SYSOLUTION

LCD Controller L20

Product Specifications

Version： Ver.1.1

Statement

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Update Record

No.	Version	Remark	Date
1	Ver.1.0	Initial Release	2020.04.01
2	Ver.1.1	Parameters change	2020.11.16

Note: The contents of the document are subject to change without notice.

Functions

The L20 panel integrates multimedia decoding, LCD driver, Ethernet, HDMI, WIFI, 4G, and Bluetooth in one, supports most of the current popular videos and picture format decoding, supports HDMI video output / input, dual 8 / 10-bit LVDS The interface and EDP interface can drive a variety of TFT LCD displays, greatly simplifying the whole machine system design. The TF card and the SIM card seat with lock are more stable and are very suitable for high-definition network playback box, video advertising machine and frame advertising machine.

1. High integration: Integrate USB / LVDS / EDP / HDMI / Ethernet / WIFI / Bluetooth in one, simplify the design of the whole machine, and can insert TF card;

2. Save labor costs: Built-in PCI-E 4G module, support a variety of PCI-E 4G modules such as Huawei, Longshang are more suitable for remote maintenance of all-in-one advertising machines, saving labor costs;

3. Rich expansion interfaces: 6 USB interfaces (4 pins and 2 standard USB ports), 3 available extended serial ports, GPIO/ADC interface, can meet the requirements of various peripherals on the market;

4. High-definition: Maximum support 3840 × 2160 decoding and various LVDS/EDP interface LCD display;

5. Complete functions: Support horizontal and vertical screen playback, video split screen, scrolling subtitles, timer switch, USB data import and other functions;

6. Convenient management: Humanized playlist background management software, which is convenient for advertising playback management and control. Play log, easy to

understand the playback situation.

Product Appearance

Product Parameters

Main Hardware Indicators	
CPU	Rockchips RK3288 The strongest quad-core 1.8GHz Cortex-A17 Four nuclear GPU Mail-T764
Memory	2G(Default) (Highest 4G)
Built-in Memory	EMMC 16G(Default)/32G/64G (Optional)
Built-in ROM	2KB EEPROM
Decoding Resolutions	Highest support 3840*2160
Operating System	Android 7.1
Play Mode	Support multiple playback modes such as loop, timing, insertion and so on
Network Support	4G, Ethernet, support WiFi/ Bluetooth 4.0, wireless peripheral extension
Video Playback	Support MP4 (.H.264、MPEG、DIVX、XVID) Format
USB2.0 Interface	2 USB HOST、4 USB Sockets
Mipi Camera	24pin FPC interface，Support 1300w Camera (Optional)
Serial Port	3 default serial port COM Sockets(can change to RS232 or 485)
GPS	External GPS (Optional)
WIFI、BT	Built-in WIFI，BT4.0 (Optional)
4G	4GBuilt-in 4G module communication (Optional)
Ethernet	1，10M/100M/1000M Adaptive Ethernet
TF Card	Support TF card

LVDS Output	1 single/dual port, can directly drive 50/60Hz LCD screen
EDP Output	Can directly drive EDP interface LCD screen with multiple resolutions
HDMI Output	1, support 1080P@120Hz，4kx2k@60Hz output
Audio and Video Output	Support left and right channel output, built-in dual 8R/5W power amplifier
RTC Real Time Clock	Support
Timing Switcher	Support
System Upgrade	Support SD card/Computer update

