

# WT-EVK6ULX Hardware User Manual

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V0.9	2019/01/10	Create
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## 1. Introduction

WT-EVKSOM6ULX is a develop board based on WT-SOM6ULX module, which adopts the NXP's i.MX6ULL SOC. The board can used as an evaluation board for WT-SOM6ULX module and a mainboard for general HMI product as well. The embedded Linux OS and Qt SDK are well supported on this board.

## 2. Technical Parameter

### 2.1 Hardware Parameter

Table 1 hardware parameter

HW Param	Remarks
CPU	NXP i.MX6ULL ARM 800MHZ, -40~105°C Working Temperature
DDR3	256MB/512MB Optional, default: 256MB
FLASH/EMMC	Support NAND FLASH from 128MB to 8GB。 Or EMMC 4GB~32GB Default: 256MB NAND FLASH
Ethernet	1x RJ45, 10M/100Mbps adaptive。
USB	2x USB 2.0 Host (1 with PH-4P connector), 1x Usb Device (MicroUSB)
RS485	1x RS485 with electronic protection。
RS232	2x RS232 with electronic protection, one is for Linux terminal
Audio	1x 3.5mm Headphone, supporting CTIA standard , supporting audio recording; 2x 8ohm 1W Speaker (PH2.0 2Pin)
SD Card	1x Micro SD Card。
LCD	Supporting from 4.3inch to 10.1 inch LCD for RGB interface, resolution up to 1366*768 @60HZ. 1x 40Pin 0.5mm FPC (upright) ,supporting general 4.3 and 5 inch LCD 1x 50Pin 0.5mm FPC, supporting general 7 and 10.1 inch LCD
Resistive Touch	4-wire resistive touch panel supported, with FPC-4P by 1mm pitch
Capacitive Touch	1x Capacitive Touch interface of IIC, with FPC-6P 0.5mm pitch
Reset Button	1x
Power Button	1x Supporting long press on/off
Buzzer	1x
WIFI&Bluetooth	Supporting RT8723BU WIFI/BT module, SMA-K antenna header on board.
Extend Header	2x, Extending up to 30 CPU pins by two 2.54mm pitch header
RTC	Independent RTC IC with rechargeable battery
LED Indicator	2x One power indicator and one system indicator controlled by I/O 。
Power Supply	9~12V @1A DC by 5.5*2.1 DC header

## 2.2 Electronic Parameter

**Table 2 electronic parameters table**

Power supply range	9V~12V @1A DC
Rated power	<0.4W (screen not included)
Power protection	Overvoltage protection
Interface protection (RS485,RS232)	Group pulse± 1KV, ESD air 8KV, contact 4KV
Environmental protection	RoHS

