

IDO-EVB3020 DEMO BOARD

specification



IDO-EVB3020

Smart motherboard specification

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Document revision history

edition	Revision:	revise	to examine	date
V1. 0	create documents			2022/03/21

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1. Product overview

1.1 Product Overview

Ido-evb3020 intelligent motherboard, equipped with Ruixin micro px30 / px30k (arm cortex-a35) quad core 64 bit CPU, equipped with Android / Linux system, with a main frequency of 1.5GHz. At the same time, the new generation and powerful GPU (mali-g31) embedded in the chip support dvalin-2ee, OpenGL Es11 / 2.0/3.2, Vulkan 1.0, OpenCL 2.0, embedded high-performance 2D hardware acceleration. Support 1080p 60fps video decoding in vc-1, h265 / h264, MPEG-1 / 2 / 4, VP8 and other multi formats.

Ido-evb3020 intelligent motherboard has strong multi-threaded computing ability, image and video decoding ability, and supports Android (7.1 and above), Ubuntu and Debian systems. It can be applied to industrial control, commercial display, advertising all-in-one machine, medical and health equipment, intelligent POS, face recognition terminal, Internet of things, smart city and other fields.

1.2 product features

- 4-lane mipi-dsi, support to1080P@60Hz

- •LVDS, support to1080P@60HzLarge screen
- •1 independent Ethernet port
- •WiFi wireless communication
- •Onboard 6-way USB20
- •1-way can and 6-way serial port (RS232 / RS485)

