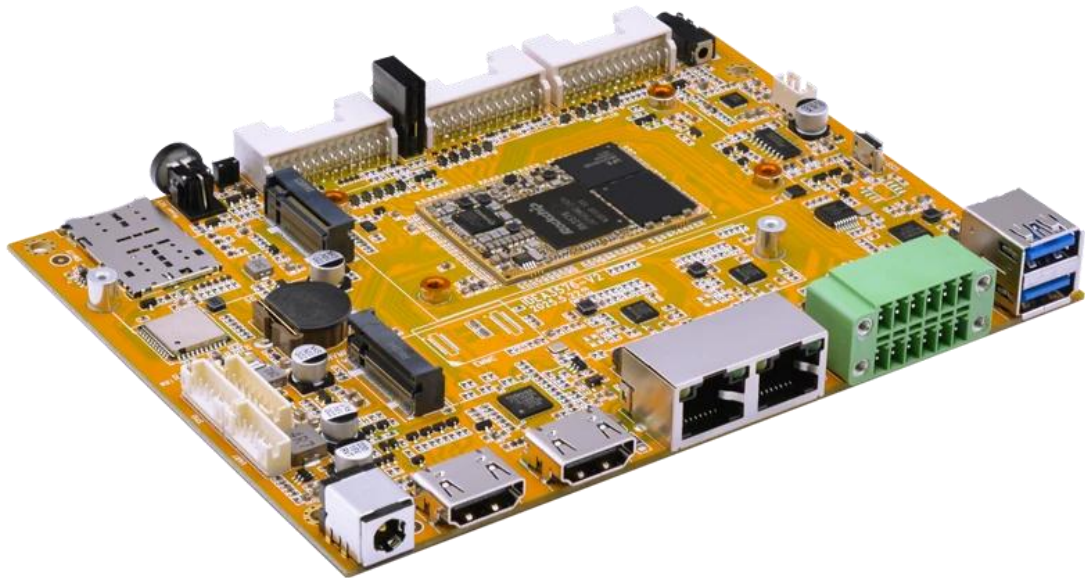


Idea3576 Hardware Manual

V2.202507



Boardcon Embedded Design

www.boardcon.com

1.Introduction

1.1.About this Manual

This manual is intended to provide the user with an overview of the board and benefits, complete features specifications, and set up procedures. It contains important safety information as well.

1.2.Feedback and Update to this Manual

To help our customers make the most of our products, we are continually making additional and updated resources available on the Boardcon website(www.boardcon.com, www.armdesigner.com).

These include manuals, application notes, programming examples, and updated software and hardware. Check in periodically to see what's new!

When we are prioritizing work on these updated resources, feedback from customers is the number one influence. If you have questions, comments, or concerns about your product or project, please do not hesitate to contact us at support@armdesigner.com.

1.3.Limited Warranty

Boardcon warrants this product to be free of defects in material and workmanship for a period of one year from date of buy. During this warranty period Boardcon will repair or replace the defective unit in accordance with the following process:

A copy of the original invoice must be included when returning the defective unit to Boardcon. This limited warranty does not cover damages resulting from lightning or other power surges, misuse, abuse, abnormal conditions of operation, or attempts to alter or modify the function of the product.

This warranty is limited to the repair or replacement of the defective unit. In no event shall Boardcon be liable or responsible for any loss or damages, including but not limited to any lost profits, incidental or consequential damages, loss of business, or anticipatory profits arising from the use or inability to use this product.

Repairs made after the expiration of the warranty period are subject to a repair charge and the cost of return shipping. Please contact Boardcon to arrange for any repair service and to obtain repair charge information.

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1 Idea3576 Introduction

1.1 Summary

The Idea3576 adopts the Rockchip RK3576 SoC, which integrates a quad-core Cortex-A72 processor running at up to 2.2 GHz and a quad-core Cortex-A53 processor running at up to 1.8 GHz. The SoC also features a dedicated NPU with computing power up to 6 TOPS, enabling efficient AI processing for various AI scenarios. It supports 8K video decoding and 4K video encoding, providing ultra-high-definition rendering and superior image processing capabilities. The RK3576 also offers powerful network communication functions, including support for 4G, Wi-Fi 2.4/5, Bluetooth 5.4, and Gigabit Ethernet. The Idea3576 is equipped with a variety of interfaces, such as HDMI IN, HDMI OUT, MIPI_LCD, making it suitable for Edge AI, embedded vision, 4K media gateways, and multi-interface industrial applications demanding reliability and scalability.

Idea3576 is implemented with a LGA3576 computer-on-module providing most of the functions and interfaces, and Idea3576 carrier board providing connectors and several additional functions. The rich feature set of Idea3576 is customizable according to the price / performance needs of the target application. Idea3576 contains expansion connectors which accommodate a wide range of standard peripheral devices. Wide input range switched power supply is compatible with requirements for telecom and automotive applications. Idea3576 is provided with full ready-to-run Android 14, Debian 12 and Buildroot SW packages and comprehensive user manual and designing guide.

1.2 Rockchip RK3576 Features

- **Microprocessor**

- Cortex-A72 cluster

- Quad-core Cortex-A72 MPCore processor.

- 48kB L1 instruction cache and 32kB L1 data cache for each core.

- 1MB unified L2 cache

- Cortex-A53 cluster

- Quad-core Cortex-A53 MPCore processor.

- 32kB L1 instruction cache and 32kB L1 data cache for each core.

- 512kB unified L2 cache.

- **Memory Organization**

-32GB UFS (up to 512GB).

-Low power mode including power-down and self-refresh with power-down.

- **Cortex-M0**

-Single core Cortex-M0 cooperate with quad-core Cortex-A72 / Cortex-A53.

- **PWM**

- Supports 16 on-chip PWMs with interrupt-based operation.

- Support continuous mode and one-shot output mode.

- **Watchdog**

-Supports 5 non-secure watchdog and 1 secure watchdog.

-32-bit watchdog counter.

- **Interrupt Controller**

-Support 4 PPI interrupt source and 480 SPI interrupt sources input.

-Support 16 software-triggered interrupts.

- **3D Graphics Engine**

-Arm Mali-G52 MC3 GPU.

-High performance OpenGL ES 1.1, 2.0 and 3.2, OpenCL 2.0, Vulkan 1.1.

- **Power unit**

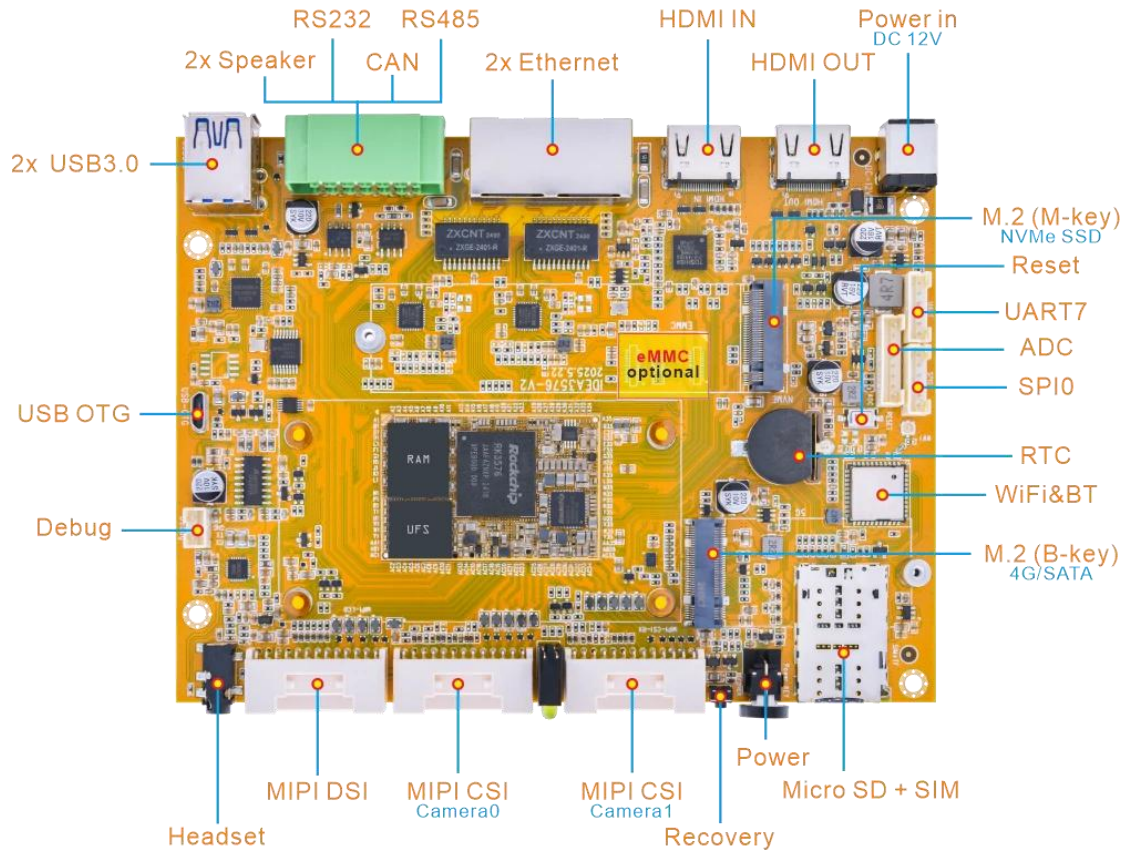
-Very low RTC consume current, less 7uA at 3V button Cell.