## 2.3 Environment

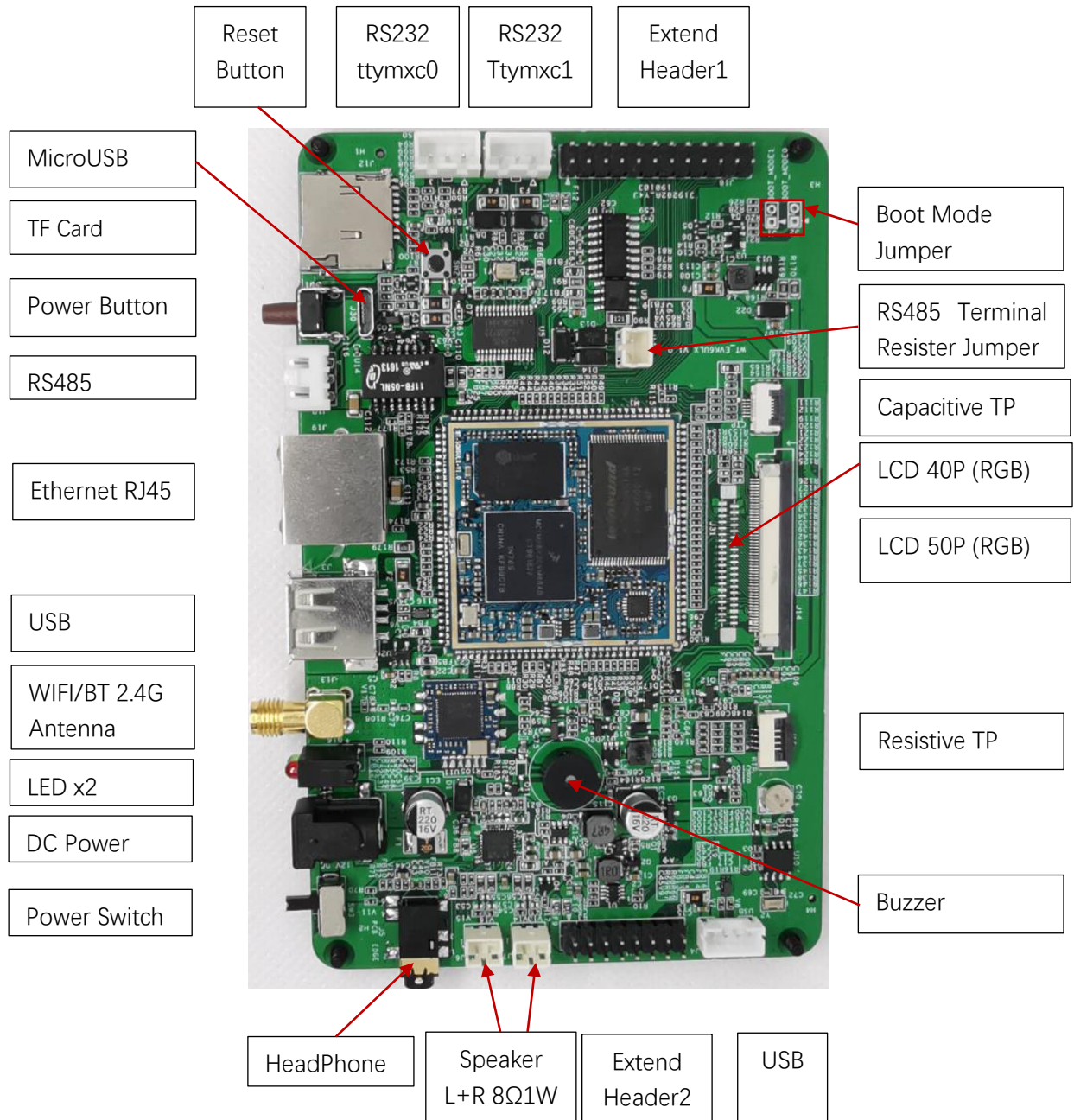
**Table 3. Use environment parameter table**

Working Temperature	-10~70°C
Storage Temperature	-40~85°C
Working relative humidity	10~90%RH (non-condensing)

## 3 Interface Introduction

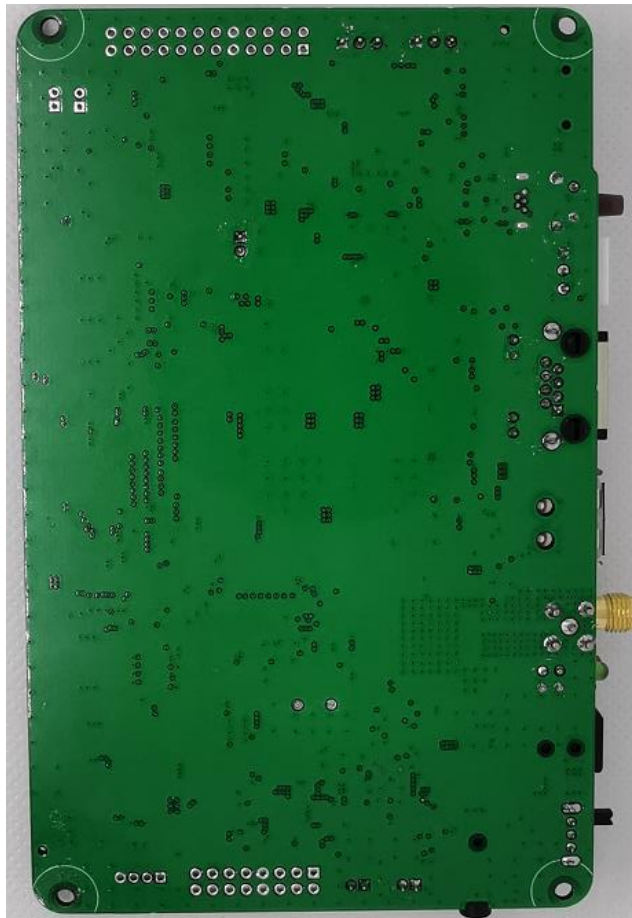
### 3.1 PCB interface

#### 3.1.1 PCB interface on top side



Picture1. PCB interface on top side

### 3.1.2 PCB bottom side



Picture2. PCB bottom side

## 3.2 Power interface

Default power supply 9~12V@1A DC, default use standard 5.5x2.1mm DC socket.