Interface Parameters/Definitions
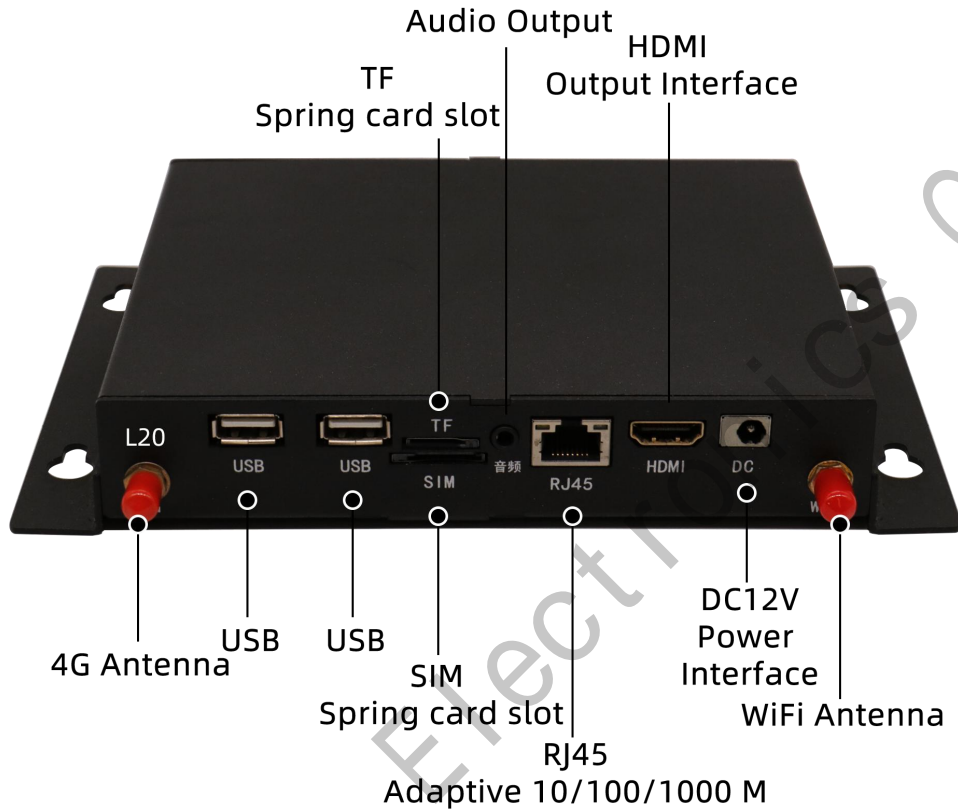
The following is the definition of the built-in socket interface

◆ **CON12   UART0-TTL Interface   (2.00MM Vertical Socket)**

Serial number	Definition	Attribute	Description	
1	VCC-3.3V	Power Output	VCC-3.3V	
2	UART0_TX	Output	UART0_TX	
3	UART0_RX	Input	UART0_RX	
4	GND	Ground	Ground	

◆ **CON33　UART-TTL / RS232 Interface　(2.00MM Horizontal Socket)**

Serial number	Definition	Attribute	Description	
1	VCC-3.3V	Power Output	VCC-3.3V	
2	UART_TX	Output	Data output, connect to RX pin of external device	The square hole at the arrow is the first PIN
3	UART_RX	Input	Data output, connect to TX pin of external device	
4	GND	Ground	Ground	

◆ **CON34　UART-TTL / RS232 Interface　(2.00MM Horizontal Socket)**

Serial number	Definition	Attribute	Description	
1	VCC-3.3V	Power Output	VCC-3.3V	The square hole at the arrow is the first PIN
2	UART_TX	Output	Data output, connect to RX pin	

			of external device	
3	UART_RX	Input	Data output, connect to TX pin of external device	
4	GND	Ground	Ground	

1：This serial port can be adjusted by hardware, and configured as TTL/RS232 for data connection with external device;

2：TTL output is used by default, and the port number is UART4.

◆ **CON46　　UART-TTL / RS485 Interface　　(2.00MM Horizontal Socket)**

Serial number	Definition	Attribute	Description	
1	VCC-3.3V	Power Output	VCC-3.3V	
2	UART_TX / A	Output	Data output, connect to RX pin of external device	The square hole at the arrow is the first PIN
3	UART_RX / B	Input	Data output, connect to TX pin of external device	
4	GND	Ground	Ground	

1：This serial port can be adjusted by hardware, and configured as TTL/RS485 for data connection with external device;

2：TTL output is used by default, and the port number is UART0.

3：This socket shares the serial port PIN with the Bluetooth module. If you need to use the Bluetooth function, this socket is not used. This socket is used by default, and without Bluetooth.

