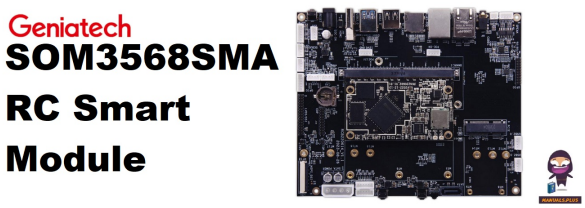
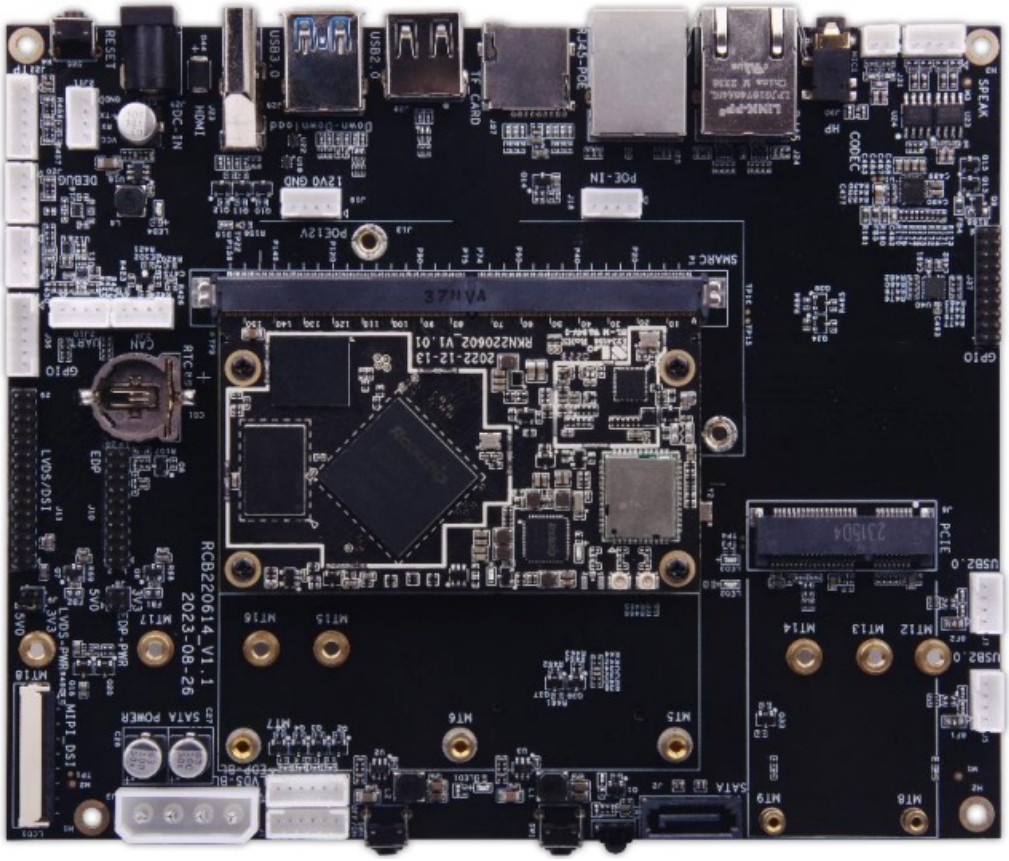


Geniatech SOM3568SMARC Smart Module Owner's Manual

Contents

Geniatech SOM3568SMARC Smart Module



Product Usage Instructions

- The CBD-3568-SMARC is a development board featuring the SMARC-Module chipset with a Rock-Chip RK3568 CPU. It is designed for various applications requiring the capabilities of a Quad-core ARM Cortex-A55 CPU.
- The device comes with standard interfaces and connectors for external I/O, including I2C touch connector, CAN Bus, LVDS VCC switch connector, and more.
- The board supports Debian 11(Linux) or Android 12 operating systems and offers Wi-Fi/BT connectivity. It is equipped with LPDDR4 memory and eMMC storage options.
- The board features various connectors labeled for different functions such as Touch Panel Connector (J22) and DEBUG UART Connector (J20). Refer to the manual for pin definitions and usage details.

