灰度科技
HUIDU TECHNOLOGY

PRODUCT SPECIFICATION

LCD Android Board

HD-3576V

Version: V1.0

Update History

Version	Release time	Description
V1.0	Jun. 20, 2025	First official release.

Contents

Chapter Ⅰ Product Description

Ⅰ. Overview

HD-3576V uses Rockchip RK3576 octa-core high-computing processor, big and small core architecture (Quad-Core Cortex-A72 + Quad-Core Cortex-A53) , 8nm process technology , and main frequency up to 2.2GHz. It has excellent computing power and efficient energy consumption ratio, providing more powerful core support for high-performance computing and multi-tasking. It has 6TOPS super computing power NPU, supports dual-core collaborative work or independent work, and supports multi-tasking and multi-scenario parallel. Equipped with Android 14.0 system, it provides a safer and more stable system environment for the research and development of terminal equipment

RK3576 uses Mail G52 MC3 GPU and is equipped with a variety of image processing algorithms, which can further improve the clarity and color performance of images in terms of contrast adjustment, dithering algorithm, color enhancement and brightening. It supports LCD display screens and cropped screens with interfaces such as LVDS/ V-by-One/ HDMI/ MIPI_DSI, with a resolution of up to 4K@120fps. The video encoder supports H.264 and H.265, up to 4K@60fps, and the high-quality JPEG encoder/decoder. The embedded 3D GPU makes RK3576 fully compatible with 0penGLES1.1, 2.0 and 3.2, OpenCL up to 2.0 and Vulkan 1.1 . It supports dual-screen display to meet users' diverse display needs in multiple scenarios.

It supports infrared remote control, Wi-Fi, RJ45 and other rich interfaces, and is widely used in advertising machines, interactive all-in-one machines, security, medical treatment, transportation, finance, industrial control and other intelligent control fields. Due to its hardware platform and Android intelligence, it can be used on the intelligent terminal motherboard when human-computer interaction and network device interaction are required, and it can be your best choice.

Ⅱ. Features

- High performance : RK3576 chip integrates quad-core Cortex-A72 and quad-core Cortex-A53 architecture , with a maximum frequency of 2.2 GHz, which is a qualitative leap in performance. It can play high-definition video in various formats and handle complex interactive operations. It supports high-performance dual-channel external memory interface (LLPDDR5) to support high-demand memory bandwidth, and also provides a complete set of peripheral interfaces to support very flexible applications.
- High stability : RK3576 Android integrated board uses timer circuit technology in hardware . The program clears the timer within a certain time range to ensure stable operation of the program and product stability, allowing the final product to be unattended 24/7.
- High integration : RK3576 Android integrated board integrates Ethernet, Wi-Fi, power amplifier, TF expansion card, USB expansion port, IR remote control function, HDMI, LVDS, MIPI_DSI, HDMI, backlight control, microphone and other interface, which meets the requirements of various peripherals on the market and greatly simplifies the overall design.
- High compatibility: Onboard 6TOPS NPU, supports INT4/INT8/INT16/FP16/BF16/TF32 mixed operations. Network models based on frameworks such as TensorFlow/MXNet/PyTorch/Caffe can be easily converted .
- High scalability : 5 USB ports (3 built-in 4pin*2.0mm USB ports , 2 standard USB 3.0 ports), 4 TTL serial ports (2*RS485 ports, 2*RS232 ports), 1 MCU burning serial port, 1 GPIO interface, 1 PoE interface, 1 DEBUG interface, etc., which can meet various peripheral requirements on the market .
- High definition : Supports LCD displays with various LVDS / V-by-One / HDMI / MIPI_DSI interfaces, and supports screen cropping of various sizes and resolutions.
- Perfectly supports multiple mainstream touch screen functions such as multi-point infrared touch, multi-point capacitive touch, multi-point nanofilm touch, multi-point acoustic wave touch, and multi-point optical touch.

Chapter II Specifications

Ⅰ. Basic Parameters

1. Hardware parameters

Hardware Specifications	
CPU	RK3576 , octa-core CPU, big and small core architecture (Quad-Core Cortex-A72 + Quad-Core Cortex-A53) , main frequency up to 2.2 GHz
GPU	3D GPU fully compatible with 0penGLES1.1, 2.0 and 3.2, OpenCL up to 2.0 and Vulkan 1.1
NPU	RKNN NPU, 6TOPS computing power NPU
Storage Configuration	Standard configuration: 4GB+64GB, 8GB+64GB
Network	Support Gigabit Ethernet, support PoE power supply; Support 2.4GHz+5GHz Wi-Fi 6 ; support Wi-Fi 802.11 b/g/n/ax protocol; Supports Bluetooth 5.3
Image Rotation	Supports 0, 90, 180, and 270 degree manual rotation; optional gravity sensor to support automatic rotation
Display Interface	1*LVDS, support 1920*1080@60Hz; 1* HDMI OUT, support 4096*2160@120Hz; 1*V-by-One, support 3840@2160@60Hz; 1 *MIPI_DSI 2560*1600@60Hz Onboard backlight control supports 12V backlight power supply Note: Only one of LVDS/V-by-One/HDMI OUT can be selected..
Audio	Support standard left and right channel line output; support 3.5mm audio output interface
Amplifier	2-way output (8 ohm 5 watt , compatible with 8 ohm 10 watt dual-channel audio amplifier output)
Microphone	Support differential MIC input
Touchscreen	Support USB multi-point infrared touch, multi-point capacitive touch, multi-point nano film touch, multi-point acoustic wave touch, multi-point optical touch, etc.
RTC	Built-in real-time clock function
USB	1-way USB 3.0 HOST, 1-way USB 3.0 OTG, 3 -way expansion USB port
Infrared	Infrared receiver, supports infrared remote control function
Led	1*power status LED (green), 1*system LED (green, flashing by default)
Button	1*Upgrade key

