SYSOLUTION

LCD Controller L16

Specification Product

Version：Ver.1.2

Statement

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Update Record

No.	Version	Updates	Revision Date
1	Ver.1.0	Initial Release	2024.06.25
2	Ver.1.1	Add a size diagram	2024.08.05
3	Ver.1.2	Add content	2024.10.24

The document is subject to change without prior notice.

Product Introduction

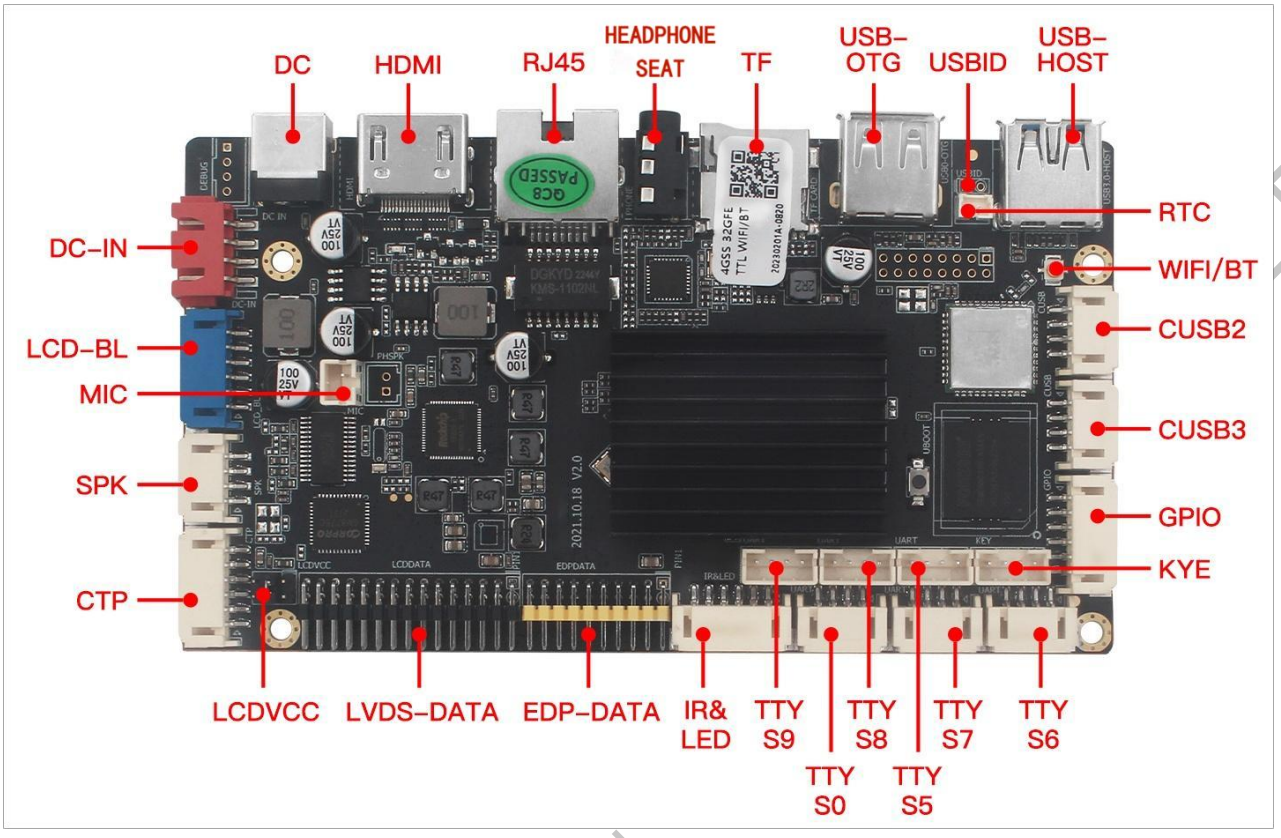
The L16 is powered by a high performance, low power consumption quad-core processor from Rexchip Microelectronics, RK3566, equipped with Android 11, with an up to 1.8GHz main frequency. The embedded 3D GPU makes the RK3566 fully compatible with OpenGL ES 1.1/2.0/3.2, OpenCL 2.0 and Vulkan 1.1.Integrated LVDS, MIPI, 100Gb Ethernet, wifi, Bluetooth, 5W*2 amplifier, TF card expansion, IR remote control, serial port/IO expansion, HDMI output, MIC, backlight power supply, etc., which greatly simplifies the whole machine design.