◆ **CON41 SPK-OUT Interface (2.00MM Horizontal Socket)**

Serial number	Definition	Attribute	Description	
1	LOUTP	L output is positive	Speaker amplifier output is positive	
2	LOUTN	L output is negative	Speaker amplifier output is negative	The square hole at the arrow is the first PIN
3	ROUTN	R output is negative	Speaker amplifier output is negative	
4	ROUTP	R output is positive	Speaker amplifier output is positive	

1：This is the dual speakers connection. When using a single speaker, it is a group of PIN and PIN 2, and a group of PIN 3 and PIN 4, which can not be mistaken;

2：For the use of the speaker, it is necessary to connect the speaker first and then turn it on. 8R speaker is used by default;

3：The power amplifier chip can support up to 2*8R/10W. Note the matching range of the speaker used, it is recommended that the rated power of the speaker can reach more than 3W.

◆ **CON43 USB-HOST** Interface **(2.00MM Horizontal Socket)**

Serial number	Definition	Attribute	Description	
1	GND	Ground	Ground	The square hole at the arrow is the first PIN
2	DP	Data is positive	The data single is positive, connect the USB_DP pin of the external device	
3	DM	Data is negative	The data single is negative, connect the USB_DM pin of the external device	
4	VCC-5V	Power Output	Power cord	

1： Use either this socket or PCI_E socket. If you need to use 3G/4G equipment, this socket can not be connected to other equipment;

2： It is recommended to use other sockets first, if necessary, use this socket last.

◆ **CON37 USB-HOST Interface (2.00MM Horizontal socket)**

Serial number	Definition	Attribute	Description	
1	GND	Ground	Ground	The square hole at the arrow is the first PIN
2	DP	Data is positive	The data single is positive, connect	

Serial number	Definition	Attribute	Description	
			the USB_DP pin of the external device	
3	DM	Data is negative	The data single is negative, connect the USB_DM pin of the external device	
4	VCC-5V	Power Output	Power cord	

◆ **CON38 USB-HOST Interface (2.00MM Horizontal Socket)**

Serial number	Definition	Attribute	Description	
1	GND	Ground	Ground	
2	DP	Data is positive	The data single is positive, connect the USB_DP pin of the external device	
3	DM	Data is negative	The data single is negative, connect the USB_DM pin of the external device	The square hole at the arrow is the first PIN
4	VCC-5V	Power Output	Power cord	

◆ **CON39 USB-HOST Interface (2.00MM Horizontal Socket)**

Serial	Definition	Attribute	Description

number				
1	GND	Ground	Ground	
2	DP	Data is positive	The data single is positive, connect the USB_DP pin of the external device	
3	DM	Data is negative	The data single is negative, connect the USB_DM pin of the external device	
4	VCC-5V	Power Output	Power cord	

1：This socket extends directly from the main control, it is recommended to exchange a large number of devices to connect this socket first.

◆ **J56   USB OTG Function Optional Socket   (2.00MM Horizontal Pin)**

Serial number	Definition	Attribute	Description	
1	GND	Ground	Ground	
2	OTG-SEL	Optional Pin	USB function selection output	

1：After this jumper cap is connected, the external USB port (J12) is the USB-HOST function, and if it is not connected, it is the USB-DRV function;

2：If you use the J12 interface for DEBUG debugging, please remove this jumper cap.

For example, when connecting a mouse and other devices, this jumper cap must be connected. The default is connected.

◆ **CON35　Power-DC12V-IN Interface　(2.54MM Horizontal Socket　Red)**

Serial number	Definition	Attribute	Description	
1	DC12V-IN	Power Input	12V Power input	
2	DC12V-IN	Power Input	12VPower input	
3	GND	Power Ground	Power Ground	The square hole at the arrow is the first PIN
4	GND	Power Ground	Power Ground	
5	5VSTB	Signal Input	STB Power input	
6	STB	Signal Output	STB Signal output	

1：When using the built-in power input, connect to this socket;

2：The STB function needs external power strip support before it can be used;

3：The power supply voltage is 12V input, the use range is acceptable between 9V-14V, do not use a power adapter that exceeds this range.

