

Android210 Hardware Manual



Boardcon Technology Limited
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 no 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 products.

Repairs make 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.

Content

1 Android210 Introduction.....	3
1.1 Summary.....	3
1.2 S5PV210AH Features.....	3
1.3 Android210 Specifications.....	4
1.4 PCB Dimension.....	5
1.5 Block Diagram.....	6
1.6 Motherboard Power meter.....	6
1.7 CPU Introduction.....	7
2 Peripherals Introduction.....	10
2.1 Power (J1&J6).....	10
2.2 Power switch (S1).....	11
2.3 USB OTG (J2).....	11
2.4 USB Host & USB HUB_SEL (J3, J41).....	12
2.5 Ethernet (J35).....	13
2.6 TVOUT (J28).....	14
2.7 Audio I/O (J23, J24, J25, J26).....	14
2.8 Serial ports (J9, J11, J14, J15).....	15
2.9 SPI/AD (J29).....	17
2.10 Camera (J17, J21).....	18
2.11 GPIO/Keypad (J30, J31).....	20
2.12 GPIO/I2C (J5).....	21
2.13 Buttons (K1, K2, K3, RST).....	21
2.14 Boot select (SW1).....	22
2.15 LCD (J16, J18).....	23
2.16 HDMI (J40).....	24
2.17 WiFi (J19).....	25
2.18 SD Card (J20).....	25
2.19 RTC (BT1).....	26
3 Product Configurations.....	27
3.1 Standard Contents.....	27
3.2 Optional Parts.....	27

1 Android210 Introduction

1.1 Summary

Boardcon Android210 is an embedded computer based on a Samsung S5PV210AH-A0 at 1GHz ARM Cortex-A8 CPU. An internal 64-bit bus provides a standard set of high-end on-board peripherals. The Android210 features 512MB DDR2 and 512MB high-speed NAND flash. It is an ideal solution for applications requiring cost-effective, low power and high performance.

To reduce total system cost and enhance overall functionality, Android210 allows development of multi-function embedded applications through its multiple peripheral interfaces, which include 10/100 Ethernet port, USB HOST2.0, USB OTG2.0, serial ports, SD card socket, general I/O lines, RTC, audio codec and speaker, touchscreen, and TFT 24-bit true color LCD interface.

Android210 runs Android 4.0 which uses an improved Linux 3.0 kernel (currently 3.0.8 version) that allows bootup from NAND flash and provides driver support for all on-board hardware in a short time.

Equipped with the high-end processor, rich peripheral interface and open-source code, Android210 is ideal for embedded applications such as arm pc, MID, Netbook, Learning machine, AD player, IPC, PDA, GPS, Vehicle equipment, NVisual telephone, MMT, HMI, Monitoring equipment, and Teaching laboratory equipment.

1.2 S5PV210AH Features

- ARM CortexTM-A8 based CPU Subsystem with NEON
 - 32/ 32 KB I/D Cache, 512 KB L2 Cache
 - Operating frequency up to 800 MHz or 1 GHz
- 64-bit Multi-layer bus architecture
 - MSYS domain for ARM CortexTM-A8, 3D engine, Multi Format Codec and Interrupt Controller
- Operating frequency up to 200 MHz
 - DSYS domain mainly for Display IPs (such as LCD controller, Camera interface, and TVout), and MDMA
- Operating frequency up to 166 MHz
 - PSYS domain mainly for other system component such as system peripherals, external memory interface, peri DMAs, connectivity IPs, and Audio interfaces.
- Operating frequency up to 133 MHz
 - Audio domain for low power audio play
- Advanced power management for mobile applications
- 64 KB ROM for secure booting and 96 KB RAM for security function
- 8-bit ITU 601/656 Camera Interface supports horizontal size up to 4224 pixels for scaled and 8192 pixels for un-scaled resolution

- Multi Format Codec provides encoding and decoding of MPEG-4/H.263/H.264 up to 1080p@30fps and decoding of MPEG-2/VC1 video up to 1080p@30 fps
- 3D Graphics Acceleration with Programmable Shader up to 20M triangles/s and 1000 Mpixels/s
- 2D Graphics Acceleration up to 160Mpixels/s
- 1/ 2/ 4/ 8 bpp Palletized or 8/ 16/ 24 bpp Non-Palletized Color TFT recommend up to XGA resolution
- TV-out and HDMI interface support for NTSC and PAL mode with image enhancer
- MIPI-DSI and MIPI-CSI interface support
- One AC-97 audio codec interface and 3-channel PCM serial audio interface
- Three 24-bit I2S interface support
- One TX only S/PDIF interface support for digital audio
- Three I2C interface support
- Two SPI support
- Four UART supports three Mbps ports for Bluetooth 2.0
- On-chip USB 2.0 OTG supports high-speed (480 Mbps, on-chip transceiver)
- On-chip USB 2.0 Host support
- Asynchronous Modem Interface support
- Four SD/ SDIO/ HS-MMC interface support
- ATA/ ATAPI-6 standard interface support

1-3

S5PV210_UM 1 OVERVIEW OF S5PV210

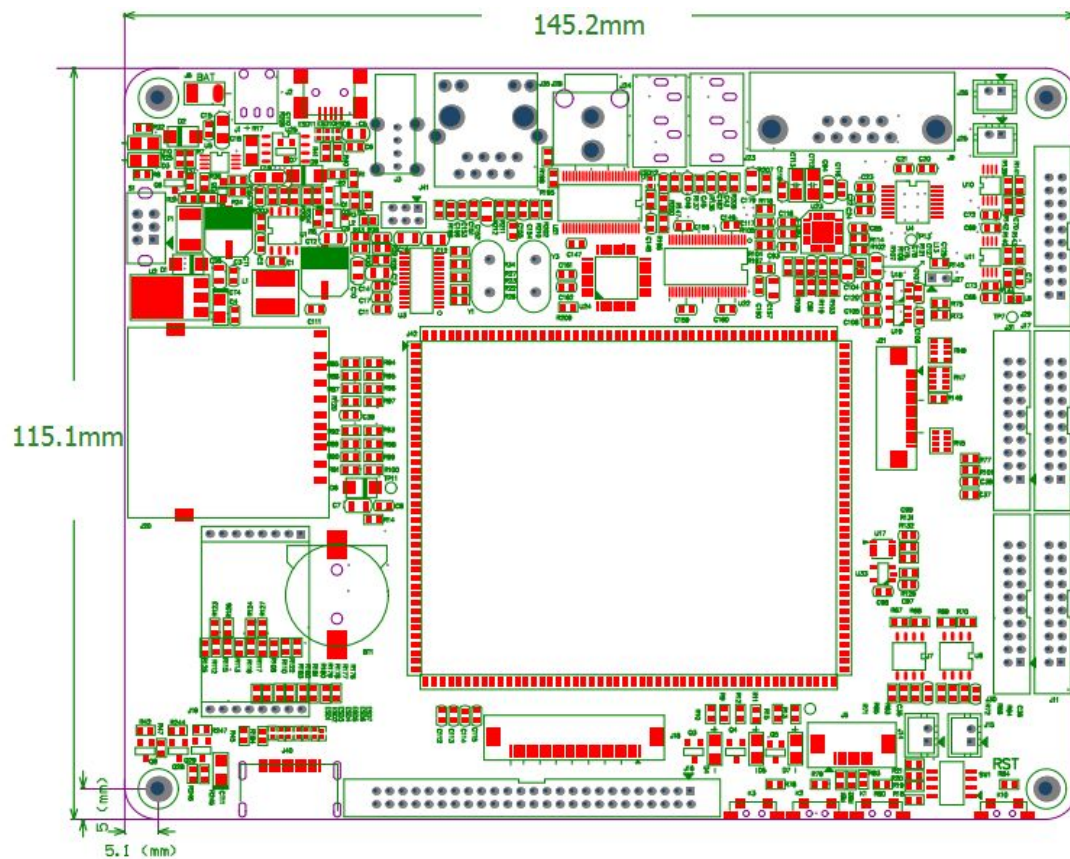
- 24-channel DMA controller (8 channels for Memory-to-memory DMA, 16 channels for Peripheral DMA)
- Supports 14x8 key matrix
- 10-channel 12-bit multiplexed ADC
- Configurable GPIOs
- Real time clock, PLL, timer with PWM and watch dog timer
- System timer support for accurate tick time in power down mode (except sleep mode)
- Memory Subsystem
 - Asynchronous SRAM/ ROM/ NOR Interface with x8 or x16 data bus
 - NAND Interface with x8 data bus
 - Muxed/ Demuxed OneNAND Interface with x16 data bus
 - LPDDR1 Interface with x16 or x32 data bus (up to 400 Mbps/ pin DDR)
 - DDR2 interface with x16 or x32 data bus (up to 400 Mbps/ pin DDR)
 - LPDDR2 interface (up to 400 Mbps/ pin DDR)