- **Temperature**

-Less 40°run video play (exposed board at 20°).



1.3 Idea3576 Specifications

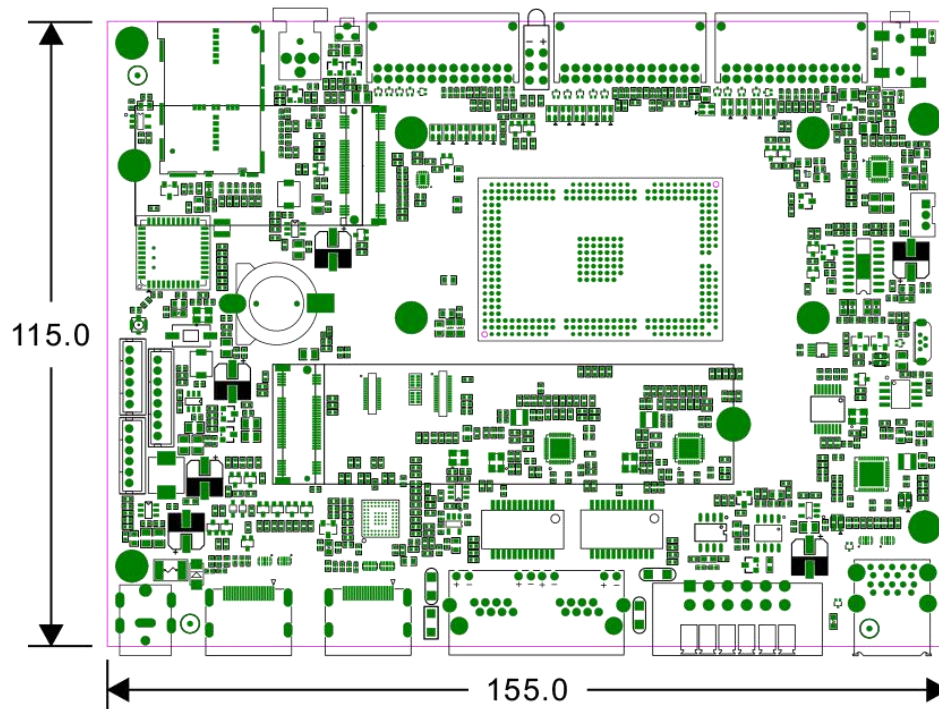


Feature	Specifications
CPU	• Octa-core ARM processor • Quad-core Cortex-A72+Quad-core Cortex-A53
GPU	• Arm Mali G52 MC3 GPU • OpenGL ES 1.1/2.0/3.2 • Vulkan 1.1 • OpenCL 2.0
Memory	32GB UFS
Power	DC 12V/3A
USB	1x USB2.0 OTG, 2x USB3.0 Host. USB2.0 OTG is multiplexed with USB3.0 Host

Serial Port	• 1x Debug, 3-pin connector • 1x RS232, 1x RS485, 1x CAN, 2x spk, 12-pin pluggable terminal block • 1x UART(TTL), 6-pin connector • 1x SPI, 6-pin connector • 5x ADC, 8-pin connector
Ethernet	2x 10/100/1000 Mbps Ethernet RJ45 port via Realtek RTL8211F-CG controller
Display	• Support 1x HDMI2.1 output, up to 4K@120fps • Support 1xMIPI output, up to 2K@60fps
HDMI IN	HDMI in interface
Headset	Headset output / input interface
RTC	Real Time Clock, powered by external lithium battery
M.2 SSD	M.2 SSD interface
SD card	1x T-Flash card slot
SIM card	1x SIM card slot
Keys&Switch	1x Power key, 1x Reset key, 1x Recovery key
WIFI&BT	WIFI&Bluetooth module, support 2.4G/5G 1T1R WiFi (802.11a/b/g/n/ac) with Bluetooth 5.4
4G	M.2 socket with Nano SIM card port to support 4G LTE Module
Dimension	155 x 115 mm