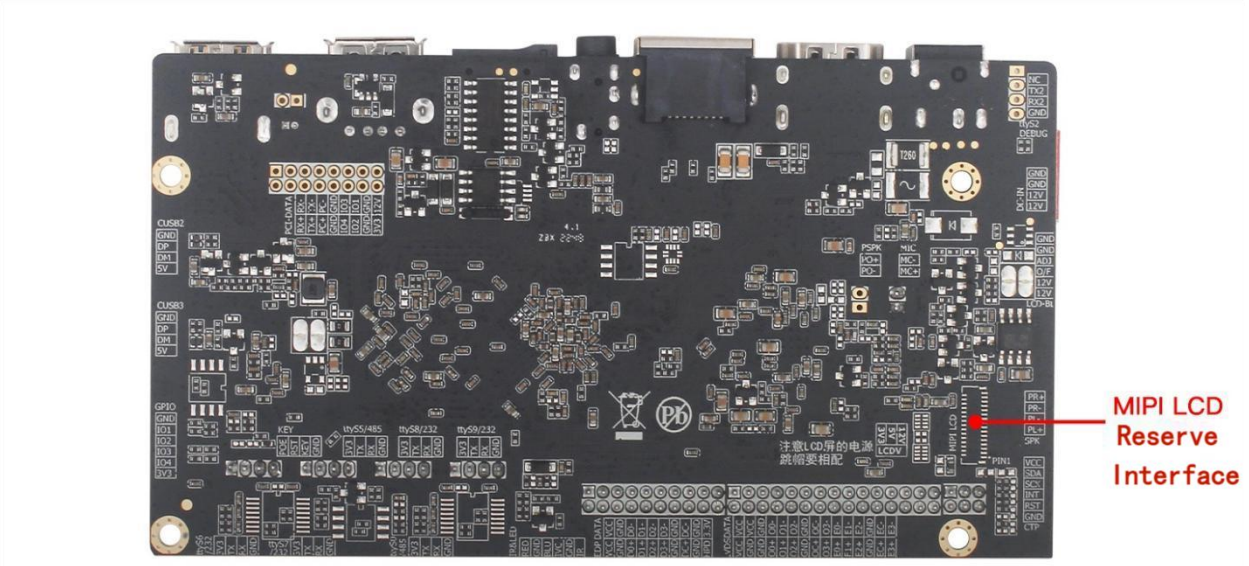
It supports decoding of most of the current popular video and image formats, and can drive various TFT LCD displays, greatly simplifying the whole system design, with stronger stability, and is widely used in AI servers, face payment devices, security, healthcare, transportation, finance, industrial control, intelligent education, smart retail and other AI intelligent fields.

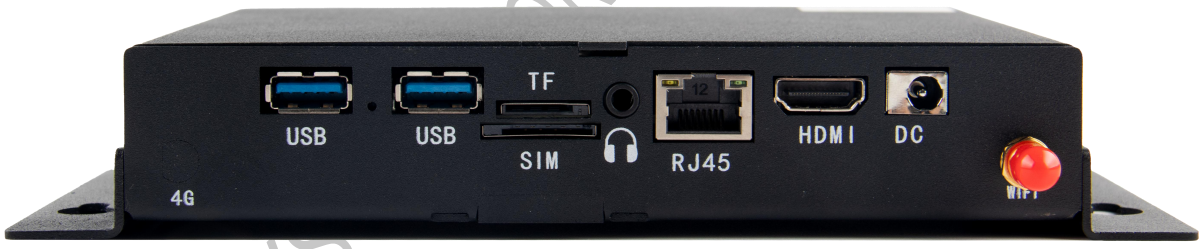
Functions:

1. High integration: integrated USB/LVDS/EDP/HDMI/Ethernet/WIFI/Bluetooth in one, simplify the whole machine design, can be inserted into the TF card.
2. High stability: in the hardware and software, increase the division to develop the technology to ensure the stability of the product, can make the final product to 7 * 24 hours unattended.
3. Rich expansion interface: 4 USB interfaces (2 pins, 1 standard USB3.0, 1 standard USB2.0), 6 expandable serial port, GPIO/ADC interface, can meet the market requirements of a variety of peripherals.
4. High-definition: maximum support for 3840 × 2160 decoding and a variety of LVDS/EDP interface LCD display.
5. Full-featured: support for 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, easy to manage and control the advertisement playback. Playback log, easy to understand the playback situation.

Product Appearance







Note: The above pictures are selected from a batch (a combination of functions) of our base plate to shoot, due to the continuous updating and maintenance of products, the actual shipment of the base plate may not be consistent with the picture, to the customer to get the prototype shall prevail.

Product Parameters

Main hardware parameters	
Mode	Main recommended ：L16(no 4G), L16B-CH (China 4G Global) , L16B-G(Global, recommend) L16B-NA、L16B-EU、L16B-LA（Bulk consider the cost can choose, sample recommended global models）
CPU	Quad-core 64-bit Cortex-A55, up to 1.8 Ghz
GPU	ARM G52 2EE support OpenGL ES 1.1/2.0/3.2、OpenCL 2.0，Vulkan 1.1
Memory	2G/ 4G/8G(Optional)
Built-in Memory	EMMC 16G / 32G /64G/128G(Optional)
Display	Support EDP/HDMI2.0/MIPI/LVDS（Only supports single-screen output display by default）
System	Android 11
Play Mode	Support multiple playback modes such as loop, timing, insertion and so on
Multi-media	Support 4K 60fps H.265/H.264/VP9 1080P 100fps H.265/H.264 video decoding
USB Interface	1 USB 3.0/USB2.0 each, 2 built-in USB sockets
Serial Interface	6 TTL serial sockets (can be changed to RS232 or 485)
LVDS Output	1 single/dual interfaces to directly drive 50/60Hz multi-resolution LCDs
EDP Output	Supports up to 2560*1600 @ 60fps output
HDMI	1pc,support 1080P@120Hz,4kx2k@30Hz output