1.3 Android210 Specifications

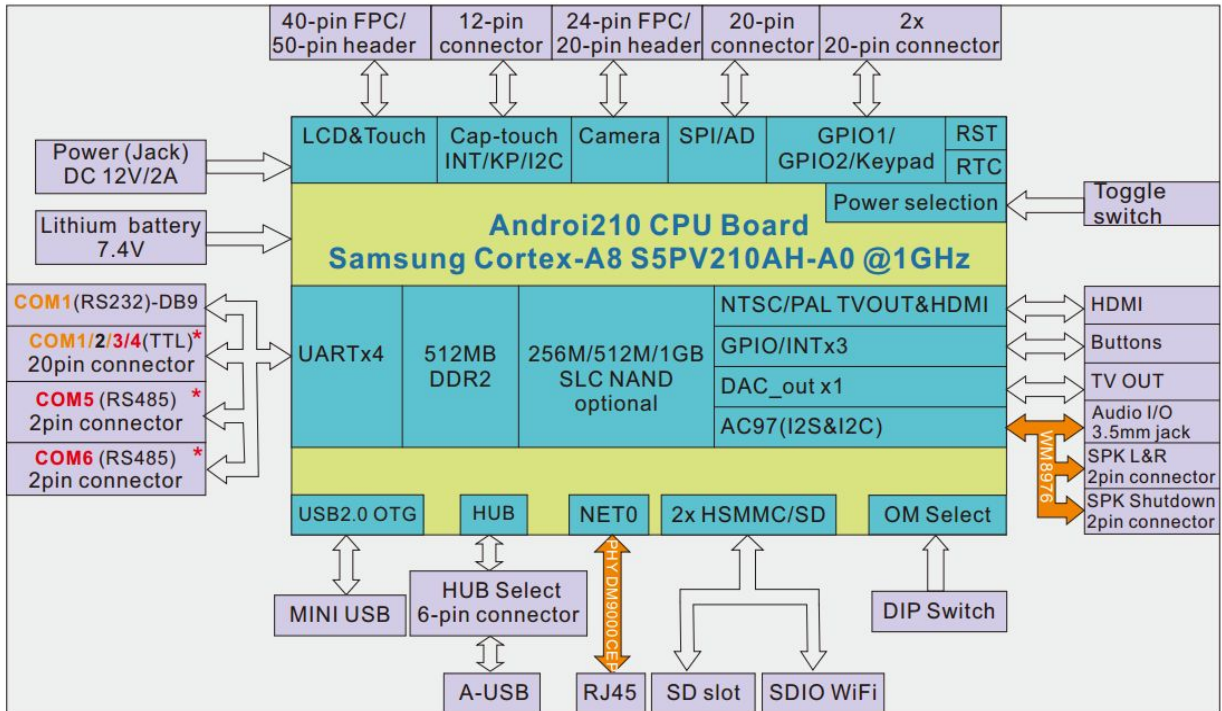
Feature	Specifications
CPU	Samsung S5PV210AH-A0, ARM Cortex-A8, up to 1GHz
Memory	512MB DDR2
NAND Flash	256MB/512MB/1GB optional
CPU Dimension	65.5mm x 52.8mm
Power Input	Two types of power supply: DC 12V@2A , Lithium cell

USB	USB OTG 2.0, USB Host 2.0
Ethernet	10/100M Ethernet interface, DM9000
TVOUT	RCA, standard composite video signal output
COM	COM1, DB9 RS232 serial port; COM1 ~ COM4 led out from a 20-pin expansion connector; COM5 ~ COM6, RS485 serial port
SPI/AD	1-channel SPI interface, 2-channel ADC
Camera(optional)	2 Camera interfaces
GPIO/Keypad	GPIO / 8*8 matrix Keypad
Keys	1 Reset Key, 3 User Keys
LCD	4.3", 7" TTL/LVDS LCD
HDMI	HDMI v1.3, 1080p@30fps
WIFI(optional)	Two types of WIFI Module (SDIO interface and USB interface)
RTC Battery	External lithium battery
SD Card	Standard SD card interface
Carrier board Dimension	145mm x 115mm

1.4 PCB Dimension



1.5 Block Diagram



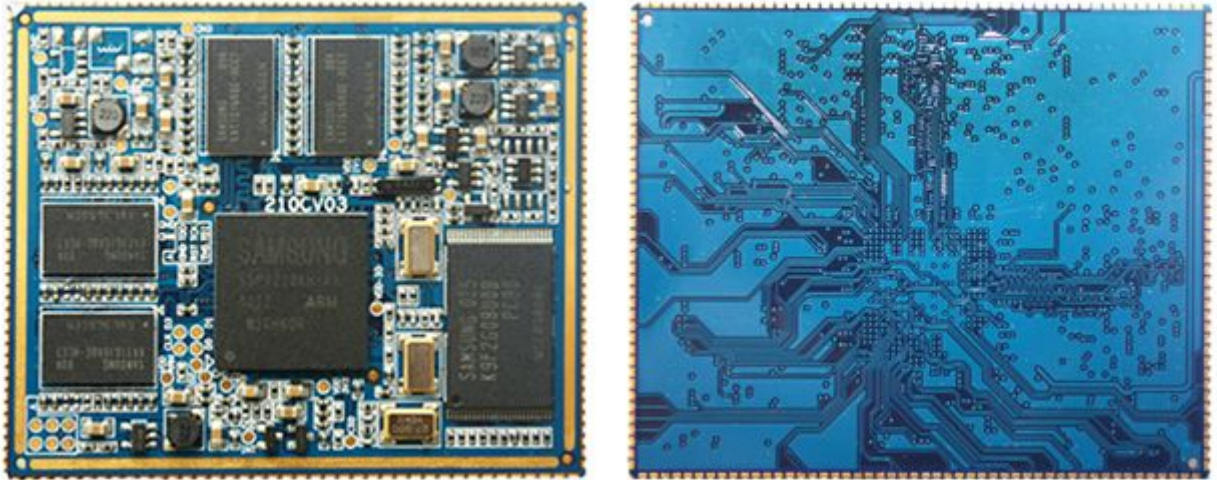
* **Note:** COM3 and COM4 are multiplexed with COM5 and COM6.