FAQ

- **Q:** What are the default operating systems supported by the CBD-3568-SMARC?
- **A:** The default operating systems supported are Global Debian 11(Linux) and Android 12.
- **Q:** What are the memory options available for the CBD-3568-SMARC?
- **A:** The board comes with 2GB LPDDR4 memory as standard, with optional configurations ranging from 1GB to 8 GB. The eMMC storage options include an 8GB base option with up to 32GB as an alternative.
- **Q:** What is the power requirement for the CBD-3568-SMARC?
- **A:** The board requires a DC input of 12V at 2A.

Revision History

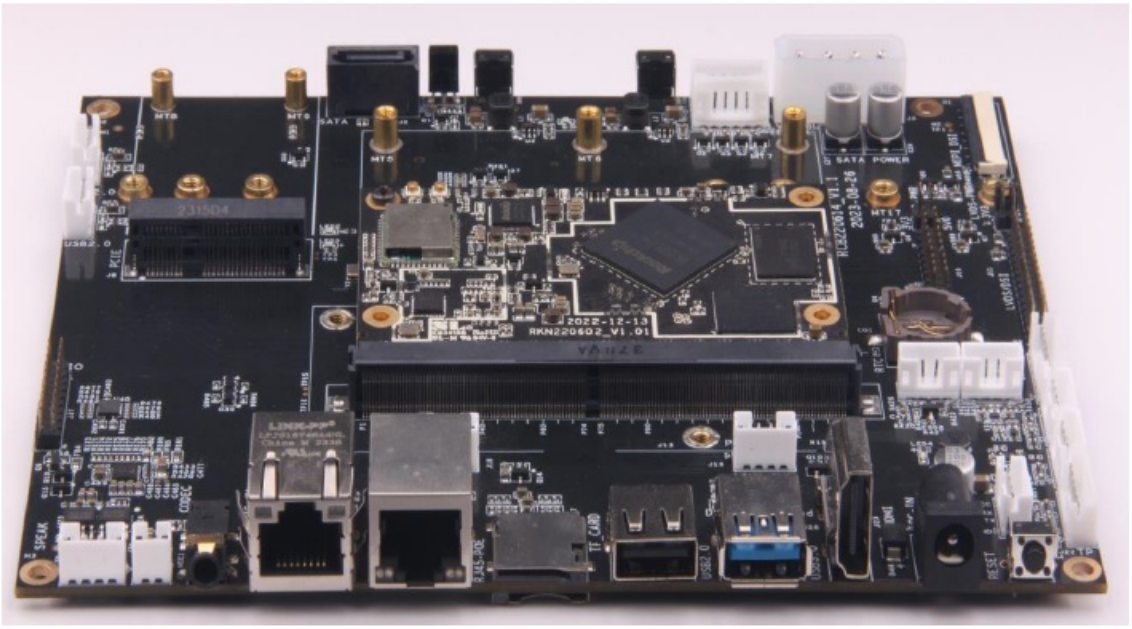
VERSION	DATE	BOARD ID	PAGE	DESCRIPTION	AUTHOR
V1.0	22/06/14	RCB220614_V1.0			
V1.1	24/08/07	RCB220614_V1.1			

GENERAL DESCRIPTION

- The RK3568 SMARC Development Platform incorporates RK3568 SoC-based SOM-3568-SMARC and CBD-3568-SMARC Carrier board for complete validation of RK3568 SoC functionality.
- The Development board CBD-3568-SMARC can be used for quick prototyping of various applications targeted by the RK3568 Applications Processor.
- With the 170mmx138mm size, the SMARC Carrier board is highly packed with all the necessary on-board connectors to validate the features of SOM-3568-SMARC.
- With the high SOC performance, applications focusing on smart NVR, cloud terminal, industrial automation, Internet of Things applications, commercial display, and other fields.