Output	
CTP Interface	1 way I2C touch screen interface
Audio and Video Outputs	Support left and right channel outputs, built-in dual 8R/5W amplifiers
RTC Real Time Clock	Support
Scheduled on/off Switching	Support
System Upgrade	Support SD card/computer update
Network Support	Support 10/100M/1000M adaptive Ethernet Support WiFi/Bluetooth 4.0, 4G external expansion
Size	126.5mm*70mm/±0.5mm，Plate thickness 1.6mm±10%
Working Environment	Temperature: 0°C to 80°C, recommended 5°C to 35°C, humidity: 10% to 90%, no condensation
Software	LedOK Express、LEDOK Lite

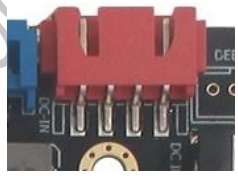
Supported Bands		
Mode	**3G/4G bands (optional)**	**Certification**

L16B-CH	-China（China/India） FDD-LTE：B1/3/5/8 TDD-LTE：B38/39/40/41 TDSCDMA：B34/39 WCDMA：B1/8 CDMA 1X/EVDO：BC0 GSM：B3/5/8	Mandatory certification：SRRC/ NAL/ CCC Other：WHQL
L16B-NA	-North America（North America） FDD-LTE：B2/4/5/7/12/13/17 WCDMA： B2/4/5	Carrier certification：AT&T/ T-Mobile/Rogers/ TelusVerizon/AT&T (FirstNet)/T-Mobile/U.S. Cellular/Rogers/ Telus Mandatory/conformance certification:： FCC/ IC/ PTCRB Other：WHQL
L16B-EU	-Eurasia （ EMEA/Korea/Thailand/India and other Asian countries） FDD-LTE：B1/3/5/7/8/20 TDD-LTE：B38/40/41 WCDMA：B1/5/8 GSM：B3/5/8	Carrier certification：Vodafone/Deutsche Telekom/SKT/ Telefónica Mandatory/conformance certification： GCF/ CE/ KC/ NCC/RCM/ FAC/ NBTC/ICASA Other：WHQL

L16B-LA	-Latin AmericaLatin America /Australia / New Zealand) FDD-LTE：B1/3/5/7/8/28 TDD-LTE：B40 WCDMA：B1/2/5/8 GSM：B2/3/5/8	Mandatory/conformance certification： GCF/ FCC/ Anatel/ NCC/RCM Other：WHQL
L16B-G	-Global（Global） FDD-LTE：B1/2/3/4/5/7/8/12/13/ 18/19/20/25/26/28 TDD-LTE：B38/39/40/41 WCDMA：B1/2/4/5/8/6/19 GSM：Quad-band	Carrier certification：Deutsche Telekom/ Verizon/ AT&T/ Sprint/U.S. Cellular/ Telus Mandatory/conformance certification：GCF/ CE/ FCC/ PTCRB/ IC/ Anatel/IFETEL/ SRRC/ NAL/ CCC/ KC/ NCC/ JATE/ TELEC/ RCM/ NBTC/ IMDA/ICASA Othe：WHQL
L16B-J	-Japan（Japan） FDD-LTE：B1/3/8/18/19/26 TDD-LTE：B41 WCDMA：B1/6/8/19	Carrier certification：NTT DOCOMO/SoftBank/ KDDI Mandatory/conformance certification： JATE/ TELEC Other：WHQL

Interface Parameters/Definitions

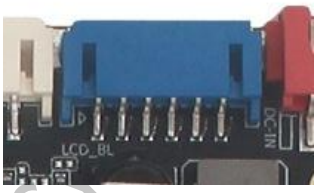
(Power Horizontal Socket 2.54MM)

Serial number	Definition	Attribute	Description	
1	12V	DC12V-IN	12V power input	
2	12V	DC12V-IN	12V power input	
3	GND	Power Ground	Power Ground	
4	GND	Power Ground	Power Ground	

1. Connect to this socket when using the built-in power input;
2. The power supply voltage is 12V input, the use range is acceptable between 9V-14V, don't use the power adapter which exceeds this range.
3. Please be sure to connect the motherboard input power to the power input connector or socket, and evaluate whether the whole board current meets the requirements according to the total peripherals to select the appropriate power adapter;
4. 2.54 Socket single PIN rated current 2.5A, 2PIN seat maximum 5A, please do not exceed this current.

LCD-BL (LVDS Screen Backlight Horizontal Socket 2.00MM)

Serial number	Definition	Attribute	Description

1	BL-12V_IN	Power Output	12V backlight power output, 12V power supply directly backlight board, the size of the current depends on the current of the adapter	
2	BL-12V_IN	Power Output		
3	ON / OFF	Control Output	Backlight panel switch signal, active high	
4	ADJ	Control Output	PWM control of LVDS screen brightness	
5	GND	Power Ground	Power Ground	
6	GND	Power Ground	Power Ground	

1. Pay attention to the order of the feet, can not be connected to the reverse;

2. For models that do not need to use the ADJ function, the ADJ can be directly suspended or connected to the ON/OFF, so as to avoid the problem of screen darkness, the ADJ is connected to the high or low, need to check the screen specifications to determine.

