

# VPC-3588 Mainboard Specification

## Document Version

Version	V1.1
Date	2023-08-07

Note: This document is copyrighted by the content original company and all rights reserved. If the contents of the document are updated, please contact the provider for the latest version without notice.

# Changelog

1.0.0	2023-04-24	Chinese and English merged version.
1.0.1	2023-05-26	Reset button to update the mainboard picture, increasing system interface definitions.
1.1.0	2023-06-16	Updated based on V2.0 hardware version.
1.1.1	2023-08-07	Update the description of the extended serial port and PCIe4 hard disk slot.

# Contents

<b>1</b>	<b>RK3588 BRIEF .....</b>	<b>5</b>
<b>2</b>	<b>PRODUCT OVERVIEW .....</b>	<b>6</b>
<b>3</b>	<b>SPECIFICATION LIST .....</b>	<b>8</b>
<b>4</b>	<b>INTERFACE DEFINITION .....</b>	<b>10</b>
➤	J1 DC-12V SOCKET .....	10
➤	J2 MICRO-SIM CARD SOCKET .....	10
➤	J3 SATA POWER SUPPLY HEADER 2 .....	10
➤	J4 SATA POWER SUPPLY HEADER 1 .....	10
➤	J5 I2C BUS HEADER .....	11
➤	J6 M-PCIE 4G SOCKET .....	11
➤	J7 3-POLE HP OUT JACK .....	11
➤	J8 CAN HEADER 0 .....	11
➤	J9 SPEAKER HEADER .....	12
➤	J10 HDMI OUTPUT SOCKET .....	12
➤	J12 CAN HEADER 1 .....	12
➤	J13 KIO KEYPAD HEADER .....	12
➤	J14 FRONT PANEL HEADER .....	13
➤	J15 LVDS HEADER .....	13
➤	J17 POE PD HEADER .....	13
➤	J18 HDMI INPUT JACK .....	14
➤	J19 LVDS BACKLIGHT CONTROL HEADER .....	14
➤	J20 EDP HEADER .....	14
➤	J21 EDP VOLTAGE HEADER .....	15
➤	J22 WIFI ANTENNA IPEX .....	15
➤	J23 MIPI PANEL FPC CONNECTOR .....	15
➤	J24 EDP BACKLIGHT CONTROL HEADER .....	16
➤	J25 DC-12V INPUT HEADER .....	16
➤	J26 VGA OUTPUT JACK .....	17
➤	J27 DUAL-TIER LED .....	17
➤	J29 USB 2.0 DIP HEADER .....	17
➤	J30 USB 2.0 DIP HEADER .....	17
➤	J31 USB 2.0 HOST HEADER .....	17
➤	J33 USB 2.0 HOST HEADER .....	18
➤	J34 USB2.0 HOST DIRECT HEADER .....	18
➤	J35 DOUBLE USB 3.0 TYPE A SOCKET .....	18
➤	J36 USB 3.0 TYPE A SOCKET .....	18
➤	J37 DUAL USB 3.0 TYPE A SOCKET .....	18
➤	J38 LVDS VOLTAGE HEADER .....	19
➤	J39 DC-12V INPUT HEADER .....	19
➤	J40 MSATA SOCKET .....	19
➤	J41 SYS FAN POWER HEADER .....	19

➤	J42 CPU FAN POWER HEADER.....	19
➤	J43 SATA HARD DISK SOCKET 1 .....	20
➤	J44 SATA HARD DISK SOCKET 2 .....	20
➤	J45 SATA HARD DISK SOCKET 3 .....	20
➤	J46 SATA HARD DISK SOCKET 4 .....	20
➤	J47 MIC-IN HEADER.....	20
➤	J48 VBO 4K LCD CABLE SOCKET.....	20
➤	J49 TAMPER HEADER.....	20
➤	J50 DATA SERIAL PORT 0.....	21
➤	J51 DATA SERIAL PORT 2.....	21
➤	J52 DATA SERIAL PORT 3.....	21
➤	J53 DATA SERIAL PORT 5.....	22
➤	J54 DATA SERIAL PORT8.....	22
➤	J55 EXTENDED SERIAL PORT 1.....	22
➤	J56 EXTENDED SERIAL PORT 2.....	22
➤	J57 EXTENDED SERIAL PORT 3.....	23
➤	J58 EXTENDED SERIAL PORT 4.....	23
➤	J59 MIC IN JACK.....	23
➤	J60 AUDIO EXTENSION INTERFACE.....	23
➤	J61 RJ45 INTERNAL GIGABIT ETHERNET JACK.....	24
➤	J62 VGA OUTPUT HEADER.....	24
➤	PCIEX4-64P HARD DISK SOCKET .....	24
➤	RECOVERY MODE BUTTON.....	24
➤	SW2 SYSTEM RESET BUTTON.....	24
<b>5</b>	<b>PHYSICAL SIZE.....</b>	<b>25</b>
<b>6</b>	<b>ASSEMBLE PRECAUTIONS .....</b>	<b>26</b>
<b>7</b>	<b>SOFTWARE GUIDE .....</b>	<b>27</b>

# 1 RK3588 Brief

RK3588 chip has the characteristics of high performance and high expansion application. At present, it is the most cost-effective chip in the Rockchip product line, and its hardware specifications are in a leading position in the industry.