1.3 product appearance and size

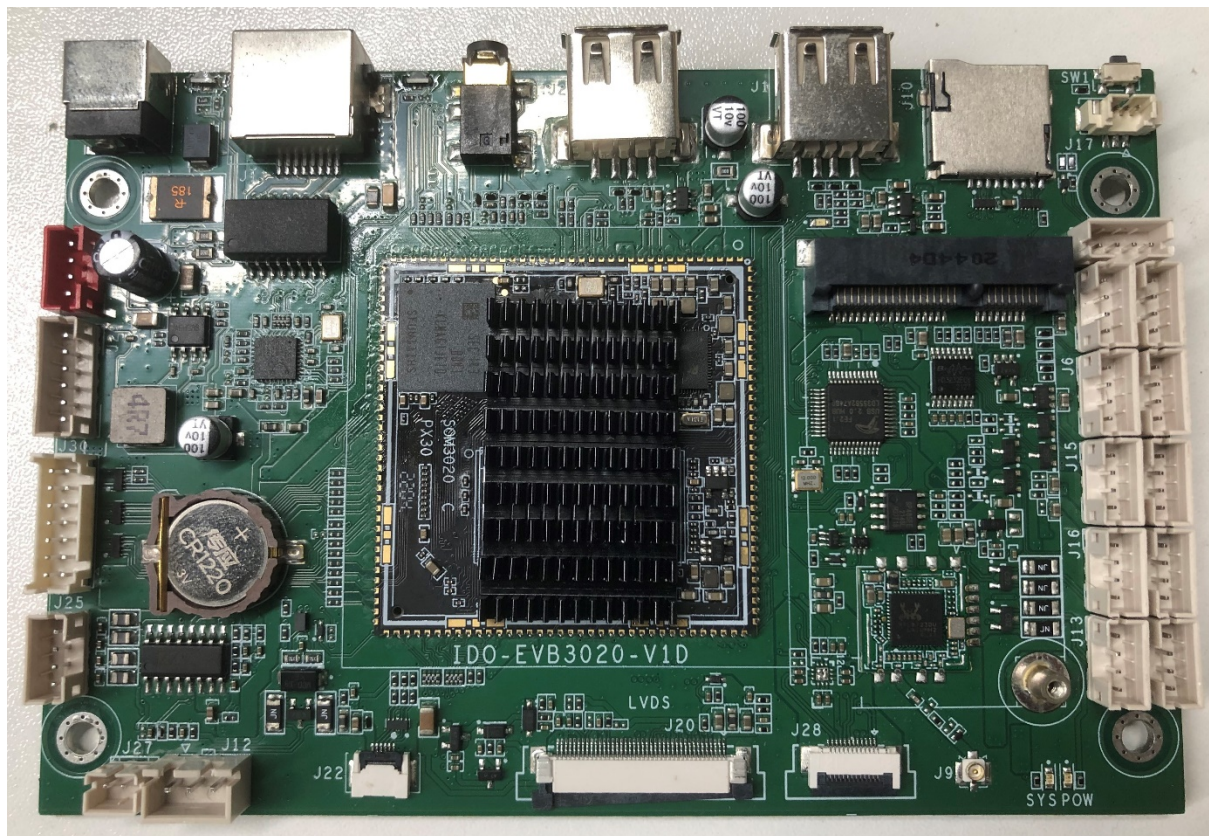


Figure 1Ido-evb3020-v1 front interface diagram

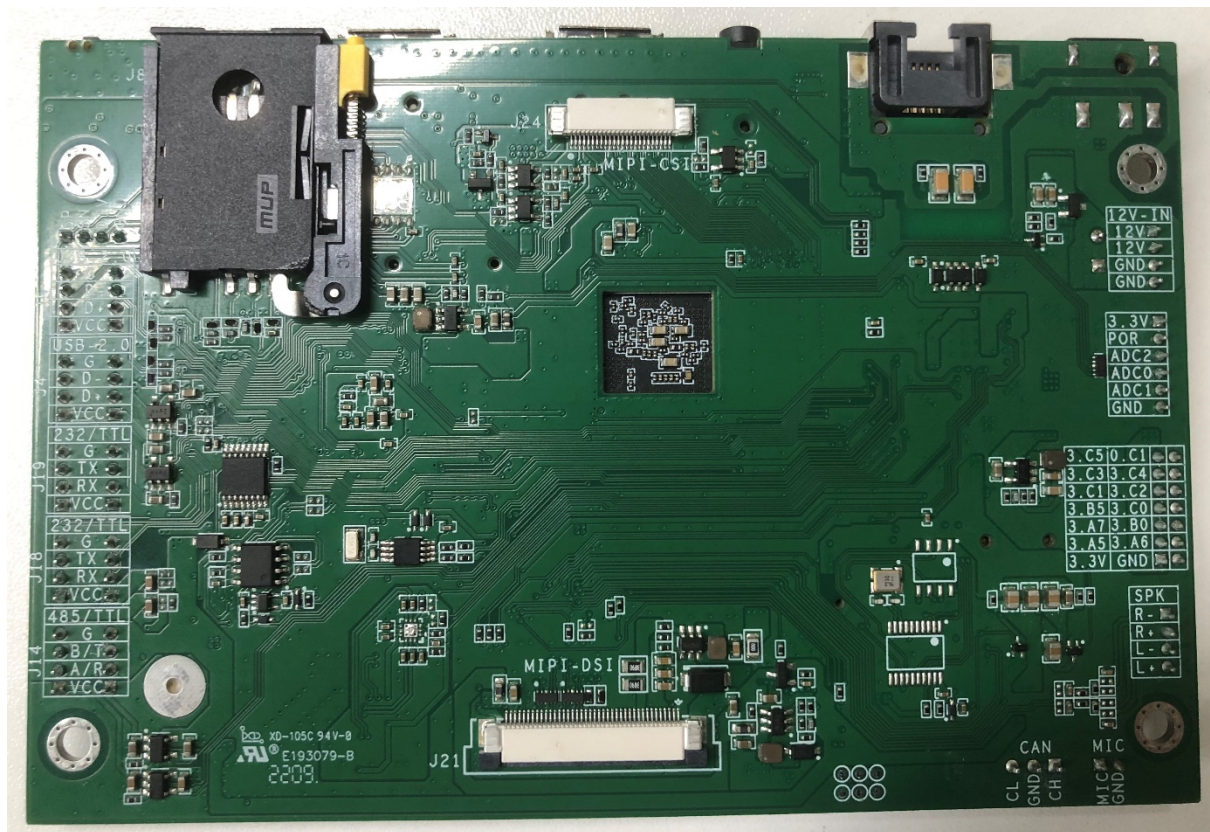


Figure 2 ldo-evb3020-v1 reverse interface diagram

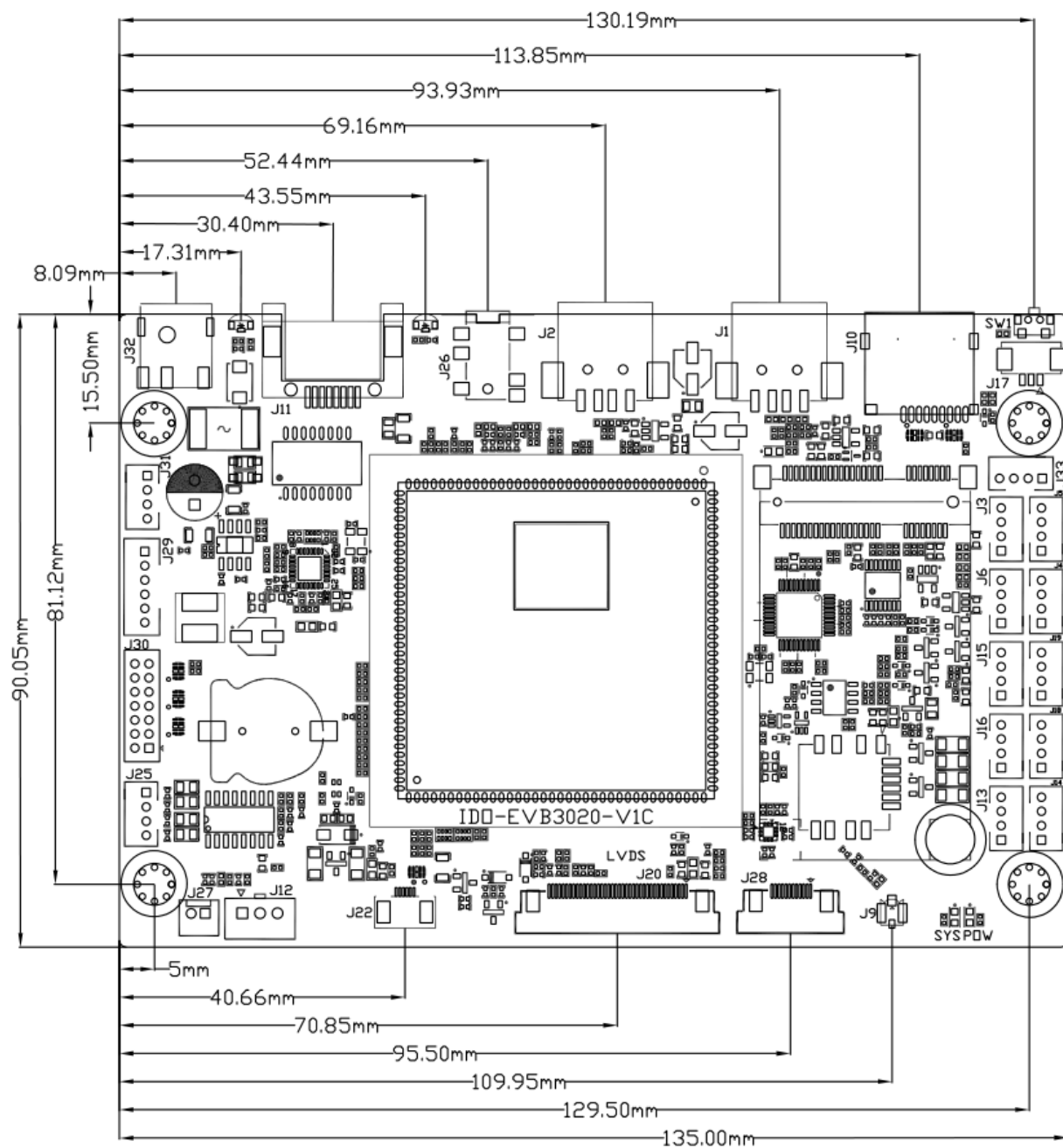


Figure 3ldo-evb3020-v1 front dimension drawing

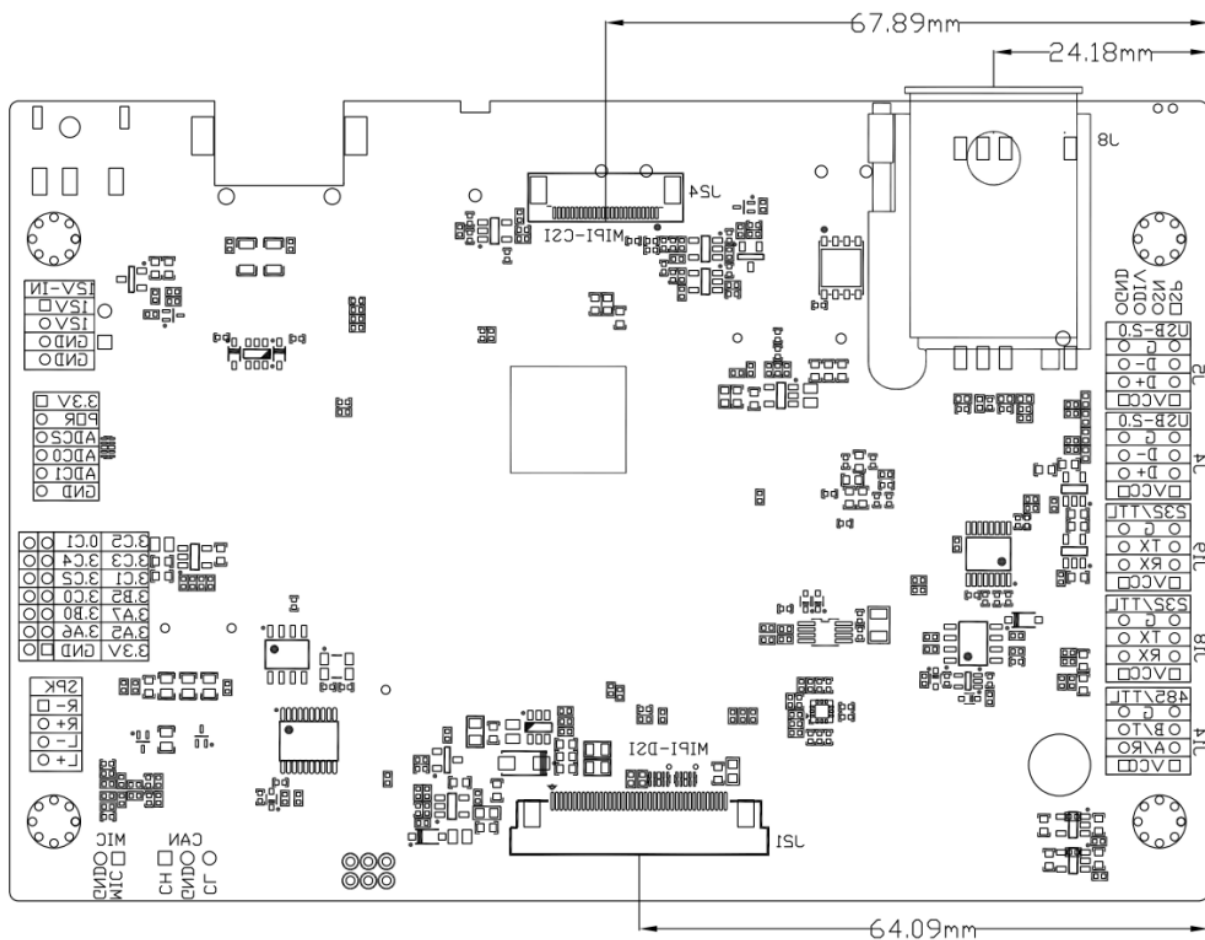


Figure 4lido-evb3020-v1 back dimension drawing

2. Technical parameters

2.1 hardware parameters

Basic parameters	
SOC	RockChip PX30
CPU	ARM® Cortex-a35 quad core processor, main frequency 1.5GHz
GPU	Dvalin-2EE

	OpenGL ES1. 1/2.0/3.2, Vulkan 1.0, OpenCL 2.0 High performance 2D hardware acceleration
VPU	Support 1080p 60fps MPEG-4, H.264, h.265/hevc, VP8, vc-1 video decoding Support 1080p 30fps H.264 video coding
Memory	DDR4 (1GB / 2GB optional)
storage	8GB / 16GB / 32GB / 64GB eMMC one× TF card slot X1 (can support TF card expansion)
Hardware parameters	
Ethernet	1-way adaptive 10 / 100Mbps Ethernet
wireless network	Support single frequency 2.4G WiFi
Display interface	one× Mipi-dsi, support 1920*1080@60fpsoutput one× Single LVDS, support 1366*768@60fpsOutput (multiplexed with mipi-dsi)
camera	one× 4-Lane MIPI-CSI
RTC	Independent RTC clock chip, 1220 button battery, easy maintenance
audio interface	1 x headphone output 1 x microphone on-board audio input 1 x left and right speaker speaker output, support4ohm@3Whorn