3. EDP backlight control interface definition as above.

LCDVCC（ LVDS Screen Backlight Horizontal Socket 2.00MM)

Serial number	Definition	Attribute	Description	
1	BL-3.3V_IN	Power Input	3.3V power input, jump cap connection	

2	BL-VCC-OUT	Backlight Output	LVDS_LOGIC power output	
3	BL-5.0V_IN	Power Input	5.0V power input, jump cap connection	
4	BL-VCC-OUT	Backlight Output	LVDS_LOGIC power output	
5	BL-12V_IN	Power Input	12V power input, jump cap connection	
6	BL-VCC-OUT	Backlight Output	LVDS_LOGIC power output	

1. After connecting the LCD screen, be sure to pay attention to how much logic voltage is needed for the display, and jump the jump cap to the corresponding voltage selection above the PIN foot, otherwise it is easy to burn out the display circuit. (On the display voltage, please consult the corresponding screen specification) It is very important;

USBID (Power Input Jump-Select Vertical Pin 2.00MM)

Serial number	**Definition**	**Attribute**	**Description**	
1	GND	Ground	Ground	
2	OTG-SEL	Select Foot	USB function status selection	

1. After this jump cap is connected, the external USB port (by the TF card slot) is USB-HOST function, not connected is USB-DRV function.
2. If you are using J12 interface for DEBUG debugging, please remove this jump cap. If you connect the mouse and other devices, this jump cap must be connected, the default

connection.

3. No posting by default

WIFI/BT Antenna Holder

Serial number	Definition	Attribute	Description	
1	GND	Ground	Ground	
2	RF	Signal Input	WIFI,BT Signal Input	

1. Note that the WIFI antenna holder is IPEX-2 generation holder, please match the external antenna bar with the 2 generation female holder.

2. Regarding the connection between the antenna holder and the PCB fixed pad is small. When disassembling, please pay attention to the light buckle to take out, to avoid directly pulling out and lead to the antenna holder and the PCB separation can not be repaired.

MIC (Microphone Standing Socket 2.00MM)

Serial number	Definition	Attribute	Description	
1	MIC+	Mic input +	Microphone Positive	
2	MIC-	Mic input +	Microphone Positive	

1. The MIC+ of the microphone connector and the headphone connector are the same way,

and can only be used in one of the two ways

Headphone Holder (Quad 3.5MM Interface)

Serial number	Definition	Attribute	Description	
1	PL	L-OUT	left channel output	
2	PR	R-OUT	right channel output	
3	SNS	GND	Ground	
4	MIC+		microphone input	

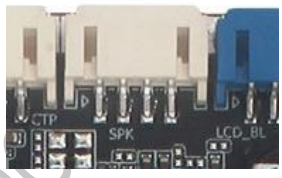
1. The MIC+ of the headphone jack and the microphone 2PIN connector are the same way, only one can be used in either way.

RTC (Battery Vertical Pin 1.25MM)

Serial number	**Definition**	**Attribute**	**Description**	
1	GND	Ground	Ground	
2	RT+	RTC Clock Power Supply	Power supply output, hold system time	

1. External 2032 coin cell battery with extension cable for RTC.

SPK (Speakers Horizontal Sockets 2.00MM)

Serial number	Definition	Attribute	Description	
1	PL+	L output positive	Speaker amplifier output positive	
2	PL-	L output negative	Speaker amplifier output negative	
3	PR-	R output negative	Speaker amplifier output negative	
4	PR+	R output positive	Speaker amplifier output positive	

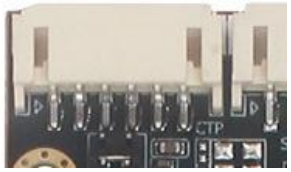
1. This is a double speaker connection, when using a single speaker is PIN1 and PIN2 group, PIN3 and PIN4 group, can not be mistaken;
2. The use of the speaker, need to connect the speaker before switching on, do not allow the use of power unplugging. Default use of 8-ohm speakers;
3. Speaker interface power output characteristics (limit conditions: TA = 25 ℃, DC = 12.0V)
4. Amplifier chip default 2 * 8 ohm / 5W, pay attention to the use of the speaker matching interval. It is recommended that the speaker rated power can be achieved in more than 3W. Chip can support up to 2 * 8 ohm / 10W (need to change the hardware parameters)

KEY（External Vertical Socket 2.00MM）

Serial number	Definition	Attribute	Description	
1	POE	Input	System Boot Button	
2	RST	Input	Reset Signal Interface	
3	KEY	Input	KEY expansion interface (up to 7 keys)	
4	GND	Ground	Ground	

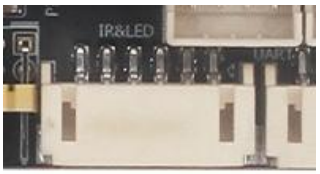
1. The configuration of the keys can be adjusted, subject to the actual communication requirements.