PRODUCT OVERVIEW

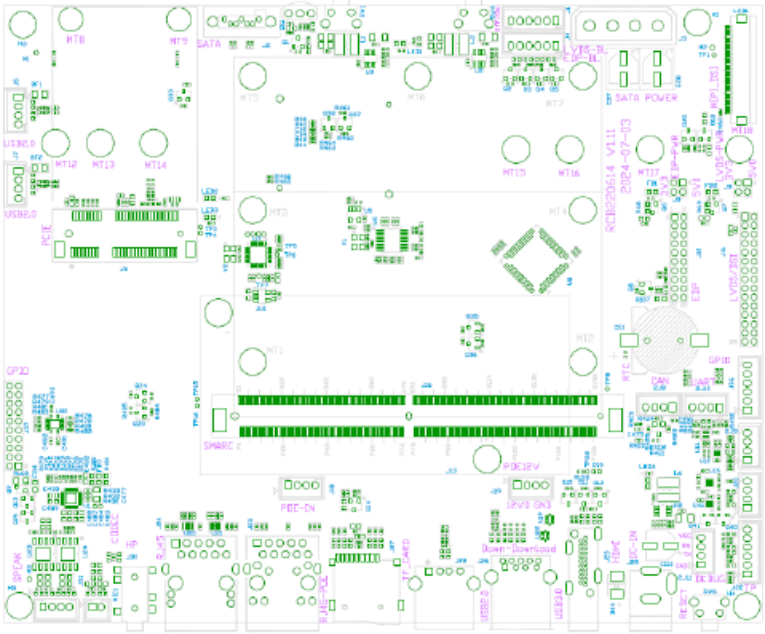
- The below picture is for reference only, please prevail in kind.