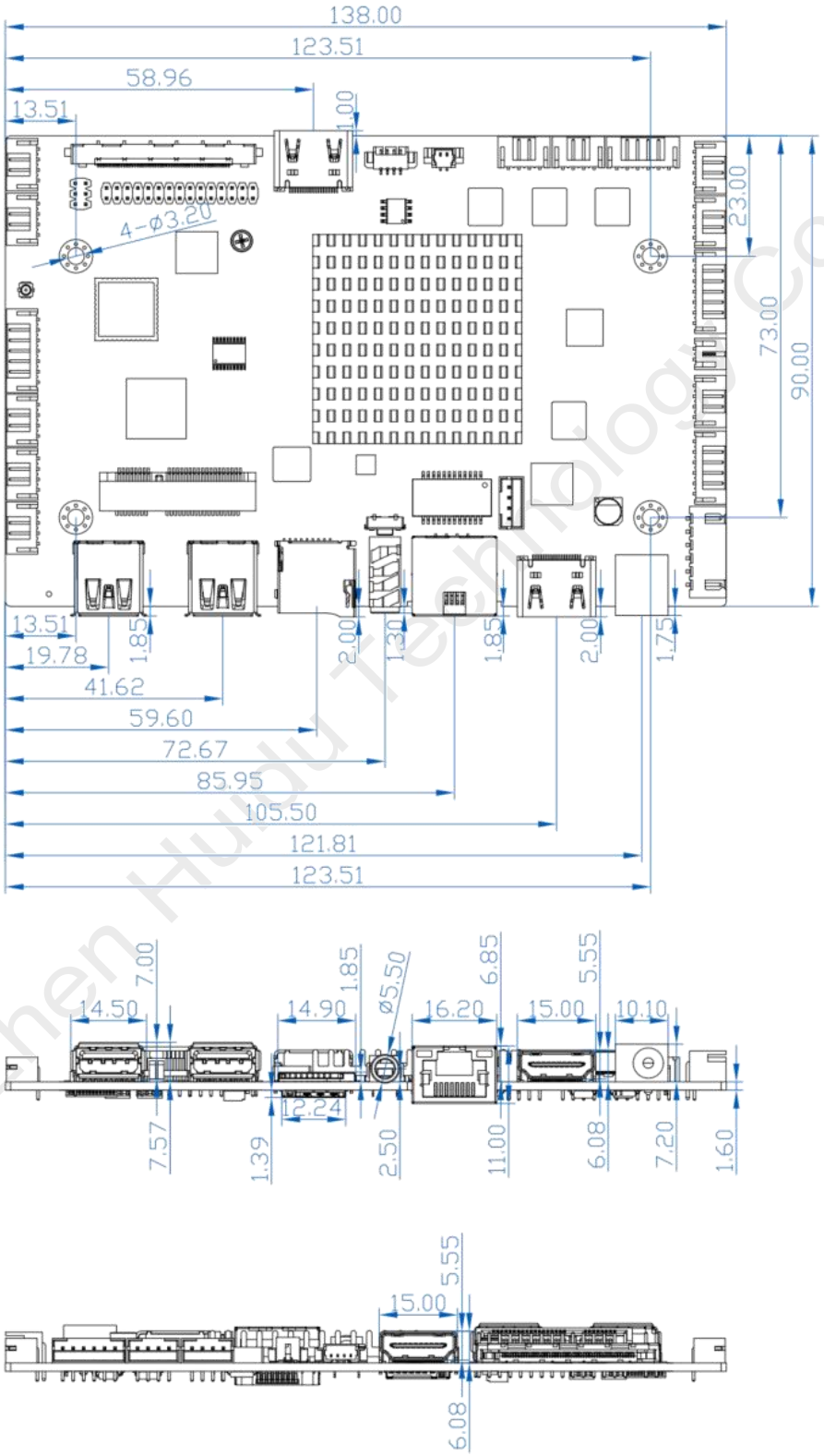
Serial Port	4-channel UART (optional 2-channel RS232, 2-channel RS485), 1-channel DEBUG, 1-channel MCU burning serial port
GPIO	5-way IO input and output control, can be used for key scanning control
KEY	Support physical switch
TF	Data storage, maximum support 512GB
Storage humidity	10% ~ 90%, no condensation
Storage temperature	-40 ℃ ~70 ℃
Operating temperature	-20 ℃ ~70 ℃
System watchdog	Support software watchdog and hardware watchdog