◆ **CON45　GPIO Signal Output　(2.00MM Horizontal Socket)**

Serial number	Definition	Attribute	Description	
1	GND	Ground	Ground	
2	GPIO1	Input/Output	GPIO1 Interface input / Output interface	The square hole at the arrow is the first PIN
3	GPIO2	Input/Output	GPIO2 Interface	

NO.	Define	Attribute	Describe	
			input / Output interface	
4	GPIO3	Input/Output	GPIO3 Interface input / Output interface	
5	GPIO4	Input/Output	GPIO4 Interface input / Output interface	
6	VCC-3.3V	Power Output	VCC-3.3V	

1：The default configuration is GPIO port to use.

◆ **CON42 KEY External Socket Interface（2.00MM Horizontal Socket)**

NO.	Define	Attribute	Describe	
1	POWEN	Input	System startup button	
2	RESET	Input	Reset signal interface	
3	KEY	Input	KEY extension interface（Up to 7 keys can be extended）	
4	GND	Ground	Ground	

1 ： The configuration of the button can be adjusted, depending on the actual communication needs.

◆ **CON52 CTP Socket Interface （2.00MM Horizontal Socket)**

Serial number	Definition	Attribute	Description	
1	GND	Ground	Ground	The square hole at the arrow is the first PIN
2	RST	Input/Output	CTP Reset	
3	INT	Input/Output	CTP Interrupt	
4	I2C-SCL	Input/Output	I2C Clock signal	
5	I2C-SDA	Input/Output	I2C Data signal	
6	VCC-3.3V	Power output	VCC-3.3V	

◆ **CON22　Backlight Inverter Control Interface　(2.00MM Horizontal Socket)**

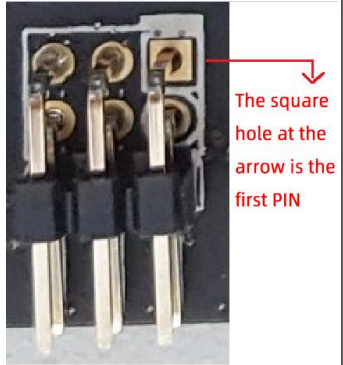| Serial number	Definition	Attribute	Description	
1	BL-12V_IN	Power Input	12V Backlight power output, 12V power supply is directly connected to the external adapter, and the current depends on the current of the adapter	The square hole at the arrow is the first P
2	BL-12V_IN	Power Input		

3	ON / OFF	Control Output	Backlight switch signal, high level effective, software configuration	
4	ADJ	Control Output	LVDS Screen brightness control	
5	GND	Power Ground	Power Ground	
6	GND	Power Ground	Power Ground	

1：Pay attention to the order of the pins, not reverse.

2：For models that do not need to use the ADJ function, the ADJ can be left unconnected or connected to ON/OFF, so as to avoid the problem of dark screen. Whether the ADJ is connected high or low, please check the screen specifications.

◆ J57　EDP_LOGIC Power Input Optional Socket　(2.00MM Horizontal Pin)

Serial number	Definition	Attribute	Description	
1	BL-3.3V_IN	Power Input	3.3V power input, jumper cap is connected	The square hole at the arrow is the first PIN
2	BL-VCC-OUT	Backlight Output	EDP_LOGIC power output	
3	BL-5.0V_IN	Power Input	5.0V power input, jumper cap is connected	

4	BL-VCC-OUT	Backlight Output	EDP _LOGIC power output	
5	BL-12V_IN	Power Input	12V power input, jumper cap is connected	
6	BL-VCC-OUT	Backlight Output	EDP _LOGIC Power output	

1： When selecting this power supply, you must pay attention to the logic voltage required by the display, and then jump the jumper cap to the corresponding voltage selection PIN, otherwise it will easily burn the display circuit. (For the display voltage, please check the corresponding screen specifications)