1.6 Motherboard Power meter

Support voltage	12v/2A				
System	Connected devices	Electric current(A)	System	Connected devices	Electric current(A)
Android 4.0	12v power	0.19	Android 4.0	Power, 7 inch resistive screen (TN92)	0.4
Android 4.0	Power, sd card, play video, U disk, debug serial, Ethernet, 7inch LCD(TN92), headphone, 2XSPEAKER	0.53	Android 4.0	SLEEP+7inch LCD(TN92)	0.3
Linux	12v power	0.19	Linux	Power, 7 inch Resistive screen(TN92)	0.36
Linux	Power, SD card, play video, U disk, debug serial, Ethernet, 7inch LCD(TN92), headphone, 2XSPEAKER	0.45			

1.7 CPU Introduction

CM210-II is an embedded system on module used to design PDA with a Custom base board, preinstalled Android4.0 OS. The module is designed to provide a cost-effective, low-power, high performance Application Processor solution for MID, smartphone and so on.



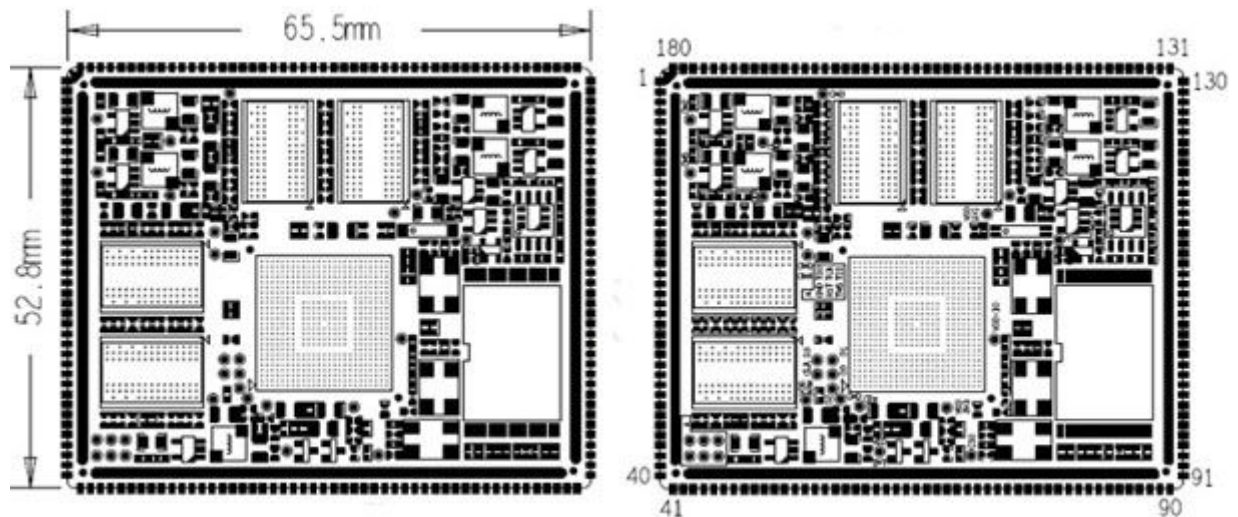
Board Dimension

- * Board size: 65.5mm x 52.8 mm x 3 mm
- * Pin to Pin space: 1.27mm
- * Stamp Hole: 1.5mm x 0.8mm
- * Pin number: (J1A+J1C) x 40 + (J1B+J1D) x 50, total 180 pins
- * Layer: 8 Layers, complying with EMS/EMI

Feature

- * Power supply: 3.3V~ 5V
- * The modular is led out most signals of S5PV210, such as 10/100 Ethernet port, USB HOST, USB OTG, UART, GPIO, RTC, EXTINT, audio codec and speaker, HDMI and so on.
- * Application: MID, smartphone, PDA, PND, automotive systems, data terminals, etc.

PCB Dimension



Pin Definition

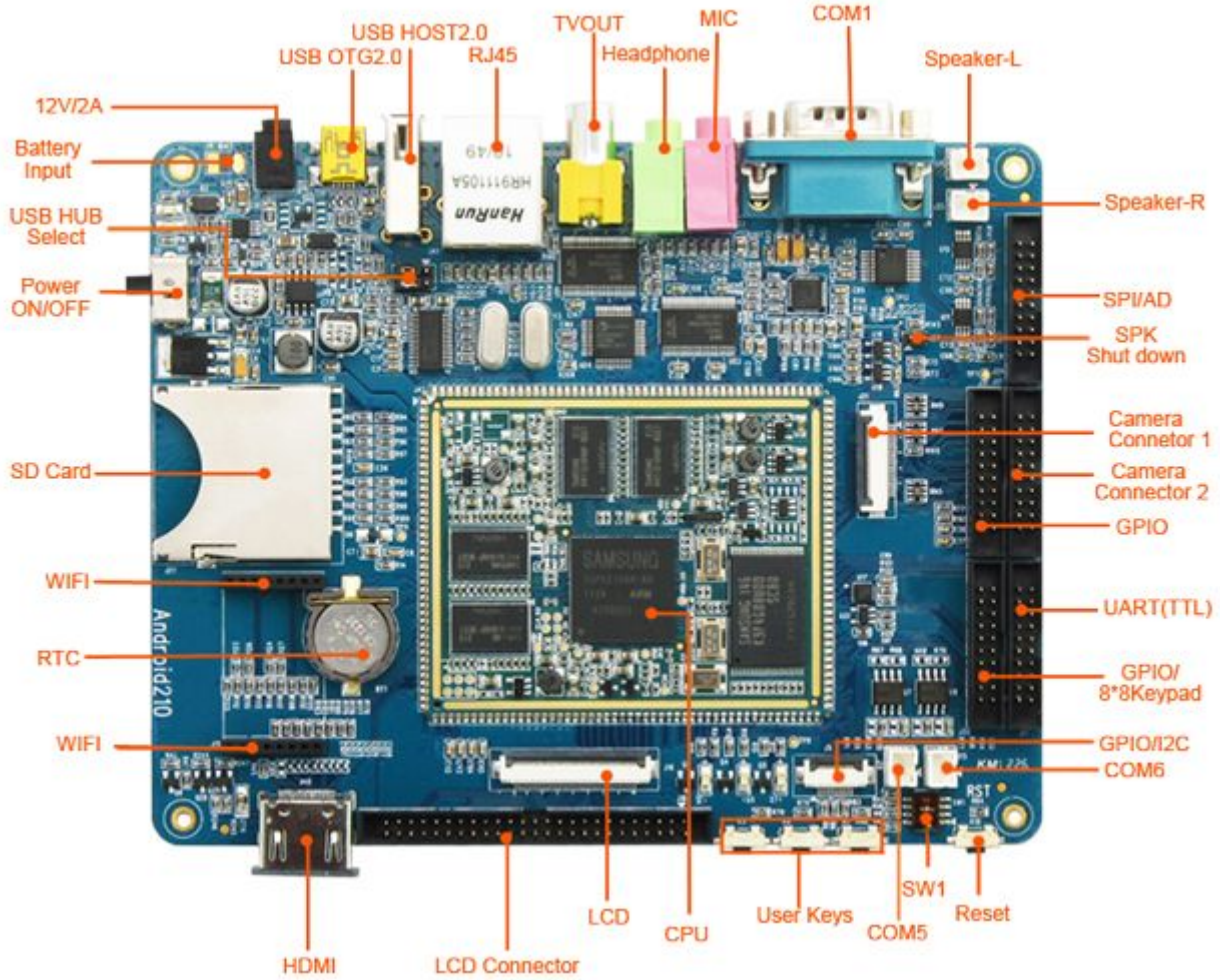
Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	DC_IN	46	EINT17	91	EINT24	136	I2C_SCL1
2	DC_IN	47	EINT18	92	EINT25	137	DATA15
3	DC_IN	48	EINT19	93	AC97_SYNC/ i2sLRCK1	138	DATA14
4	VDD_IO	49	EINT20	94	AC97_BITCLK/ i2sSCLK1	139	DATA13
5	VDD_IO	50	EINT21	95	AC97_SDI/i2sSDI1	140	DATA12
6	VDD_ARM	51	HDMI_TX2N	96	AC97_SDO/i2sSDO1	141	DATA11
7	VDD_INT	52	HDMI_TX2P	97	AC97_RSTn/ i2sCDCLK1	142	DATA10
8	VDD_DDR2	53	HDMI_TX1N	98	EINT26	144	DATA9
9	VDD_RTC	54	HDMI_TX1P	99	EINT27	144	DATA8
10	GND	55	HDMI_TX0N	100	TXD3	145	DATA7
11	PWRRGTON	56	HDMI_TX0P	101	RXD3	146	DATA6
12	EINT9	57	HDMI_TXCN	102	TXD2	147	DATA5
13	OTG_ID	58	HDMI_TXCP	103	RXD2	148	DATA4
14	OTG_DP	59	VD0	104	RTSn1	149	DATA3
15	OTG_DM	60	VD1	105	CTSn1	150	DATA2
16	VBUS	61	VD2	106	TXD1	151	DATA1
17	OTG_DRVVBUS	62	VD3	107	RXD1	152	DATA0
18	HOST_DP	63	VD4	108	RTSn0	153	OEn
19	HOST_DN	64	VD5	109	CTSn0	154	Wen
20	EINT11	65	VD6	110	TXD0	155	CSn1
21	EINT12	66	VD7	111	RXD0	156	EINT10
22	MMC0_D0	67	VD8	112	SPI0_MOSI	157	ADDR2
23	MMC0_D1	68	VD9	113	SPI0_MISO	158	nRESET