CTP（Touch Screen Horizontal Socket 2.00MM）

Serial number	Definition	Attribute	Description	
1	GND	Ground	Ground	
2	RST	Reset	CTP reset, compatible with GPIO/PWM	
3	INT	Interrupt	CTP interrupt, compatible with GPIO/PWM	
4	SCL	I2C- SCL	I2C clock	
5	SDA	I2C-SDA	I2C data,	
6	VCC-3.3V	Power output	VCC-3.3V	

1. Default is CTP interface, when want to change to GPIO port, you need to reconfigure the software.

IR&LED（Remote Control Indicator Horizontal Socket 2.00MM）

Serial number	Definition	Attribute	Description	
1	RED	LED Red Output	Positive pole of RED lamp, system operation status indicator	
2	GND	Ground	Power Ground	
3	BLUE	LED Blue Output	Positive pole of RED lamp, system operation status indicator	
4	IVC	Power Input	Remote Power Output	
5	GND	Ground	Power Ground	
6	IR	Signal Input	IR Signal Input	

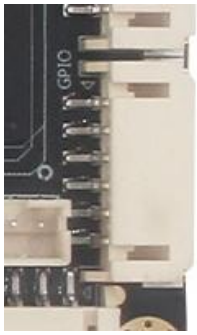
1. Indicator lamps use common cathode LED lamps by default. If a common anode lamp is used, the common pin of the LED lamp can be connected to the 3rd PIN as the power input when making an external extension cable. Note that the state of the light will change after this connection, and software configuration update is required;

2. Remote control supports hard switching function. Remote power on button needs software configuration, or remote code value learning to match before use;

3. About the remote control that needs to be reconfigured to make sure the buttons are available. If use a remote control that is not certified by our company, need to communicate with the business to confirm

GPIO (Horizontal Socket 2.00MM)

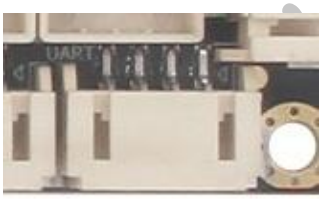
Serial number	Definition	Attribute	Description
1	GND	Ground	Ground
2	GPIO1	Input/Output	Default GPIO port, compatible with RST for CTP
3	GPIO2	Input/Output	Default GPIO port, compatible with RST for CTP
4	GPIO3	Input/Output	Default GPIO port, compatible with RST,SCL for CTP
5	GPIO4	Input/Output	Default GPIO port, compatible with SDA for CTP
6	VCC-3.3V	Input/Output	VCC-3.3V



1. The port is GPIO by default. When used as CTP port, it needs to be configured separately by software;

2. I/O port voltage is 3.3V, pay attention to the level matching.

TTYS6 (UART/RS232 Vertical Socket 2.00MM)

Serial number	Definition	Attribute	Description	
1	VCC-3.3V	Power Output	VCC-3.3V	
2	UART_TX6/A	Data Transmission	UART_TX, compatible with GPIO	
3	UART_RX6/B	Data Reception	UART_RX, compatible with GPIO	
4	GND	Ground	Ground	

1. Default is 1 TTL form of output, can add chip to change to RS232, port number is ttyS6;
2. 3 V 3 output voltage is 3.3V; output current is 500MA;
3. When to use as GPIO port, need software to configure separately.
4. The I/O port voltage is 3.3V, note the level matching.

TTYS7 (UART/RS232 Horizontal Socket 2.00MM)

Serial number	Definition	Attribute	Description	
1	VCC-3.3V	Power Output	VCC-3.3V	
2	UART_TX7/A	Data Transmission	UART_TX, compatible with GPIO	
3	UART_RX7/B	Data	UART_RX, compatible with	

		Reception	GPIO	
4	GND	Ground	Ground	

1. Default is 1 TTL form of output, can add chip to change to RS232, port number is ttyS7;
2. 3 V 3 output voltage is 3.3V; output current is 500MA;
3. When to use as GPIO port, need software to configure separately.
4. The I/O port voltage is 3.3V, note the level matching.

TTYS8 (UART/RS232 Horizontal Socket 2.00MM)

Serial number	Definition	Attribute	Description	
1	VCC-3.3V	Power Output	VCC-3.3V	
2	UART_TX8/A	Data Transmission	UART_TX, compatible with GPIO	
3	UART_RX8/B	Data Reception	UART_RX, compatible with GPIO	
4	GND	Ground	Ground	

1. Default is 1 TTL form of output, can add chip to change to RS232, port number is ttyS8;
2. 3 V 3 output voltage is 3.3V; output current is 500MA;
3. When to use as GPIO port, need software to configure separately.
4. The I/O port voltage is 3.3V, note the level matching.

TTYS9 (UART/RS232 Horizontal Socket 2.00MM)

Serial number	Definition	Attribute	Description	
1	VCC-3.3V	Power Output	VCC-3.3V	
2	UART_TX9	Data Transmission	UART_TX, compatible with GPIO	
3	UART_RX9	Data Reception	UART_RX, compatible with GPIO	
4	GND	Ground	Ground	

1. Default is 1 TTL form of output, can add chip to change to RS232, port number is ttyS9;
2. 3 V 3 output voltage is 3.3V; output current is 500MA;
3. When to use as GPIO port, need software to configure separately.
4. The I/O port voltage is 3.3V, note the level matching.

TTYS0 (UART/RS485 Horizontal Socket 2.00MM)

Serial number	Definition	Attribute	Description	
1	VCC-3.3V	Power Output	VCC-3.3V	
2	UART_TX0	Data Transmission	UART_TX, compatible with GPIO	
3	UART_RX0	Data Reception	UART_RX, compatible with GPIO	

4	GND	Ground	Ground	

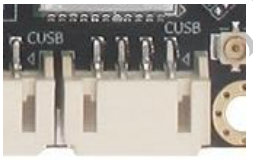
1. Default is 1 TTL form of output, can add chip to change to RS232, port number is ttyS0;
2. 3 V 3 output voltage is 3.3V; output current is 500MA;
3. When to use as GPIO port, need software to configure separately.
4. The I/O port voltage is 3.3V, note the level matching.