- CPU: Octa-core 64-bit size core architecture, quad-core Cortex-A76 + quad-core Cortex-A55, based on high-end 8nm technology, the main frequency is up to 2.4GHz.
- GPU: ARM Mali-G610 MC4, support OpenGL ES 1.1/2.0/3.1/3.2, OpenCL 1.1,1.2,2.0, Vulkan 1.1,1.2, Embedded high performance 2D image acceleration module.
- NPU: 6 tops AI work force, three nuclear architecture, support int4/int8/int16/FP16/BF16/TF32.
- Multimedia: Support H.265/H.264/AV1/VP9/AVS2 video decoding, up to 8K@60FPS; Support H.264/H.265 video encoding, up to 8K@30FPS.
- Display: Support multiple screen display, up to 8K@60FPS; Supports EDP/DP/HDMI2.1/MIPI display interfaces \*
- Video input: Supports multiple camera input (4\*4lanes or 4\*2lanes+2\*4Lanes) MIPI CSI-2 and DVP interface; 32MP ISP, support HDR and 3DNR; Supports HDMI2.0 input, up to 4K@60FPS \*
- High speed interface: Support PCIe3.0/PCIe2.0/SATA3.0/RGMII/TYPER-C/USB3.1/USB2.0\*



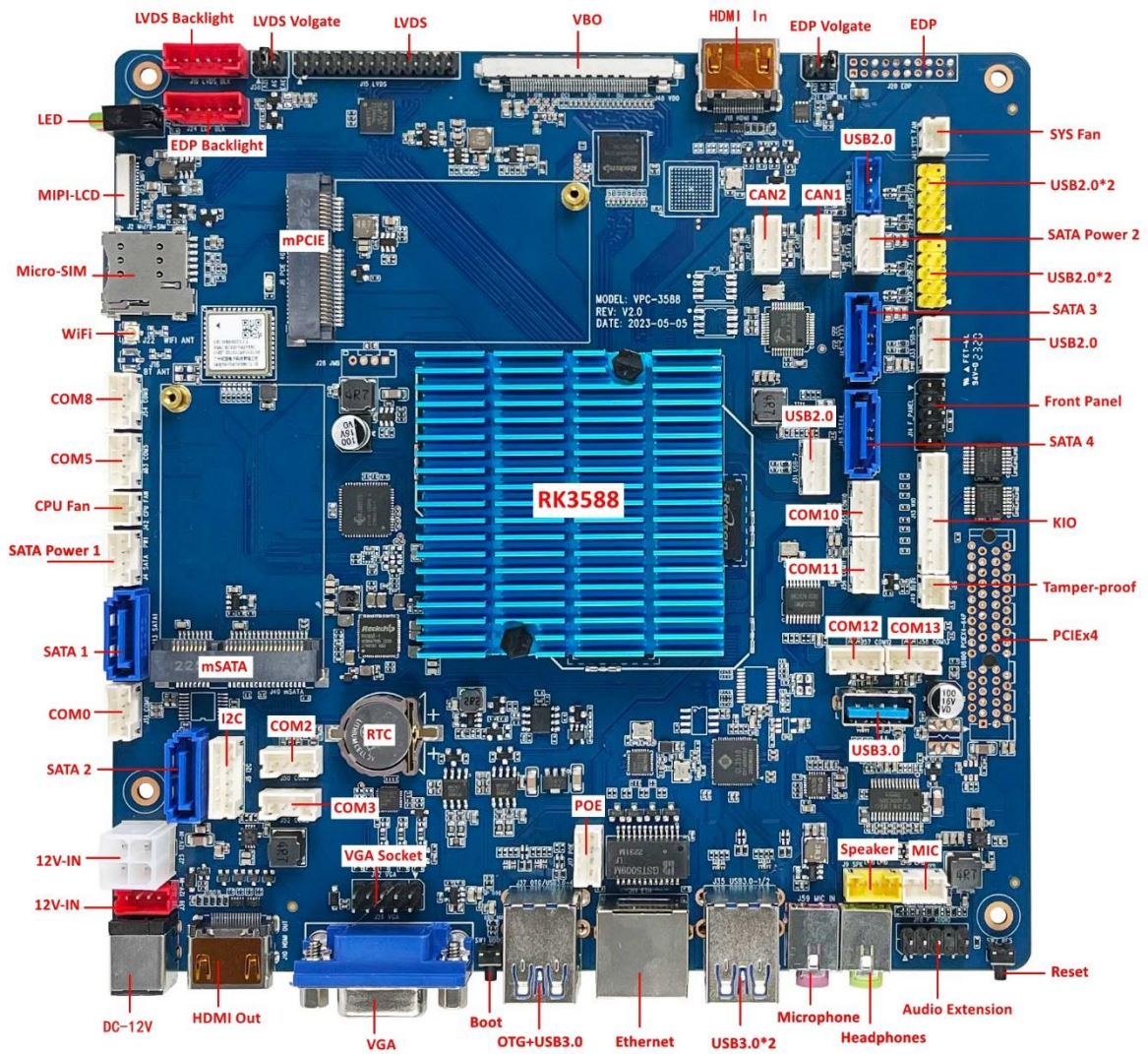
\* Related functions are internal features of the CPU. For details about whether the mainboard supports these functions, see the corresponding interface descriptions.