Extension interface	4 x RS232 (ph-4 base)
	2 x RS485 (ph-4 base)
	1 x DEBUG
	1 x CAN
	1 x electricity meter
	2x USB 2.0
	4X USB 2.0 (ph-4 base)
	one× Speaker
	one× Mic
	3 x ADC
	12 x GPIO
	Four microphone linear array interface (fpc-12)
	one× Power voltage input base (12V / 12V / GND / GND)
	one× TP seat (I2C)

2.2 working environment

work environment	
working temperature	0°C ~ 70°C
Working humidity	5 ~ 90% RH non condensing
Storage temperature:	-40°C ~ 85°C

2.3 system support

Serial number	operating system	support	explain
1	Android8. one	• •	
2	Debian9	• •	
3	Ubuntu20 base	• •	
4	Buildroot	• •	

3. Main interface definition

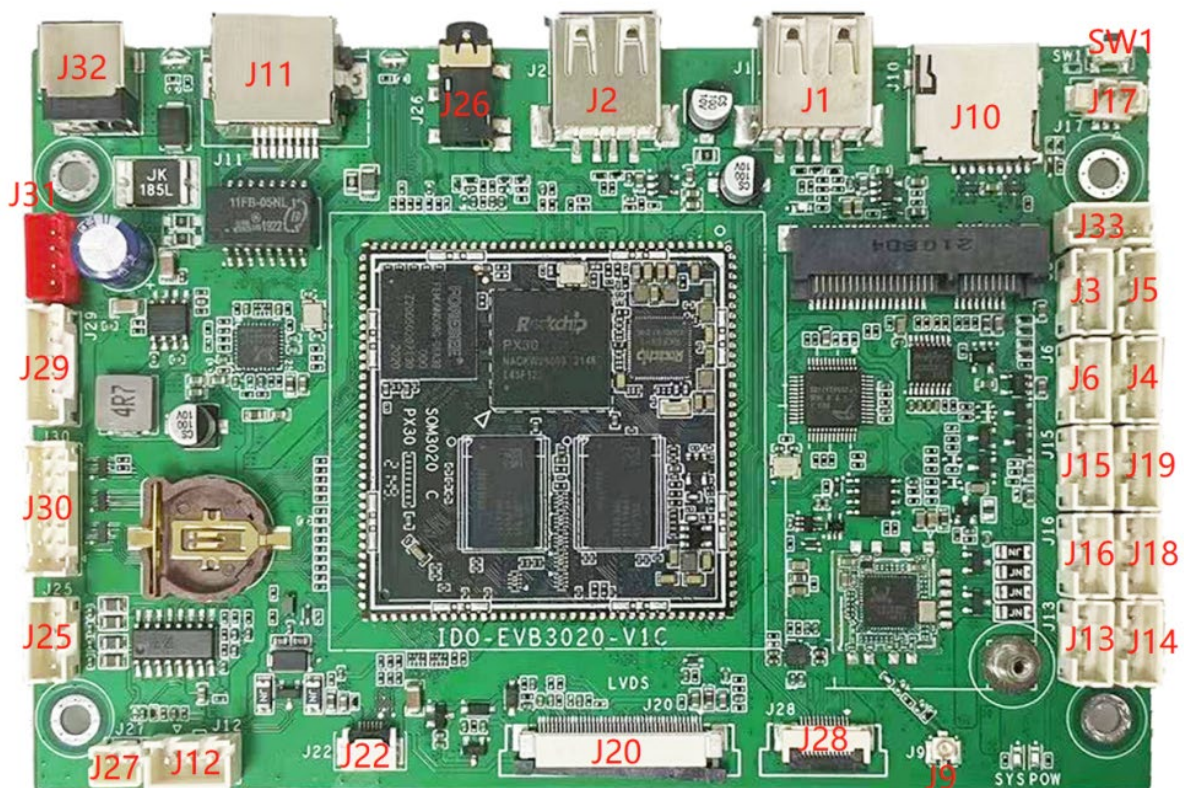


Figure 5Ido-evb3020-v1 front interface tag number diagram

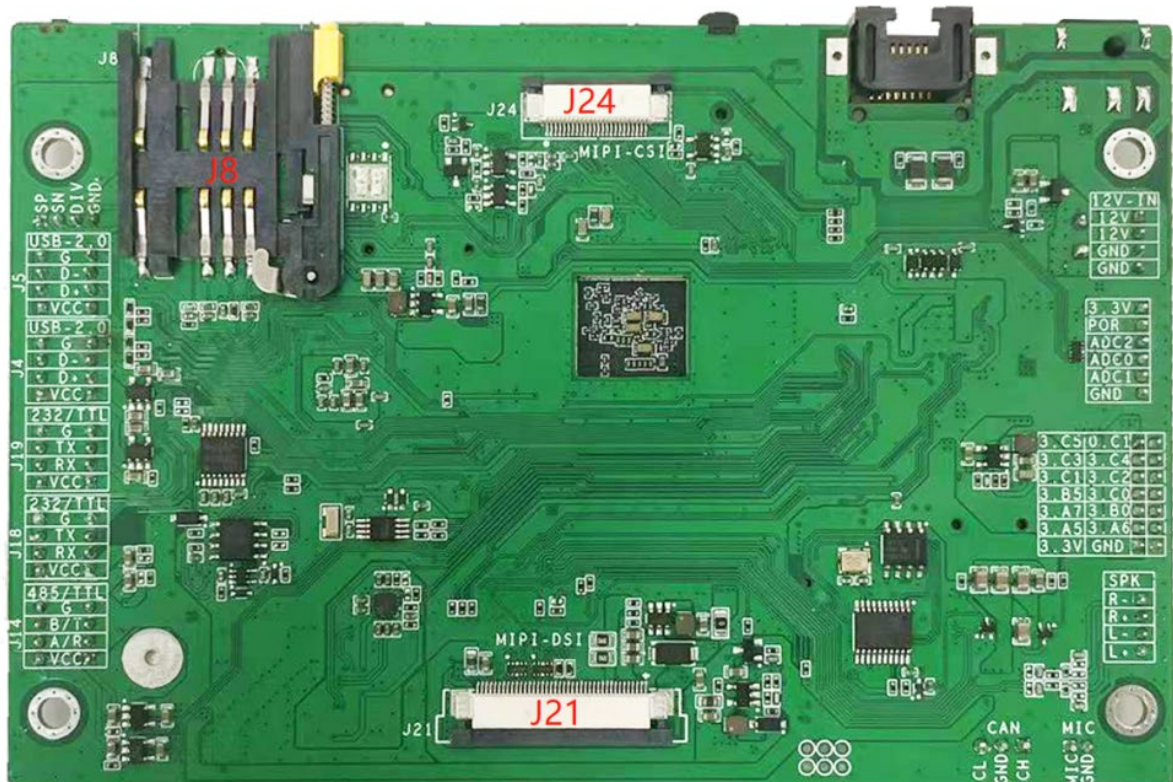


Figure 6 ldo-evb3020-v1 reverse interface tag number diagram

3.1 power interface

Rated voltage of main board: 12V.

Current requirement: $\geq 2A$.

Note: the main board can adapt to the power supply voltage range: 9v-24v.

The main board provides two power supply methods.

1. 1.Connect the power adapter through J32 dc005 seat (inner diameter 2.1mm, outer diameter 5.5mm).
2. 2.Through J31 red pH20-4p seats.

J31 red pH20-4p base pin definition description



Serial number	definition	Level / V	explain
1	12V_IN	12V	Power supply 12V input
2	12V_IN	12V	
3	GND	GND	Power ground
4	GND	GND	

3.2 serial port

1. The evb3020 motherboard expands 6 serial ports in total (excluding debugging serial ports).
2. 2.6-channel serial port through 6 pH20-4p straight socket outlet.
3. The default configuration of the 6-channel serial port is: 4-channel RS232 (j15, j16, J18 and J19) and 2-channel RS485 (j13 and J14).
4. 4.6-channel serial port can be customized and configured. The combination includes:
 - 4 x RS232 + 2 x RS485 [default configuration]
 - 4 x UART + 2 x RS485
 - 2 x UART + 2 x RS232 + 2 x RS485

- 2 x UART + 4 x RS232
- 6 x UART

Detailed description of pin definition of serial port base (j13 / J14 / j15 / j16 / J18 / J19)



Seat	Serial number	definition	Level / V	explain
J13	1	VCC	5V	Power supply 5V output
	2	UART2_RXD_M1	3.3V	1. 1.UART2_M1 is configured as debug serial port by default
