

# H-A133R Mainboard Specification

Version	V1.0
Date	2023-09-27

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# Changelog

1.0.0	2023-09-27	Chinese and English merged version.
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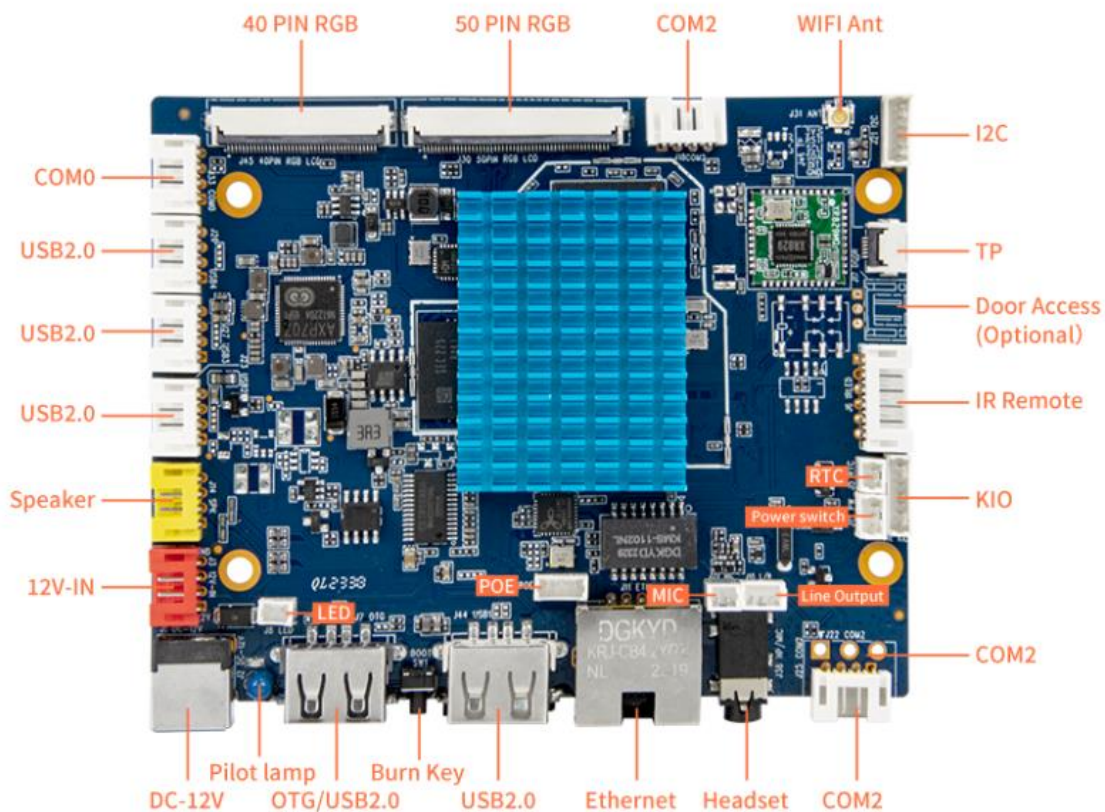
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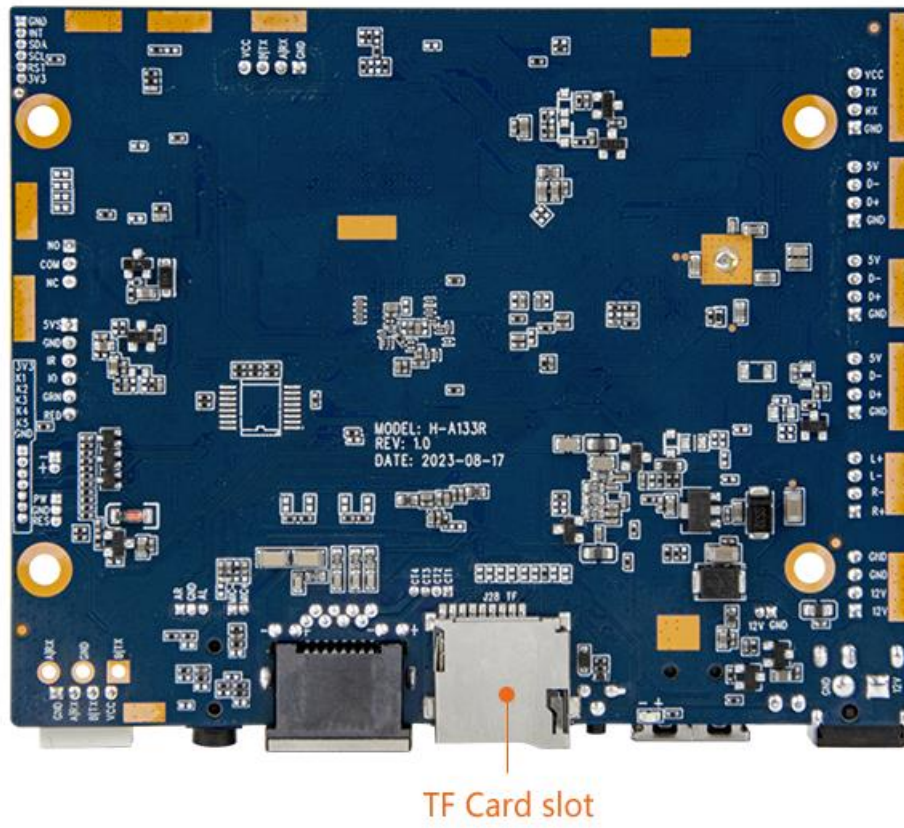
# 1 Product Overview