TTYS5 (UART/RS485 Horizontal Socket 2.00MM)

Serial number	Definition	Attribute	Description	
1	VCC-3.3V	Power Output	VCC-3.3V	
2	UART_TX5 / A	Power Output	Data output, connected to RX pin of external device	
3	UART_RX5 / B	Power Input	Data input, connected to RX pin of external device	
4	GND	Ground	Ground	

1. Default is 1 TTL form of output, can add chip to change to RS232, port number is ttyS5;
2. 3 V 3 output voltage is 3.3V; output current is 500MA;
3. When to use as GPIO port, need software to configure separately.
4. The I/O port voltage is 3.3V, note the level matching.

CUSB2 (Horizontal Socket 2.00MM)

Serial number	Definition	Attribute	Description	
1	GND	Ground	Ground	
2	DP	Data Positive	Data positive, connect to USB_DP pin of external device	
3	DM	Data Negativity	Data negative, connect to USB_DM pin of external device	
4	5V	Power Output	5V Power cable	

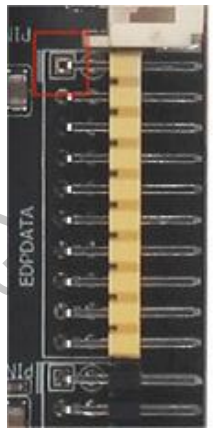
1. This USB port is the main control directly out of the USB port;

CUSB3 (Horizontal Socket 2.00MM)

Serial number	Definition	Attribute	Description	
1	GND	Ground	Data positive, connect to USB_DP pin of external device	
2	DP	Data Positive	Data negative, connect to USB_DM pin of external device	
3	DM	Data Negativity	5V Power cable	
4	5V	Power Output	Data positive, connect to USB_DP pin of external device	

1. This USB port is the main control directly out of the USB port;

EDP-DATA（Double Row EDP Screen Horizontal Socket 2.00MM）

Serial number	Definition	Attribute	Description	
1	EDP-VCC_IN	Power Input	LCD power supply, +3.3V / +5V/ +12V selectable via “J55	 The red box marks the first pin
2				
3	GND	Ground	Ground	
4				
5	EDP-TX0-	Output	Display Port Lane 0 negative	
6	EDP-TX0+	Output	Display Port Lane 0 positive	
7	EDP-TX1-	Output	Display Port Lane 1 negative	
8	EDP-TX1+	Output	Display Port Lane 1 positive	
9	EDP-TX2-	Output	Display Port Lane 2 negative	
10	EDP-TX2+	Output	Display Port Lane 2 positive	
11	EDP-TX3-	Output	Display Port Lane 3 negative	
12	EDP-TX3+	Output	Display Port Lane 3 positive	
13	GND	Ground	Ground	
14	GND	Ground	Ground	
15	EDP-AUX-	Output	Port AUX- chanenl negative	
16	EDP-AUX+	Output	Port AUX+ chanenl positive	
17	GND	Ground	Ground	
18	GND	Ground	Ground	
19	+3.3V	Output	Voltage Output	
20	EDP-HPD	Output	Screen hot-plugging detection	

1. There is a 1-pin start bit on the main board.

LVDS-DATA（Dual Row LVDS Screen Horizontal Socket 2.00MM）

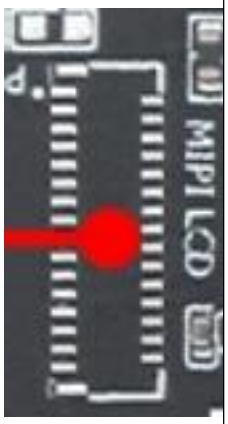
Serial number	Definition	Attribute	Description	
1	LCDVCC-IN	Power Output	LCD power supply, +3.3V / +5V/ +12V selectable via "J55"	
2				
3				
4	GND	Ground	Ground	
5				
6				
7	RXO0-	Output	Pixel0 Negative Data (Odd)	
8	RXO0+	Output	Pixel0 Positive Data (Odd)	
9	RXO1-	Output	Pixel1 Negative Data (Odd)	
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	
16	RXOC+	Output	Positive Sampling Clock	
17	RXO3-	Output	Pixel3 Negative Data (Odd)	
18	RXO3+	Output	Pixel3 Positive Data (Odd)	The red box marks the first pin
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	
28	RXEC+	Output	Positive Sampling Clock	
29	RXE3-	Output	Pixel3 Negative Data (Even)	
30	RXE3+	Output	Pixel3 Positive Data (Even)	

1. There is a 1-pin start bit on the main board.

MIPI LCD Screen（31PIN flip-top ）

Serial number	Definition	Attribute	Description	
1	LEDA+	Backlight Positive	Backlight Power Positive	
2		Backlight Positive	Backlight Power Positive	
3		Backlight Positive	Backlight Power Positive	
4	NC			
5	LEDK+	Backlight Negative	Negative feedback constant current driver	
6		Backlight Negative	Negative feedback constant current driver	
7		Backlight Negative	Negative feedback constant current driver	
8		Backlight Negative	Negative feedback constant current driver	
9	GND	Ground	Ground	
10	GND	Ground	Ground	
11	TDP2	Data channel 2 positive	Data bit	