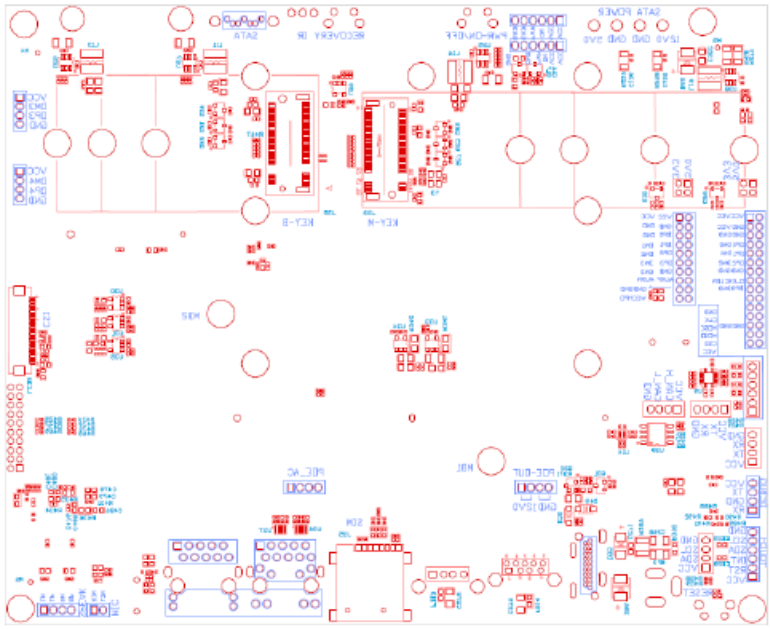


FEATURES

CHIPSET	Rock-Chip RK3568	
MARKET AREA	Global	
SMARC-Module	OS	Debian 11(Linux)/Android 12
	CPU	Quad-core ARM Cortex-A55 CPU up to 2GHz per core
	LPDDR4	2GB（1G-8G optional）
	EMMC	8GB eMMC5. 1(8-32GB Optional)
	Wi-Fi/BT	Wifi2.4G/5G +BT 4.1 (Optional)
Development board Interfaces	SMARC	SMARC V2.1 Compatible with SMARC modules CPU Modules. (82 x 50mm)
	External I/O Connector	1 x Power Key 1 x Reset Key 1 x Recovery Key 1 x DC Jack 1x USB 2.0 Type A 1 x USB 3.0 OTG Type A 1 x HDMI 2 x Giga Ethernet (J25 for POE) 1 x Mic Phone 2P Header 1 x Speaker (Left/Right Channel) 2P Header 1 x TF Card Socket 1 x SIM Socket 1 x RTC-Battery（CR2032） 1 x mini PCIe Connect 1 x M.2 Key B Connector for 5G 1 x M.2 Key M Connector for Storage 1 x SATA & 1 x SATA Power 2 x USB 2.0MM Connector 1 x HDMI module Connector 1 x Wi-Fi/BT module connector 1 x POE Module Connector 1 x A55 Core Debug connector (UART) 1 x LVDS Backlight 6P Header 1 x eDP Backlight 6P Header 1 x MIPI DSI Screen connector for MIPI Panel 1 x MIPI CSI Screen connector for MIPI Camera 1 x LVDS/eDP Screen connector
	Internal I/O Connector	1 x I2C touch connector 1 x CAN Bus 1 x LVDS VCC switch connector 1 x eDP VCC switch connector
	DC-IN	12V2A
Dimensions	170*138mm	

Connectors List



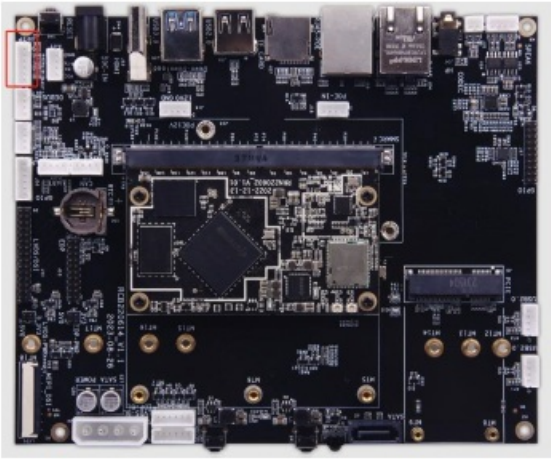


Label	Function	Note
J31	Speaker connector	4x 1 wafer, pitch 2.00mm
J30	HP Jack connector	
MIC1	MIC Connector	2×1 wafer, pitch 2.00mm
J24	RJ-45 Ethernet	
J25	RJ-45 Ethernet(Support POE)	
J27	Micro SD slot	
J35	SIM Card slot	

J18	POE-IN Connector	
J19	POE-12V Connector	
J28	USB2.0-Type A connector	
J26	USB3.0-Type A connector	OTG
J23	HDMI out Connector	
J29	DC-IN Jack	
SW6	RESET KEY	
JRTC1	RTC Battery connector	
J22	Touch Panel connector	6 x 1 wafer, pitch 2.00mm
J20	Debug connector (UART)	4 x 1 wafer, pitch 2.00mm
J9	LVDS_PANELVCC SWITCH CONNECTOR	2 x 3 HDR, pitch 2.00mm
J11	LVDS connector	2 x 15 HDR, pitch 2.00mm
J36	GPIO connector	6 x 1 wafer, pitch 2.00mm
J10	eDP Connector	2 x 10 HDR, pitch 2.00mm
J8	eDP_PANELVCC SWITCH CONNECT	2 x 3 HDR, pitch 2.00mm
LCD1	Single- MIPI1 LCM Connector	FPC 34 Pin, pitch 0.5mm
J3	SATA Power Connector	SATA_IDE_DIP_4Pin
J1	LVDS backlight connector	6 x 1 wafer, pitch 2.00mm
J4	eDP backlight connector	6 x 1 wafer, pitch 2.00mm
SW1	RECOVERY KEY	
SW4	PWR_ON/OFF KEY	
IR1	IR Receiver	
J2	SATA3.0 connector	
J33	PCIe M.2 KEY M for Storage	