H-A133R mainboard is based on Allwinner A133 high-performance application processor platform. A133 is a low power, high performance processor for computing, personal mobile internet devices and other smart device applications. It integrates quad-core Cortex-A53 clocked at up to 1.6GHz, with superior computing performance, 2D/3D graphics processing capabilities and Full HD video codec capabilities. It perfectly supports 4Kx2K@30fps video decoding.

This mainboard is specially designed for **ultra-thin** applications with strict material selection and design. The compact size and rich interface facilitate its integration into the complete machine, bringing a smooth experience and superior performance to the final product. It can be applied to digital signage, touch interactive, consumer electronics, entertainment systems and other industries.

H-A133R V1.0 mainboard actual interface diagram as shown below.





TF Card slot

## 2 Specification List

H-A133R's system functions and interface features are shown in the following table.

Function & Interface	Detailed Description
<b>CPU</b>	Allwinner A133 Cortex-A53 quad-core, up to 1.6GHz
<b>DDR</b>	LPDDR4 1GB (2GB   4GB optional)
<b>Storage</b>	The default comes with an 8GB EMMC NAND chip that can scale up to 128GB
<b>LCD RGB</b>	40-pin and 50-pin common FPC LCD RGB supporting normal panel up to 1024x768
<b>HP/MIC</b>	Support CTIA 4-pole HP/MIC socket (Left-Right-GND-Mic)
<b>Line Output</b>	Support standard left and right channel line output (pin header)
<b>Amplifier Output</b>	8 Ohm 6W Dual Audio Amplifier Output
<b>MIC Input</b>	Differential MIC input (pin header)
<b>USB Interface</b>	2 horizontal USB 2.0 connectors (Single Socket, one is for OTG), 3 pin headers
<b>Serial Port</b>	1 TTL/RS-232 compatible, 1 TTL/RS-232/RS-485 compatible
<b>TF Card</b>	Self-elastic micro TF card socket, up to 256GB capacity
<b>Camera</b>	Support USB camera within 2 million pixels
<b>WiFi</b>	Built-in high performance SDIO interface WiFi module, support IEEE 802.11 b/g/n/ac
<b>Bluetooth</b>	Built-in high performance serial interface BT module with support for V2.1+EDR/BT v3.0/BT v3.0+HS/BT v4.2
<b>Ethernet</b>	10/100M Adaptive Ethernet RJ45 connector
<b>Infrared RC</b>	Standard infrared remote control receiver and infrared receiver pin header
<b>GPIO Signals</b>	5-way GPIO signals for such as GPIO buttons and/or 3.3V digital input/output
<b>Door Control</b>	1 single-pole double-throw access control relay ( <b>optional</b> )
<b>I2C Bus</b>	I2C pin header and FPC for I2C capacitive screen and etc
<b>Real Time Clock</b>	Ultra-low-power RTC circuit (CR1220 battery) with timer and alarm functionalities
<b>LED Indicator</b>	Blue LED indicator for running
<b>Buttons</b>	Recovery mode button and power switch button
<b>DC Input</b>	Supports 9~15V wide voltage DC power input
<b>Ambient Requirement</b>	Working temperature -20°C ~ 70°C, working humidity 0%~95% (non-condensing)
<b>Physical Size</b>	Length*Width*Height (100mm*80mm*9mm), <b>PCB top side height 7mm</b>
<b>Operating System</b>	Recommended Android 10, LinuxQT optional