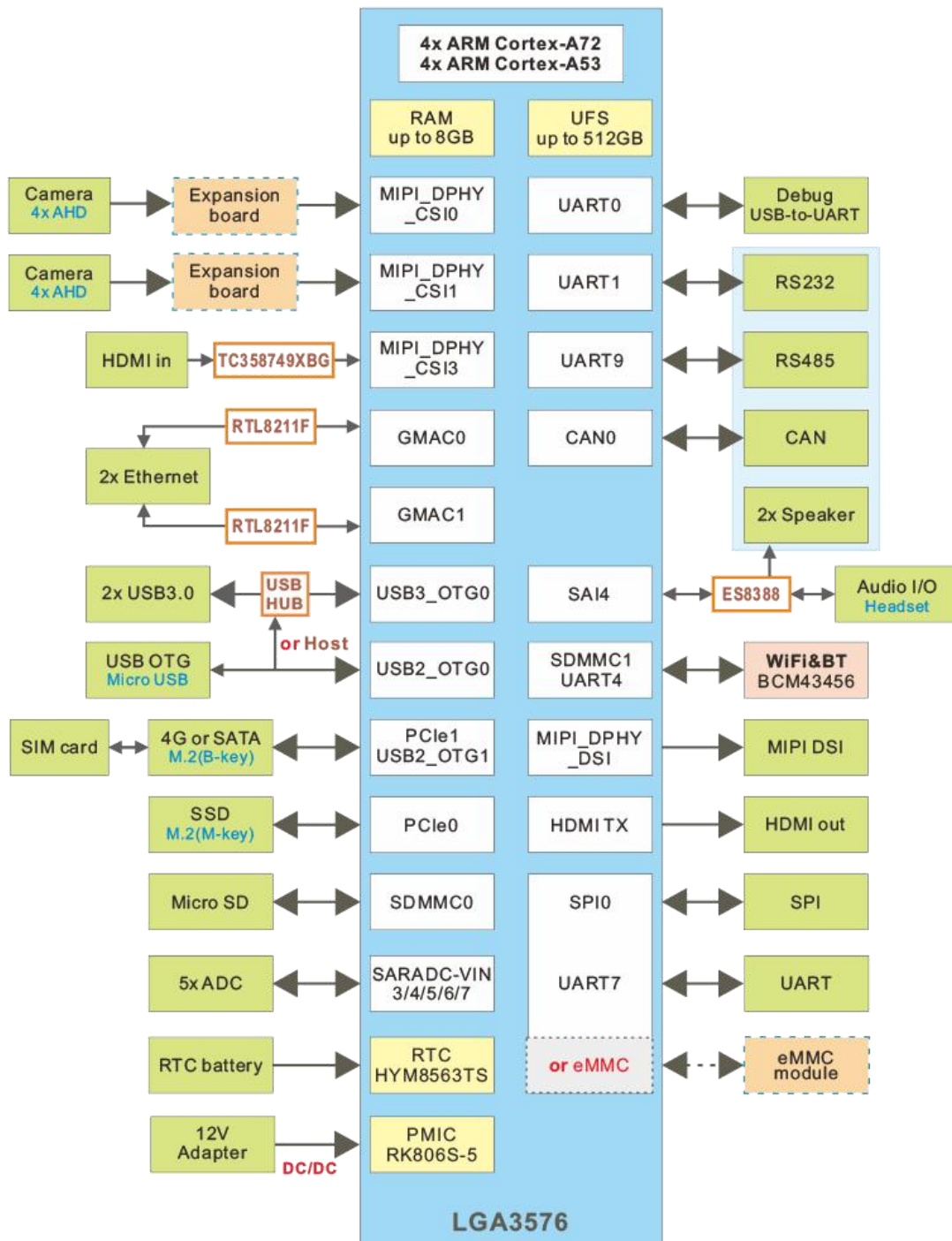


1.4 PCB Dimension





1.5 Block Diagram



1.6 CPU Introduction

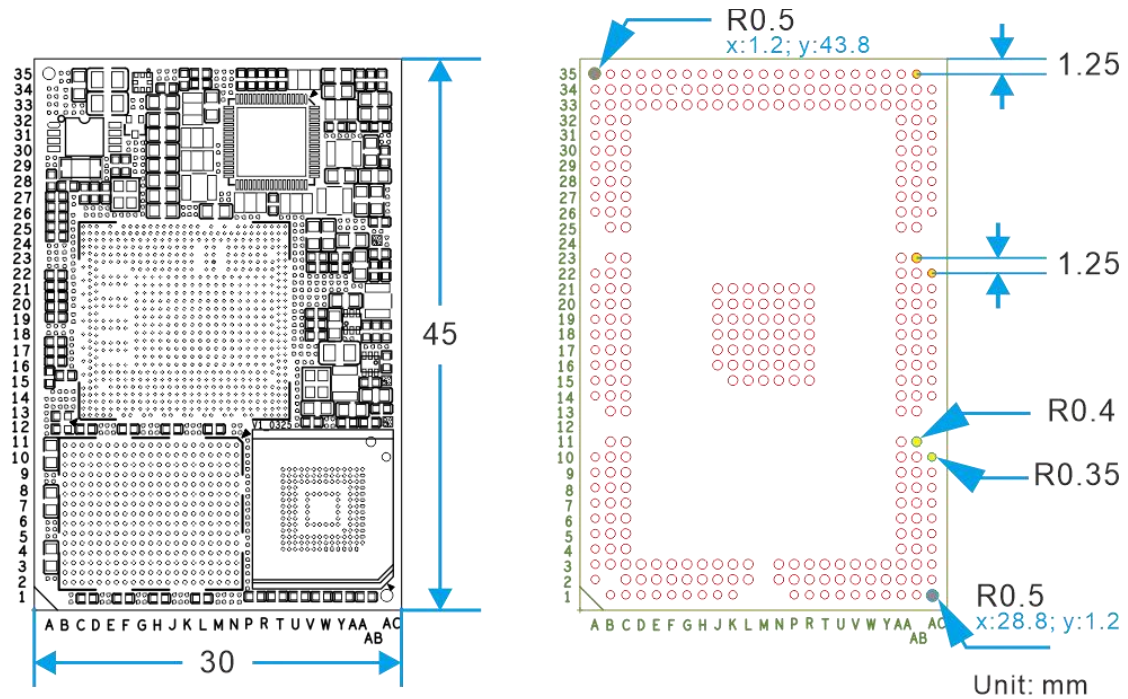
The CPU module RK3576 is equipped with up to 512GB of UFS storage.

[LGA3576 specifications](#)

Weight—6.9 gram

Dimension—45mm x 30mm

Application—Smart Home Devices, Intelligent Transportation Devices, Digital Signage, Automation Devices, Industrial Robots, etc.



Pin Definition

Pin	Signal	Pin	Signal
A2	GND	M21	GND
A3	LCDC_D8/EBC_SDDO8/DSMC_INT3	M33	MIPI_DPHY_CSI4_RX_CLKP
A4	HP_CTL_H	M34	PCIE1_RXP
A5	LCDC_D13/EBC_SDDO13/DSMC_DQS1	M35	PCIE1_RXN
A6	GND	N2	PCIE1_PWREN_H
A7	LCDC_D18/EBC_SDCE2/DSMC_DATA12	N3	IRC_AIN
A8	LCDC_D20/EBC_VCOM/DSMC_DATA13	N15	GND
A9	LCDC_D23/EBC_SDSHR/DSMC_RDYN	N16	GND
A10	GMAC1_MDC	N17	GND
A14	GMAC1_TXD1	N18	GND
A15	GND	N19	GND

Pin	Signal	Pin	Signal
A16	GMAC1_RXD1	N20	GND
A17	GMAC1_RXD0	N21	GND
A18	SAI0_SDI3_M0/E0_TD2_M1_1V8	N33	PCIE1_TXP
A19	SAI0_SDO1_M0/E0_TCT_M1_1V8	N34	PCIE1_TXN
A20	SAI0_SCLK_M0/E0_RD3_M1_1V8	N35	PCIE0_TXP
A21	SPDIF_RX1_M1/E0_RCT_M1_1V8	P1	DSMC_INT2/GPIO4_A1_d
A22	GND	P2	DSMC_INT0/GPIO4_A0_d
A26	SDMMC0_D1	P3	GND
A27	eMMC_D6	P15	GND
A28	eMMC_D2	P16	GND
A29	eMMC_D0	P17	GND
A30	SDMMC1_CLK_M0_1V8	P18	GND
A31	SDMMC1_D3_M0_1V8	P19	GND
A32	SDMMC1_D1_M0_1V8	P20	GND
A33	SARADC_VIN5	P21	GND
A34	SARADC_VIN4	P33	PCIE1_REFCLKP
B1	LCDC_CLK/EBC_SDOE/DSMC_RESETN	P34	PCIE1_REFCLKN
B3	GND	P35	PCIE0_TXN
B4	SPK_CTL_H	R1	I2C3_SCL_M0
B5	IRC_BIN	R2	I2C3_SDA_M0
B6	LCDC_D15/EBC_SDDO15/DSMC_DATA9	R3	PWM2_CH5_M1_FAN
B7	LCDC_D17/EBC_SDCE1/DSMC_DATA11	R15	GND
B8	GND	R16	GND
B9	LCDC_D22/EBC_GDSP/DSMC_DATA15	R17	GND
B10	GMAC1_MDIO	R18	GND
B11	GND	R19	GND
B13	GMAC1_TXCTL	R20	GND

Pin	Signal	Pin	Signal
B14	GMAC1_TXD2	R21	GND
B15	GMAC1_TXCLK	R33	PCIE0_RXN
B16	GMAC1_RXDV_CRS	R34	PCIE0_REFCLKP
B17	GMAC1_RXD3	R35	PCIE0_REFCLKN
B18	SAI0_SDI0_M0/E0_TD1_M1_1V8	T1	GND
B19	SAI0_SDI1_M0/E0_TD0_M1_1V8	T2	HDMI_TX_CEC_M0
B20	SAI0_LRCK_M0/E0_RD2_M1_1V8	T3	HDMI_TX_HPDI_M0
B21	SAI0_SDO0_M0/E0_RD0_M1_1V8	T33	PCIE0_RXP
B22	SDMMC0_CLK	T34	GND
B23	SDMMC0_D3	T35	BT_WAKE_HOST_H_1V8
B25	SDMMC0_D0	U1	HDMI_TX_SCL
B26	eMMC_DATA_STROBE	U2	HDMI_TX_SDA
B27	eMMC_D7	U3	DP_HPDI_M0
B28	eMMC_D4	U33	RESET_L
B29	eMMC_D1	U34	WIFI_WAKE_HOST_H_1V8
B30	GND	U35	GPIO0_A5_d_1V8
B31	SDMMC1_CMD_M0_1V8	V1	PCIE0_PERSTn
B32	SDMMC1_D0_M0_1V8	V2	PCIE0_CLKREQn_M3
B33	SARADC_VIN6	V3	GND
B34	SARADC_VIN7	V33	I2C0_SCL_M1_TP
B35	SARADC_VIN3	V34	UART0_RX_M0_DEBUG
C1	GND	V35	UART0_TX_M0_DEBUG
C2	LCDC_D5/EBC_SDDO5/DSMC_DATA3	W1	GND
C3	LCDC_D2/EBC_SDDO2/DSMC_CSN2	W2	I2C7_SDA_M1/E0_MDC_M1_1V8
C4	LCDC_D14/EBC_SDDO14/DSMC_DATA8	W3	SAI2_SDI_M0_1V8
C5	GND	W33	I2C0_SDA_M1_TP
C6	LCDC_D16/EBC_SDCE0/DSMC_DATA10	W34	LCD_BL_PWM1_CH1_M0

Pin	Signal	Pin	Signal
C7	LCDC_D19/EBC_SDCE3/DSMC_CSN1	W35	VCC_1V8_S3
C8	LCDC_D9/EBC_SDDO9/DSMC_INT1	Y1	I2C7_SCL_M1/E0_MDIO_M1_1V8
C9	LCDC_D21/EBC_GDOE/DSMC_DATA14	Y2	SAI2_LRCK_M0_1V8
C10	GND	Y3	N.C.
C11	GMAC1_CLK1_25M_OUT_M0	Y33	USBCC_INT_L
C13	GMAC1_MCLKINOUT_M0	Y34	I2C2_SCL_M0
C14	GMAC1_TXD3	Y35	I2C2_SDA_M0
C15	GMAC1_TXD0	AA1	GND
C16	GMAC1_RXD2	AA2	UART4_RX_M1_1V8
C17	GMAC1_RXCLK	AA3	GND
C18	GND	AA4	SAI2_SDO_M0_1V8
C19	SAI0_SDI2_M0/E0_TD3_M1_1V8	AA5	USB2_OTG0_DP
C20	SAI0_SDO2_M0/E0_TCK_M1_1V8	AA6	USB2_OTG1_DP
C21	CSI0_PWREN/E0_RD1_M1_1V8	AA7	DP_TX_AUXN
C22	SAI0_MCLK_M0/E0_RCK_M1_1V8	AA8	DP_TX_AUXP
C23	SDMMC0_D2	AA9	GND
C25	SDMMC0_CMD	AA10	USB3_OTG0_SSTX1P/DP_TX_D1P
C26	eMMC_CLKOUT	AA11	USB3_OTG0_SSTX1N/DP_TX_D1N
C27	GND	AA13	LCD_PWREN_H
C28	eMMC_D3	AA14	TP_RST_L
C29	eMMC_D5	AA15	GMAC1_INT
C30	eMMC_CMD	AA16	GPIO0_C4_d
C31	eMMC_RSTn	AA17	GND
C32	SDMMC1_D2_M0_1V8	AA18	MIPI_DPHY_DSI_TX_D1N
C33	GND	AA19	MIPI_DPHY_DSI_TX_D2P
C34	SARADC_VIN2	AA20	MIPI_DPHY_CSI0_RX_D1N
C35	VDD_CORE_5V	AA21	MIPI_DPHY_CSI0_RX_D1P