## 2 Product Overview

VPC-3588 mainboard is based on Rockchip RK3588 high-performance application processor platform. RK3588 is a low power, high performance processor for computing, personal mobile internet devices and other smart device applications. It integrates quad-core Cortex-A76, quad-core Cortex-A55, and Mali-G610 MC4 high-performance GPUs clocked at up to 2.4GHz, with superior computing performance, 2D/3D graphics processing capabilities and Full HD video codec capabilities. It perfectly supports 8K@60fps decoding and 8K@60fps output.

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.

VPC-3588 V2.0 mainboard actual interface diagram as shown below.



### 3 Specification List

VPC-3588's system functions and interface features are shown in the following table.

Function & Interface	Detailed Description
<b>CPU</b>	RK3588 Quad-core Cortex-A76 and Quad-core Cortex-A55, up to 2.4GHz
<b>DDR</b>	LPDDR4 2GB (4GB 8GB 16GB 32GB 可选) LPDDR4 2GB (4GB 8GB 16GB 32GB optional)
<b>Storage</b>	The default comes with an 16GB EMMC NAND chip that can scale up to 128GB
<b>LVDS</b>	30-pin industry-standard dual LVDS supporting VESA/JEITA format up to 1080P output
<b>MIPI-DSI</b>	31-Pin FPC MIPI-DSI display port supporting up to 1920x1200
<b>HDMI Output</b>	1 HDMI 2.1 standard display interface supports up to 8K output
<b>HDMI Input</b>	HDMI 2.0/1.4b standard video input interface, up to 1080p@60Hz
<b>EDP</b>	20-pin industry-standard EDP supporting 1~4 lanes format up to 4K@60Hz output (optional)
<b>VGA Output</b>	Industry-standard DB-15 and 9-pin header VGA output up to 1080P
<b>4K LCD</b>	Industry-standard 51Pin 4K LCD cable VBO display interface
<b>Amplifier output</b>	8 Ohm 6W Dual Audio Amplifier Output
<b>Headphone Output</b>	Stereo Headphone Output (Audio Jack)
<b>MIC Input</b>	Differential MIC input (Audio Jack)
<b>USB Interface</b>	4 horizontal connectors (USB Host 3.0x3 and OTG USB 3.0x1), 1 built-in vertical port USB 3.0, 7 pin headers (USB Hub 2.0x6 and USB Host 2.0x1 direct)
<b>Serial Port</b>	1 TTL, 2 TTL/RS-232/RS-485 compatible, 2 TTL/RS-232 compatible, 4 extended TTL/RS-232 compatible
<b>Camera</b>	Support USB camera within 8 million pixels
<b>WIFI</b>	Built-in high performance SDIO interface WiFi6 module, support IEEE 802.11 a/b/g/n/ac/ax, The default is 2.4G/5GHz WiFi.
<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 v4.0/BT v5.0
<b>Ethernet</b>	1 port 10/100/1000M Adaptive Ethernet RJ45 connector + <b>4-Pin POE header</b>
<b>m-PCIE 4G</b>	1 Industry standard m-PCIE 4G module interface
<b>Backlight Control</b>	2 port Industry standard LCD backlight control header for LVDS & EDP, support for backlight switch and brightness adjustment
<b>GPIO Signals</b>	Up to 8-way GPIO signals for such as GPIO buttons and/or 3.3V digital input/output
<b>I2C Bus</b>	I2C pin header for I2C capacitive screen and etc
<b>Security Port</b>	1 Tamper control port
<b>CAN Bus</b>	2 CAN pin headers for CAN Bus peripherals
<b>m-SATA</b>	1 Industry standard mSATA module interface
<b>SATA HD</b>	4 ways Standard SATA 3.0 hard disk port with power supply header
<b>Hard Disk Socket</b>	1 way 64Pin splint PCIE hard disk socket X4 (optional)
<b>Real Time Clock</b>	Ultra-low-power RTC circuit (CR1220 battery) with timer and alarm functionalities
<b>LED Indicator</b>	Red LED indicator for standby and green LED indicator for running



<b>Function &amp; Interface</b>	<b>Detailed Description</b>
<b>Fan Header</b>	SYS fan power and CPU fan power
<b>Buttons</b>	Recovery mode button, power switch button and reset 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 (170mm*170mm*17mm), <b>PCB top side height 15.5mm</b>
<b>Operating System</b>	Recommended Android 12.0, Linux QT/Ubuntu-20.04/Debian 11 optional

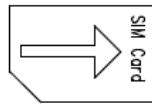
## 4 Interface definition

### ➤ 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 Micro-SIM Card Socket

[J2] Micro-SIM Card Socket.