### 3 Interface definition

#### ➤ J1 DC-12V Socket

[J1] DC-12V power socket, positive outer and negative inner, inner pin diameter 2.0mm, outer ring diameter 5.5mm.

#### ➤ J2 DC-12V Input Header

[J2] DC-12V Input Header (SIP 3.81mm-Square pad is pin 1).

Pin#	Definition	Note
1	12V	DC Power Input (9~15V)
2	GND	Power Ground

#### ➤ J3 DC-12V Input Header

[J3] DC-12V Input Header (SIP 2.0mm-Square pad is pin 1).

Pin#	Definition	Note
1	12V	DC Power Input (9~15V)
2	12V	DC Power Input (9~15V)
3	GND	Power Ground
4	GND	Power Ground

#### ➤ J5 RTC Battery Header

[J5] RTC Battery Header (SIP-1.25mm Square pad is pin 1).

Pin#	Definition	Note
1	BAT-	3V Coin Battery Negative
2	BAT+	3V Coin Battery Positive

#### ➤ J6 Remote Control & LED Header

[J6] Remote Control & LED Header (SIP 2.0mm-Square pad is pin 1).

Pin#	Definition	Note
1	5VS	Power output supply 5V standby
2	GND	Digital Ground



3	IR	5V level Irda remote control input signal
4	IO	3.3V level GPIO input signal
5	GREEN	Running indicator for external green LED
6	RED	Standby indicator for external red LED

### ➤ J7 USB 2.0 OTG Type A

[J7] USB 2.0 OTG Horizontal Type A Jack (Standard jack).

**Note:** This interface is connected to the internal USB0 signal and defaults to the firmware burning port when it is powered on. It can be connected to a PC for software burning; after entering Android, it can be set to the USB ADB debugging port or the ordinary USB Host interface through the software.

### ➤ J8 LED Power Switch

[J8] LED Power Switch (SIP 1.25mm-Square pad is pin 1).

Pin#	Definition	Note
1	GND	Power Ground
2	12V	12V Switch Power Output (IO #363)

### ➤ J11 Ethernet RJ45 Jack

[J11] 100M Ethernet RJ45 Jack (Standard jack).

### ➤ J12 Power Switch & Reset Header

[J12] Power switch & reset Header (SIP 1.25mm-Square pad is pin 1).

Pin#	Definition	Note
1	PW	Power on/off and screen on/off signal
2	GND	Digital Ground
3	RES	Hardware reset signal

### ➤ J13 POE PD Header

[J13] POE PD Header (SIP 1.25mm-Square pad is pin 1)

Pin#	Definition	Note
1	CT1	Transformer Center1
2	CT2	Transformer Center2

3	CT3	Transformer Center3
4	CT4	Transformer Center4

**Noted:** J11 Ethernet port. This interface is connected to the POE powered conversion board for 12V power supply conversion. The current size of the 12V power supply is affected by the power supply capability of the POE switch and the conversion capability of the adapter board. The typical current is 1~1.5A. This interface supports POE power supply equipment with 1/2 wires of the network cable being positive and 3/6 wires being negative. It can also be connected to POE power supply equipment with 4/5 wires of the network cable being positive and 7/8 wires being negative.