2. Software parameters

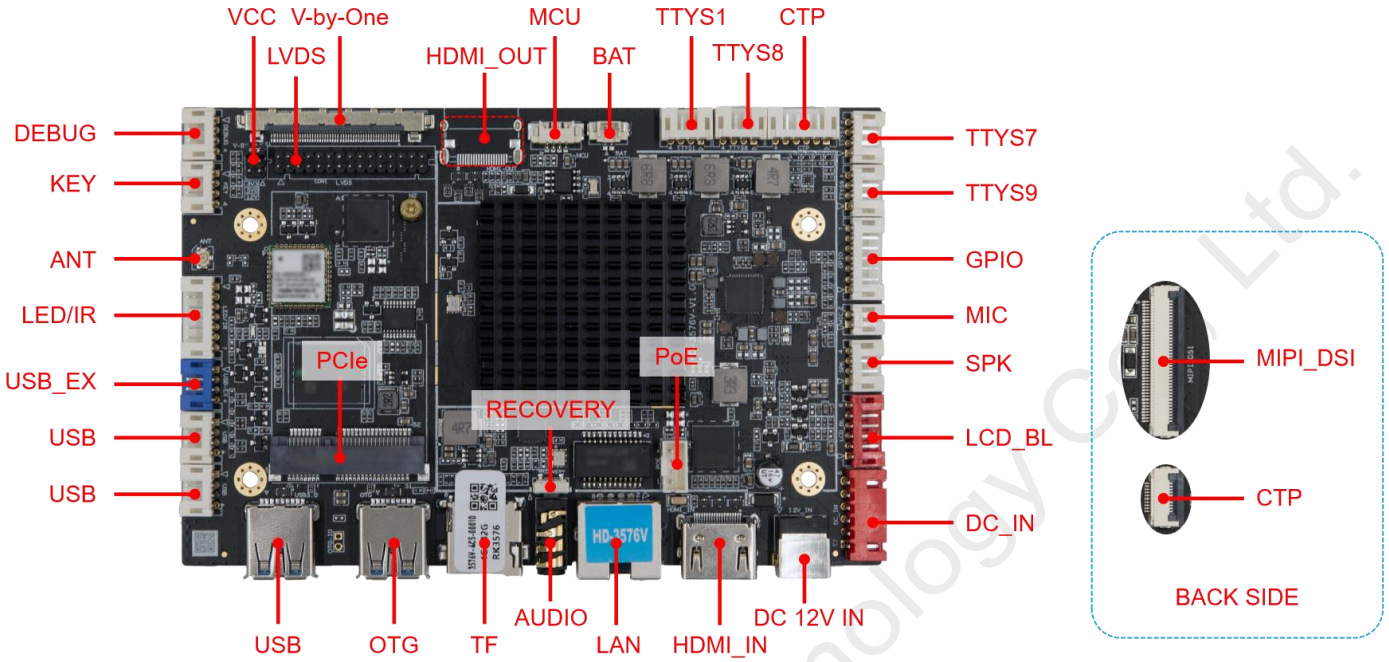
Software Specifications	
Operating system	Android 14.0
Audio	MP3, WAV, APE, FLAC, OGG, M4A, 3GPP and other formats
Video	Support H.265, H.264, VP9, AVS2, AV1 and other video formats
Image	Support various image formats such as JPG, BMP, PNG, etc.
System comes with application software	APK Installer, Email, Calculator, Browser, Recorder, Calendar, Settings, Clock, Video Player, Search, Contacts, Gallery, Download, Camera, Music, Explorer, etc.
Language	Support multiple languages
Input	Standard Android keyboard, optional third-party input method
System Management	Native Android system, open root permissions, and can be used for product customization and development
	Real-time remote monitoring, self-recovery in case of system crash, 24/7 unattended operation
	Support OTA remote upgrade; support USB flash drive upgrade
	Support boot animation definition
	Support server/stand-alone mode switching
	Support Wi-Fi hotspot

Ⅱ. Product Size Specifications

Bare board size specification, unit: mm, Screw hole specifications：φ3. 2 mm x 4, PCB layer number: 4 layers, PCB board thickness：1.6mm ± 10%



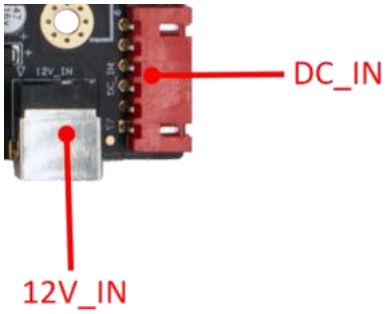
Ⅲ. Product Interface Diagram



IV. Interface Parameter Description

1. Power interface

It uses a 12V DC power supply, and only allows the board system to be powered from a DC socket and a power socket.