**Note:** The SIM card seat is a regular card slot. Please note that the SIM card gap faces outward when inserting the card.

### ➤ J3 SATA Power Supply Header 2

[J3] SATA Power Supply Header 2 (SIP 2.0mm-Square pad is pin 1)

Pin#	Definition	Note
1	12V	Power output 12V
2	GND	Power Ground
3	GND	Power Ground
4	5V	Power output 5V

**Note:** The maximum output current of 12V and 5V is not more than 1A. If the power supply is insufficient for a 3.5-inch hard disk, it is recommended to connect to an external power supply.

### ➤ J4 SATA Power Supply Header 1

[J4] SATA Power Supply Header 1 (SIP 2.0mm-Square pad is pin 1)

Pin#	Definition	Note
1	12V	Power output 12V
2	GND	Power Ground
3	GND	Power Ground
4	5V	Power output 5V

**Note: The maximum output current of 12V and 5V is not more than 1A. If the power supply is insufficient for a 3.5-inch hard disk, it is recommended to connect to an external power supply.**

### ➤ J5 I2C Bus Header

[J5] I2C Bus Header (SIP 2.0mm-Square pad is pin 1).

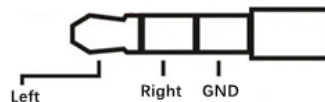
Pin#	Definition	Note
1	GND	Digital Ground
2	INT	Interrupt input (3.3V level)
3	SDA	I2C Bus data signal
4	SCL	I2C Bus clock signal
5	RST	Mainboard reset output (3.3V level)
6	3V3	Power output supply 3.3V

### ➤ J6 m-PCIE 4G Socket

[J6] Standard m-PCIE 4G Socket. USB signals are from Hub USB-6.

### ➤ J7 3-Pole HP OUT Jack

[J7] 3-Pole 3.5mm Headphone Jack (CTIA Standard jack). It supports insert detection for speaker mute.



### ➤ J8 CAN Header 0

[J8] CAN Header 0 (SIP 2.0mm-Square pad is pin 1)

Pin#	Definition	Note
1	VSS	Digital Ground
2	L	L Data
3	H	H Data
4	VCC	Power output (Default 3.3V, 5V option)

**Note: The corresponding interface of CAN0 software is can0. To use this port, weld the U9500 chip.**

## ➤ J9 Speaker Header

[J9] 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 +

## ➤ J10 HDMI Output Socket

[J10] Standard HDMI Output Socket.

## ➤ J12 CAN Header 1

[J12] CAN Header 1 (SIP 2.0mm-Square pad is pin 1)

Pin#	Definition	Note
1	VSS	Digital Ground
2	L	L Data
3	H	H Data
4	VCC	Power output (Default 3.3V, 5V option)

**Note: The corresponding interface of CAN1 software is can1. If you need to use this interface, please weld the U9828 chip. If two CAN channels are required, weld U9500 to form CAN0+CAN1 combination.**

## ➤ J13 KIO Keypad Header

[J13] KIO Keypad Header (SIP 2.0mm-Square pad is pin 1).

Pin#	Definition	Note
1	3V3	Power output supply 3.3V
2	K1	K1 (Regular GPIO #152)
3	K2	K2 (Regular GPIO #153)
4	K3	K3 (Regular GPIO #154)
5	K4	K4 (Regular GPIO #155)
6	K5	K5 (Regular GPIO #156)
7	K6	K6 (Regular GPIO #157)
8	K7	K7(Regular GPIO #129)
9	K8	K8 (Regular GPIO #130)
10	GND	Digital Ground

## ➤ J14 Front Panel Header

[J14] Front Panel Header (DIP 2.54mm-Square pad is pin 1).

Pin#	Definition	Note	Pin#	Definition	Note
1	HD+	Running status indicator+	2	LED+	Power indicator light+
3	HD-	Running status indicator-	4	LED-	Power indicator light-
5	RES-	Reset-	6	PW-	Power switch-
7	RES+	Reset+	8	PW+	Power switch+
9	GND	Digital Ground	10	Null	Null

## ➤ J15 LVDS Header

[J15] Dual LVDS header (DIP 2.0mm-Square pad is pin 1).

Pin#	Definition	Pin#	Definition
1	VLCD	2	VLCD
3	VLCD	4	GND
5	GND	6	GND
7	RXO0-	8	RXO0+
9	RXO1-	10	RXO1+
11	RXO2-	12	RXO2+
13	GND	14	GND
15	RXOC-	16	RXOC+
17	RXO3-	18	RXO3+
19	RXE0-	20	RXE0+
21	RXE1-	22	RXE1+
23	RXE2-	24	RXE2+
25	GND	26	GND
27	RXEC-	28	RXEC+
29	RXE3-	30	RXE3+

## ➤ J17 POE PD Header

[J17] POE PD Header (SIP 2.0mm-Square pad is pin 1)

Pin#	Definition	Note
1	CT1	Transformer Center1
2	CT2	Transformer Center2
3	CT3	Transformer Center3
4	CT4	Transformer Center4

**Note:** The power supply for the POE receiver port comes from the J61 Ethernet port. This port is connected to the external POE receiver board for 12V power supply conversion. The current of the 12V power supply depends on the power supply capability of the POE switch and the conversion capability of the conversion board. This port supports a POE power supply device with 1/2 positive and 3/6 negative cables, or a POE power supply device with 4/5 positive and 7/8 negative cables.