Pin	Signal	Pin	Signal
D1	PCIE1_CLKREQn_M2	AA22	MIPI_DPHY_CSI0_RX_CLKP
D2	HDMI_TX_ON_H	AA23	MIPI_DPHY_CSI0_RX_D2P
D3	GND	AA25	MIPI_DPHY_CSI0_RX_D3P
D33	RECOVERY_SARADC_VIN1	AA26	GND
D34	VDD_CORE_5V	AA27	HDMI_TX_D0P
D35	VDD_CORE_5V	AA28	HDMI_TX_D1P
E1	GND	AA29	MIPI_DPHY_CSI2_RX_CLKN
E2	LCDC_D1/EBC_SDDO1/DSMC_CSN3	AA30	MIPI_DPHY_CSI2_RX_CLKP
E3	TYPEC_DPTX_AUX_PUPDCTL2	AA31	MIPI_DPHY_CSI1_RX_D3P
E33	32KOUT_RTC_1V8	AA32	MIPI_DPHY_CSI1_RX_D0N
E34	GND	AA33	MIPI_DPHY_CSI1_RX_D0P
E35	PWRON_L	AA34	GPIO0_B4_d
F1	TYPEC_DPTX_AUX_PUPDCTL1	AA35	GMAC1_RSTn
F2	LCDC_VSYNC/EBC_SDCLK/DSMC_CLKN	AB1	SPDIF_RX1_M2_1V8
F3	LCDC_D3/EBC_SDDO3/DSMC_DATA1	AB2	UART4_RTSN_M1_1V8
F33	VCC_RTC	AB3	UART4_CTSN_M1_1V8
F34	SDMMC0_DET_L_1V8	AB4	SAI2_SCLK_M0_1V8
F35	WIFI_REG_ON_H_1V8	AB5	USB2_OTG0_DM
G1	LCDC_D4/EBC_SDDO4/DSMC_DATA2	AB6	USB2_OTG1_DM
G2	LCDC_D0/EBC_SDDO0/DSMC_CSN0	AB7	GND
G3	GND	AB8	USB3_OTG0_SSRX1P/DP_TX_D0P
G33	HOST_WAKE_BT_H_1V8	AB9	USB3_OTG0_SSRX2N/DP_TX_D2N
G34	BT_REG_ON_H_1V8	AB10	USB3_OTG0_SSRX2P/DP_TX_D2P
G35	MIPI_DPHY_CSI3_RX_D0N	AB11	GND
H1	GND	AB13	PCIE0_WAKEn_M0
H2	LCDC_D6/EBC_SDDO6/DSMC_DATA4	AB14	GND
H3	LCDC_DEN/EBC_SDLE/DSMC_DATA0	AB15	PCIE0_PWREN_H

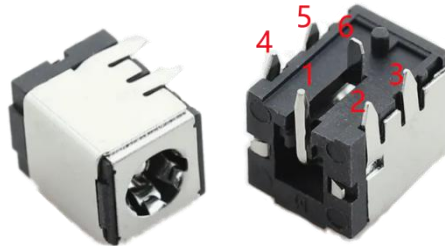
Pin	Signal	Pin	Signal
H33	MIPI_DPHY_CSI3_RX_D1P	AB16	GND
H34	MIPI_DPHY_CSI3_RX_D1N	AB17	MIPI_DPHY_DSI_TX_D0P
H35	MIPI_DPHY_CSI3_RX_D0P	AB18	MIPI_DPHY_DSI_TX_D1P
J1	LCDC_D7/EBC_SDDO7/DSMC_DATA5	AB19	MIPI_DPHY_DSI_TX_D2N
J2	LCDC_D11/EBC_SDDO11/DSMC_DATA7	AB20	MIPI_DPHY_DSI_TX_D3P
J3	LCDC_HSYNC/EBC_GDCLK/DSMC_CLKP	AB21	MIPI_DPHY_CSI0_RX_D0P
J16	GND	AB22	MIPI_DPHY_CSI0_RX_CLKN
J17	GND	AB23	MIPI_DPHY_CSI0_RX_D2N
J18	GND	AB25	MIPI_DPHY_CSI0_RX_D3N
J19	GND	AB26	HDMI_TX_SBDP
J20	GND	AB27	HDMI_TX_D0N
J21	GND	AB28	HDMI_TX_D1N
J33	MIPI_DPHY_CSI3_RX_CLKN	AB29	HDMI_TX_D2P
J34	VCC_3V3_S3	AB30	GND
J35	MIPI_DPHY_CSI3_RX_D2N	AB31	MIPI_DPHY_CSI1_RX_D3N
K1	GND	AB32	MIPI_DPHY_CSI1_RX_D2P
K2	LCDC_D10/EBC_SDDO10/DSMC_DATA6	AB33	MIPI_DPHY_CSI1_RX_D1P
K3	PCIE1_PERSTn	AB34	GND
K15	GND	AB35	GND
K16	GND	AC2	GND
K17	GND	AC3	UART4_TX_M1_1V8
K18	GND	AC4	GND
K19	GND	AC5	USB2_OTG0_VBUSDET
K20	GND	AC6	GND
K21	GND	AC7	USB2_OTG0_ID
K33	MIPI_DPHY_CSI3_RX_CLKP	AC8	USB3_OTG0_SSRX1N/DP_TX_D0N
K34	MIPI_DPHY_CSI3_RX_D3N	AC9	USB3_OTG0_SSTX2P/DP_TX_D3P



Pin	Signal	Pin	Signal
K35	MIPI_DPHY_CSI3_RX_D2P	AC10	USB3_OTG0_SSTX2N/DP_TX_D3N
L2	LCDC_D12/EBC_SDDO12/DSMC_DQS0	AC14	TP_INT_L
L3	GND	AC15	PCIE1_WAKEn_M0
L15	GND	AC16	GND
L16	GND	AC17	MIPI_DPHY_DSI_TX_D0N
L17	GND	AC18	MIPI_DPHY_DSI_TX_CLKN
L18	GND	AC19	MIPI_DPHY_DSI_TX_CLKP
L19	GND	AC20	MIPI_DPHY_DSI_TX_D3N
L20	GND	AC21	MIPI_DPHY_CSI0_RX_D0N
L21	GND	AC22	GND
L33	MIPI_DPHY_CSI4_RX_CLKN	AC26	HDMI_TX_SBDN
L34	MIPI_DPHY_CSI3_RX_D3P	AC27	HDMI_TX_D3N
L35	GND	AC28	HDMI_TX_D3P
M15	GND	AC29	HDMI_TX_D2N
M16	GND	AC30	MIPI_DPHY_CSI1_RX_CLKN
M17	GND	AC31	MIPI_DPHY_CSI1_RX_CLKP
M18	GND	AC32	MIPI_DPHY_CSI1_RX_D2N
M19	GND	AC33	MIPI_DPHY_CSI1_RX_D1N
M20	GND	AC34	PLDO2_S0

2 Peripherals Introduction

2.1 DC-5V(P2)



The DC JACK is metal enclosure full package, 7-pin plug Type. Typical 12V/3A DC adapter.

Pin	Signal	Description	Pin	Signal	Description
1	VCC12V _DCIN	12V DC input power supply	2	GND	Ground
3	GND	Ground	4	GND	Ground
5	GND	Ground	6	GND	Ground

2.2 Audio I/O(J11)



The Idea3576 adopts audio codec ES8388, provides stereo audio output / input.

Feature

- Low power.
- IIS transfer audio data.
- Stereo output, support recording.

Pin	Signal	Description	Pin	Signal	Description
1	HP_GND	Headphone Ground	2	HPOUT_R	Headphone Right Channel Output
3	HPOUT_L	Headphone Left Channel Output	4	PHE_DET	Headphone Detect
5	MIC_INP_PHONE	Microphone Input for Phone			

2.3 HDMI OUT(J21)



Idea3576 HDMI OUT supports up to 4K@120fps output, regular 19pins HDMI type A, with width 13.9mm and thickness 4.45mm.

Features

- Transmits high-quality audio signals, including support for various audio formats and audio synchronization.
- Features a nickel-plated copper shell for enhanced durability and corrosion resistance.
- Compatible with a wide range of HDMI-enabled devices, including smart TVs, gaming consoles and more.

