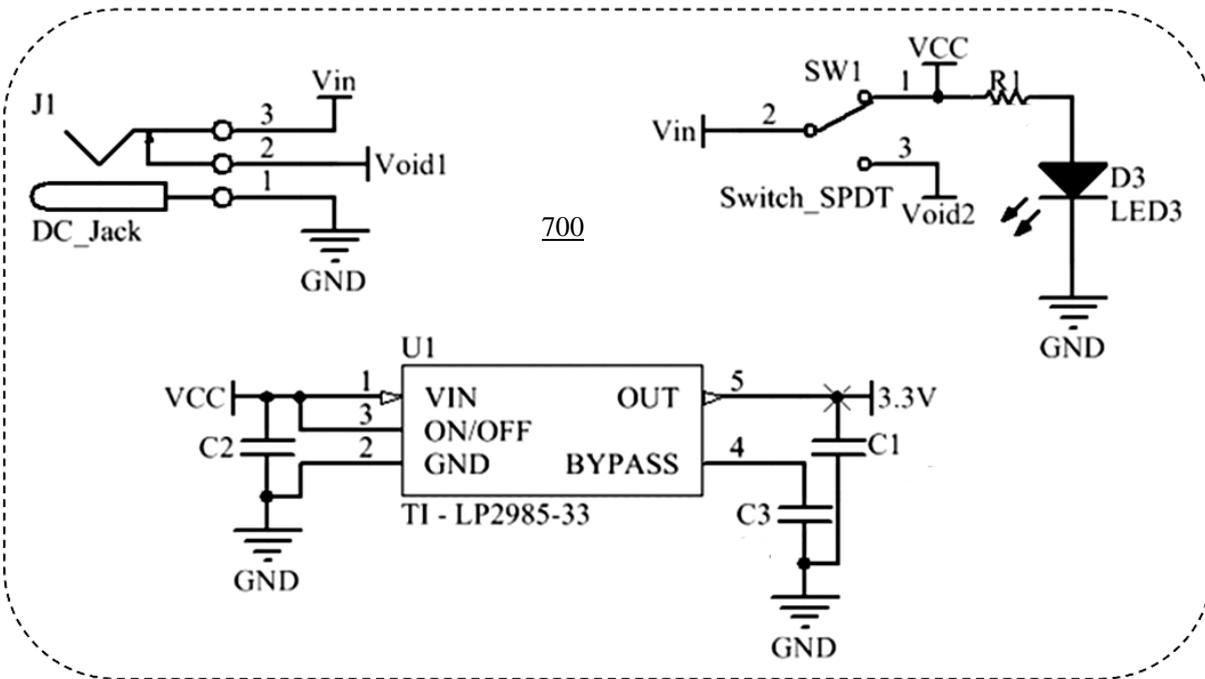


Fig. 10

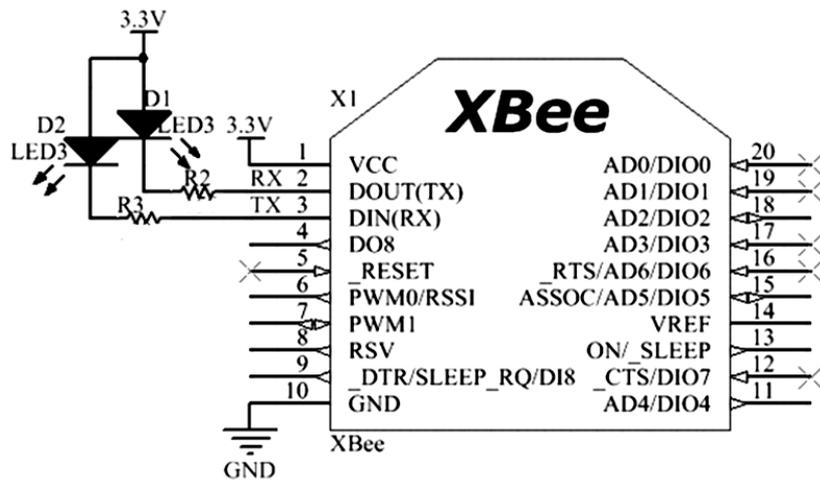


Fig. 11