No.	Definition	Attributes	Description
6	12V	Input	12V input
5	12V	Input	12V input
4	GND	Ground	Ground
3	GND	Ground	Ground
2	5VS	Input	Standby 5V input
1	STB	Output	Standby signal output

Note: The inner diameter of the DC seat is 2.0mm and the outer diameter is 5.8mm

2. MIC interface (microphone) (2pin*2.0mm)

No.	Definition	Attributes	Description
1	MIC +	Input	MIC+Input
2	MIC -	Input	MIC-Input

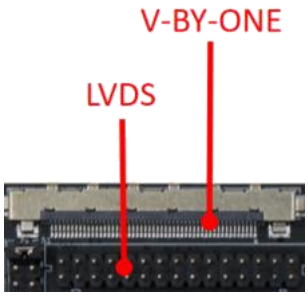
3. LED/IR interface (remote control) (7pin*2.0mm)

No.	Definition	Attributes	Description
1	RED	Output	Red indicator light
2	3V3	Power	3.3V output
3	GRN	Output	Green indicator light
4	IO 6	Output	Remote control signal output
5	I R	Input	Remote control signal input
6	GND	Ground	Ground
7	3V3	Power	3.3V output

4. LCD-BL interface (6pin*2.0mm)

No.	Definition	Attributes	Description
1	GND	Ground	Ground
2	GND	Ground	Ground
3	ADJ	Output	Backlight brightness control
4	EN	Output	Backlight enable control
5	12V	Power	12V output
6	12V	Power	12V output

5. LVDS interface (2*15pin*2.0mm)



Universal LVDS interface definition, supports single/dual, 6/8/10-bit 1080P LVDS screen. Screen voltage can be selected through jumper cap, and can support 3.3V/5V/12V screen power supply.

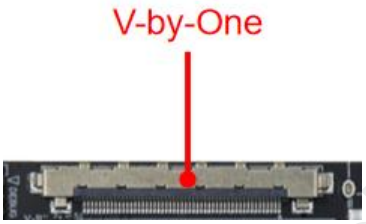
To avoid burning the board and screen, please pay attention to the following:

1. Please confirm whether the screen power supply voltage in the screen specification is correct and whether the corresponding power supply of the board can meet the maximum working current of the screen.
2. Please use a multimeter to confirm whether the power selected by the jumper cap is correct.
3. When connecting the screen cable of a 6/8-bit LVDS screen, install it close to pin1.

No.	Definition	Attributes	Description
1	VCC	Power	3.3V/5V/12V optional output
2	VCC	Power	3.3V/5V/12V optional output
3	VCC	Power	3.3V/5V/12V optional output
4	GND	Ground	Ground
5	GND	Ground	Ground
6	GND	Ground	Ground
7	D0 -	Output	Odd 0-
8	D0 +	Output	Odd 0+
9	D1 -	Output	Odd 1-
10	D1 +	Output	Odd 1+
11	D2 -	Output	Odd 2-
12	D2 +	Output	Odd 2+
13	GND	Ground	Ground
14	GND	Ground	Ground
15	CK -	Output	Odd Clock-
16	CK +	Output	Odd Clock+
17	D3 -	Output	Odd 3-
18	D3 +	Output	Odd 3+
19	D 4-	Output	Even 0-
20	D 4+	Output	Even 0+
21	D 5-	Output	Even 1-
22	D 5+	Output	Even 1+
23	D 6-	Output	Even 2-
24	D 6+	Output	Even 2+

25	GND	Ground	Ground
26	GND	Ground	Ground
27	CK -	Output	Even Clock-
28	CK +	Output	Even Clock+
29	D 7-	Output	Even 3-
30	D 7+	Output	Even 3+

6. V-by-One interface

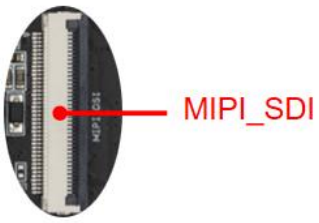


No.	Definition	Attributes	Description
1	GND	Ground	Ground
2	VBX-7P	Output	Pixel0 Positive Data
3	VBX-7N	Output	Pixel0 Negative Data
4	GND	Ground	Ground
5	VBX-6P	Output	Pixel 1 Positive Data
6	VBX-6N	Output	Pixel 1 Negative Data
7	GND	Ground	Ground
8	VBX-5P	Output	Pixe2 Positive Data
9	VBX-5N	Output	Pixel 2 Negative Data
10	GND	Ground	Ground
11	VBX-4P	Output	Pixel 3 Positive Data
12	VBX-4N	Output	Pixel 3 Negative Data
13	GND	Ground	Ground
14	VBX-3P	Output	Pixel 4 Positive Data
15	VBX-3N	Output	Pixel 4 Negative Data
16	GND	Ground	Ground
17	VBX-2P	Output	Pixel 5 Positive Data
18	VBX-2N	Output	Pixel 5 Negative Data
19	GND	Ground	Ground
20	VBX-1P	Output	Pixel 6 Positive Data
21	VBX-1N	Output	Pixel 6 Negative Data
22	GND	Ground	Ground