		RS485-A （default）	/	
	3	UART2_TXD_M1	3.3V	2. 2.UART2_When M1 is configured as a normal serial port, the corresponding device node is / dev / ttys2
		RS485-B （default）	/	
				3. 3.The default is RS485 level, and the UART TTL 3.3V level can be changed
			4. 4.RS485 supports to 115200bps baud rate	
	4	GND	GND	Power ground

J14	1	VCC	5V	Power supply 5V output
	2	UART3_RXD_M1	1.8V	1. 1.UART3_M1 corresponds to the / dev / ttys3 node 2. 2.The default is RS485 level, and the UART TTL 1.8V level can be changed 3. 3.RS485 supports to 115200bps baud rate
		RS485-A (default)	/	
	3	UART3_TXD_M1	1.8V	
		RS485-B (default)	/	
	4	GND	GND	Power ground
J15	1	VCC	5V	Power supply 5V output
	2	UART1_RXD	3.3V	1. 1.Uart1 corresponds to the / dev / ttys1 node 2. 2.The default is RS232 level, and the UART TTL 3.3V level can be changed 3. 3.115200bps baud rate 4. 4.RS232 supports to 115200bps baud rate
		RS232-RX (default)	/	
	3	UART1_TXD	3.3V	
		RS232-TX (default)	/	
	4	GND	GND	Power ground

J16	1	VCC	5V	Power supply 5V output
	2	UART5_RXD	3.3V	1. 1.Uart5 corresponds to the / dev / ttys5 node 2. 2.The default is RS232 level, and the UART TTL 3.3V level can be changed 3. 3.115200bps baud rate 4. 4.RS232 supports to 115200bps baud rate
		RS232-RX (default)	/	
	3	UART5_TXD	3.3V	
		RS232-TX (default)	/	
	4	GND	GND	Power ground
J18	1	VCC	5V	Power supply 5V output
	2	UART4_RXD	3.3V	1. 1.Uart4 corresponds to / dev / ttys4 node 2. 2.The default is RS232 level, and the UART TTL 3.3V level can be changed 3. 3.115200bps baud rate 4. 4.RS232 supports to 115200bps baud rate
		RS232-RX (default)	/	
	3	UART4_TXD	3.3V	
		RS232-TX (default)	/	

	4	GND	GND	Power ground
J19	1	VCC	5V	Power supply 5V output
	2	UART0_RXD	3.3V	1. 1.UART0 corresponds to the / dev / ttys0 node 2. 2.The default is RS232 level, and the UART TTL 3.3V level can be changed 3. 3.115200bps baud rate 4. 4.RS232 supports to 115200bps baud rate
		RS232-RX (default)	/	
	3	UART0_TXD	3.3V	
		RS232-TX (default)	/	
	4	GND	GND	Power ground

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3.3 can interface (j12 ph2.54-3p in-line white)

1. 1.Support 1-way can bus.
2. 2.Support can20b protocol, up to 1Mbps.