24	MMC0_D2	69	VD10	114	SPI0_CLK	159	EINT2
25	MMC0_D3	70	VD11	115	SPI0_CS _n	160	OM5
26	MMC0_CLK	71	VD12	116	EINT28	161	OM3
27	MMC0_CMD	72	VD13	117	EINT29	162	OM2
28	MMC0_CD _n	73	VD14	118	EINT30	163	OM1
29	EINT7	74	VD15	119	EINT31	164	EINT3
30	MMC1_D0	75	VD16	120	EINT0	165	EINT4
31	MMC1_D1	76	VD17	121	EINT1	166	EINT5
32	MMC1_D2	77	VD18	122	CAM_D7	167	KEY_RST
33	MMC1_D3	78	VD19	123	CAM_D6	168	EINT6
34	MMC1_CLK	79	VD20	124	CAM_D5	169	ADCIN1
35	MMC1_CMD	80	VD21	125	CAM_D4	170	ADCIN0
36	MMC1_CD _n	81	VD22	126	CAM_D3	171	GND
37	EINT8	82	VD23	127	CAM_D2	172	GND
38	EINT13	83	VSYNC	128	CAM_D1	173	GND
39	EINT14	84	HSYNC	129	CAM_D0	174	GND
40	EINT15	85	VCLK	130	CAM_PCLK	175	GND
41	TSXM1	86	VDEN	131	CAM_CLKOUT	176	GND
42	TSXP1	87	PWMTOUT0	132	CAM_VSYNC	177	GND
43	TSYM1	88	EINT22	133	CAM_HREF	178	GND
44	TSYP1	89	EINT23	134	CAM_FIELD	179	GND
45	EINT16	90	DAC_OUT0	135	I2C_SDA1	180	GND



2 Peripherals Introduction



2.1 Power (J1&J6)

Android210 supports two types of power input.

1. Power supply: DC 12V/2A



J1

Pin	Signal	Description	Pin	Signal	Description
1	12V_IN	DC12V. Power in	2	GND	Ground

3	GND	Ground	
---	-----	--------	--

2. Lithium-ion polymer battery 7.4V (Default not solder)

Solder position



J6

Pin	Signal	Description	Pin	Signal	Description
1	VBAT	Connect to EUP8057	2	GND	Ground

2.2 Power switch (S1)

The power switch is a toggle switch, controlling the evaluation board power ON/OFF.



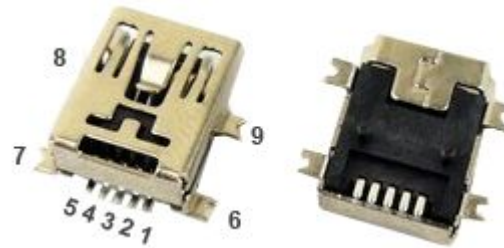
Pin	Signal	Description	Pin	Signal	Description
1	VDD_IN	DC12V. Power in	2	VDD_IN	DC12V. Connect to FUSE
3	NC	Not connect	4	NC	Not connect
5	NC	Not connect	6	NC	Not connect
7	NC	Not connect	8	NC	Not connect

2.3 USB OTG (J2)

HS OTG can be configured as a Host-only or Device-only controller. Default is Device-only controller. It is used to download image.

Features:

- Supports USB 2.0 High Speed (480Mbps), Full Speed (12Mbps) and Low Speed (1.5Mbps) operation in host mode
- Supports USB 2.0 High Speed (480 Mbps) and Full Speed (12 Mbps) operation in device mode.
- Hardware support: OTG signaling, session request protocol, and host negotiation protocol



Pin	Signal	Description	Pin	Signal	Description
1	VBUS	USB OTG mini-Receptacle Vbus	2	OTG_DM	USB OTG negative data
3	OTG_DP	USB OTG positive data	4	OTG_ID	USB OTG ID signal
5	GND	Ground	6	GND	Ground
7	GND	Ground	8	GND	Ground
9	GND	Ground			

2.4 USB Host & USB HUB_SEL (J3, J41)

The Android 210 only supports a A –type USB host 2.0 at High Speed (480Mbps), Full Speed (12Mbps) and Low Speed (1.5Mbps) modes. It is used to connect USB mouse, U disk and other USB devices. Hot-plug is supported.



USB Host (J3)

Pin	Signal	Description	Pin	Signal	Description
1	VDD_5V	5V voltage	2	USBDNA	USB host port A negative data
3	USBDPA	USB host port A positive data	4	GND	Ground
5	GND	Ground	6	GND	Ground
7	GND	Ground	8	GND	Ground



J41 is used to select USB HUB (effect on Host). Connect Pin3&5, Pin4&6 with Jumper is select USB HUB, USB host is available; and connect Pin1&3, Pin2&4 is not.

USB HUB Select (J41)

Pin	Signal	Description	Pin	Signal	Description
1	USBDPA	USB host positive data A	2	USBDNA	USB host negative data A
3	HOST_DP	USB host positive data	4	HOST_DN	USB host negative data
5	USBDPU	USB host positive data use	6	USBDNU	USB host negative data use

2.5 Ethernet (J35)

Android 210 incorporates a full-featured 10/100M Ethernet interface. The platform adopts DM9000AEP as the Ethernet chip.