### ➤ J14 Speaker Header

[J14] Speaker Header (SIP 2.0mm-Square pad is pin 1).

Pin#	Definition	Note
1	R+	Speaker right channel +
2	R-	Speaker right channel -
3	L-	Speaker left channel -
4	L+	Speaker left channel +

### ➤ J15 Audio Line Output

[J15] Audio Line Output (SIP 1.25mm-Square pad is pin 1).

Pin#	Definition	Note
1	AR	Stereo output right channel
2	GND	Audio Ground
3	AL	Stereo output left channel

### ➤ J16 KIO Keypad and Switch Header

[J16] KIO Keypad Header (SIP 1.25mm-Square pad is pin 1).

Pin#	Definition	Note
1	3V0	3 Power output supply 3.3V
2	K1	K1 (Regular GPIO #66)
3	K2	K2 (Regular GPIO #67)
4	K3	K3 (Regular GPIO #68)
5	K4	K4 (Regular GPIO #71)
6	K5	K5 (Regular GPIO #76)
7	GND	Digital Ground

Note: All KIO signals can be adjusted to regular GPIO via a separated software version (level is 3.3V).

## ➤ J17 Door Control Header

[J17] Door Control header (DIP 2.0mm-Square pad is pin 1).

Pin#	Definition	Note
1	NO	Access control is always on, software GPIO number 232
2	COM	Access control public terminal
3	NC	Access control public and closed terminals, default COM-NC conduction, software GPIO number 232

## ➤ J18 Data Serial Port 2

[J18] Built-in Serial Port 2 (SIP 2.0mm-Square pad is pin 1). The output level is TTL 3.3V by default and it could be setup to RS-232/RS-485 if required (RS-232 if U35 mounted, RS-485 if U67 mounted). **The related software device node name is ttyS2.**

Pin#	Definition	Note
1	GND	Digital Ground
2	RX A+	Data receive (TTL or RS-232 or RS-485 level)
3	TX B-	Data transmit (TTL or RS-232 or RS-485 level)
4	VCC	Power output (Default 3.3V, 5V option)

**Note: J18 COM2, J22 COM2 and J25 COM2 interfaces are internally multiplexed with the same set of signals and cannot be used at the same time.**

## ➤ J20 Mic Input Header

[J20] Audio input header (SIP 1.25mm-Square pad is pin 1).

Pin#	Definition	Note
1	GND	Audio Ground
2	MIC	Mono microphone input

## ➤ J21 I2C Bus Header

[J21] I2C Bus Header (SIP 1.25mm-Square pad is pin 1).

Pin#	Definition	Note
1	GND	Digital Ground
2	INT	Interrupt input (3.3V level)
3	SDA	I2C Bus data signal
4	SCL	I2C Bus clock signal
5	RST	Mainboard reset output (3.3V level)

6	3V3	Power output supply 3.3V
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### ➤ J22 Data Serial Port 2

。 [J22] Built-in Serial Port 2 (SIP 3.81mm-Square pad is pin 1). The output level is TTL 3.3V by default and it could be setup to RS-232/RS-485 if required (RS-232 if U35 mounted, RS-485 if U67 mounted). **The related software device node name is ttyS2.**

Pin#	Definition	Note
1	TX B-	Data transmit (TTL or RS-232 or RS-485 level)
2	GND	Digital Ground
3	RX A+	Data receive (TTL or RS-232 or RS-485 level)

**Note: J18 COM2, J22 COM2 and J25 COM2 interfaces are internally multiplexed with the same set of signals and cannot be used at the same time.**

### ➤ J23 USB 2.0 Host Header

[J23] USB 2.0 Host Header (SIP 2.0mm-Square pad is pin 1).