Serial number	definition	Level / V	explain
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1	CAN_H	/	CAN0
2	GND	GND	Power ground
3	CAN_L	/	CAN0

3.4 electricity meter interface (j33 ph2.0-4p in-line white)



Serial number	definition	Level / V	explain
1	SNSP	/	Battery negative electrode sampling resistance terminal signal
2	SNSN	/	Battery negative electrode sampling resistance terminal signal
3	BATDIV	/	Battery voltage dividing input
4	GND	GND	Power ground

3.5 Ethernet interface (j11)

Provide one 10 / 100Mbps adaptive Ethernet interface.



Figure 7Ido-evb3020 RJ45 interface

3.6 LVDS/MIPI-DSI

1. Support 1-way LVDS / mipi-dsi, 4-lane, support 1080P@60HZ
2. Mipi-dsi and LVDS share the same Mipi signal, and only one of them can be used at the same time.
3. Mipi-dsi and LVDS share the same PWM backlight resource (pwm0 pin).
4. The backlight current can be adjusted by changing the material. The default is 100mA.
5. Mipi screen interface default screen model specification:

3.6.1 LVDS interface (J20 40pin FPC 0.5mm pull-out connection)



Serial number	definition	Level / V	explain
1	VCOM	3.55V	
2	LCD_VDD	3.3V	Screen 3.3V power supply
3	LCD_VDD	3.3V	
4	NC	/	In the air
5	Panel RESET	/	Reset signal
6	STBYB	/	
7	GND	GND	Power ground
8	MIPI_TDN0_	/	MIPI_Tdn0 signal pair
9	MIPI_TDP0_	/	
10	GND	GND	Power ground
11	MIPI_TDN1_	/	MIPI_Tdn1 signal pair

12	MIPI_TDP1_	/	
13	GND	GND	Power ground
14	MIPI_TDN2_	/	MIPI_Tdn2 signal pair
15	MIPI_TDP2_	/	
16	GND	GND	Power ground
17	MIPI_TCN	/	MIPI_TC signal pair
18	MIPI_TCP	/	
19	GND	GND	Power ground
20	MIPI_TDN3_	/	MIPI_Tdn3 signal pair
21	MIPI_TDP3_	/	
22	GND	GND	Power ground
23	NC	/	In the air
24	NC	/	
25	GND	GND	Power ground
26	NC	/	In the air
27	NC	/	
28	6_8BSEL	/	

29	LCD_AVDD	10.6V	
30	GND	GND	Power ground
31	V_LED-	/	LVDS backlight
32	V_LED-	/	
33	SHLR	/	
34	UPDN	/	
35	VGL	-7.5V	
36	NC	/	In the air
37	NC	/	
38	VGH	16V	
39	V_LED+	/	LVDS backlight
40	V_LED+	/	

3.6.2 mipi-dsi interface (J21 40pin FPC 0.5mm pull-out connection)



Serial number	definition	Level / V	explain
1	V_LED+	/	Mipi backlight
2	V_LED+	/	
3	NC	/	NC
4	NC	/	
5	NC	/	
6	NC	/	
7	NC	/	
8	NC	/	
9	V_LED-	/	Mipi backlight
10	V_LED-	/	
11	GND	GND	Power ground
12	NC	/	NC
13	NC	/	
14	NC	/	
15	NC	/	
16	GND	GND	Power ground

17	NC	/	NC
18	NC	/	
19	GND	GND	Power ground
20	MIPI_TDP3_	/	MIPI_Td3 signal pair
21	MIPI_TDN3_	/	
22	GND	GND	Power ground
23	MIPI_TDP2_	/	MIPI_TD2 signal pair
24	MIPI_TDN2_	/	
25	GND	GND	Power ground
26	MIPI_TCP_	/	MIPI_TC signal pair
27	MIPI_TCN_	/	
28	GND	GND	Power ground
29	MIPI_TDP1_	/	MIPI_TD1 signal pair
30	MIPI_TDN1_	/	
31	GND	GND	Power ground
32	MIPI_TDP0_	/	MIPI_Td0 signal pair
33	MIPI_TDN0_	/	

34	GND	GND	Power ground
35	NC	/	NC
36	Panel RESET	/	Reset signal
37	GND	GND	Power ground
38	LCD_VDD	3.3V	Screen 3.3V power supply
39	LCD_VDD	3.3V	
40	NC	/	NC

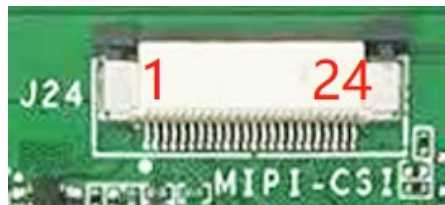
3.7 TP interface (J22 6pin FPC 0.5mm front plug-in and rear press up)



Serial number	definition	Level / V	explain
1	GND	GND	Power ground
2	TP_SDA	3.0V	I2C bus signal
3	TP_SCL	3.0V	
4	TP_INT	3.0V	TP interrupt signal

5	TP_RST	3.0V	TP reset signal
6	TP_3V0	3.0V	3V output power supply

3.8 camera interface (J24 24pin FPC 0.5mm pull-out connection)



Serial number	definition	Level / V	explain
1	VCC2V8_DVP	2.8V	2.8V power output
2	VCC2V8_DVP	2.8V	2.8V power output
3	VCC1V5_DVP	1.5V	1.5V power output
4	VCC1V8_DVP	1.8V	1.8V power output
5	CIF_RST	1.8V	CIF reset signal, low valid
6	CIF_PDNO	1.8V	CIF enable signal, low effective
7	SCL_CAM	1.8V	I2C bus signal