Features:

- 10/100 BASE-T IEEE 802.3 compliant
- IEEE 802.3u compliant Auto-Negotiation
- Integrated IEEE 1588 time stamping module (inside the MAC).
- Automatic channel swap (ACS)
- Full- and Half-duplex
- Automatic MDI/MDIX crossover
- Automatic polarity correction
- Activity and speed indicator LED controls
- You can set a fixed IP or automatically obtain IP



Pin	Signal	Description	Pin	Signal	Description
1	DM9000_TX+	Net data send +	2	DM9000_TX-	Net data send -
3	DM9000_RX+	Net data receive +	4	NET_AVDD25	Connect to DM9000AEP
5	NET_AVDD25	Connect to DM9000AEP	6	DM9000_RX-	Net data receive -
7	NC	Not connect	8	GND	Ground
9	VDD_IO	IO Supply Voltage (3.3V Power in)	10	DM9000_LINKLED	Detect link

11	DM9000_LANLED	LANLED detect speed	12	VDD_IO	IO Supply Voltage (3.3V Power in)
----	---------------	---------------------	----	--------	---------------------------------------

2.6 TVOUT (J28)

S5PV210 MCU comes with 1 TVOUT, standard composite video signal, can be connected to all kinds of video device directly.

Note: The TVOUT driver is unavailable.



Pin	Signal	Description	Pin	Signal	Description
1	DAC_OUT0	Analog output of Video DAC	2	GND	Ground

2.7 Audio I/O (J23, J24, J25, J26)

The development board adopts IIS chip WM8976G, supports stereo audio output (Green, 3.5mm audio jack) and MIC recording (Pink 3.5mm audio jack).

Features:

- Low power
- Integrated ADC and DAC
- IIS transfer audio data
- Stereo output, support recording

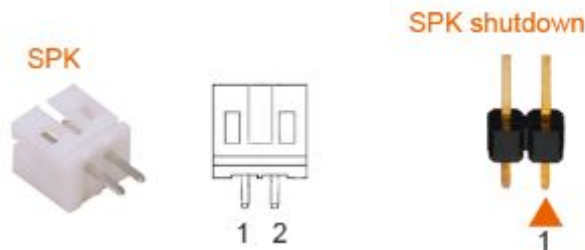
Note: The recording driver is unavailable.



MIC					
Pin	Signal	Description	Pin	Signal	Description
1	MICIN	MIC input	2	MICIN	MIC input
3	MICIN	MIC input	4	MICIN	MIC input
5	GND	Ground			

PHONE					
Pin	Signal	Description	Pin	Signal	Description
1	HPL	Left Channel Headphone Output	2	HPL	Left Channel Headphone Output
3	HPR	Right Channel Headphone Output	4	HPR	Right Channel Headphone Output
5	GND	Ground			

Android 210 supports 2-channel SPEAKER that led out from 2x 2-pin 2.0mm connectors. The SPK on/off is controlled by a 2-pin 2.0mm connector (J27). Connect J27 with jumper is shutdown the SPKs.



SPKL (J25)					
Pin	Signal	Description	Pin	Signal	Description
1	VOUT1L	Output 1 left channel	2	VOUT2L	Output 2 left channel
SPKR(J26)					
Pin	Signal	Description	Pin	Signal	Description
1	VOUT1R	Output 1 right channel	2	VOUT2R	Output 2 right channel
SPK Shutdown(J27)					
Pin	Signal	Description	Pin	Signal	Description
1	SHUTDOWN	SHUTDOWN speaker	2	GND	Ground

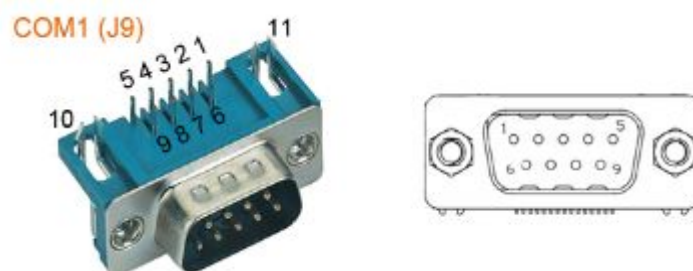
2.8 Serial ports (J9, J11, J14, J15)

Android 210 supports 1x RS232 (DB9), 4x TTL (or 2x TTL and 2x RS485).

Features:

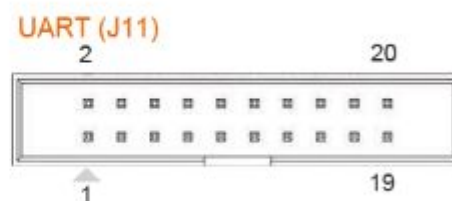
- 32-entry FIFO for receiver and 32-entry FIFO for transmitter
- Programmable baud rate of up to 250K bit/s
- The serial port operates at RS232 voltage levels.

The COM1 is debug serial port. It is used to input and display interactive command, view system boot information and transfer files between the platform and PC.



COM1 (J9)

Pin	Signal	Description	Pin	Signal	Description
1	NC	Not connect	2	RXD0N	Uart 0 receives data input
3	TXD0N	Uart 0 transmits data output	4	NC	Not connect
5	GND	Ground	6	NC	Not connect
7	CTSn0N	Uart 0 clean to send input signal	8	RTSn0N	Uart 0 request to send output signal
9	NC	Not connect	10	GND	Ground
11	GND	Ground			



The UART (J11) is a 20-pin connector and can be extended to 4x serial ports (TTL). The serial signals are led out directly from CPU.

The signal TXD0/RXD0 shared with COM1 (DB9). If it is used as debug, TXD0/RXD0 in UART is disabled. The UART is use to connect serial device.

The signals TXD2/RXD2 and TXD3/RXD3 shared with COM5 and COM6.

COM1/2/3/4 (J11)

Pin	Signal	Description	Pin	Signal	Description
1	VDD_5V	5V voltage	2	VDD_IO	IO Supply Voltage
3	TXD0	Uart 0 transmits data output	4	RXD0	Uart 0 receives data input
5	RTSn0	Uart 0 request to send output signal	6	CTSn0	Uart 0 clean to send input signal
7	TXD1	Uart 1 transmits data output	8	RXD1	Uart 1 receives data input
9	RTSn1	Uart 1 request to send output signal	10	CTSn1	Uart 1 clean to send input signal
11	TXD2	Uart 2 transmits data output	12	RXD2	Uart 2 receives data input
13	TXD3	Uart 3 transmits data output	14	RXD3	Uart 3 receives data input
15	NC	Not connect	16	NC	Not connect
17	NC	Not connect	18	NC	Not connect
19	GND	Ground	20	GND	Ground

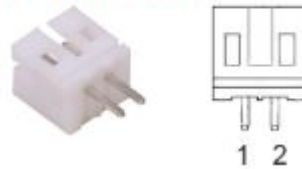
RS485 uses differential mode to transmit signals, without checking the signal just check potential difference to send / receiver data.

COM5 and COM6 are converted by COM3 (TXD2/RXD2) and COM4 (TXD3/RXD3).

Features:

- 9-bit or Multidrop mode (RS-485) support (automatic slave address detection);
- RXD input and TXD output can be inverted respectively in RS-485 mode;
- RS-485 driver direction control via CTS signal.