## 3.3 TF card interface

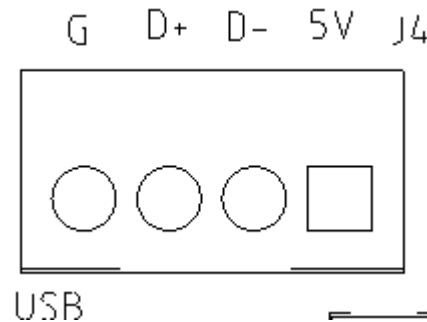
Support standard MicroSD memory card, support FAT , EXT etc. file system, maximum 32GB.

i.MX6ULL when the core board NAND FLASH/EMMC has no bootable program, default started from SD/TF card.

## 3.4 USB interface

Have 2xUSB2.0, support standard USB storage disk and other devices. Offer 5V@1A power supply capability. The USB interface is extended to 3 channels by the USB HUB chip, one of which is connected to the external USB plug-and-play device through

the USB HOST socket, one channel is led out through the PH-4P socket (J4), and the third channel USB is used to connect the WIFI/BT module. The J4 pin is defined as follows:



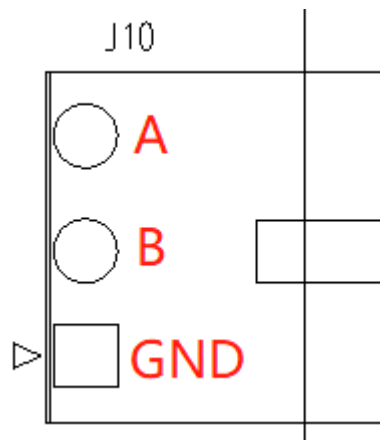
Picture3. J4 USB extend interface pin definition

### 3.5 Ethernet interface

1x Ethernet interface, 100M/10Mbps adaptive.

### 3.6 RS485 interface

RS485 interface (J10) use XH-3P connector extension, pin definition as below:



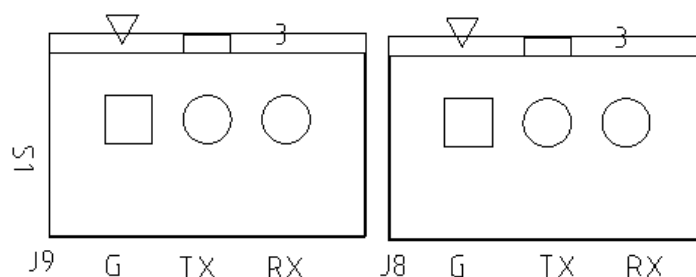
Picture4. RS485 interface pin diagram

Table 4. RS485 interface pin definition

Pin number	Definition	Description
3	A	RS485 use self-controlled direction by default, up to 115200bps
2	B	
1	G	RS485 GND

RS485 use i.MX6ULL UART3, in Linux system correspond /dev/ttymx2 device node.