### ➤ J18 HDMI Input Jack

[J18] Standard HDMI Input Socket.

### ➤ J19 LVDS Backlight Control Header

[J19] LVDS Backlight Control Header (SIP 2.0mm-Square pad is pin 1).

Pin#	Definition	Note
1	12V	If the current exceeds 2A, external 12V is recommended
2	12V	If the current exceeds 2A, external 12V is recommended
3	EN	The default output is 5V
4	ADJ	3.3V square wave (1KHz Freq.)
5	GND	Power Ground
6	GND	Power Ground

### ➤ J20 EDP Header

[J20] EDP header (DIP 2.0mm-Square pad is pin 1).

Pin#	Definition	Pin#	Definition
1	VLCD	2	VLCD
3	GND	4	GND
5	TX0-	6	TX0+
7	TX1-	8	TX1+
9	TX2-	10	TX2+
11	TX3-	12	TX3+
13	GND	14	GND
15	AUX-	16	AUX+
17	GND	18	GND
19	3.3V	20	NC

### ➤ J21 EDP Voltage Header

[J21] EDP Voltage Header (DIP 2.0mm-Square pad is pin 1). If pin 1 and 2 are jumper shorted, the VLCD of J20 is 12V. If pin 3 and 4 are jumper shorted, the VLCD of J20 is 5V. If pin 5 and 6 are jumper shorted, the VLCD of J20 is 3.3V. Please adjust the jumper position according to the actual logic voltage of the LCD screen. Be careful not to jumper to the wrong position or it may damage the LCD screen and the motherboard circuit.

### ➤ J22 WIFI Antenna IPEX

[J22] Standard IPEX 3dBi antenna connector (Φ2.0mm).

### ➤ J23 MIPI Panel FPC Connector

[J23] MIPI Panel FPC Connector (FPC-0.3mm 31-Pin **Top/Bottom** Contact).



Pin#	Definition	Note
1	LED+	LED Anode
2	LED+	LED Anode
3	LED+	LED Anode
4	NC	Not Connected
5	LED-	LED Cathode
6	LED-	LED Cathode
7	LED-	LED Cathode
8	LED-	LED Cathode
9	GND	Digital Ground
10	GND	Digital Ground
11	MIPI_D2P	+MIPI differential lane2
12	MIPI_D2N	-MIPI differential lane2
13	GND	Digital Ground
14	MIPI_D1P	+MIPI differential lane1
15	MIPI_D1N	-MIPI differential lane1
16	GND	Digital Ground
17	MIPI_CKP	+MIPI differential clock output

18	MIPI_CKN	-MIPI differential clock output
19	GND	Digital Ground
20	MIPI_D0P	+MIPI differential lane0
21	MIPI_D0N	-MIPI differential lane0
22	GND	Digital Ground
23	MIPI_D3P	+MIPI differential lane3
24	MIPI_D3N	-MIPI differential lane3
25	GND	Digital Ground
26	VDD-1V8	Power Supply 1.8V (Default is not connected, need to weld R9232 0R)
27	RESET	Reset Signal in 1.8V
28	GND	Digital Ground
29	VDD-1V8	Power Supply 1.8V
30	VDD-3V3	Power Supply 3.3V
31	VDD-3V3	Power Supply 3.3V

**Note:** According to the size of the backlight current of the LCD screen, the feedback resistance of the motherboard needs to be adjusted. The default backlight current is 160mA, that is,  $(200/160)*2=2.5R$ , then two resistors of 2.49R-0603 are used for R117 and R9223.

### ➤ J24 EDP Backlight Control Header

[J24] Backlight Control Header (SIP 2.0mm-Square pad is pin 1).

Pin#	Definition	Note
1	12V	If the current exceeds 2A, external 12V is recommended
2	12V	If the current exceeds 2A, external 12V is recommended
3	EN	The default output is 5V
4	ADJ	3.3V square wave (1KHz Freq.)
5	GND	Power Ground
6	GND	Power Ground

### ➤ J25 DC-12V Input Header

[J25] DC-12V Input Header (SIP 2.54mm-Square pad is pin 1), it is the same to J1/J39 Jack.

Pin#	Definition	Note
1	GND	Power GND
2	GND	Power GND
3	12V	Power Input
4	12V	Power Input



### ➤ J26 VGA Output Jack

[J26] Standard DB-15 VGA Output Jack.

### ➤ J27 Dual-Tier LED

[J27] User defined dual-tier LED. Lower power LED light (on the power); Upper level LED lights (flicker controlled by software after turning on).