RS485 (J14, J15)



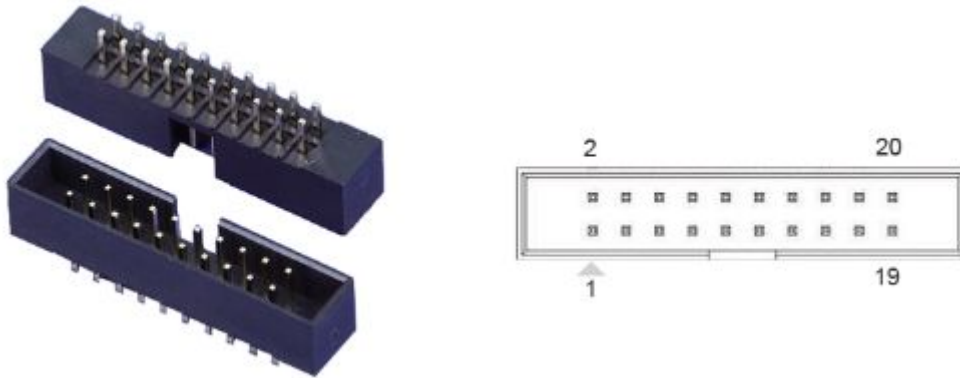
COM5 (J14)					
Pin	Signal	Description	Pin	Signal	Description
1	B	Connect to MAX3430(inverting terminal)	2	A	Connect to MAX3430(non-inverting terminal)
COM6 (J15)					
Pin	Signal	Description	Pin	Signal	Description
1	B	Connect to MAX3430(inverting terminal)	2	A	Connect to MAX3430(non-inverting terminal)

2.9 SPI/AD (J29)

Android210 reserves 1- channel high-speed SPI and 2- channel ADC interface.

SPI features:

- Full duplex
- 8/16/32-bit shift register for TX/RX
- 8-bit Prescaler logic
- 2 clock sources: PCLK and SPI_EXT_CLK from SYSCON
- Supports 8-bit/16-bit/32-bit bus interface
- Supports the Motorola SPI protocol and National Semiconductor Microwire
- Two independent 32-bits wide transmit and receive FIFOs: depth 64 in port 0 and depth 16 in port 1
- Master-mode and Slave-mode
- Receive-without-transmit operation
- Tx/Rx maximum frequency at up to 50MHz

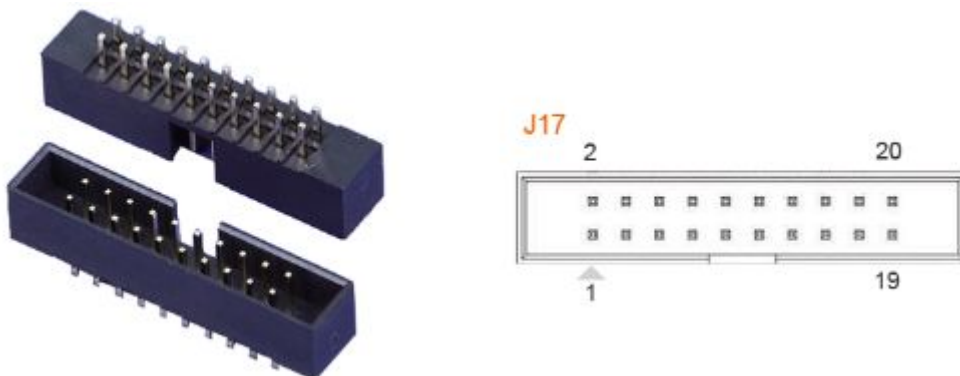


Pin	Signal	Description	Pin	Signal	Description
1	VDD_5V	5V Voltage	2	VDD_IO	IO Supply Voltage
3	SPI0_CS _n	SPI CH0 chip select	4	SPI0_MISO	SPI CH0 master input / slave output
5	SPI0_CLK	SPI CH0 clock	6	SPI0_MOSI	SPI CH0 master output / slave input
7	NC	Not connect	8	NC	Not connect
9	NC	Not connect	10	NC	Not connect
11	NC	Not connect	12	NC	Not connect
13	NC	Not connect	14	NC	Not connect
15	NC	Not connect	16	NC	Not connect
17	ADC_IN0	12bit ADC CH0 input	18	ADC_IN1	12bit ADC CH1 input
19	GND	Ground	20	GND	Ground

2.10 Camera (J17, J21)

Android210 provides 2 types of camera interfaces: header and FPC connector.

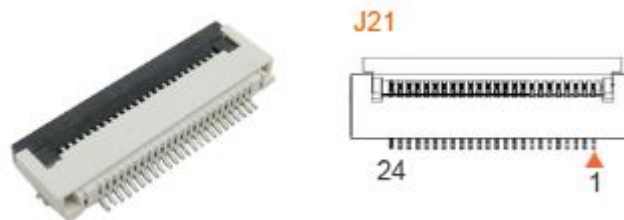
J17 is a 2mm pitch 20-pin header connector. It can be connected to the 1.3M pixels OV9650 module combined with an adapter plate.



J17

Pin	Signal	Description	Pin	Signal	Description
1	VDD_5V	5V Voltage	2	VDD_IO	IO Supply Voltage
3	GND	Ground	4	CAMFIELD	Reset or Power down Camera
5	LCAMPCLK	Camera clock in	6	CAM_SCL	Camera IIC-bus CH clock
7	CAM_SDA	Camera IIC-bus CH data	8	LCAMVSY NC	Camera VSYNC in
9	LCAMHREF	Camera HSYNC in	10	LCAMCLK	Master clock
11	LCAMDATA0	Camera data 0 in	12	LCAMDATA1	Camera data 1 in
13	LCAMDATA2	Camera data 2 in	14	LCAMDATA3	Camera data 3 in
15	LCAMDATA4	Camera data 4 in	16	LCAMDATA5	Camera data 5 in
17	LCAMDATA6	Camera data 6 in	18	LCAMDATA7	Camera data 7 in
19	GND	Ground	20	GND	Ground

J21 is a 24pin FPC connector. It can be connected directly to camera module without any adapter plate.



J21					
Pin	Signal	Description	Pin	Signal	Description
1	EINT22	Interrupt port 22	2	GND	Ground
3	CAM_SDA	Camera IIC-bus CH data	4	CAM_2.8V	2.8V Voltage for camera
5	CAM_SCL	Camera IIC-bus CH clock	6	CAMFIELD	Reset or Power down Camera
7	LCAMVSY NC	Camera VSYNC in	8	EINT21	Interrupt port 21
9	LCAMHREF	Camera HSYNC in	10	CAM_1.8V	1.8V Voltage for camera
11	CAM_2.8V	2.8V Voltage for camera	12	LCAMDATA7	Camera data 7 in
13	LCAMCLK	Master clock	14	LCAMDATA6	Camera data 6 in
15	GND	Ground	16	LCAMDATA5	Camera data 5 in
17	LCAMPCLK	Camera clock in	18	LCAMDATA4	Camera data 4 in
19	LCAMDATA0	Camera data 0 in	20	LCAMDATA3	Camera data 3 in
21	LCAMDATA1	Camera data 1 in	22	LCAMDATA2	Camera data 2 in
23	NC	Not connect	24	NC	Not connect