### 3.7 RS232 interface



Picture5. RS232 interface pin diagram

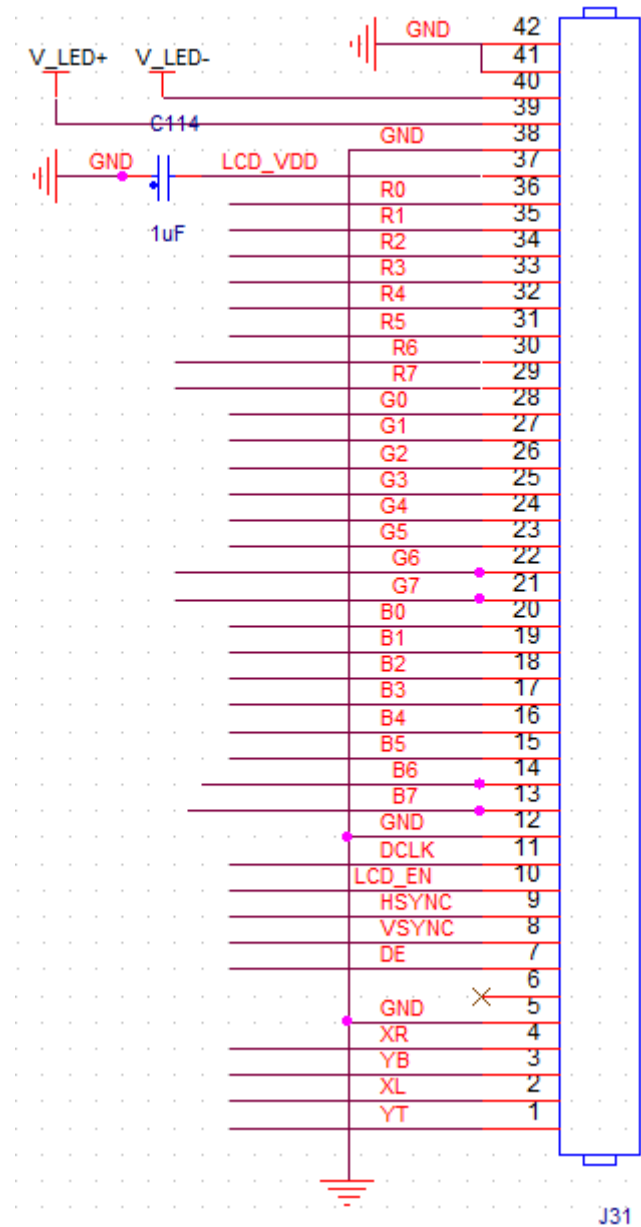
Table 5. RS232 interface pin definition

Pin number	Definition	Description
J8.1	GND	Power Gnd
J8.2	S1_TXD	/dev/ttymxc0 TXD (UART1)
J8.3	S1_RXD	/dev/ttymxc0 RXD (UART1)
J9.1	GND	Power Gnd
J9.2	S2_TXD	/dev/ttymxc1 TXD (UART2)
J9.3	S2_RXD	/dev/ttymxc1 RXD (UART2)

### 3.8 40Pin LCD interface

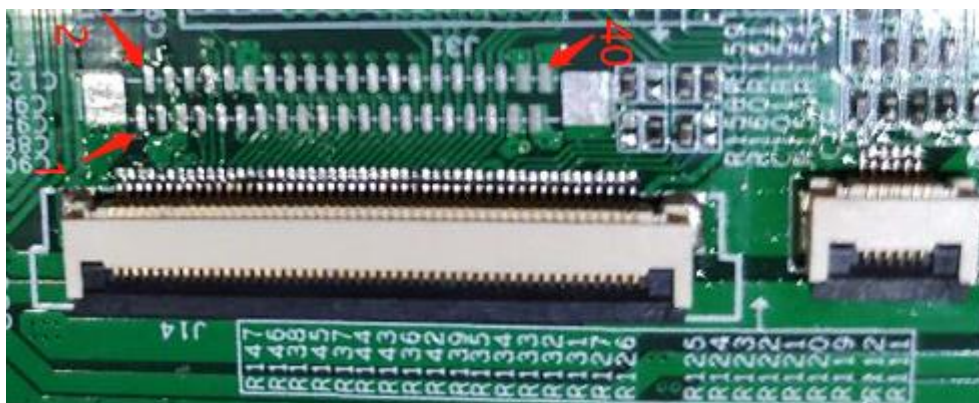
J31 40Pin RGB LCD interface uses a vertical SMD FPC connector, can connect most 40Pin RGB interface's 4.3 inches and 5 inches LCD screen, in the pin definition, in addition to LCD signal, there are four-wire resistor TP signals included.