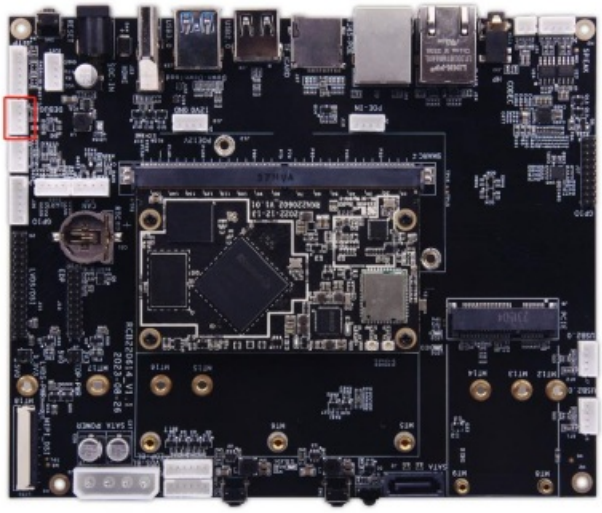
J6	mini PCIe Connector	
J32	PCIe M.2 KEY B connector	
J5	USB2.0 slot	4 x 1 wafer, pitch 2.00mm
J7	USB2.0 slot	4 x 1 wafer, pitch 2.00mm
J37	GPIO connector	10 x 2 wafer, pitch 2.00mm
J16	SMARC connector	

Touch Panel Connector (J22)



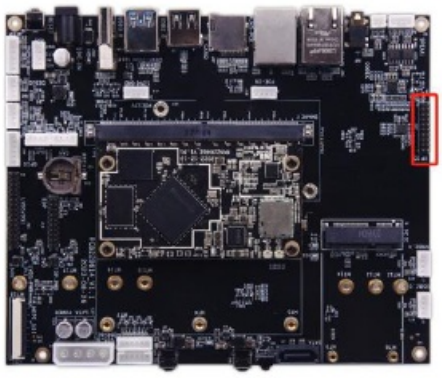
Pin NO	Definition
1	VCC3V3_TP
2	TP_RST
3	TP_INT
4	I2C_SDA_TP
5	I2C_SCL_TP
6	GND

DEBUG UART Connector (J20)



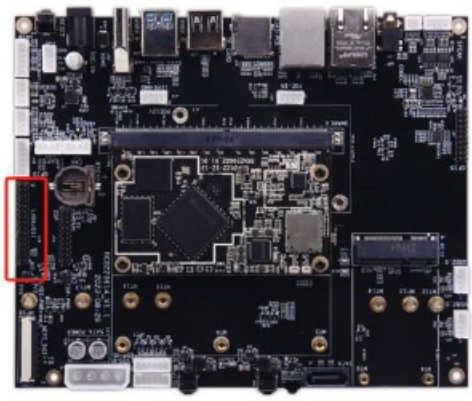
Pin NO	Definition
1	UART2_RX_M0_DEBUG_3V3
2	GND
3	UART2_TX_M0_DEBUG_3V3
4	NC

General purpose I/O connector (J37)



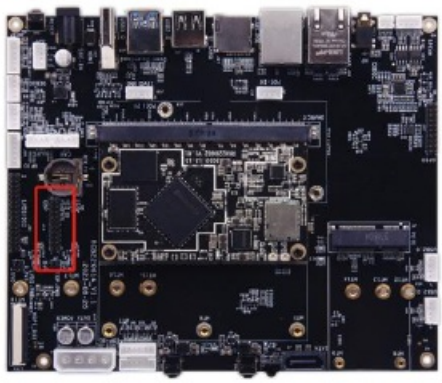
Pin NO	Definition	Pin NO	Definition
1	VCC5V0_SYS	2	VCC3V3_SYS
3	VCC5V0_SYS	4	VCC3V3_SYS
5	GND	6	GND
7	UART7_TX_M1_3V3	8	GPIO4_C5
9	UART7_RX_M1_3V3	10	GPIO4_C6
11	GPIO3_B2	12	NA
13	GPIO3_B1	14	NA
15	NA	16	NA
17	GND	18	GND
19	GND	20	GND