Pin	Signal	Description	Pin	Signal	Description
1	HDMI_TX_D2P	HDMI Transmit Data 2 Positive	2	GND	Ground
3	HDMI_TX_D2N	HDMI Transmit Data 2 Negative	4	HDMI_TX_D1P	HDMI Transmit Data 1 Positive
5	GND	Ground	6	HDMI_TX_D1N	HDMI Transmit Data 1 Negative
7	HDMI_TX_D0P	HDMI Transmit Data 0 Positive	8	GND	Ground
9	HDMI_TX_D0N	HDMI Transmit Data 0 Negative	10	HDMI_TX_D3P	HDMI Transmit Data 3 Positive
11	GND	Ground	12	HDMI_TX_D3N	HDMI Transmit Data 3 Negative
13	HDMI_TX_CEC_PORT	HDMI Consumer Electronics Control Port	14	HDMITX_SBDP	HDMI Transmit Sideband Data Positive
15	HDMI_TX_SCL_PORT	HDMI Transmit I2C Clock Line Port	16	HDMI_TX_SDA_PORT	HDMI Transmit I2C Data Line Port
17	GND	Ground	18	VCC5V_HDMI_TX	5V Power Supply for HDMI Transmit
19	HDMITX_HPDI N/HDMITX_SBDN	HDMI Transmit Hot Plug Detect Input / HDMI Transmit Sideband Data			

		Negative	
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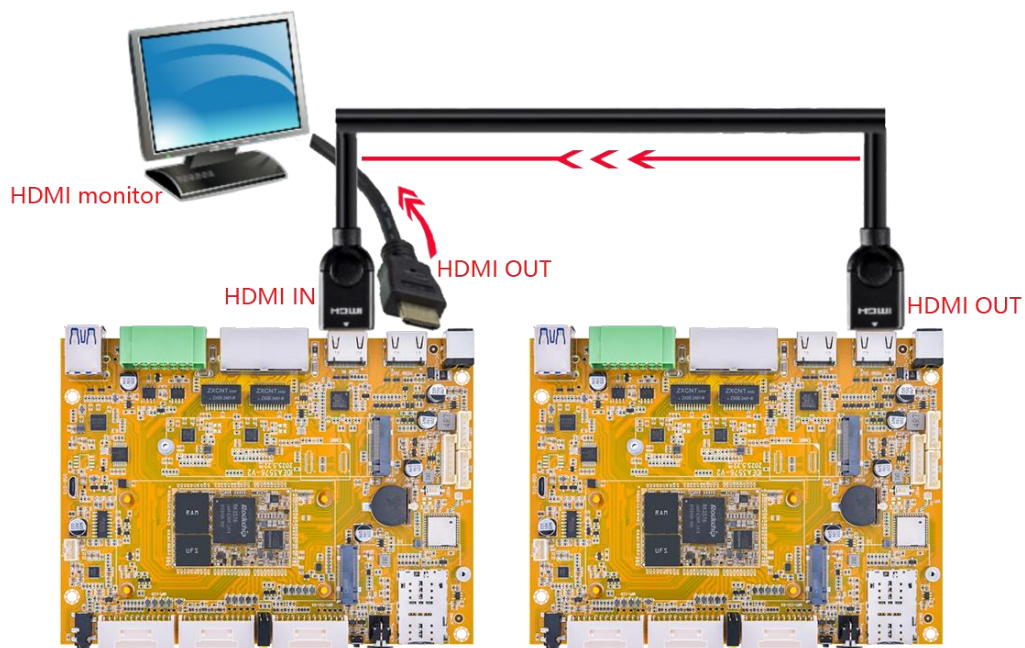
2.4 HDMI IN(J7)



Idea3576 HDMI IN is regular 19pins HDMI type A, with width 13.9mm and thickness 4.45mm.

Features

- The HDMI Type-A interface is widely compatible with various devices and can receive signals from various HDMI output devices.
- Supports high-bandwidth transmission and is capable of transmitting high-quality video and audio signals.
- Supports hot plugging for convenient user operation.



Pin	Signal	Description	Pin	Signal	Description
1	HDMI_RX2+	HDMI differential data channel 2 positive	2	GND	Ground
3	HDMI_RX2-	HDMI differential data channel 2 negative	4	HDMI_RX1+	HDMI differential data channel 1 positive

5	GND	Ground	6	HDMI_RX1-	HDMI differential data channel 1 negative
7	HDMI_RX0+	HDMI differential data channel 0 positive	8	GND	Ground
9	HDMI_RX0-	HDMI differential data channel 0 negative	10	HDMI_RXC+	HDMI differential clock channel positive
11	GND	Ground	12	HDMI_RXC-	HDMI differential clock channel negative
13	HDMIIN_CEC	HDMI Consumer Electronics Control signal	14	NC	Not connect
15	HDMIIN_DDC_SCL	HDMI Display Data Channel (DDC) Serial Clock Line	16	HDMIIN_DDC_SDA	HDMI Display Data Channel (DDC) Serial Data Line
17	GND	Ground	18	HDMIIN_5V	HDMI 5V power supply
19	HDMIIN_HPDO	HDMI Hot Plug Detect Output			

2.5 MIPI_LCD(CON2)



Idea3576 MIPI_LCD output supports up to 2560x1600@60fps output, 2x13 pins.

Pin	Signal	Description	Pin	Signal	Description
1	VCC_LCD	LCD Power Supply	2	VCC_LCD	LCD Power Supply
3	GND	Ground	4	GND	Ground
5	LCD-3V3	3.3V Power Supply	6	LCD-3V3	3.3V Power Supply
7	LCD-1V8	1.8V Power Supply	8	GND	Ground
9	LCD_BL_PWM 1_CH1_M0	LCD Backlight PWM Channel 1	10	DP_HPDIIN_M0	DisplayPort Hot Plug Detect Input
11	NC	Not connect	12	TP0_SCL	Touch Panel I ² C Clock
13	TP0_SDA	Touch Panel I ² C Data	14	TP0_RST	Touch Panel Reset
15	TP0_INT	Touch Panel Interrupt	16	GND	Ground

17	MIPI_DPHY_D SI_TX_D0N	MIPI DSI Data Lane 0 Negative	18	MIPI_DPHY_DS I_TX_D0P	MIPI DSI Data Lane 0 Positive
19	MIPI_DPHY_D SI_TX_D1N	MIPI DSI Data Lane 1 Negative	20	MIPI_DPHY_DS I_TX_D1P	MIPI DSI Data Lane 1 Positive
21	MIPI_DPHY_D SI_TX_CLKN	MIPI DSI Clock Lane Negative	22	MIPI_DPHY_DS I_TX_CLKP	MIPI DSI Clock Lane Positive
23	MIPI_DPHY_D SI_TX_D2N	MIPI DSI Data Lane 2 Negative	24	MIPI_DPHY_DS I_TX_D2P	MIPI DSI Data Lane 2 Positive
25	MIPI_DPHY_D SI_TX_D3N	MIPI DSI Data Lane 3 Negative	26	MIPI_DPHY_DS I_TX_D3P	MIPI DSI Data Lane 3 Positive

2.6 USB2.0 OTG(J1)



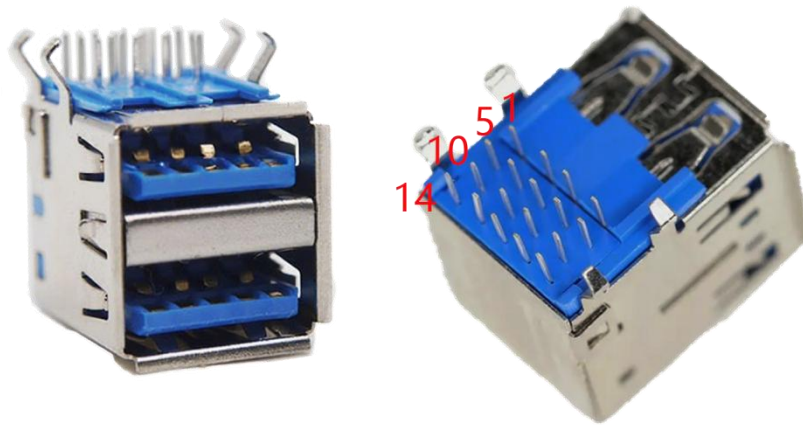
Idea3576 USB-OTG is a Micro USB2.0 port, it is used to download image and ADB transfer file.

Feature

- Vertical plug-in rolled edge design and nickel plating treatment.
- Supports USB 2.0 High Speed (480Mbps), Full Speed (12Mbps) and Low Speed (1.5Mbps) operation in host mode.
- Hardware support for OTG signaling, session request protocol, and host negotiation protocol.