### ➤ J29 USB 2.0 DIP Header

[J29] USB 2.0 header (DIP 2.54mm-Square pad is pin 1).

Pin#	Definition	Note	Pin#	Definition	Note
1	5V	Power output 5V	2	5V	Power output 5V
3	D-	USB Differential Data+	4	D-	USB Differential Data+
5	D+	USB Differential Data-	6	D+	USB Differential Data-
7	GND	Digital Ground	8	GND	Digital Ground
9	Null	Null	10	GND	Digital Ground

**Note:** This port is Hubx7 expansion port of USB20\_HOST1 port of the main chip.

### ➤ J30 USB 2.0 DIP Header

[J30] USB 2.0 header (DIP 2.54mm-Square pad is pin 1).

Pin#	Definition	Note	Pin#	Definition	Note
1	5V	Power output 5V	2	5V	Power output 5V
3	D-	USB Differential Data+	4	D-	USB Differential Data+
5	D+	USB Differential Data-	6	D+	USB Differential Data-
7	GND	Digital Ground	8	GND	Digital Ground
9	Null	Null	10	GND	Digital Ground

**Note:** This port is Hubx7 expansion port of USB20\_HOST1 port of the main chip.

### ➤ J31 USB 2.0 Host Header

[J31] USB 2.0 Host Header (SIP 2.0mm-Square pad is pin 1)

Pin#	Definition	Note
1	GND	Digital Ground
2	D+	USB Differential Data+
3	D-	USB Differential Data-

4	5V	Power output 5V
---	----	-----------------

**Note:** This port is Hubx7 expansion port of USB20\_HOST1 port of the main chip.

### ➤ J33 USB 2.0 Host Header

[J33] USB 2.0 Host Header (SIP 2.0mm-Square pad is pin 1)

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

**Note:** This port is Hubx7 expansion port of USB20\_HOST1 port of the main chip.

### ➤ J34 USB2.0 Host Direct Header

[J34] USB 2.0 Host Direct Header (SIP 2.0mm-Square pad is pin 1)

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

**Note:** This port passes through the USB port of the main chip USB20\_HOST0.

### ➤ J35 Double USB 3.0 Type A Socket

[J35] Standard Double USB 3.0 Type A Socket.

### ➤ J36 USB 3.0 Type A Socket

[J36] USB 3.0 Type A Socket.

### ➤ J37 Dual USB 3.0 Type A Socket

[J37] Dual USB 3.0 Type A socket.

**Note:** The upper port is the pass-through OTG signal, the default is the firmware burning and debugging port, the lower port is the USB 3.0 1x4 Hub group.

### ➤ J38 LVDS Voltage Header

[J38] LVDS Voltage Header (DIP 2.0mm-Square pad is pin 1). If pin 1 and 2 are jumper shorted, the VLCD of J15 is 12V. If pin 3 and 4 are jumper shorted, the VLCD of J15 is 5V. If pin 5 and 6 are jumper shorted, the VLCD of J15 is 3.3V. Please adjust the jumper position according to the actual logic voltage of the LCD screen. Be careful not to jumper to the wrong position or it may damage the LCD screen and the motherboard circuit.

### ➤ J39 DC-12V Input Header

[J39] 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

### ➤ J40 mSATA Socket

[J40] mSATA Socket. Support standard mSATA modules.

### ➤ J41 SYS Fan Power Header

[J41] SYS fan power header (SIP 2.0mm-Square pad is pin 1). It is controlled by GPIO #76 (Low active)

Pin#	Definition	Note
1	GND	Digital Ground
2	12V	12V output with on/off switch

### ➤ J42 CPU Fan Power Header

[J42] CPU fan power header (SIP 2.0mm-Square pad is pin 1). It is controlled by GPIO #77 (Low active)

Pin#	Definition	Note
1	GND	Digital Ground
2	12V	12V output with on/off switch

## ➤ J43 SATA Hard Disk Socket 1

[J43] SATA Hard Disk Standard 7-Pin Data Cable Socket 1.

## ➤ J44 SATA Hard Disk Socket 2

[J44] SATA Hard Disk Standard 7-Pin Data Cable Socket 2.

## ➤ J45 SATA Hard Disk Socket 3

[J45] SATA Hard Disk Standard 7-Pin Data Cable Socket 3.

## ➤ J46 SATA Hard Disk Socket 4

[J46] SATA Hard Disk Standard 7-Pin Data Cable Socket 4.

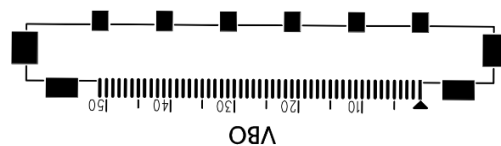
## ➤ J47 MIC-IN Header

[J47] Audio input header (SIP 2.0mm-Square is pin 1).

Pin#	Definition	Note
1	DET	Microphone detect signal
2	MIC-R	Right microphone input
3	GND	Audio Ground

## ➤ J48 VBO 4K LCD Cable Socket

[J48] 4K LCD cable socket (I-PEX -0.5mm 51-Pin **Bottom** Contact-Square pad is pin 1).