LVDS/DSI Connector (J11)



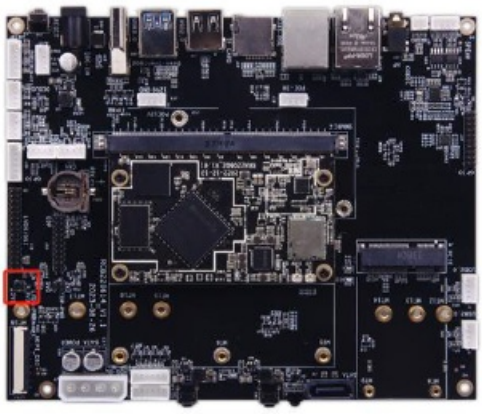
Pin NO	Definition	Pin NO	Definition
1	LVDS_PANELVCC	2	LVDS_PANELVCC
3	LVDS_PANELVCC	4	GND
5	GND	6	GND
7	MIPI_DSI_TX0_D0N/LVDS_TX0_D0N	8	MIPI_DSI_TX0_D0P/LVDS_TX0_D0P
9	MIPI_DSI_TX0_D1N/LVDS_TX0_D1N	10	MIPI_DSI_TX0_D1P/LVDS_TX0_D1P
11	MIPI_DSI_TX0_D2N/LVDS_TX0_D2N	12	MIPI_DSI_TX0_D2P/LVDS_TX0_D2P
13	GND	14	GND
15	MIPI_DSI_TX0_CLKN/LVDS_TX0_CLKN	16	MIPI_DSI_TX0_CLKP/LVDS_TX0_CLKP
17	MIPI_DSI_TX0_D3N/LVDS_TX0_D3N	18	MIPI_DSI_TX0_D3P/LVDS_TX0_D3P
19	NC	20	NC
21	NC	22	NC
23	NC	24	NC
25	GND	26	GND
27	NC	28	NC
29	NC	30	NC

eDP Connector (J10)



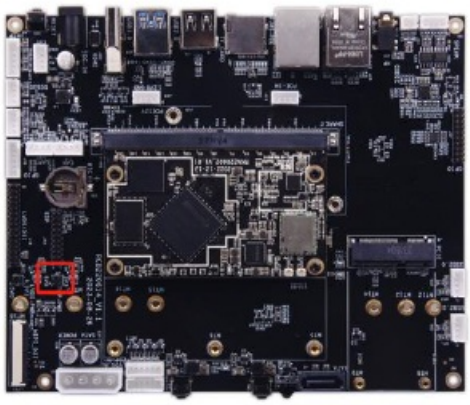
Pin NO	Definition	Pin NO	Definition
1	EDP_PANELVCC	2	EDP_PANELVCC
3	GND	4	GND
5	EDP_TX_D0N	6	EDP_TX_D0P
7	EDP_TX_D1N	8	EDP_TX_D1P
9	EDP_TX_D2N	10	EDP_TX_D2P
11	EDP_TX_D3N	12	EDP_TX_D3P
13	GND	14	GND
15	EDPTX_AUXN	16	EDPTX_AUXP
17	GND	18	GND
19	EDP_HPD	20	VCC3V3_LCD0

LVDS_PANELVCC SWITCH CONNECTOR(J9)