2.11 GPIO/Keypad (J30, J31)

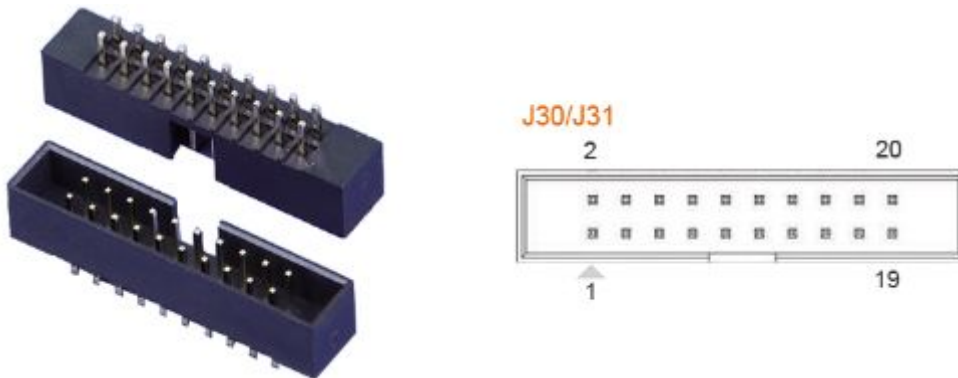
J30 is a 20-Pin 2.0 connector multiplexed GPIO and Keypad.

Keypad Features:

- Open drain design
- Glitch suppression circuit design
- Multiple-key detection
- Long key-press detection
- Support 2-point and 3-point contact key matrix

J31 is GPIO interface that can connect a variety of external devices. The pins can be defined as:

- Data input / output.
- Interrupt generation.

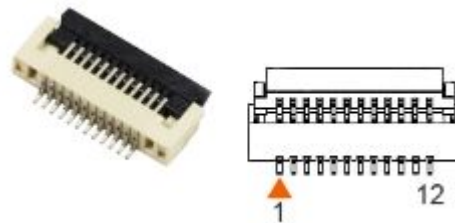


GPIO/8*8 Keypad (J30)					
Pin	Signal	Description	Pin	Signal	Description
1	VDD_5V	5V Voltage	2	VDD_IO	IO Supply Voltage
3	EINT24	Interrupt 24 (OR KP_ROW0)	4	EINT25	Interrupt 25(OR KP_ROW1)
5	EINT26	Interrupt 26(OR KP_ROW2)	6	EINT27	Interrupt 27(OR KP_ROW3)
7	EINT28	Interrupt 28(OR KP_ROW4)	8	EINT29	Interrupt 29(OR KP_ROW5)
9	EINT30	Interrupt 30(OR KP_ROW6)	10	EINT31	Interrupt 31(OR KP_ROW7)
11	EINT16	Interrupt 16(OR KP_COL0)	12	EINT17	Interrupt 17(OR KP_COL1)
13	EINT18	Interrupt 18(OR KP_COL2)	14	EINT19	Interrupt 19(OR KP_COL3)
15	EINT20	Interrupt 20(OR KP_COL4)	16	EINT21	Interrupt 21(OR KP_COL5)
17	EINT22	Interrupt 22(OR KP_COL6)	18	EINT23	Interrupt 23(OR KP_COL7)
19	GND	Ground	20	GND	Ground
GPIO (J31)					
Pin	Signal	Description	Pin	Signal	Description
1	VDD_5V	5V Voltage	2	VDD_IO	IO Supply Voltage
3	EINT0	Interrupt 0	4	EINT1	Interrupt 1
5	EINT2	Interrupt 2	6	EINT3	Interrupt 3
7	EINT4	Interrupt 4	8	EINT5	Interrupt 5
9	EINT6	Interrupt 6	10	MMC0_WP/	MMC0 WP/Interrupt 7

				EINT7	
11	EINT8	Interrupt 8	12	EINT9	Interrupt 9
13	EINT10	Interrupt 10	14	EINT11	Interrupt 11
15	EINT12	Interrupt 12	16	HDMI_INT/ EINT13	Defined for HDMI HPD signal /Interrupt 13
17	EINT14	Interrupt 14	18	EINT15	Interrupt 15
19	GND	Ground	20	GND	Ground

2.12 GPIO/I2C (J5)

The J5 connector is used to connect the capacitive touchscreen.



Pin	Signal	Description	Pin	Signal	Description
1	VDD_IO	IO Supply Voltage	2	EINT5	Interrupt 5
3	EINT15	Interrupt 15	4	I2C_SCL1	I2C clock signal
5	I2C_SDA1	I2C data signal	6	GND	Ground
7	KP_COL0	Keypad col0	8	KP_COL1	Keypad col1
9	KP_COL2	Keypad col2	10	EINT24	Interrupt 24
11	EINT25	Interrupt 25	12	EINT26	Interrupt 26

2.13 Buttons (K1, K2, K3, RST)

On-board 3x user buttons (User-Defined) and 1 reset button.



K1					
Pin	Signal	Description	Pin	Signal	Description
1	VDD_IO	IO Supply Voltage	2	EINT24	Interrupt 24
3	GND	Ground	4	GND	Ground
K2					
Pin	Signal	Description	Pin	Signal	Description

1	VDD_IO	IO Supply Voltage	2	EINT25	Interrupt 25
3	GND	Ground	4	GND	Ground
K3					
Pin	Signal	Description	Pin	Signal	Description
1	VDD_IO	IO Supply Voltage	2	EINT26	Interrupt 26
3	GND	Ground	4	GND	Ground

The RST button is a Side Tact Switch. The board adopts MAX811 as the Reset chip.



Pin	Signal	Description	Pin	Signal	Description
1	KEY_RST	Connect to pin3 of MAX811	2	GND	Ground
3	GND	Ground	4	GND	Ground

2.14 Boot select (SW1)

Android210 supports booting from SD Card, USB and NAND Flash. The CPU will boot in corresponding way automatically after getting the OM signal set by DIP switch SW1.



Pin	Signal	Description	Pin	Signal	Description
1	VDD_IO	IO Supply Voltage	2	VDD_IO	IO Supply Voltage
3	VDD_IO	IO Supply Voltage	4	VDD_IO	IO Supply Voltage
5	OM5	Mode selection 5	6	OM3	Mode selection 3
7	OM2	Mode selection 2	8	OM1	Mode selection 1

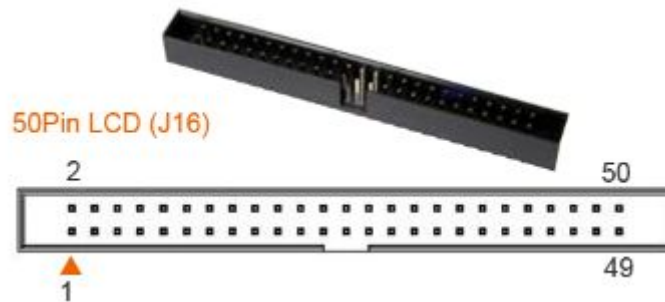
Boot mode

Pin \ Boot mode	J1	J2	J3	J4
NAND FLASH	1	0	0	0
USB	1	0	0	1
SD card	0	1	1	0

- NOTE:** 1. Android210 is set to boot from NAND Flash by default.
 2. For SW1 switch, "1" = ON, "0" = OFF.

2.15 LCD (J16, J18)

Android210 supports two types of LCD interfaces, one is 40P FPC and the other is 50P header. The board comes with driver for 4.3-inch resistive, 7-inch resistive/capacitive LCD. User also can choose other size of LCD&touchscreen. Android210 supports 24bit LCD, PWM backlight and external interrupt control.