Pin	Signal	Description	Pin	Signal	Description
1	VBUS_5V	Power supply positive, provides 5V	2	USB_OTG0DM	Data Negative (D-) for data transfer
3	USB_OTG0DP	Data Positive (D+) for data transfer	4	USB_OTG0ID	Identification for device role
5	GND	Ground			

2.7 USB30_HOST(J12)



Idea3576 USB3.0 port, it is 14-pin, used to docking station to connect USB device.

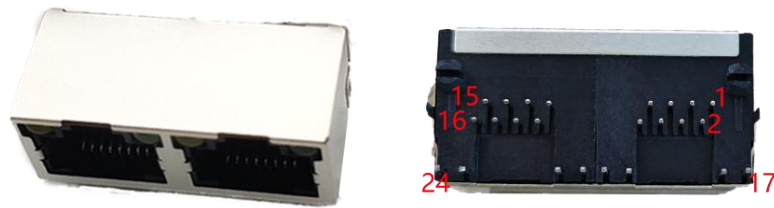
Feature

- Providing super speed data transfer capabilities.
- The connector adopts the through-hole design, which is convenient for plugging and unplugging as well as connecting devices.

Pin	Signal	Description	Pin	Signal	Description
1	VCC5V0_USB30_HOST0	5V Power Supply for USB 3.0 Host 0	2	HUB1_USB2-DM	USB 2.0 Hub Differential Data Negative
3	HUB1_USB2-DP	USB 2.0 Hub Differential Data Positive	4	GND	Ground
5	HUB1_USB2-SS RXN	USB 2.0 Hub Single-Ended Receive Negative	6	HUB1_USB2-SS RXP	USB 2.0 Hub Single-Ended Receive Positive
7	GND	Ground	8	HUB1_USB2-SS TXN	USB 2.0 Hub Single-Ended Transmit Negative
9	HUB1_USB2-SS TXP	USB 2.0 Hub Single-Ended Transmit Positive	10	VCC5V0_USB30_HOST0	5V Power Supply for USB 3.0 Host 0
11	HUB1_USB3-DM	USB 3.0 Hub Differential Data Negative	12	HUB1_USB3-DP	USB 3.0 Hub Differential Data Positive
13	GND	Ground	14	HUB1_USB3-SS RXN	USB 3.0 Hub Single-Ended Receive

					Negative
15	HUB1_USB3-SS RXP	USB 3.0 Hub Single-Ended Receive Positive	16	GND	Ground
17	HUB1_USB3-SS TXN	USB 3.0 Hub Single-Ended Transmit Negative	18	HUB1_USB3-SS TXP	USB 3.0 Hub Single-Ended Transmit Positive

2.8 Ethernet(JP1)



Idea3576 adopts an RJ45-1X2 connector as its Ethernet interface.

Feature

- Supports 10/100/1000-Mbps data transfer rates with the RGMII interfaces.
- It adopts an integrated design, integrating two standard RJ45 interfaces on the same base, saving installation space on the equipment panel or PCB board.
- The two interfaces are independent of each other and can be connected to different network devices respectively.

Pin	Signal	Description	Pin	Signal	Description
1	DA1+	Differential Pair A Positive	2	DA1-	Differential Pair A Negative
3	DB1+	Differential Pair B Positive	4	DC1+	Differential Pair C Positive
5	DC1-	Differential Pair C Negative	6	DB1-	Differential Pair B Negative
7	DD1+	Differential Pair D Positive	8	DD1-	Differential Pair D Negative
9	DA+	Differential Pair A Positive	10	DA-	Differential Pair A Negative
11	DB+	Differential Pair B Positive	12	DC+	Differential Pair C Positive
13	DC-	Differential Pair C Negative	14	DB-	Differential Pair B Negative
15	DD+	Differential Pair D Positive	16	DD-	Differential Pair D Negative
17	LINK1	eDP Link Training Configuration Bit 1	18	VCC_3V3 _S3	3.3 V Stand-by Power
19	GND	Ground	20	SEEPD1	Serial EEPROM Presence Detect 1
21	LINK0	eDP Link Training Configuration Bit 0	22	VCC_3V3 _S3	3.3 V Stand-by Power
23	GND	Ground	24	SEEPD0	Serial EEPROM Presence Detect 0

2.9 User Buttons (SW1, K4, K5)



Key	Signal	Description	Key	Signal	Description
SW1	Reset-KEY	Reset	K4	POWER KEY+ Green LED	Power On/Off and Green LED
K5	RECOVER-KEY	Recover			

2.10 M.2 SSD(J10)



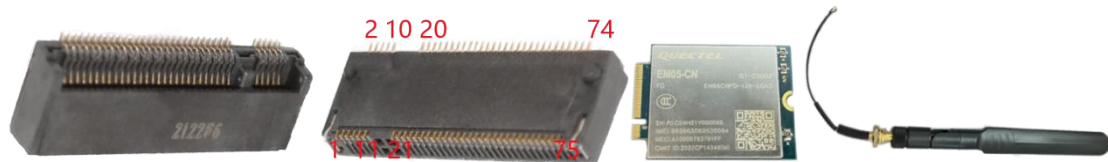
M2_KEY_B_M_Socket socket (PCIe) for NVMe SSD.

Pin	Signal	Description	Pin	Signal	Description
1	GND	Ground	2	VCC3V3_M.2	3.3V Power Supply for M.2 Module
3	GND	Ground	4	VCC3V3_M.2	3.3V Power Supply for M.2 Module
5	NC	Not connect	6	NC	Not connect
7	NC	Not connect	8	NC	Not connect
9	NC	Not connect	10	DAS	Device Activity Signal / LED
11	NC	Not connect	20	NC	Not connect
21	GND	Ground	22	NC	Not connect
23	NC	Not connect	24	NC	Not connect
25	NC	Not connect	26	NC	Not connect
27	GND	Ground	28	NC	Not connect
29	NC	Not connect	30	NC	Not connect
31	NC	Not connect	32	NC	Not connect
33	GND	Ground	34	NC	Not connect
35	NC	Not connect	36	NC	Not connect
37	NC	Not connect	38	NC	Not connect

39	GND	Ground	40	NC	Not connect
41	SATA-B+	SATA Data Positive (B)	42	NC	Not connect
43	SATA-B-	SATA Data Negative (B)	44	NC	Not connect
45	GND	Ground	46	NC	Not connect
47	SATA-A-	SATA Data Negative (A)	48	NC	Not connect
49	SATA-A+	SATA Data Positive (A)	50	PCIE0_PERS Tn	PCIe0 Peripheral Reset
51	GND	Ground	52	PCIE0_CLKR EQn_M3	PCIe0 Clock Request (Mode 3)
53	PCIE0_REFCLK N	PCIe0 Reference Clock Negative	54	PCIE0_WAKE n_M0	PCIe0 Wake Signal (Mode 0)
55	PCIE0_REFCLK P	PCIe0 Reference Clock Positive	56	NC	Not connect
57	GND	Ground	58	NC	Not connect
67	NC	Not connect	68	NC	Not connect
69	GND	Ground	70	VCC3V3_M.2	3.3V Power Supply for M.2 Module
71	GND	Ground	72	VCC3V3_M.2	3.3V Power Supply for M.2 Module
73	GND	Ground	74	VCC3V3_M.2	3.3V Power Supply for M.2 Module
75	GND	Ground			

2.11 4G(CON6)

The M2_B-KEY_H8.5MM interface supports PCI Express and 5G network connections. The 4G model is EM05.



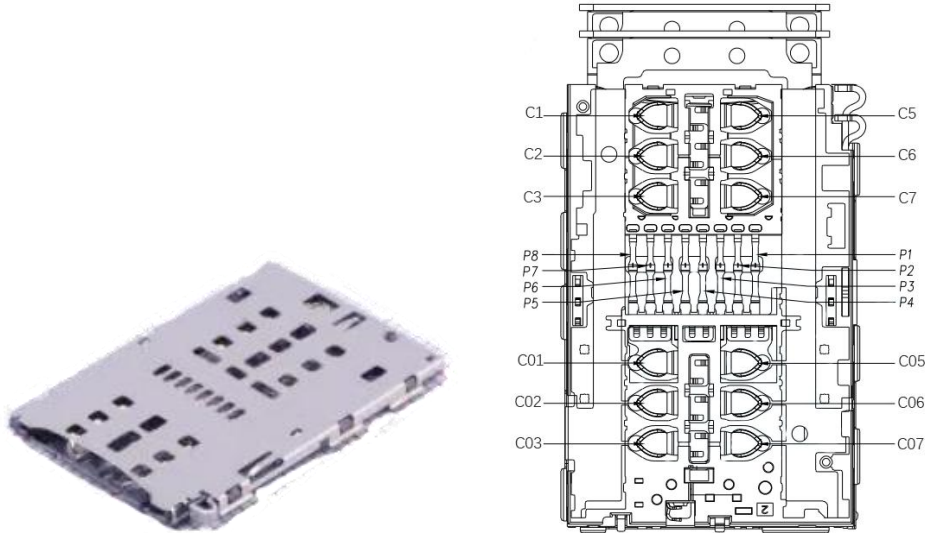
Pin	Signal	Description	Pin	Signal	Description
1	NC	Not connect	2	PCIE_3V3	3.3V Power Supply for PCI Express
3	GND	Ground	4	PCIE_3V3	3.3V Power Supply for PCI Express
5	GND	Ground	6	GMAC1_RSTn	Ethernet MAC 1 Reset