Pin#	Definition	Note
1	GND	Digital Ground
2	DP	USB Differential Data+
3	DM	USB Differential Data-
4	5V	Power output 5V

**Note: This USB interface is connected to the 1x4 Hub group of USB1.**

### ➤ J25 Data Serial Port 2

[J25] Built-in Serial Port 2 (SIP 2.0mm-Square pad is pin 1). The output level is TTL 3.3V by default and it could be setup to RS-232/RS-485 if required (RS-232 if U35 mounted, RS-485 if U67 mounted). **The related software device node name is ttyS2.**

Pin#	Definition	Note
1	GND	Digital Ground
2	RX A+	Data receive (TTL or RS-232 or RS-485 level)
3	TX B-	Data transmit (TTL or RS-232 or RS-485 level)
4	VCC	Power output (Default 3.3V, 5V option)

**Note: J18 COM2, J22 COM2 and J25 COM2 interfaces are internally multiplexed with the same set of signals and cannot be used at the same time.**

### ➤ J26 USB 2.0 Host Header

[J26] USB 2.0 Host Header (SIP 2.0mm-Square pad is pin 1).

Pin#	Definition	Note
1	GND	Digital Ground
2	DP	USB Differential Data+
3	DM	USB Differential Data-
4	5V	Power output 5V

**Note:** This USB interface is connected to the 1x4 Hub group of USB1.

### ➤ J27 USB 2.0 Host Header

[J27] USB 2.0 Host Header (SIP 2.0mm-Square pad is pin 1).

Pin#	Definition	Note
1	GND	Digital Ground
2	DP	USB Differential Data+
3	DM	USB Differential Data-
4	5V	Power output 5V

**Note:** This USB interface is connected to the 1x4 Hub group of USB1.

### ➤ J28 TF Card Socket

[J28] Standard TF Card Socket.

### ➤ J30 50PIN RGB LCD Panel FPC

[J30] 50PIN RGB LCD panel FPC connector (FPC-0.5mm 50-Pin Top/Bottom Contact).

Pin#	Definition	Note
1	VLED+	Power for LED backlight (Anode)
2	VLED+	Power for LED backlight (Anode)
3	VLED-	Power for LED backlight (Cathode)
4	VLED-	Power for LED backlight (Cathode)
5	GND	Power ground
6	VCOM	Common voltage
7	DVDD	Power for Digital Circuit
8	MODE	DE/SYNC mode select ( <b>High for DE mode by default</b> )
9	DE	Data Input Enable
10	VS	Vertical Sync Input

11	HS	Horizontal Sync Input
12~17	B7~B2	Blue data(MSB) B7~B2
18~19	GND	Power ground
20~25	G7~G2	Green data(MSB) G7~G2
26~27	GND	Power ground
28~33	R7~R2	Red data(MSB) R7~R2
34~35	GND	Power ground
36	GND	Power ground
37	DCLK	Sample clock
38	GND	Power ground
39	L/R	Left/Right selection ( <b>High for Left to Right by default</b> )
40	U/D	Up/Down selection ( <b>Low for Up to Down by default</b> )
41	VGH	Gate ON Voltage
42	VGL	Gate OFF Voltage
43	AVDD	Power for Analog Circuit
44	RESET	Global reset pin
45	NC	No connection
46	VCOM	Common Voltage
47	DITHB	Dithering function ( <b>High for Disable internal dithering function</b> )
48	GND	Power ground
49	NC	No connection
50	NC	No connection

### ➤ J31 WiFi Antenna IPEX

[J31] Standard IPEX antenna connector (Φ2.0mm).