J16 (50P)							
Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	VDD_5V	2	VDD_5V	3	VDD_IO	4	GND
5	NC	6	VD0	7	VD1	8	VD2
9	VD3	10	VD4	11	VD5	12	VD6
13	VD7	14	VD8	15	VD9	16	VD10
17	VD11	18	GND	19	VD12	20	VD13
21	VD14	22	VD15	23	VD16	24	VD17
25	VD18	26	VD19	27	VD20	28	VD21
29	VD22	30	VD23	31	GND	32	NC
33	PWMTOUT0	34	NC	35	NC	36	DE
37	VSY NC	38	HSY NC	39	VCLK	40	NC
41	NC	42	GND	43	XM	44	XP
45	NC	46	GND	47	YM	48	YP
49	NC	50	GND				

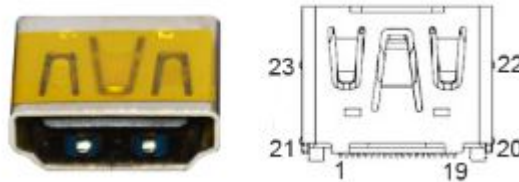


J18 (40P)							
Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal

1	VDD_5V	2	VDD_5V	3	VDD_IO	4	VD0
5	VD1	6	VD2	7	VD3	8	VD4
9	VD5	10	VD6	11	VD7	12	VD8
13	VD9	14	VD10	15	VD11	16	VD12
17	VD13	18	VD14	19	VD15	20	VD16
21	VD17	22	VD18	23	VD19	24	VD20
25	VD21	26	VD22	27	VD23	28	NC
29	PWMTOUT0	30	DE	31	VSY NC	32	HSY NC
33	VCLK	34	NC	35	XM	36	XP
37	YM	38	YP	39	GND	40	GND

2.16 HDMI (J40)

Android210 supports HDMI v1.3,1080p@30fps at 60Hz high-definition digital output, and it also enables HDMI/LCD audio and video synchronization output. The HDMI interface is the regular 19pins HDMI type A, with width 13.9mm and thickness 4.45mm.



Pin	Signal	Description	Pin	Signal	Description
1	HDMI_TX2P	HDMI phy transmits data output 2 P	2	GND	Ground
3	HDMI_TX2N	HDMI phy transmits data output 2 N	4	HDMI_TX1P	HDMI phy transmits data output 1 P
5	GND	Ground	6	HDMI_TX1N	HDMI phy transmits data output 1 N
7	HDMI_TX0P	HDMI phy transmits data output 0 P	8	GND	Ground
9	HDMI_TX0N	HDMI phy transmits data output 0 N	10	HDMI_TXCP	HDMI phy TX clock P
11	GND	Ground	12	HDMI_TXCN	HDMI phy TX clock N
13	GND	Ground	14	NC	Not connect
15	HDMI_SCL1	HDMI clock signal 1	16	HDMI_SDA1	HDMI data signal 1
17	GND	Ground	18	VDD_5V	5V Voltage
19	HDMI_INT/ EINT13	HDMI interrupt /interrupt 13	20	GND	Ground
21	GND	Ground	22	GND	Ground

23	GND	Ground	
----	-----	--------	--

2.17 WiFi (J19)

J19 is SDIO WIFI wireless network interface (MMC CH1).

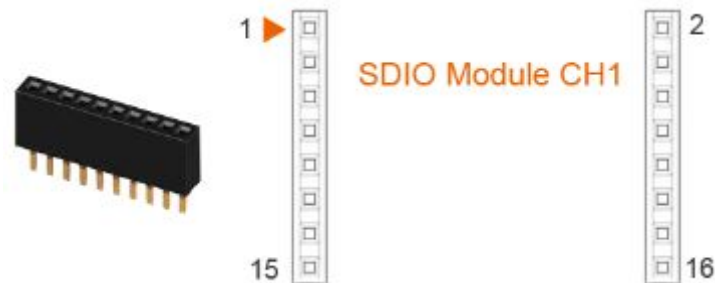
Note: The signals USB DNB / USB DPB are reserved for USB WIFI module.

Features:

WLAN Standards: IEEE 802 Part 11b/g (802.11b/g)

Coexistence: Hardware signaling

Frequency Band: 2.400 ~ 2.484 GHz



Pin	Signal	Description	Pin	Signal	Description
1	NC	Not connect	2	SD1_VDD	SD1 Voltage
3	SDCH1_DATA1/ MMC1_D1	SDCH1 interface DATA1/MMC1 DATA1	4	SD1_VDD	SD1 Voltage
5	SDCH1_DATA0/ MMC1_D0	SDCH1 interface DATA0/MMC1 DATA0	6	USB DNB	USB host port B negative data
7	SDCH1_CLK/ MMC1_CLK	SDCH1 interface Clock /MMC1 clock	8	USB DPB	USB host port B positive data
9	SDCH1_CDn/ CDn	SDCH1 Card Detect/Card Detect	10	GND	Ground
11	SDCH1_CMD/ CMD	SDCH1 Command/Response	12	GND	Ground
13	SDCH1_DATA3/ MMC1_D3	SDCH1 interface DATA3/MMC1 DATA3	14	GND	Ground
15	SDCH1_DATA2/ MMC1_D2	SDCH1 interface DATA2/MMC1 DATA2	16	GND	Ground

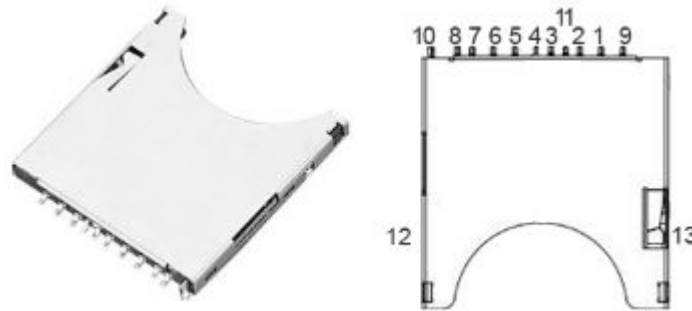
2.18 SD Card (J20)

The SD card is used as an external storage device. It also can be used as bootable card and download image. The MMC controller interface supports up to 4-bit transfer modes. MMC is always accessible

through the carrier board interface.

Features

- Low voltage consumption.
- Support hot-plug.
- Support SD mode and SPI mode.



Pin	Signal	Description	Pin	Signal	Description
1	SD0_D3	SD0 interface DATA3	2	SD0_CMD	SD0 Command/Response
3	GND	Ground	4	VDD_IO	IO Supply Voltage
5	SD0_CLK	SD0 clock	6	GND	Ground
7	SD0__D0	SD0 interface DATA0	8	SD0_D1	SD0 DATA1
9	SD0_D2	SD0 interface DATA2	10	SD0_WP	SD Write Protect
11	SD0_CD	SD0 Card Detect	12	GND	Ground
13	GND	Ground			

2.19 RTC (BT1)



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.

3 Product Configurations

3.1 Standard Contents

- Android 210 Single board computer x1
- CD-ROM (Linux BSP, Android BSP, Documents, tools, Schematic Drawing, datasheets) x1
- Ethernet cable x1
- Serial Cable x1
- USB Cable x1
- 12V/2A DC power adaptor x1

3.2 Optional Parts

- WiFi Module
- Camera Module
- LCD Module