23	VBX-0P	Output	Pixel 7 Positive Data
24	VBX-0N	Output	Pixel 7 Negative Data
25	GND	Ground	Ground
26	LOCKN-OUT	Output	CLOCK
27	HTPDN	Output	TCON
28	SEL	NC	TCON
29	AGP	NC	TCON
30	SCN-EN	NC	TCON
31	Bit-SEL	NC	TCON
32	LD-EN2	NC	TCON
33	BOE-SCL	NC	TCON
34	BOE-SDA	NC	TCON
35	2D/3D	NC	TCON
36	L/R-IN	NC	TCON
37	L/R OUT	NC	TCON
38	NC	NC	NC
39	GND	Ground	Ground
40	GND	Ground	Ground
41	GND	Ground	Ground
42	GND	Ground	Ground
43	NC	NC	NC
44	VCC-VX1	Power	Power
45	VCC-VX1	Power	Power
46	VCC-VX1	Power	Power
47	VCC-VX1	Power	Power
48	VCC-VX1	Power	Power
49	VCC-VX1	Power	Power
50	VCC-VX1	Power	Power
51	VCC-VX1	Power	Power

V-by-One and HDMI-OUT share the same channel, only one of them can be selected for use.

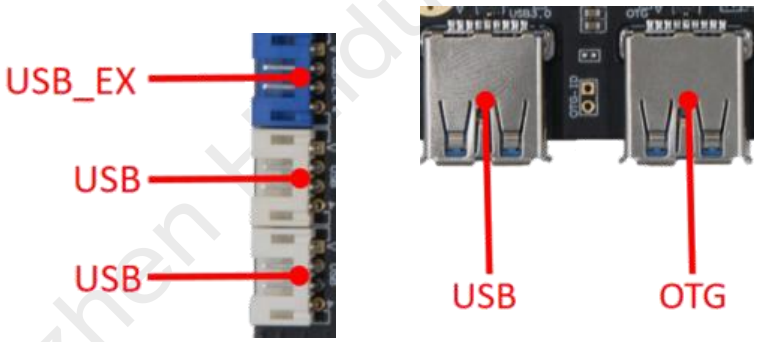
7. MIPI_SDI interface



No.	Definition	Attributes	Describe
1	LED+	Output	LED+
2	LED+	Output	LED+
3	NC	Null	NC
4	NC	Null	NC
5	NC	Null	NC
6	NC	Null	NC
7	NC	Null	NC
8	NC	Null	NC
9	LED-	Output	LED-
10	LED-	Output	LED-
11	GND	Ground wire	Ground wire
12	NC	Null	NC
13	NC	Null	NC
14	NC	Null	NC
15	NC	Null	NC
16	GND	Ground wire	Ground wire
17	NC	Null	NC
18	NC	Null	NC
19	GND	Ground wire	Ground wire
20	RXE3+	Output	MIPI 3+ Signal
21	RXE3-	Output	MIPI 3- Signal
22	GND	Ground wire	Ground wire
23	RXE2+	Output	MIPI 2+ Signal
24	RXE2-	Output	MIPI 2- Signal
25	GND	Ground wire	Ground wire

26	RXECLK+	Output	MIPI CLK + Signal
27	RXECLK-	Output	MIPI CLK - Signal
28	GND	Ground wire	Ground wire
29	RXE1+	Output	MIPI 1 + Signal
30	RXE1-	Output	MIPI 1 - Signal
31	GND	Ground wire	Ground wire
32	RXE0+	Output	MIPI 0 + Signal
33	RXE0-	Output	MIPI 0 - Signal
34	GND	Ground wire	Ground wire
35	NC	Null	NC
36	RST	Output	Reset
37	GND	Ground wire	Ground wire
38	VCC	Output	Power supply
39	VCC	Output	Power supply
40	NC	Null	NC

8. USB interface

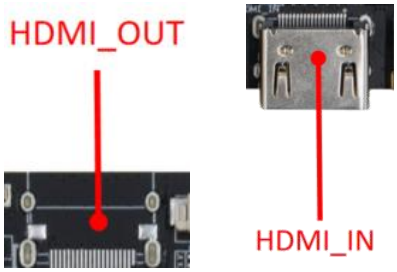


The board has 2 standard USB interfaces and 3 built - in (4pin*2.0mm) USB pins, one of which is shared with the 4G module.

No.	Definition	Attributes	Description
1	5V	Power	5V output
2	DM	Input/Output	DM
3	DP	Input/Output	DP
4	GND	Ground	Ground

9. HDMI interface

HDMI IN support 3840*2160@60Hz, HDMI OUT support 4096*2160@120Hz.



Note: HDMI OUT is optional

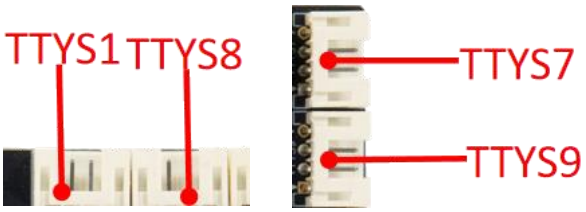
10. SPK interface (power amplifier) (4pin*2.0mm)

No.	Definition	Attributes	Description
1	SPK R+	Output	Right Channel+
2	SPK R-	Output	Right Channel -
3	SPK L-	Output	Left Channel -
4	SPK L+	Output	Left Channel+

11. GPIO interface (expansion) and definition (7pin*2.0mm)

No.	Definition	Attributes	Description
1	GND	Ground	Ground
2	IO1	IO1	volume-
3	IO2	IO2	Volume +
4	IO3	IO3	Return
5	IO 4	IO4	Back to Home
6	IO 5	IO5	Short touch 1S: Turn on/off the screen Long press 3S: "Restart/Shutdown" pop-up window Long touch 6S: Force shutdown
7	3V3	Power	3V3 output

12. UART (serial port) interface (4pin*2.0mm)



The board has two sets of common UART serial ports, which can support common UART serial port devices on the market.