## ➤ J49 Tamper Header

[J49] Tamper header (SIP 2.0mm-Square pad is pin 1).

Pin#	Definition	Note
1	-	Line Cathode

2	+	Input high/low level, read 1 or 0 [Software GPIO number 10]
---	---	---

### ➤ J50 Data Serial Port 0

[J50] Built-in Serial Port 0 (SIP 2.0mm-Square pad is pin 1). The output level is RS-485 by default and it could be setup to TTL/RS-232 if required (RS-232 if U9825 mounted, RS-485 if U9858 mounted). **The related software device node name is ttyS0.**

Pin#	Definition	Note
1	GND	Digital Ground
2	RX A	Data receive (TTL or RS-232 or RS-484 level)
3	TX B	Data transmit (TTL or RS-232 or RS-484 level)
4	VCC	Power output (Default 3.3V, 5V option)

### ➤ J51 Data Serial Port 2

[J51] Built-in Serial Port 2 (SIP 2.0mm-Square pad is pin 1). The output level is TTL only. **The related software device node name is ttyS2.**

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

Note: If you need to use the debugging serial port 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).

### ➤ J52 Data Serial Port 3

[J52] Built-in Serial Port 3 (SIP 2.0mm-Square pad is pin 1). The output level is TTL by default and it could be setup to RS-232/RS-485 if required (RS-232 if U9825 mounted, RS-485 if U9823 mounted). **The related software device node name is ttyS3.**

Pin#	Definition	Note
1	GND	Digital Ground
2	RX A	Data receive (TTL or RS-232 or RS-484 level)
3	TX B	Data transmit (TTL or RS-232 or RS-484 level)
4	VCC	Power output (Default 3.3V, 5V option)

### ➤ J53 Data Serial Port 5

[J53] Built-in Serial Port 5 (SIP 2.0mm-Square pad is pin 1). The output level is RS-232 by default and it could be setup to TTL if required (RS-232 if U9826 mounted). **The related software device node name is ttyS5.**

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)

### ➤ J54 Data Serial Port8

[J54] Built-in Serial Port 7 (SIP 2.0mm-Square pad is pin 1). The output level is RS-232 by default and it could be setup to TTL if required (RS-232 if U9826 mounted). **The related software device node name is ttyS8.**

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)

### ➤ J55 Extended Serial Port 1

[J55] Extended Serial Port 3 (SIP 2.0mm-Square pad is pin 1). TTL 3.3V level is optional and it could be setup to RS-232 if required (RS-232 if U36 mounted). **It is mapped to software device node ttyP0.**

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)

### ➤ J56 Extended Serial Port 2

[J56] Extended Serial Port 3 (SIP 2.0mm-Square pad is pin 1). TTL 3.3V level is optional and it could be setup to RS-232 if required (RS-232 if U36 mounted). **It is mapped to software device node ttyP1.**

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)

### ➤ J57 Extended Serial Port 3

[J57] Extended Serial Port 3 (SIP 2.0mm-Square pad is pin 1). TTL 3.3V level is optional and it could be setup to RS-232 if required (RS-232 if U37 mounted). **It is mapped to software device node ttyP2.**

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)

### ➤ J58 Extended Serial Port 4

[J58] Extended Serial Port 3 (SIP 2.0mm-Square pad is pin 1). TTL 3.3V level is optional and it could be setup to RS-232 if required (RS-232 if U37 mounted). **It is mapped to software device node ttyP3.**

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)

### ➤ J59 MIC IN Jack

[J59] 3.5mm Microphone Jack. Support for 2 and 3 segment microphones.

### ➤ J60 Audio Extension Interface

[J60] Audio Line Output (DIP 2.54mm-Square pad is pin 1).

Pin#	Definition	Note	Pin#	Definition	Note
1	MIC-L	Analog left channel microphone input	2	GND	Audio Ground
3	MIC-R	Analog right channel microphone input	4	SENSE	Front audio induction signal
5	HP-R	Analog stereo output right channel	6	MIC-DEL	Front microphone detect signal
7	GND	Audio Ground	8	Null	Null

9	HP-L	Analog stereo output left channel	10	HP-DEL	Front headphone detect signal
---	------	-----------------------------------	----	--------	-------------------------------

### ➤ J61 RJ45 Internal Gigabit Ethernet Jack

[J61] RJ45 Internal Gigabit Ethernet Jack.

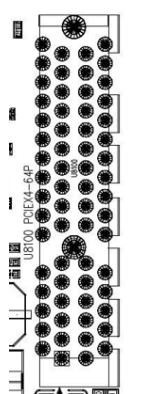
### ➤ J62 VGA Output Header

[J62] VGA Output Header (DIP 2.54mm-Square pad is pin 1).