### ➤ J33 Data Serial Port 0

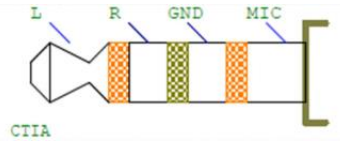
[J33] Built-in Serial Port 0 (SIP 2.0mm-Square pad is pin 1). The output level is TTL 3.3V by default and it could be setup to RS-232 if required (RS-232 if U35 mounted). **The related software device node name is ttyS0.**

Pin#	Definition	Note
1	GND	Digital Ground
2	RX	Data receive (TTL or RS-232 level)
3	TX	Data transmit (TTL or RS-232 level)
4	VCC	Power output (Default 3.3V, 5V option)

Note: If you need to use the built-in serial port 0 as a data serial port, please contact the supplier to obtain the customized software; this serial port will output the startup information in the first 5 seconds of power on (the upper or lower machine should handle this kind of data fault tolerance).

➤ J38 4-Pole HP/Mic Jack

。 [J38] 4-Pole 3.5mm Headphone & Microphone Jack (CTIA Standard jack). It is the same signals with J15/J20. It supports insert detection for speaker mute.



➤ J44 USB 2.0 Host Type A

[J44] USB 2.0 Host Horizontal Type A Jack (Standard jack).

**Note: This USB interface is connected to the 1x4 Hub group of USB1.**

➤ J45 40PIN RGB LCD Panel FPC

[J45] 40PIN RGB LCD panel FPC connector (FPC-0.5mm 40-Pin Top/Bottom Contact).

Pin#	Definition	Note
1	VLED-	LED Cathode
2	VLED+	LED Anode
3	GND	Digital Ground
4	DVDD	Power for Digital Circuit
5	GND	Digital Ground
6	GND	Digital Ground
7~12	R2~R7	Red data(MSB) R2~R7
13	GND	Digital Ground
14	GND	Digital Ground
15~20	G2~G7	Green data(MSB) G2~G7
21	GND	Digital Ground
22	GND	Digital Ground
23~28	B2~B7	Blue data(MSB) B2~B7
29	GND	Digital Ground
30	LCD_CLK	-MIPI differential lane1
31	DISP	DISPLAY ON/OFF
32	HSYNC	LCD_HSYNC
33	VSYNC	LCD_VSYNC
34	DE	LCD_DE
35	NC	No connection
36	GND	Digital Ground
37	XR	No connection