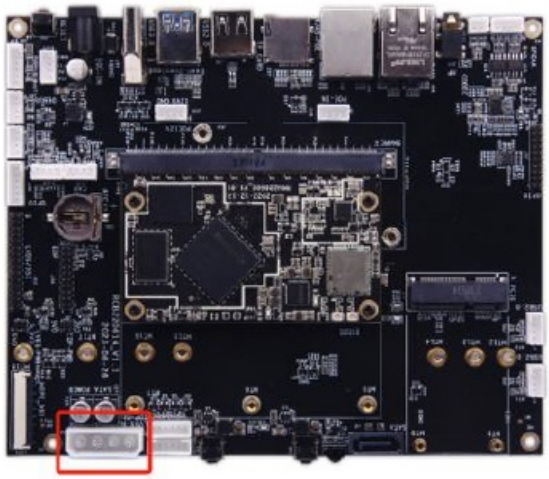
Pin NO	Definition	Pin NO	Definition
1	VCC12V_DCIN	2	LVDS_PANELVCC
3	VCC5V0_SYS	4	LVDS_PANELVCC
5	VCC3V3_SYS	6	LVDS_PANELVCC

eDP_PANELVCC SWITCH CONNECTOR(J8)



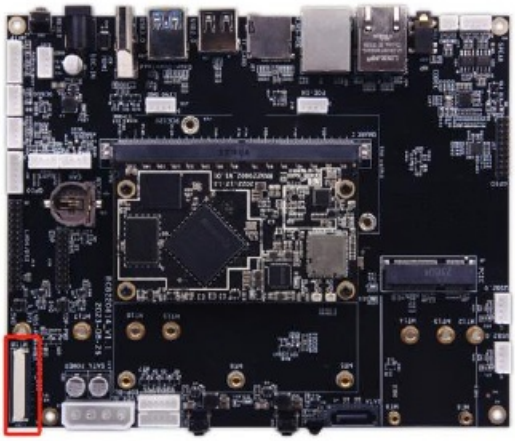
Pin NO	Definition	Pin NO	Definition
1	VCC12V_DCIN	2	eDP_PANELVCC
3	VCC5V0_SYS	4	eDP_PANELVCC
5	VCC3V3_SYS	6	eDP_PANELVCC

SATA Power Connector (J3)



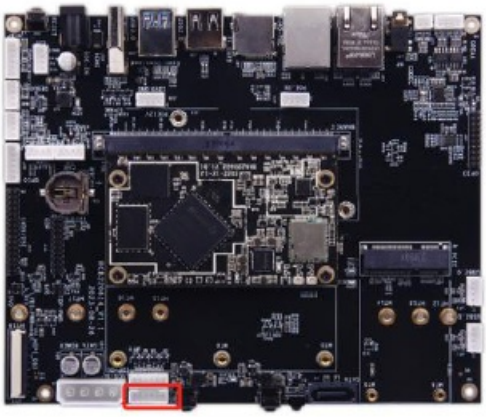
Pin NO	Definition
1	VCC5V0_SYS
2	GND
3	GND
4	VCC12V_DCIN

MIPI-DSI FPC34 Connector (LCD1)



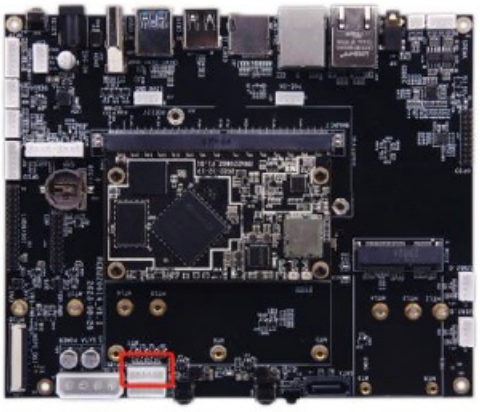
Pin NO	Definition	Pin NO	Definition
1	VCC3V3_LCD0	19	MIPI_DSI_TX1_D0P_SOC
2	VCC3V3_LCD0	20	MIPI_DSI_TX1_D0N_SOC
3	NC	21	GND
4	EDP_BL_ON	22	MIPI_DSI_TX1_D3P_SOC
5	LCD1_BL_PWM_5	23	MIPI_DSI_TX1_D3N_SOC
6	I2C3_SDA_M_0	24	GND
7	I2C3_SCL_M_0	25	GND
8	NC	26	GND
9	GND	27	GND
10	MIPI_DSI_TX1_D2P_SOC	28	TP1
11	MIPI_DSI_TX1_D2N_SOC	29	TP2
12	GND	30	NC
13	MIPI_DSI_TX1_D1P_SOC	31	VCC5V0_SYS
14	MIPI_DSI_TX1_D1N_SOC	32	VCC5V0_SYS
15	GND	33	VCC5V0_SYS
16	MIPI_DSI_TX1_CLKP_SOC	34	VCC5V0_SYS
17	MIPI_DSI_TX1_CLKP_SOC		
18	GND		