Note:

1. Check whether the serial port voltage matches. It cannot directly connect to RS232 and RS485 serial port devices.
2. Check whether the TX and RX connections are correct.

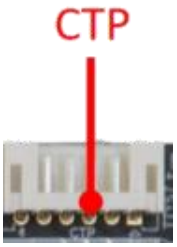
No.	Definition	Attributes	Description
1	3v3	Power	3.3V output
2	TX	Output	TX
3	RX	Input	RX
4	GND	Ground	Ground

1. TTYS7 and TTYS9 can adjust RS485 communication through hardware
2. TTYS1 and TTYS8 can adjust RS232 communication through hardware

13. DEBUG interface (4pin*2.0mm)

No.	Definition	Attributes	Description
1	3V3	Power	3.3V output
2	TX	Output	TX
3	RX	Input	RX
4	GND	Ground	Ground

14. CTP interface (6pin*2.0mm)

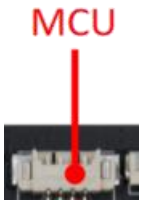


No.	Definition	Attributes	Description
1	3V3	Power	3.3V output
2	SCL	Input/Output	I2C Clock
3	SDA	Input/Output	I2C Data
4	INT	Input/Output	Interrupt
5	RST	Input/Output	Reset
6	GND	Ground	Ground

15. KEY interface (4pin*2.0mm)

No.	Definition	Attributes	Description
1	PWER ON	Power Switch	Power switch, can be connected to an external button to control the power on and off
2	RST	Reset Signal	Reset signal interface, reserved
3	KEY	RECOVERY	Upgrade button
4	GND	Ground	Ground

16. MCU interface (4pin*1.25mm)



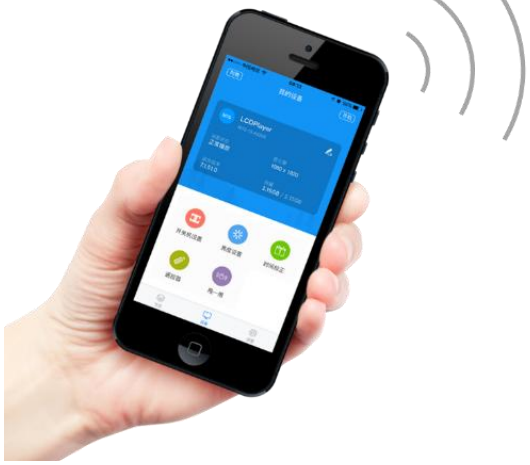
No.	Definition	Attributes	Description
1	3V3	Power	3.3V output
2	SWDIO	Output	TX
3	SWCLK	Enter	RX
4	GND	Ground	Ground

17. PoE interface (4pin*1.25mm)

No.	Definition	Attributes	Description
1	V1	CT1	Center-tap Transformer Center 1
2	V2	CT2	Center-tap Transformer Center 2
3	B1	CT3	Center-tap Transformer Center 3
4	B2	CT4	Center-tap Transformer Center 4