38	YD	No connection
39	XL	No connection
40	YU	No connection

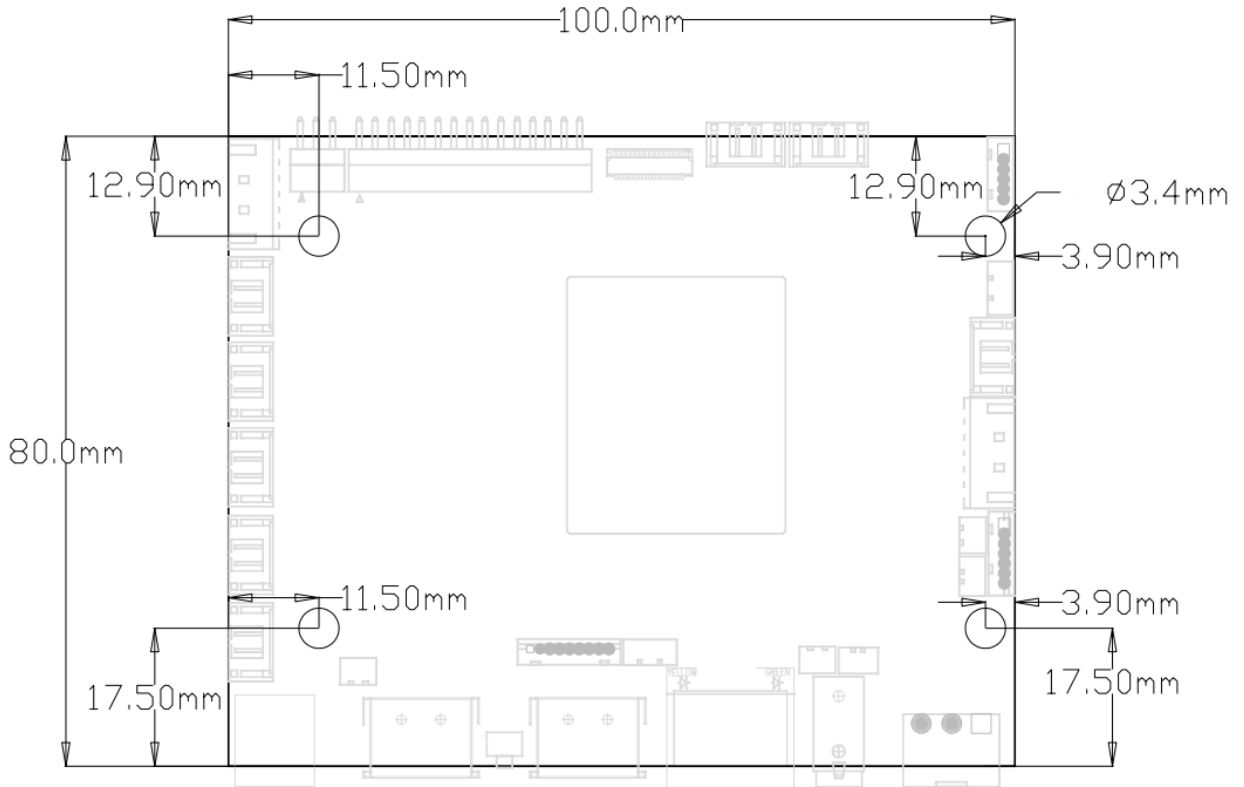
### ➤ SW1 Recovery Mode Button

[SW1] On-board recovery mode button. First press and then hold for about 3-second while power on will enter the recovery mode.



## 4 Physical Size

The PCB size is 100mm\*80mm, PCBA height is 7mm, fixed hole diameter is 3.4mm. The corresponding physical size parameters are shown in the figure below. For detailed size information, please consult the manufacturer for DXF file.



## 5 Assemble Precautions

Please note the following key points when using the H-A133R mainboard:

1. Relative humidity of this product: 10% to 90%, no condensation.
2. The working temperature of this product: -20°C ~ 70°C.
3. This storage temperature of this product: -40°C ~ 70°C.
4. Anti-static treatment is required during assembly and transportation of this product.
5. The board interface connection cable must not be too long. Otherwise, the signal quality may be affected.
6. Never allow the board to be distorted or heavily stressed during assembly.
7. Do not short circuit between mainboard and other peripherals.
8. When connecting to external LVDS or eDP LCD screen, pay attention to whether the screen voltage and current meet the requirements, and pay attention to the screen connector pin-1 direction.
9. When connecting to external LVDS or eDP LCD screen, pay attention to whether the backlight voltage and current meet the requirements. **If the LCD backlight power is above 20W, it is recommended to use a separate power board for backlight power supply.**
10. When connecting to peripherals using USB, GPIO, Serial, I2C, SPI, HDMI, etc., pay attention to whether the IO voltage level and current of the peripheral meet the requirements. **When using the power pin on these connectors to supply power to the external circuit, the regular power pin must not exceed 100mA, and the USB power pin must not exceed 500mA.** When the serial port is connected to peripherals, level matching (3.3V TTL level, RS-232 level and RS-485 level) is also required.
11. Please connect the power to the power input socket or connector, and evaluate whether the current of the whole board meets the requirements according to the total peripherals. **It is strictly forbidden to directly supply power from the backlight connector.**
12. The communication module should be mounted at least 5mm away from the metal housing to avoid signal interference.

## 6 Software Guide

**The H-A133R motherboard only supports RGB screen single-screen output and does not support dual-screen different display combinations.**

The internal serial port and extended serial port software port numbers of the H-A133R motherboard are as follows:

Port	Software Device Node
J33	/dev/ttyS0
J18	/dev/ttyS2
J22	/dev/ttyS2
J25	/dev/ttyS2