8	SDA_CAM	1.8V	
9	CIF_CLKO	1.8V	CIF clock signal
10	GND	GND	Power ground
11	MIPI_CSI_D0N	/	MIPI_CSI_D0 signal pair
12	MIPI_CSI_D0P	/	
13	GND	GND	Power ground
14	MIPI_CSI_D1N	/	MIPI_CSI_D1 signal pair
15	MIPI_CSI_D1P	/	
16	GND	GND	Power ground
17	MIPI_CSI_CLKN	/	MIPI_CSI_CLK signal pair
18	MIPI_CSI_CLKP	/	
19	GND	GND	Power ground
20	MIPI_CSI_D2N	/	MIPI_CSI_D2 signal pair
21	MIPI_CSI_D2P	/	
22	GND	GND	Power ground
23	MIPI_CSI_D3N	/	MIPI_CSI_D3 signal pair
24	MIPI_CSI_D3P	/	

3.9 mic array interface (J28 12Pin FPC 0.5mm flip down)



Serial number	definition	Level / V	explain
1	MIC_N1	/	MIC1
2	MIC_P1	/	
3	VCC_DMIC	3.0V	Mic power supply
4	MIC_P2	/	MIC2
5	MIC_N2	/	
6	AGND	AGND	Simulatively
7	MIC_N3	/	MIC3
8	MIC_P3	/	
9	VCC_DMIC	3.0V	Mic power supply
10	MIC_N4	/	MIC4
11	MIC_P4	/	
12	AGND	AGND	Simulatively

3.10 speaker (J25 ph2.0-4p in-line white)

Dual channel speaker interface, each channel supports 4ohm 3W output



Serial number	definition	Level / V	explain
1	VORN	/	Right channel horn drive output
2	VORP	/	
3	VOLN	/	Left channel horn drive output
4	VOLP	/	

3.11 mic interface (j27 ph2.0-2p in-line white)



Single microphone recording

Serial number	definition	Level / V	explain
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1	MICIN1N	GND	Microphone negative input
2	MICIN1P	3.3V	Microphone positive input

3.12 headphone interface (J26)

Support one-way otpm standard four section headphone stand.



Figure 8Ido-evb3020 headphone connector



Figure 9Schematic diagram of ido-evb3020 earphone

3.13 TF Card Holder (J10)

TF card holder supports SD30, supporting high-speed SD card.



Figure 10 ldo-evb3020 TF card interface

3.14 USB interface

Provide 6-way USB20 interface, 4 of which are pH20-4p in-line socket, the other 2 channels adopt standard USB type-A motherboard, each USB software independently controls the external power supply, and the external power supply capacity of each USB is 5V@500mA.

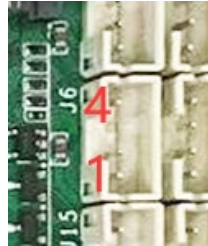
3.14.1 USB2.0 interface (J1 + J2 USB2.0 type-A female base white)

- Two standard USB20 type-A motherboard, which can support standard USB memory disk and other devices;
- The system firmware passes the standard USB20 type-A base J1 burning.



Figure 11 ldo-evb3020 USB interface

3.14.2 USB2. 0 interface (J3 + J4 + J5 + J6 ph2.0-4p straight plug white)



The main board connects four USB20 interface is extended through four 4-pin 2.0mm-apart wafer seats (J3, J4, J5, J6). Each seat provides 5V@500mA Power supply capacity.

Serial number	definition	Level / V	explain
1	5V	5V	Power supply 5V output
2	USB-D-	/	USB data cable
3	USB_D+	/	
4	GND	GND	Power ground

3.15 ADC expansion interface (j29 ph2.0-6p in-line white)



Serial number	definition	Level / V	explain
1	EXT_3V3	3.3V	3.3V output power supply
2	RK809_PWRON	1.8V	Power button
3	SARADC_VIN2	1.8V	ADC input, sampling range [0-1.8v]
4	SARADC_VIN0	1.8V	ADC input, sampling range [0-1.8v]
5	SARADC_VIN1	1.8V	ADC input, sampling range [0-1.8v]
6	GND	GND	Power ground

3.16 I/O expansion interface (J30 ph2.0-2x7p direct plug 180 degrees)



Serial number	definition	Level / V	explain
1	EXT_3V3	3.3V	Power supply: 3.3V output
2	GND	GND	Power ground
3	GPIO3_A5_d	3.3V	The default configuration is GPIO
4	GPIO3_A6_d	3.3V	The default configuration is GPIO
5	GPIO3_A7_d	3.3V	The default configuration is GPIO
6	GPIO3_B0_d	3.3V	The default configuration is GPIO
7	GPIO3_B5_d	3.3V	The default configuration is GPIO

8	GPIO3_C0_d	3.3V	The default configuration is GPIO
9	GPIO3_C1_d	3.3V	The default configuration is GPIO
10	GPIO3_C2_d	3.3V	The default configuration is GPIO
11	GPIO3_C3_d	3.3V	The default configuration is GPIO
12	GPIO3_C4_d	3.3V	The default configuration is GPIO
13	GPIO3_C5_d	3.3V	The default configuration is GPIO
14	PWM3/GPIO0_C1_d	3.3V	The default configuration is GPIO

3.17 RTC battery (rtc1 cr1220 chip battery holder)



The main board is reserved with an RTC battery interface, which uses a 1.25mm 2p socket. Ensure that the motherboard can operate normally for a long time in case of power failure.