Chapter III Communication Methods

Ⅰ. Wi-Fi Update Program



No Server required

Mobile APP management

Ⅱ. U-disk Update Program

U-disk update programs

Support Interstitial & memory expansion

Ⅲ. TF Card Update Program

TF card update programs

Support Interstitial & memory expansion

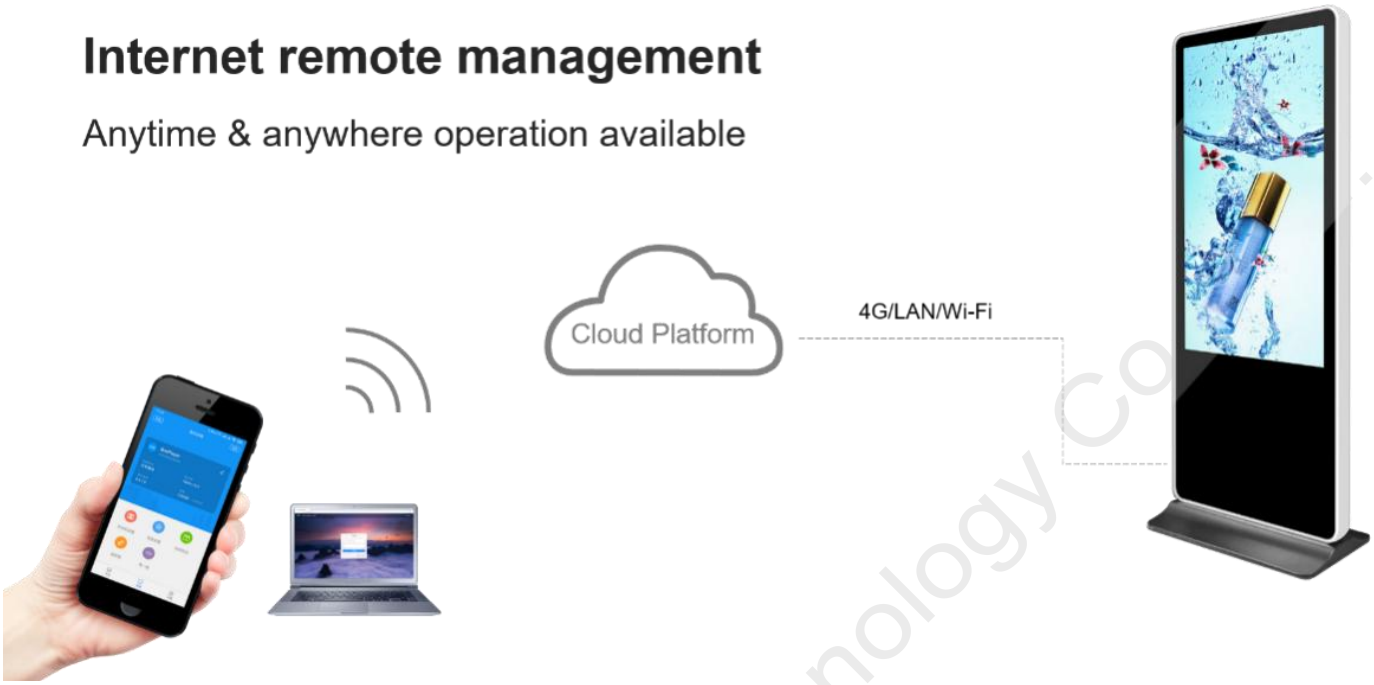
Ⅳ. Ethernet Cable to Update

LAN or Internet

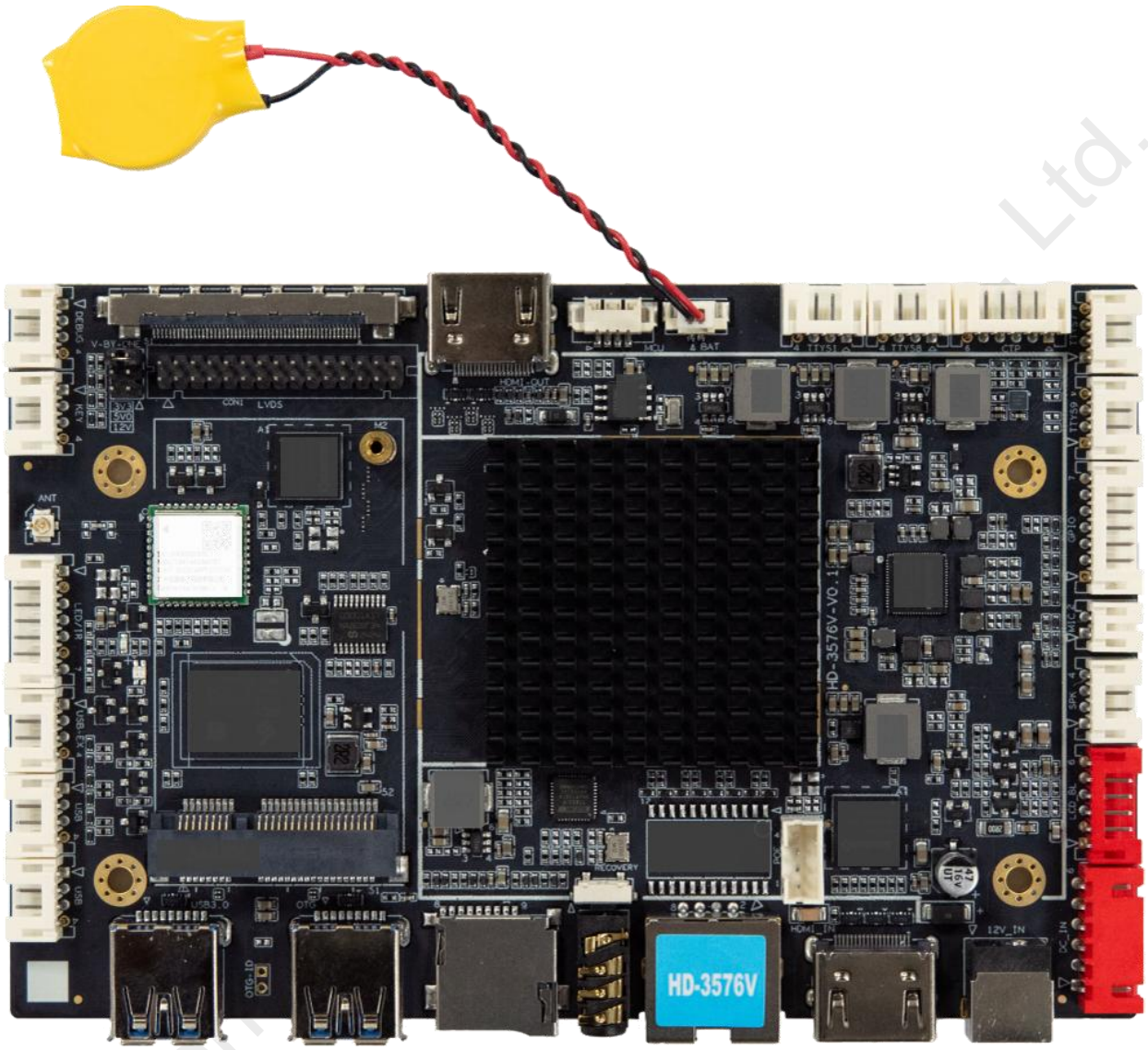
Network cable connection