◆ **J58 EDP Signal Output (Dual 2.0MM Horizontal Socket)**

Serial number	Definition	Attribute	Description	
1	EDP-VCC_IN	Power Input	Liquid crystal power output, +3.3V /+5V/ +12V optional, optional via J55	
2				
3	GND	Power Ground	Power Ground	
4				
5	EDP-TX0-	Output	Display Port Lane 0	

The square hole at the arrow is the first PIN

			negative output	
6	EDP-TX0+	Output	Display Port Lane 0 positive output	
7	EDP-TX1-	Output	Display Port Lane 1 negative output	
8	EDP-TX1+	Output	Display Port Lane 1 positive output	
9	EDP-TX2-	Output	Display Port Lane 2 negative output	
10	EDP-TX2+	Output	Display Port Lane 2 positive output	
11	EDP-TX3-	Output	Display Port Lane 3 negative output	
12	EDP-TX3+	Output	Display Port Lane 3 positive output	
13	GND	Ground	Ground	
14	GND	Ground	Ground	
15	EDP-AUX-	Output	Port AUX- channel negative signal	
16	EDP-AUX+	Output	Port AUX+ channel positive signal	
17	GND	Ground	Ground	

Serial Number	Definition	Attribute	Description	
18	GND	Ground	Ground	
19	+3.3V	Output	Output voltage	
20	EDP-HPD	Output	Screen hot plug detection signal	

◆ **J55   LVDS_LOGIC Power Output Optional Socket (2.00MM Horizontal Pin)**

Serial Number	Definition	Attribute	Description	
1	BL-3.3V_IN	Power Input	3.3V power input, jumper cap is connected	
2	BL-VCC-OUT	Backlight Output	LVDS_LOGIC power output	
3	BL-5.0V_IN	Power Input	5.0V power input, jumper cap is connected	The square hole at the arrow is the first PIN
4	BL-VCC-OUT	Backlight Output	LVDS_LOGIC power output	
5	BL-12V_IN	Power Input	12V power input, jumper cap is connected	
6	BL-VCC-OUT	Backlight Output	LVDS_LOGIC power output	

1： When selecting this power supply, you must pay attention to the logic voltage required by the display, and then jump the jumper cap to the corresponding voltage selection PIN, otherwise it will easily burn the display circuit. (For the display voltage, please check the corresponding screen specifications)

◆ **J53 LVDS Signal Output（Dual 2.0MM Horizontal Socket） Support dual channel 10-bit LVDS**

Serial Number	Definition	Attribute	Description
1	LCDVCC-IN	Power Input	Liquid crystal power output, +3.3V /+5V/ +12V optional, optional via J55
2			
3			
4	GND	Power Ground	Power Ground
5			
6			
7	RXO0-	Output	Pixel0 Negative Data (Odd)
8	RXO0+	Output	Pixel0 Positive Data (Odd)
9	RXO1-	Output	Pixel1 Negative

			Data (Odd)	
10	RXO1+	Output	Pixel1 Positive Data (Odd)	
11	RXO2-	Output	Pixel2 Negative Data (Odd)	
12	RXO2+	Output	Pixel2 Positive Data (Odd)	
13	GND	Ground	Ground	
14	GND	Ground	Ground	
15	RXOC-	Output	Negative Sampling Clock (Odd)	
16	RXOC+	Output	Positive Sampling Clock (Odd)	
17	RXO3-	Output	Pixel3 Negative Data (Odd)	
18	RXO3+	Output	Pixel3 Positive Data (Odd)	
19	RXE0-	Output	Pixel0 Negative Data (Even)	
20	RXE0+	Output	Pixel0 Positive Data (Even)	
21	RXE1-	Output	Pixel1 Negative	

			Data (Even)	
22	RXE1+	Output	Pixel1 Positive Data (Even)	
23	RXE2-	Output	Pixel2 Negative Data (Even)	
24	RXE2+	Output	Pixel2 Positive Data (Even)	
25	GND	Ground	Ground	
26	GND	Ground	Ground	
27	RXEC-	Output	Negative Sampling Clock (Even)	
28	RXEC+	Output	Positive Sampling Clock (Even)	
29	RXE3-	Output	Pixel3 Negative Data (Even)	
30	RXE3+	Output	Pixel3 Positive Data (Even)	
31	RXO4-	Output	Pixel4 Negative Data (Odd)	
32	RXO4+	Output	Pixel4 Positive Data (Odd)	
33	RXE4-	Output	Pixel4 Negative	