7	USB2_OTG1_DP	USB 2.0 OTG Data Positive	8	NC	Not connect
9	USB2_OTG1_DM	USB 2.0 OTG Data Negative	10	WWAN_LED	Wireless WAN LED
11	GND	Ground	20	NC	Not connect
21	GND	Ground	22	NC	Not connect
23	GPIO0_C4_d	GPIO 0 Port C4	24	NC	Not connect
25	NC	Not connect	26	NC	Not connect
27	GND	Ground	28	NC	Not connect
29	USB_SSTXM	USB SuperSpeed Transmit Negative	30	SIM_RST	SIM Card Reset
31	USB_SSTXP	USB SuperSpeed Transmit Positive	32	SIM_CLK	SIM Card Clock
33	GND	Ground	34	SIM_DATA	SIM Card Data
35	USB_SSRXM	USB SuperSpeed Receive Negative	36	SIM_VCC	SIM Card Power Supply
37	USB_SSRXP	USB SuperSpeed Receive Positive	38	USBCC_INT_L	USB Type-C CC interrupt (active-low)
39	GND	Ground	40	NC	Not connect
41	PCIE1_RX1N	PCI Express 1 Receive Negative	42	NC	Not connect
43	PCIE1_RX1P	PCI Express 1 Receive Positive	44	NC	Not connect
45	GND	Ground	46	NC	Not connect
47	PCIE1_TX1N	PCI Express 1 Transmit Negative	48	NC	Not connect
49	PCIE1_TX1P	PCI Express 1 Transmit Positive	50	PERST	PCI Express 1 Reset
51	GND	Ground	52	PCIE1_CLKREQ_n_M2	PCI Express 1 Clock Request Active Low Mode 2
53	PCIE1_REFCLK_N	PCI Express 1 Reference Clock Negative	54	PCIE1_WAKEn_M0	PCI Express 1 Wake Active Low Mode 0
55	PCIE1_REFCLK_P	PCI Express 1 Reference Clock Positive	56	NC	Not connect
57	GND	Ground	58	NC	Not connect
67	4G_RESET	4G Module Reset	68	NC	Not connect
69	NC	Not connect	70	PCIE_3V3	3.3V Power Supply for PCI Express
71	GND	Ground	72	PCIE_3V3	3.3V Power Supply for PCI Express

73	GND	Ground	74	PCIE_3V3	3.3V Power Supply for PCI Express
75	GND	Ground			

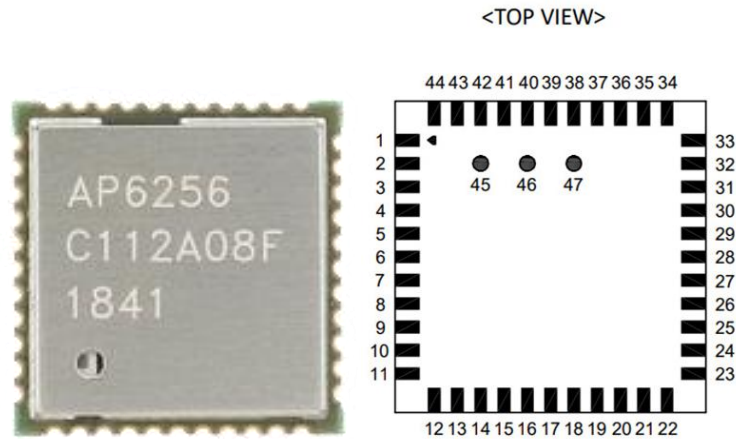
2.12 NANO_SIM+TF(J9)



The MCS-302-C1 card slot supports a combination of Nano SIM and TF card, providing flexible storage and communication options for wireless communication devices. It is compatible with 3G/4G modules to ensure efficient wireless transmission, while expanding storage through the TF card to enhance data portability.

Pin	Signal	Description	Pin	Signal	Description
P1	SDMMC0_D2	SDMMC0 Data Line 2	P2	SDMMC0_D3	SDMMC0 Data Line 3
P3	SDMMC0_CMD	SDMMC0 Command Signal	P4	VCC5V0_DE VICE_S0	5V Power Supply for Device S0
P5	SDMMC0_CLK	SDMMC0 Clock Signal	P6	GND	Ground
P7	SDMMC0_D0	SDMMC0 Data Line 0	P8	SDMMC0_D1	SDMMC0 Data Line 1
C1	SIM_VCC	SIM Power Supply	C2	SIM_RST	SIM Reset Signal
C3	SIM_CLK	SIM Clock Signal	C5	GND	Ground
C6	SIM_VCC	SIM Power Supply	C7	SIM_DATA	SIM Data Signal
C01	SIM_VCC	SIM Power Supply	C02	SIM_RST	SIM Reset Signal
C03	SIM_CLK	SIM Clock Signal	C05	GND	Ground
C06	SIM_VCC	SIM Power Supply	C07	SIM_DATA	SIM Data Signal

2.13 WiFi&Bluetooth(U3)



The AMPAK Technology® AP6256 is a fully Wi-Fi and Bluetooth functionalities module with seamless roaming capabilities and advance security, also it could interact with different vendors' 802.11a/b/g/n/ac 1x1 Access Points with SISO standard and can accomplish up to speed of 433.3Mbps with single stream in 802.11ac to connect the wireless LAN. Furthermore AP6256 included SDIO interface for Wi-Fi, UART/ PCM interface for Bluetooth.

Features

- TX and RX low-density parity check (LDPC) support for improved range and power efficiency. Operating Frequencies: 2.4~2.4835GHz or 5.15~5.85GHz.
- 20, 40, 80 MHz channels with optional SGI (256 QAM modulation).
- Supports 1antenna with one for WLAN & Bluetooth shared port.
- Adaptive frequency hopping (AFH) for reducing radio frequency interference.

Pin	Signal	Description	Pin	Signal	Description
1	GND	Ground	2	WL_BT_ANT	Wi-Fi / BT RF antenna port
3	GND	Ground	4	NC	Not connect
5	NC	Not connect	6	HOST_WAKE_BT_H_1V8	Host wake-up Bluetooth, 1.8 V active-high
7	BT_WAKE_HOST_H_1V8	Bluetooth wake-up host, 1.8 V active-high	8	NC	Not connect
9	VBAT_WL_1T1R	Wi-Fi 1T1R RF power supply	10	WIFI1T1R_XTAL_IN	40 MHz crystal input for Wi-Fi
11	WIFI1T1R_XTAL_OUT	40 MHz crystal output for Wi-Fi	12	WIFI_REG_ON_H_1V8	Wi-Fi power-enable, 1.8 V active-high

13	WIFI_WAKE_HO ST_H_1V8	Wi-Fi wake-up host, 1.8 V active-high	14	SDMMC1_D2_M0 _1V8	SDMMC1 data line 2, 1.8 V
15	SDMMC1_D3_M 0_1V8	SDMMC1 data line 3, 1.8 V	16	SDMMC1_CMD_M 0_1V8	SDMMC1 command signal, 1.8 V
17	SDMMC1_CLK_ M0_1V8	SDMMC1 clock signal, 1.8 V	18	SDMMC1_D0_M0 _1V8	SDMMC1 data line 0, 1.8 V
19	SDMMC1_D1_M 0_1V8	SDMMC1 data line 1, 1.8 V	20	GND	Ground
21	GND	Ground	22	VCC_1V8_S3	1.8 V power rail (S3 state)
23	GND	Ground	24	32KOUT_RTC_1V 8	32.768 kHz RTC clock output, 1.8 V
25	SAI2_SDI_M0_1 V8	SAI2 serial data input, 1.8 V	26	SAI2_SCLK_M0_1 V8	SAI2 serial clock (bit clock), 1.8 V
27	SAI2_SDO_M0_1 V8	SAI2 serial data output, 1.8 V	28	SAI2_LRCK_M0_1 V8	SAI2 left/right clock (frame sync), 1.8 V
29	GND	Ground	30	NC	Not connect
31	GND	Ground	32	NC	Not connect
33	GND	Ground	34	BT_REG_ON_H_1 V8	Bluetooth power-enable, 1.8 V active-high
35	NC	Not connect	36	GND	Ground
37	NC	Not connect	38	NC	Not connect
39	NC	Not connect	40	NC	Not connect
41	UART4_CTSN_M 1_1V8	UART4 clear-to-send (active-low), 1.8 V	42	UART4_RX_M1_1 V8	UART4 receive data, 1.8 V
43	UART4_TX_M1_ 1V8	UART4 transmit data, 1.8 V	44	UART4_RTSN_M1 _1V8	UART4 request-to-send (active-low), 1.8 V
45	NC	Not connect	46	NC	Not connect
47	NC	Not connect			

2.14 RTC(J5)



The backup battery (3V) is used to ensure the RTC (frequency 32.768KHz) is still able to work after power off. Lithium cell model:CR1220.