Pin#	Definition	Note	Pin#	Definition	Note
1	RED	Red analog signal	2	GND	Digital Ground
3	GRN	Green analog signal	4	GND	Digital Ground
5	BLUE	Blue analog signal	6	GND	Digital Ground
7	HS	Horizontal synchronization signal	8	DATA	Serial data signal
9	VS	Vertical synchronization signal	10	CLK	Serial clock signal

### ➤ PCIEX4-64P Hard Disk Socket

[PCIEX4-64P] The 64-pin splint PCIe slot X4 is mainly used to expand PCI-E SSDS.



### ➤ 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.

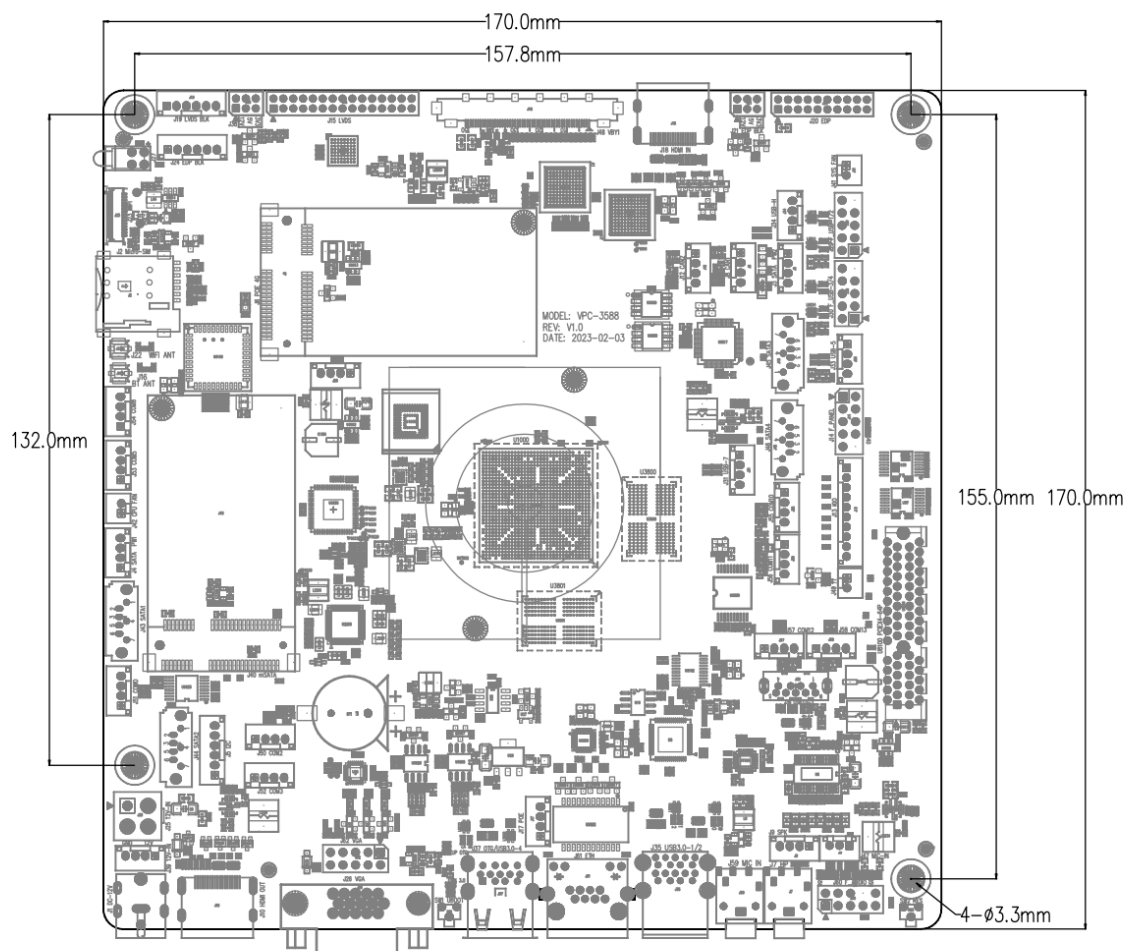
### ➤ SW2 System Reset Button

[SW2] On-board reset mode button. Click to restart the system.



## 5 Physical Size

The PCB size is 170mm\*170mm and the fixing hole diameter is 3.3mm. The corresponding physical size parameters are shown in the figure below. For detailed size information, please consult the manufacturer for DXF file.



## 6 Assemble Precautions

Please note the following key points when using the VPC-3588 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.
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.
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.

## 7 Software Guide

VPC-3588 motherboard supports LVDS/EDP/MIPI/HDMI/VGA any two output dual or triple screen display combination! For related output combinations, consult the manufacturer to provide corresponding abnormal patches.

The software ports of the VPC-3588 serial ports and extension serial ports on the mainboard are as follows:

<b>Port</b>	<b>Software Device Node</b>
J50	/dev/ttyS0
J51	/dev/ttyS2
J52	/dev/ttyS3
J53	/dev/ttyS5
J54	/dev/ttyS8
J55	/dev/ttyP0 or /dev/ttyS10
J56	/dev/ttyP1 or /dev/ttyS11
J57	/dev/ttyP2 or /dev/ttyS12
J58	/dev/ttyP3 or /dev/ttyS13