Serial Number	Definition	Attribute	Description	
			Data (Even)	
34	RXE4+	Output	Pixel4 Positive Data (Even)	

◆ J17　HDMI_IN Interface（FPC Socket 0.5MM Horizontal Socket）Screen

Serial Number	Definition	Attribute	Description	
1	I2C-SCL	Output	SCL Signal	
2	I2C-SDA	Output	SDA Signal	
3	I2S-SDI	Output	I2S group signal	
4	I2S-CLK	Output	I2S group signal	
5	I2S-SCLK	Output	I2S group signal	
6	I2S-LRCK	Output	I2S group signal	
7	RST	Ground	Reset signal	
8	HDMI-IR	Ground	To be determined	
9	STBY	Output	Standby control	
10	INT	Output	Interrupt signal	
11	CLKP	Output	Mipi Clock channel is positive	
12	CLKN	Output	Mipi Clock channel is negative	
13	D3P	Output	Mipi Data channel 3 is positive	

14	D3N	Output	Mipi Data channel 3 is negative	
15	D2P	Output	Mipi Data channel 2 is positive	
16	D2N	Output	Mipi Data channel 2 is negative	
17	D1P	Output	Mipi Data channel 1 is positive	
18	D1N	Output	Mipi Data channel 1 is negative	
19	D0P	Ground	Mipi Data channel 0 is positive	
20	D0N	Ground	Mipi Data channel 0 is negative	
21	GND	Output	Ground	
22	GND	Output	Ground	
23	PWREN	Output	Power enable	
24	VCC	Output	5V output	

◆ **CON32　Microphone Input Interface　(2.00MM Horizontal Socket)**

Serial Number	Definition	Attribute	Description	
1	MICP	Signal input is	Microphone is	The square hole at the arrow is the first PIN

Serial Number	Definition	Attribute	Description	
		positive	positive	
2	MICN	Signal input is negative	Microphone is negative	

1：When connecting the microphone, be careful not to reverse its polarity.

◆ **J16   Camera Interface   (FPC Socket 0.5MM Horizontal Socket)**

Serial Number	Definition	Attribute	Description
1	NC	/	/
2	VDD	Power	2.8V Output
3	DVDD	Power	1.2V Output
4	DOVDD	Power	1.8V Output
5	NC	/	/
6	GND	Ground	Ground
7	VDD	Power	2.8V Output
8	GND	Ground	Ground
9	I2C3_SDA	Input/Output	SDA Signal
10	I2C3_SCL	Output	SCL Signal
11	RST	Output	Reset signal
12	PWDN	Output	Power control
13	GND	Ground	Ground
14	MCLK	Output	Master clock
15	GND	Ground	Ground

16	D3P	Input/Output	Mipi Data channel 3 is positive	
17	D3N	Input/Output	Mipi Data channel 3 is negative	
18	GND	Ground	Ground	
19	D2P	Input/Output	Mipi Data channel 2 is positive	
20	D2N	Input/Output	Mipi Data channel 2 is negative	
21	GND	Ground	Ground	
22	D1P	Input/Output	Mipi Data channel 1 is positive	
23	D1N	Input/Output	Mipi Data channel 1 is negative	
24	GND	Ground	Ground	
25	CLKP	Input/Output	Mipi Clock channel is positive	
26	CLKN	Input/Output	Mipi Clock channel is negative	
27	GND	Ground	Ground	
28	D0P	Input/Output	Mipi Data channel 0 is positive	

Serial number	Definition	Attribute	Description	
29	D0N	Input/Output	Mipi Data channel 0 is negative	
30	GND	Ground	Ground	