Pin	Signal	Description	Pin	Signal	Description
1	VCC_RTC	3V battery	2	GND	Ground

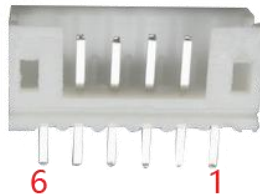
2.15 UART(J4,J8)

- UART0 with 2 wires for debug tools.
- Embedded two 64byte FIFO.
- Support auto flow control mode for UART7.



The J4 is 3-pin connector. The debug serial port baud rate is 1500000.

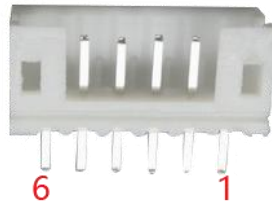
Pin	Signal	Description	Pin	Signal	Description
1	UART0_RX_M0_DEBUG	UART0 Receive for M0 Debug	2	UART0_TX_M0_DEBUG	UART0 Transmit for M0 Debug
3	GND	Ground			



The J8 is 6-pin, used for RS232.

Pin	Signal	Description	Pin	Signal	Description
1	VCC_3V3_S3	3.3V Power Supply	2	UART7_RX_M1	UART7 Receive Data
3	UART7_TX_M1	UART7 Transmit Data	4	UART7_CTSN_M1	UART7 Clear To Send
5	UART7_RTSN_M1	UART7 Request To Send	6	GND	Ground

2.16 SPI0(J6)



The SPI0 is a 6-pin header connector.

Pin	Signal	Description	Pin	Signal	Description
1	VCC_3V3_S3	3.3 V Power Supply	2	SPI0_CLK_M2	SPI0 Clock (Master 2)
3	SPI0_MISO_M2	SPI0 Master-In-Slave-Out (Master 2)	4	SPI0_MOSI_M2	SPI0 Master-Out-Slave-In (Master 2)
5	SPI0_CSN0_M2	SPI0 Chip-Select 0 (Master 2)	6	GND	Ground

2.17 ADC(J3)



8-pin connector. It is used to connect the ADC device.

Pin	Signal	Description	Pin	Signal	Description
1	VCC_1V8_S3	1.8 V Power Supply	2	SARADC_VIN3	SARADC Analog Input 3
3	SARADC_VIN4	SARADC Analog Input 4	4	SARADC_VIN5	SARADC Analog Input 5
5	SARADC_VIN6	SARADC Analog Input 6	6	SARADC_VIN7	SARADC Analog Input 7
7	NC	Not connect	8	GND	Ground

2.18 Camera(CON1, CON3)



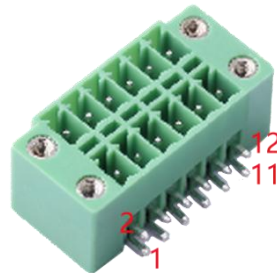
Idea3576 features two 2x 13-pin connectors with a 2mm pitch, 90° bendable inserts and locking clasps.

CON1					
Pin	Signal	Description	Pin	Signal	Description
1	CAM-5V	5 V Camera Power	2	CAM-5V	5 V Camera Power
3	GND	Ground	4	GND	Ground
5	LCD-3V3	3.3 V LCD Power	6	LCD-3V3	3.3 V LCD Power
7	LCD-1V8	1.8 V LCD Power	8	GND	Ground
9	GPIO3_C3_1V8	GPIO 3 C3 @ 1.8 V	10	GPIO3_C2_1V8	GPIO 3 C2 @ 1.8 V
11	MIPI_CLK0	MIPI CSI Clock Lane 0	12	I2C3_SCL_M0_1V8	I ² C3 Clock @ 1.8 V
13	I2C3_SDA_M0_1V8	I ² C3 Data @ 1.8 V	14	CAMERA_RST_0	Camera Reset (active low)
15	GPIO3_D3_1V8	GPIO 3 D3 @ 1.8 V	16	GND	Ground
17	MIPI_DPHY_CSI1_RX_CLKN	MIPI CSI1 Clock Lane N	18	MIPI_DPHY_CSI1_RX_CLKP	MIPI CSI1 Clock Lane P
19	MIPI_DPHY_CSI1_RX_D0N	MIPI CSI1 Data Lane 0 N	20	MIPI_DPHY_CSI1_RX_D0P	MIPI CSI1 Data Lane 0 P
21	MIPI_DPHY_CSI1_RX_D1N	MIPI CSI1 Data Lane 1 N	22	MIPI_DPHY_CSI1_RX_D1P	MIPI CSI1 Data Lane 1 P
23	MIPI_DPHY_CSI1_RX_D2N	MIPI CSI1 Data Lane 2 N	24	MIPI_DPHY_CSI1_RX_D2P	MIPI CSI1 Data Lane 2 P
25	MIPI_DPHY_CSI1_RX_D3N	MIPI CSI1 Data Lane 3 N	26	MIPI_DPHY_CSI1_RX_D3P	MIPI CSI1 Data Lane 3 P

CON3					
Pin	Signal	Description	Pin	Signal	Description
1	CAM-5V	5 V Camera Power	2	CAM-5V	5 V Camera Power
3	GND	Ground	4	GND	Ground
5	LCD-3V3	3.3 V LCD Power	6	LCD-3V3	3.3 V LCD Power

7	LCD-1V8	1.8 V LCD Power	8	GND	Ground
9	GPIO4_A0_1V8	GPIO4 A0 @ 1.8 V	10	GPIO4_A1_1V8	GPIO4 A1 @ 1.8 V
11	MIPI_CLK1	MIPI DSI Clock Lane 1	12	I2C2_SCL_M0_1V8	I ² C2 Clock @ 1.8 V
13	I2C2_SDA_M0_1V8	I ² C2 Data @ 1.8 V	14	CAMERA_RST_1	Camera Reset (active-low)
15	GPIO3_A4_1V8	GPIO3 A4 @ 1.8 V	16	GND	Ground
17	MIPI_DPHY_CSI0_RX_CLKN	MIPI CSI0 Clock Lane N	18	MIPI_DPHY_CSI0_RX_CLKP	MIPI CSI0 Clock Lane P
19	MIPI_DPHY_CSI0_RX_D0N	MIPI CSI0 Data Lane 0 N	20	MIPI_DPHY_CSI0_RX_D0P	MIPI CSI0 Data Lane 0 P
21	MIPI_DPHY_CSI0_RX_D1N	MIPI CSI0 Data Lane 1 N	22	MIPI_DPHY_CSI0_RX_D1P	MIPI CSI0 Data Lane 1 P
23	MIPI_DPHY_CSI0_RX_D2N	MIPI CSI0 Data Lane 2 N	24	MIPI_DPHY_CSI0_RX_D2P	MIPI CSI0 Data Lane 2 P
25	MIPI_DPHY_CSI0_RX_D3N	MIPI CSI0 Data Lane 3 N	26	MIPI_DPHY_CSI0_RX_D3P	MIPI CSI0 Data Lane 3 P

2.19 RS485& CAN& RS232& SPK (U27)



This 12-pin terminal block integrates RS485, CAN, UART and speaker signals into a single connector, saving space.

Pin	Signal	Description	Pin	Signal	Description
1	RS485_A-1	RS-485 bus A (non-inverted) – Port 1	2	RS485_B-1	RS-485 bus B (inverted) – Port 1
3	CANH-1	CAN bus High – Port 1	4	CANL-1	CAN bus Low – Port 1
5	RS232-TX1	RS-232 Transmit Data – Port 1	6	RS232-RX1	RS-232 Receive Data – Port 1
7	GND	Ground	8	GND	Ground
9	LOUTP	Left-channel Audio Output +	10	LOUTN	Left-channel Audio Output –
11	ROUTP	Right-channel Audio Output +	12	ROUTN	Right-channel Audio Output –

3 Product Configurations

3.1 Standard Contents

NO.	Item	Qty.(PCS)	Description
1	Idea3576 board	1	Standard Content(4GB RAM, 32GB UFS)
2	U-disk/CD-ROM	1	Android SDK, Debian / Buildroot SDK, Documents, tools, Schematic Drawing, datasheets, etc.
3	Ethernet cable	1	1.5m Crossover cable
4	Serial Cable	1	CH9102X
5	USB Cable	1	USB OTG
6	Power adaptor	1	12V / 3A DC
7	Antenna	1	WIFI antenna

3.2 Optional Parts

- LCD Module(10.1-inch MIPI panel)
- 4G Module
- AHD camera Module
- SATA
- SSD