12	TDN2	Data channel 2 negative	Data bit	
13	GND	Ground	Ground	
14	TDP1	Data channel 1 positive	Data bit	
15	TDN1	Data channel 1 negative	Data bit	
16	GND	Ground	Ground	
17	TCP	Clock positive	Clock bit	
18	TCN	Clock negative	Clock bit	
19	GND	Ground	Ground	
20	TDP0	Data channel 0 positive	Data bit	
21	TDN0	Data channel 0 negative	Data bit	
22	GND	Ground	Ground	
23	TDP3	Data channel 3 positive	Data bit	
24	TDN3	Data channel 3 negative	Data bit	
25	GND	Ground	Ground	
26	VDDIO	VDDIO-1.8V	1.8V power supply	

27	RESET	Reset	Screen Reset, Low Active	
28	GND	Ground	Ground	
29	VDDIO	VDDIO-1.8V	1.8V power supply	
30	VDD	3.3V	3.3V power supply	
31	VDD	3.3V	3.3V power supply	

1. This pin is not posted by default

2. There is a 1-pin start bit on the main board.

The following is the built-in socket interface definition
DC socket → Standard 12V round head 6.0MM aperture, 2.0MM inner pin, inner positive and outer negative TF card → Standard TF card socket interface definition HDMI → Standard A-type HDNI socket definition RJ45 → Standard 100M RJ45 socket definition USB-OTG →Standard USB2.0 large horizontal socket definition USB-HOST → Standard USB3.0 large horizontal socket definition

Note:

1. Please do not exceed 1.0A total current on 4 USB ports.
2. 3.3V total current please do not exceed 1A.
3. The bottom of the motherboard INT and GND short circuit for the remote control learning function, if necessary, you can find our business to get DXF structure diagram.

Working Parameters

Electronic device materials				
PCB board material	FR4 6-layer board, immersion gold impedance board, TG150, matte black			
Electronic materials	Lead-free, halogen-free and environmentally friendly materials (original and authentic, in line with ROSH requirements)			
Production Process	Lead-free, environmentally friendly production process (in compliance with ISO9001 production quality management system requirements)			
Electrical parameters (bare card)				
Parameter	**Minimum**	**Standard value**	**Maximum**	**Unit**
Working Voltage	9	12V	14	V
Working current	171	181	340	mA
Shutdown current	4.36	4.45	4.52	mA
Motherboard power	2.05	2.17	4.08	W
Speaker output	4	4.5	5	W

power (8R speaker)				
RTC operating current	0.452	0.482	0.528	uA
USB output current (5V)*1	1810	2030	2320	mA
UART output current (3.3V) *2	980	1270	1420	mA
Working temperature	0	Normal temperature	80	℃
Storage temperature	-10	Normal temperature	80	℃

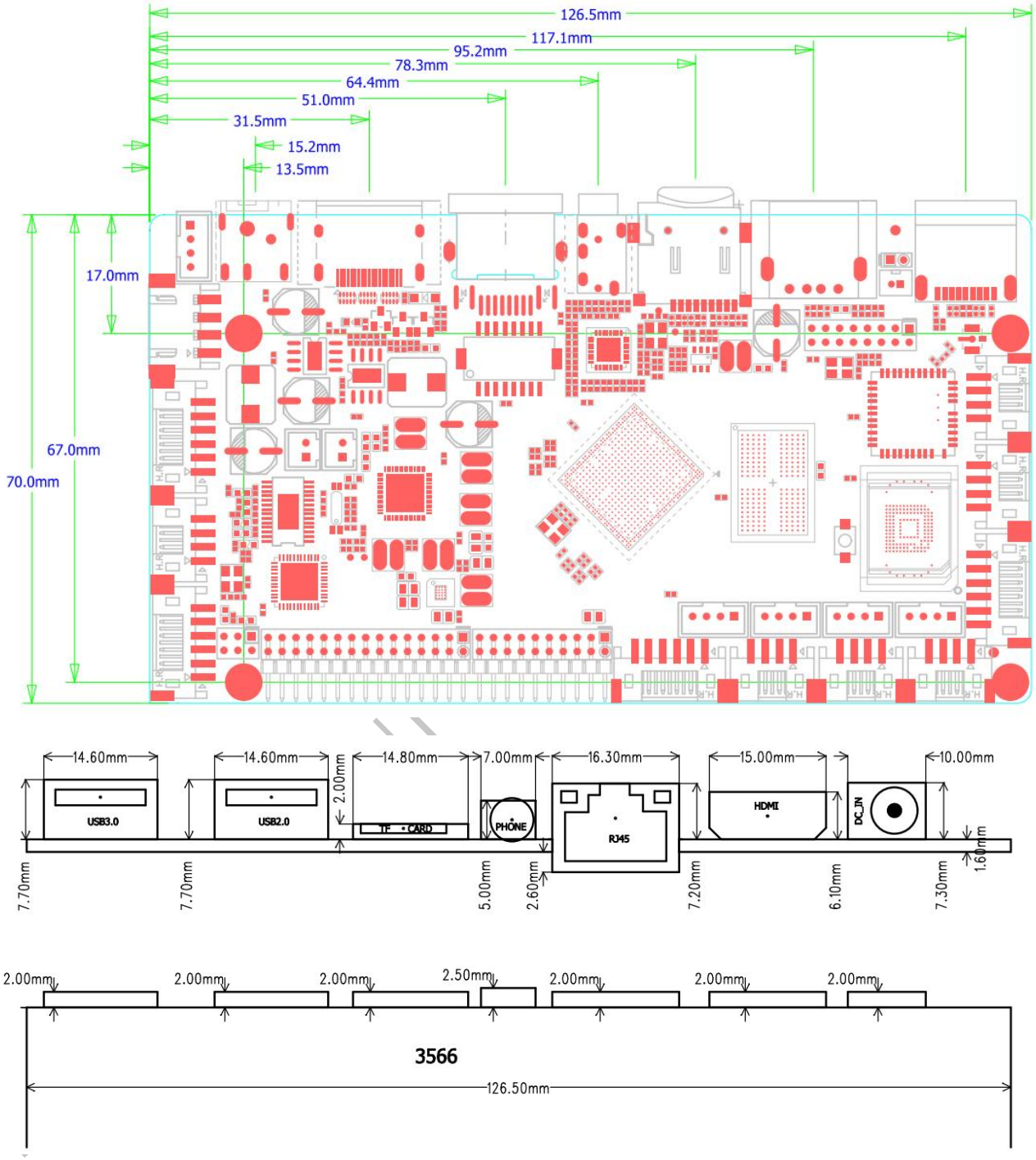
Note:

1. *1*2 is the sum of the output power of the same voltage of the motherboard. The specific output power of each interface socket shall be subject to the interface description.

2. Considering the overall working conditions, the whole machine works in an environment outside the limit value, and the working performance of the whole machine cannot be fully guaranteed.

3. The working current value is the latest firmware. Due to the subsequent firmware update, the working current size will be slightly different, which is within the normal range. The specific firmware before the product is shipped shall prevail.

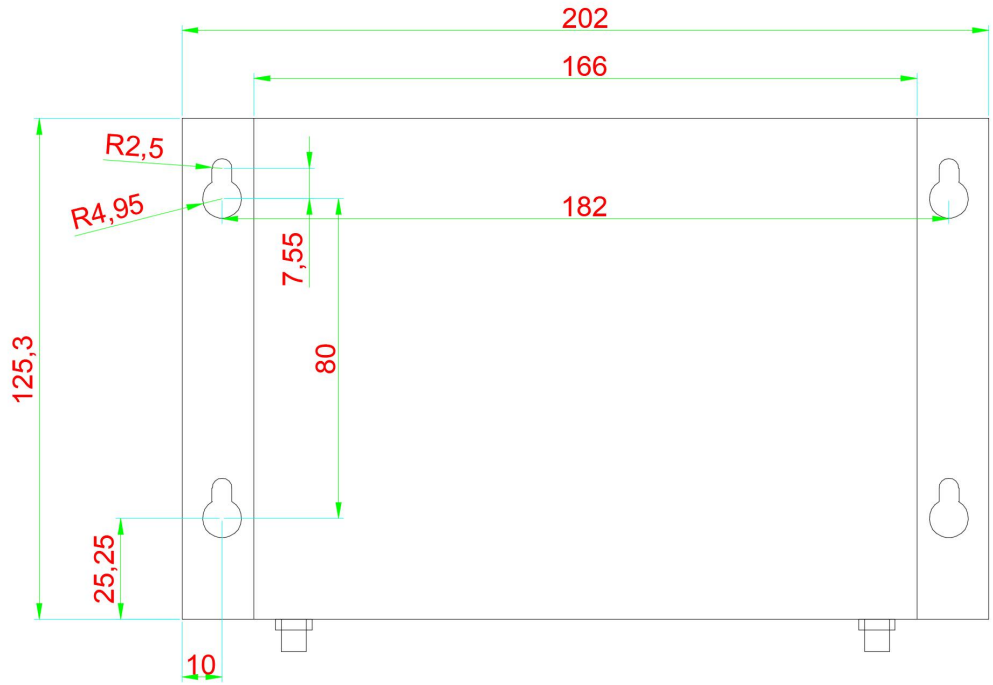
Controller installation dimensions



PCB size: 126.5mm*70mm/±0.5mm; board thickness 1.6mm±10%

Screw hole specifications：∮3.0mm x 4 /±10%

Size diagram with box



Unit: mm

Cautions

1. During the assembly process, please be careful not to operate the connection wiring with power on;

2. When touching the PCBA motherboard, must wear anti-static wristbands (sleeves) and other anti-static protection tools;

3. When connecting external devices to the motherboard, the PIN definition must be strictly checked to avoid wrong or reverse connection;

4. During the installation and fixing process, it is strictly forbidden to cause board deformation and other problems due to various reasons;

5. During the installation process, it is strictly forbidden to stack multiple boards together or short-circuit with other peripherals;

6. During the installation process, do not tie sensitive signal lines together with power lines, such as WIFI antennas/data cables;

7. When installing the LCD screen, be sure to pay attention to the selection of screen voltage, the size of the current, and the position of the first pin;

8. When installing the LCD screen, be sure to pay attention to the backlight voltage and whether the current is within the power range of the power adapter;

9. When connecting peripheral devices, pay attention to the level matching of the peripheral

data and whether the current size meets the requirements;

10. When installing the serial port, pay attention to the type of serial port device being

connected and whether the TX and RX pins are connected in reverse;

11. Consider the overall power. After the entire device is connected, what is the overall power and whether the power supply is sufficient.