◆ **CON44 Two-color LED and Infrared IR Interface (2.00MM Horizontal Socket)**

Serial number	Definition	Attribute	Description	
1	LED_ RED	Output	LED light positive pole, system running status indicator light	
2	GND	Power Ground	Power Ground	
3	LED_ BLUE	Output	LED light positive pole, system shutdown status indicator light	The square hole at the arrow is the first PIN
4	IRVCC-3V3	Power Input	Remote power output	
5	GND	Power Ground	Power Ground	
6	IR-IN	Signal Input	IR Signal input	

1： The default configuration is to use a common cathode LED lamp. If a common anode lamp is used, the common pin of the LED lamp can be connected to the 3rd PIN as the power input when making an extension cable. Note that after this connection

method , the status of the lamp will change, and need to update the software configuration;

2：The remote control supports the function of hard switching machine. The remote start button needs software configuration or the remote control code value can be used after learning to match;

3：Remote learning operation: In the shutdown state, short-circuit the MCU_INT socket, and press the key of the remote control that needs to be adapted to the switch machine on the receiver, then turn it on. After turning on, the machine has learned to switch on and off and you can use this key to switch.

Built-in Socket Interface Parameters		Interface
J3	Standard 12V round head 6.4mm aperture, 2.0mm internal needle, positive inside and negative outside	
J15	Standard TF card interface definition	
J8	Standard type A HDMI socket definition	
J6	Standard 100M RJ45 socket definition (without light)	
J12	Standard USB2.0 horizontal socket definition	
J20	Standard USB2.0 horizontal socket definition	
J59	Standard external earphone audio source socket definition	
SIM1	Standard SIM card interface definition	

Card Installation Dimensions
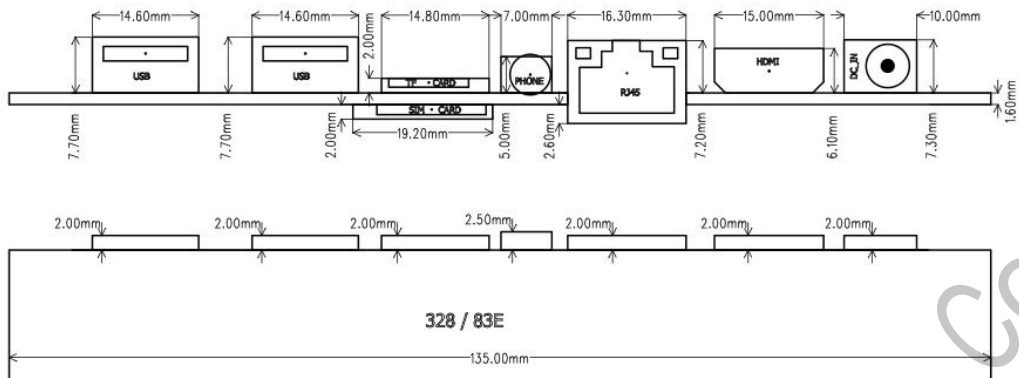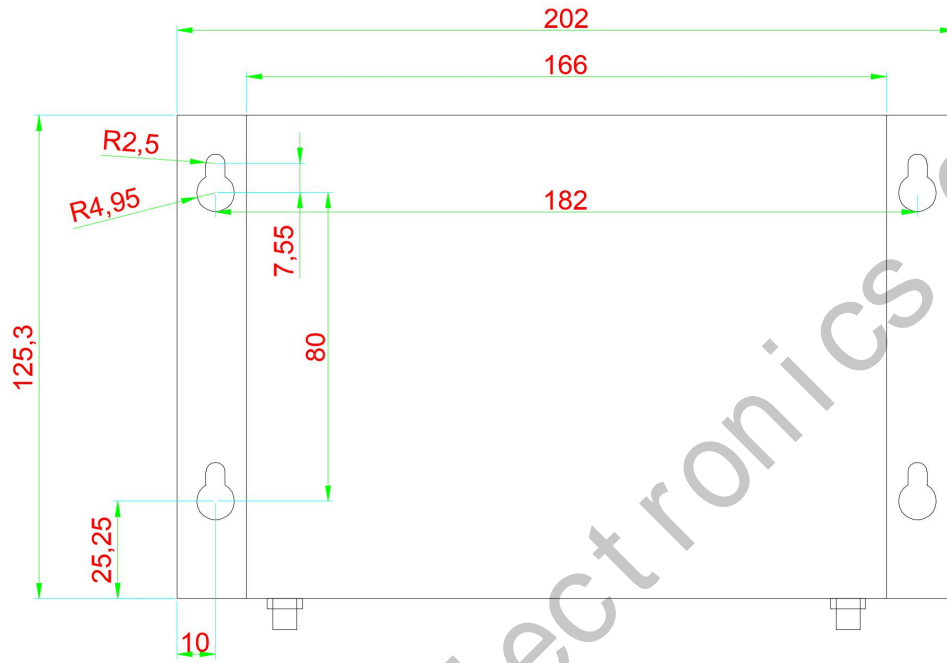