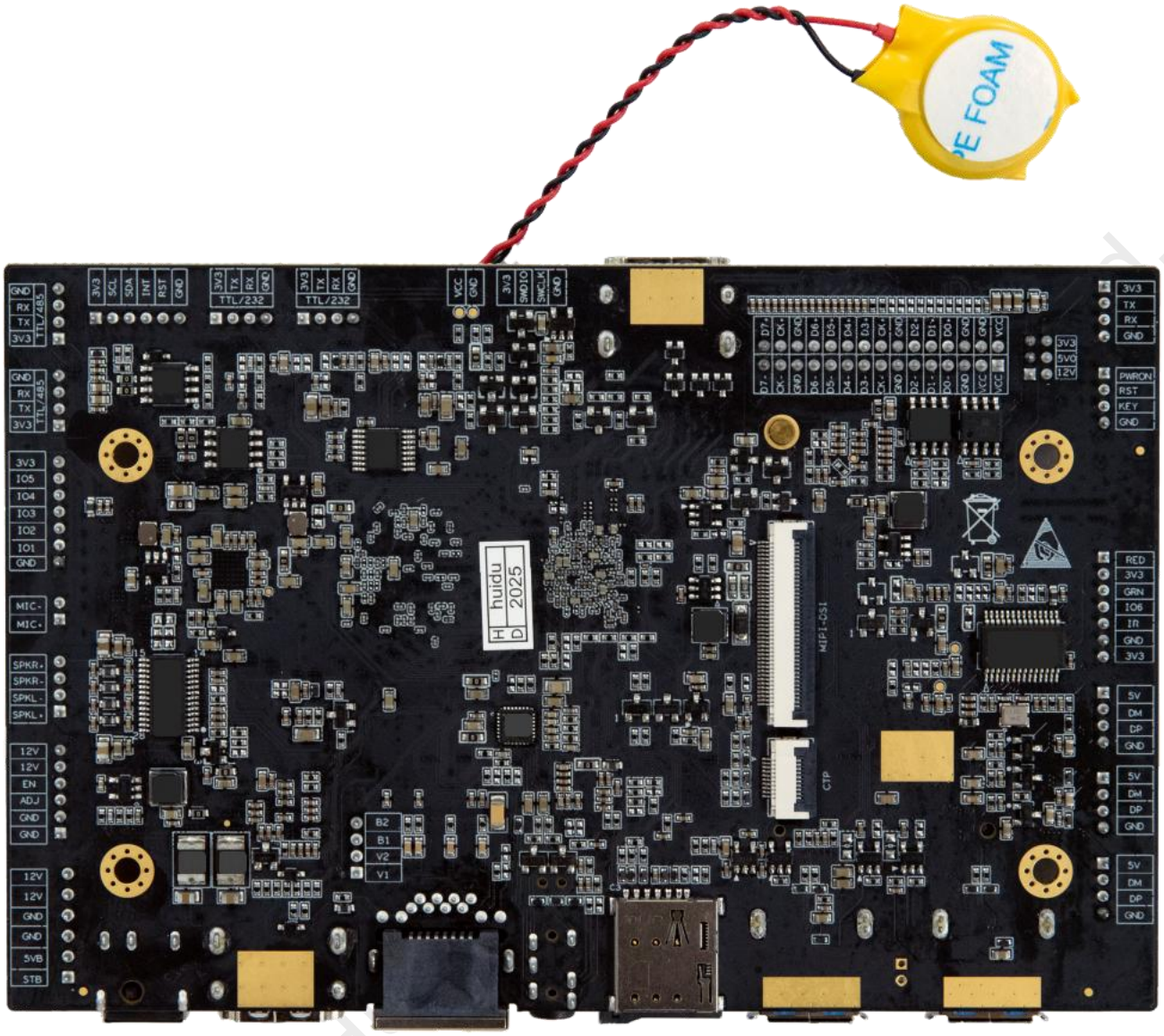
LAN & Internet integrated management

V. Internet Update



Chapter IV Appendix: Product Appearance





Note:

1. The model label is attached to the sales product. The product picture in the specification is different from the actual product. It is not a fake or inferior product. If you have any questions, please contact us for confirmation.

2. Do not operate with power on, Do not hot swap.