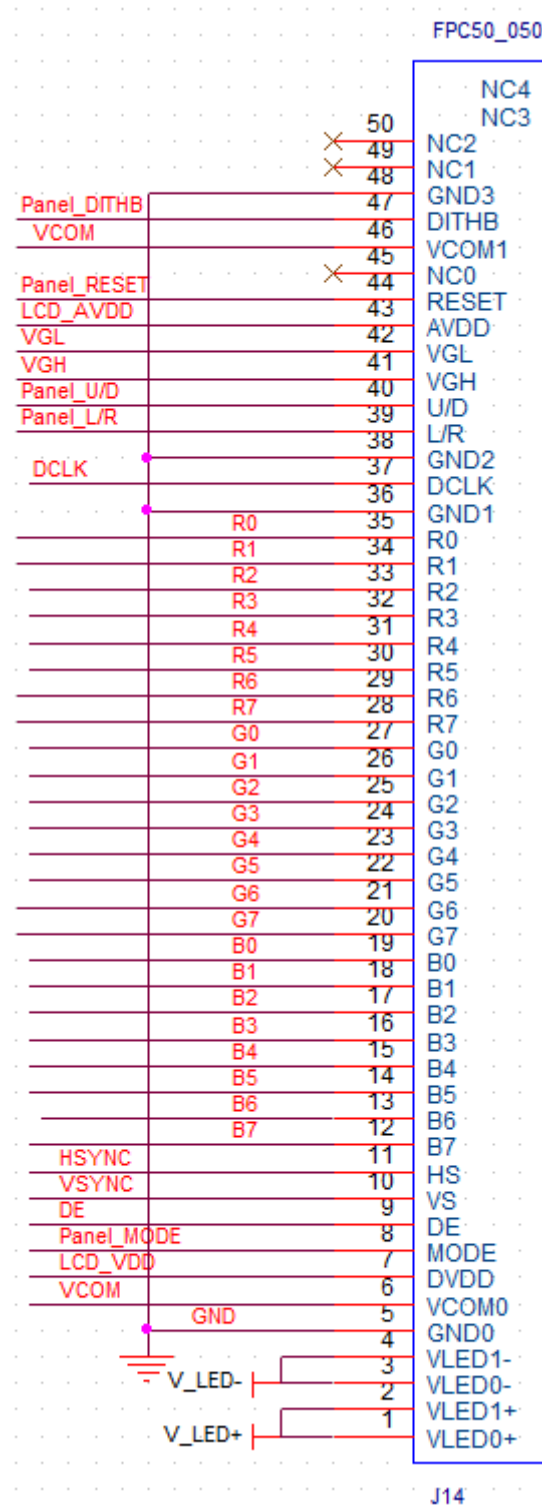
Picture6. 40Pin LCD FPC connector pin connection schematic

J17 uses vertical SMD FPC, pin 1 is shown below:

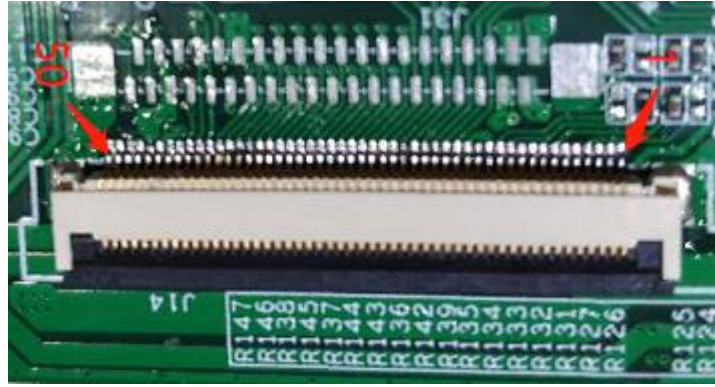


Picture7. 40Pin LCD FPC connector pin direction

### 3.9 50Pin RGB LCD interface

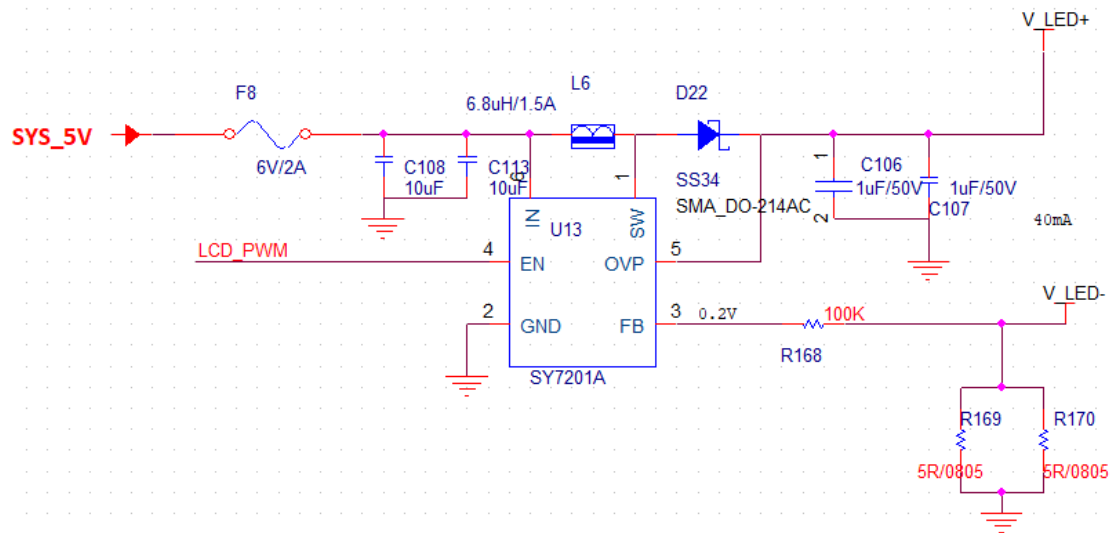


Picture8. 50Pin LCD FPC connector pin connection schematic



Picture9. 50Pin LCD FPC connector pin direction

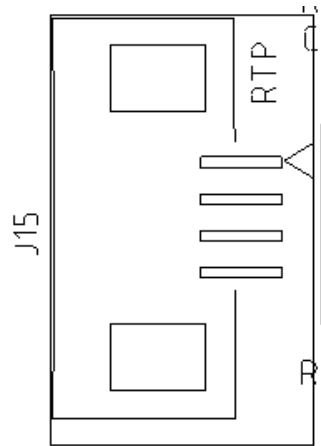
The 50Pin LCD FPC connector is suitable for most 7inch and 10.1inch RGB interface LCD screens. The backlight brightness of different screens can be adjusted by modifying the R142 and R143 resistor sizes. The circuit diagram of the backlight part is as follows:



$$I_{LED} = 0.2V / (R169 || R170)$$

According to the above calculation formula (above), the backlight current of different screens can be adjusted by adjusting the R69 and R170 resistors.

### 3.10 RTP (Resistive Touch Panel) interface



Picture10. RTP FPC-4P pin definition diagram

The four-wire RTP interface (J15) uses FPC-4P 1mm pitch carrier, pins are defined as follows:

Pin number	Pin definition	Description
Pin1	XR	Resistance TP X direction right sampling signal
Pin2	YB	Resistance TP X direction down sampling signal
Pin3	XL	Resistance TP X direction left sampling signal
Pin4	YT	Resistance TP X direction up sampling signal

### 3.11 WIFI antenna

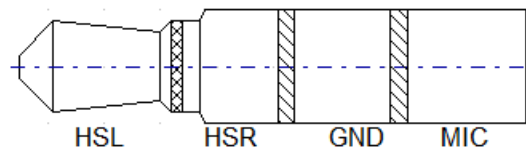
The circuit board use SMA female connector, can match a male 2.4G WIFI antenna, generally is a sucker antenna.



### 3.12 HP headphone socket

The earphone holder is fitted with CTIA standard (national standard) 4 sections 3.5mm headphone connector. The headphone connector is defined as follows:

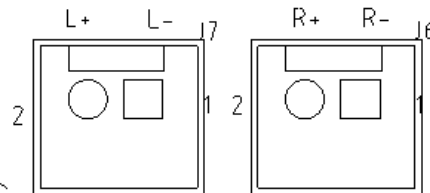
## 3.5mm POLE



Picture11. 3.5mm headphone definition diagram

### 3.13 Speaker interface

The circuit board connects to the two-channel speaker interface through two PH 2mm 2P connectors (J6, J7), each channel supports 8ohm 1W speakers. The speaker interface pins are defined as follows:

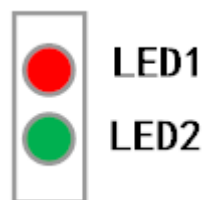


Picture12. Speaker interface pin definition

Table 7. Speaker pin assignment

Pin number	Pin definition	Description
J6.1	SPK_R-	Right channel
J6.2	SPK_R+	
J7.1	SPK_L-	Left channel
J7.2	SPK_L+	

### 3.14 LED indicator



Picture13. LED indicator definition

Table 8. LED indicator definition description list

LED	Usage	Description
LED1	PWR	power on/off indicator
LED2	SYSTEM	system running indicator