Serial number	definition	Level / V	explain
1	RTC-3.3V	3.3V	Power supply: 3.3V output
2	GND	GND	Power ground

3.18 debugging serial port (J17 1.25t 3P vertical paste)



Serial number	definition	Level / V	explain
1	UART2_RX_M0	3.3V	Default 1.5mbps baud rate
2	UART2_TX_M0	3.3V	
3	GND	GND	Power ground

3.19 LED indicator

			
Serial number	definition	Level / V	explain
Power_LED	POW	3.3V	Normally on when powered on
System_LED	SYS	3.3V	System operation status indicator, frequency indicates current CPU load

3.20 burn button (SW1)

The burn button is used to upgrade the firmware of the burn system through USB. When the power is off, press and hold the burn button, connect the J1 interface of the motherboard (USB2.0 type-A motherboard) through the computer, and then power on the motherboard. The motherboard enters the USB burn mode, and uses the burn tool to burn the system.



Figure 12Ido-evb3020 burning button

3.21 WiFi

On board WiFi module,

The wifi antenna adopts IPEX generation 1 pedestal.



Figure 14Ido-evb3020 IPEX first generation seat

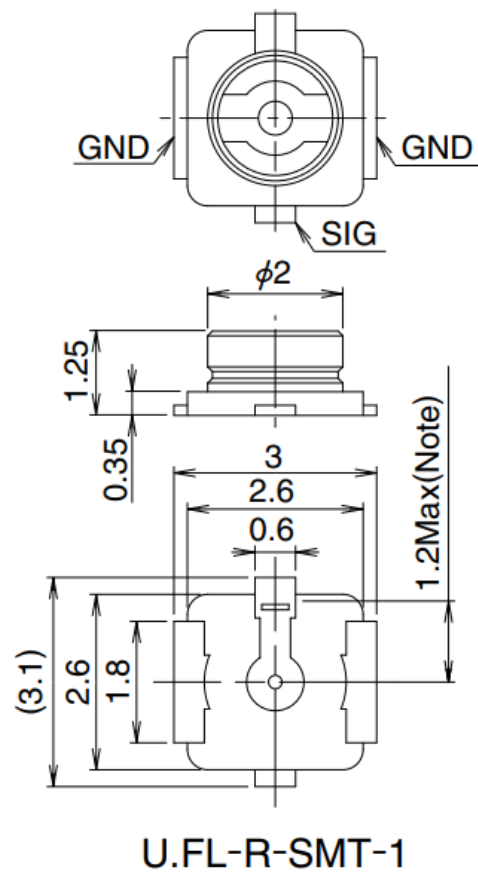


Figure 15 Schematic diagram of ido-evb3020 IPEX generation 1 seat

4. Electrical performance

4.1 standard power supply

attribute		minimum	typical	maximum
Standard power supply	Voltage	9V	12V	24V
	Ripple	/	/	50mV
	electric current	2A	/	/

4.2 working current without any external devices

attribute		minimum	typical	maximum
Standard power supply	Working current	/	0.5A (12V)	/
	Standby current	/	25mA (12V)	/
	ShutDown Current	/	<1mA	/

4.3 USB power supply

attribute		Voltage	Typical current	Maximum current
Standard power supply	USB2.0	/	/	500mA

Note: it is recommended that the total current of USB peripherals should not exceed 2000mA, otherwise the machine will not operate normally.

4.4 working current of LVDS panel

attribute		minimum	typical	maximum
Working current of LVDS panel	3.3V working current	/	400mA	800mA
	5V working current	/	/	/

	12V operating current	/	/	/
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4.5 working current of Mipi panel

attribute		minimum	typical	maximum
Working current of Mipi screen	3.3V working current	/	400mA	800mA
	5V working current	/	/	/
	12V operating current	/	/	/

5. Precautions for use

When using the motherboard, please pay special attention to the following:

1. After removing the motherboard from the packaging box, please make sure that there are no pins or other short circuits caused by transportation before powering on.
2. Electronic products are very sensitive to static electricity. Before taking the motherboard, please wear an electrostatic bracelet or electrostatic gloves to guide the static electricity away from you.
3. Please plug and unplug the components under the condition of power failure. Before connecting the power connector to the motherboard, please confirm that the power is turned off to avoid damage to sensitive components caused by instantaneous power shock.

4. When connecting peripherals with wires, please ensure that the pin definition of each peripheral corresponds to the interface of the main board, so as to avoid short circuit and board burning due to wrong wire sequence.
5. When fixing the motherboard with screws, pay attention to avoid PCB open circuit or component falling off due to board deformation.
6. When connecting peripheral devices such as USB expansion stand, pay attention to the current limit.
7. When connecting the serial port and the can port, pay attention to whether the serial port level matches, and avoid connecting the UART to the RS232 or RS485 level. UART / RS232 pay attention to rx-tx interconnection. RS485 / can interface shall pay attention to A-A / B-B and H-H / I-I.
8. When selecting the power supply, pay attention that the voltage and current meet the power requirements of the main board and peripherals.
9. When designing the complete product, the heat dissipation and height limitation of the main board shall be considered.
10. When you do not use the motherboard at ordinary times, please place the motherboard in an electrostatic table mat or electrostatic bag for sealing and storage.

Manufacturer's Name: Shenzhen Tactile Intelligent Technology Co., Ltd.

Address: Room 801-803, 8th Floor, Block A, Building 6, International Innovation Valley,
Nanshan District, Shenzhen, PRC. Post Code: 518000

EU Compliance statement: Shenzhen Tactile Intelligent Technology Co., Ltd. Hereby declares this device in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.

A copy of the EU Declaration of conformity is available online at <http://www.industio.cn/euro-compliance>

To comply with RF exposure requirements, this equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

RF Specification

WIFI: 2412-2472MHz (EU Band)

Transmission power: 16.71dbm (eirp)

Antenna designation: FPC antenna (Antenna Gain: 2.22 dBi)

Federal Communication Commission Statement (FCC, U.S.)

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Caution:

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.