External Interface Thickness Dimension Drawing
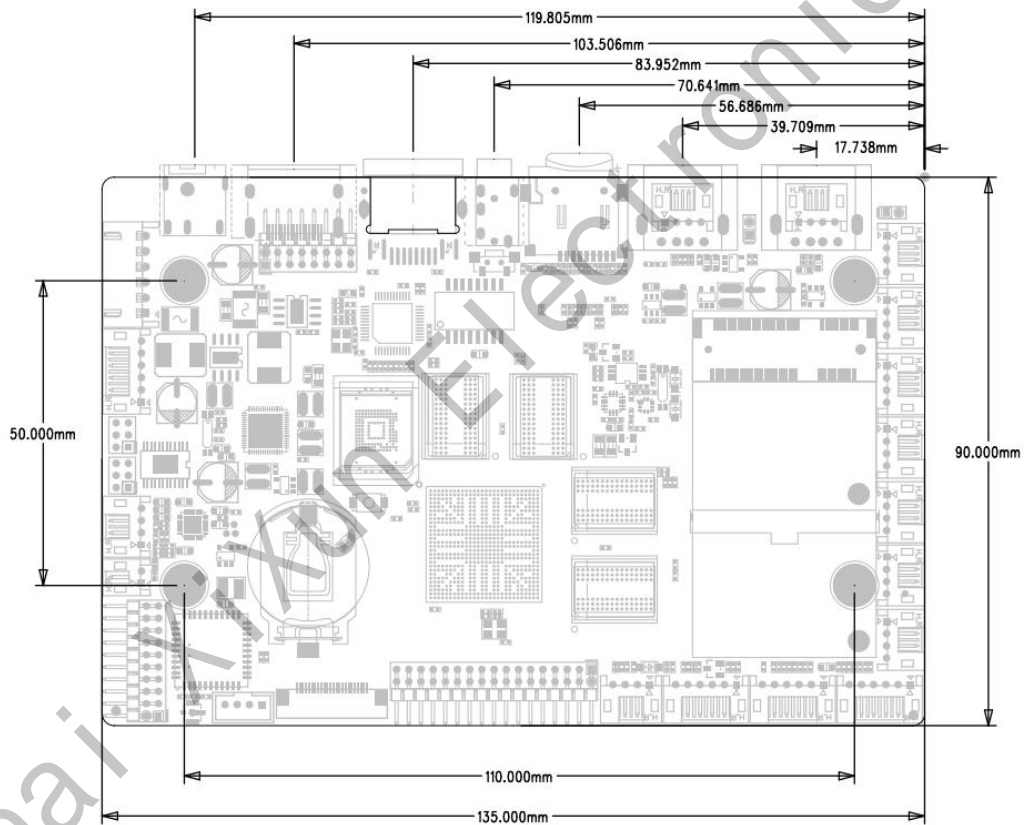
Dimensions

PCB：6 board

Size：135mm*90mm, Board thickness 1.6mm

Screw hole specification：φ3.0mm x 4

Box Installation Dimensions

202

166

R2,5

R4,95

182

7,55

80

125,3

25,25

10

Unit：mm

Cautions

1. Forbidden to disassemble and assemble the product by yourself.

2. Forbidden to plug and unplug the antenna with power on.