LCD backlight connector (J1)



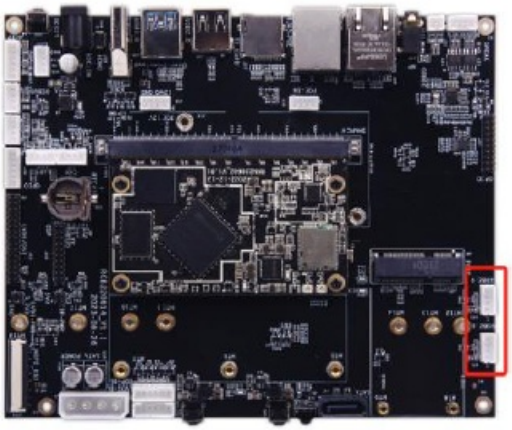
Pin NO	Definition
1	VCC12V_DCIN
2	VCC12V_DCIN
3	LVDS_BL_ON
4	LCD0_BL_PWM_4
5	GND
6	GND

eDP backlight connector (J4)



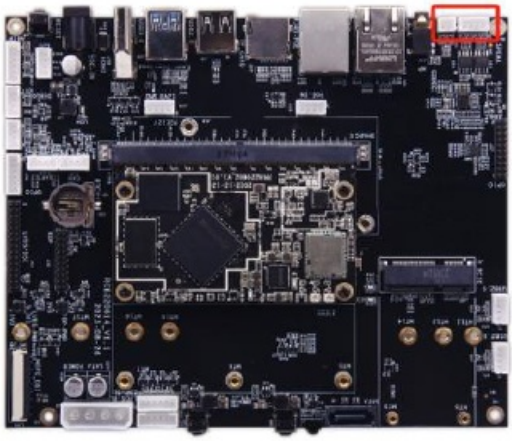
Pin NO	Definition
1	VCC12V_DCIN
2	VCC12V_DCIN
3	EDP_BL_ON
4	LCD1_BL_PWM_5
5	GND
6	GND

USB2.0 Slot (J5 & J7)



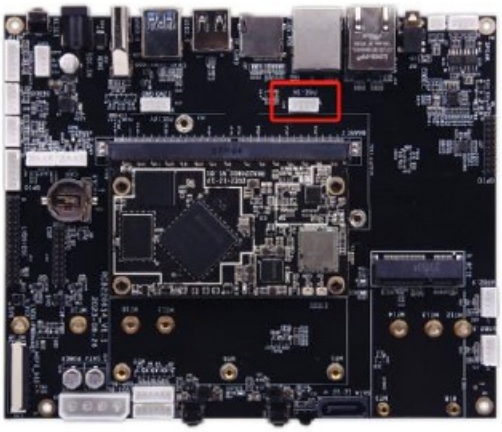
J5		J7	
Pin NO	Definition	Pin NO	Definition
1	VCC5V0_USB	1	VCC5V0_USB
2	USB2_HUB_DM_3	2	USB2_HUB_DM_4
3	USB2_HUB_DP_3	3	USB2_HUB_DP_4
4	GND	4	GND

SPEAKER & MIC Connector (J31 & MIC1)



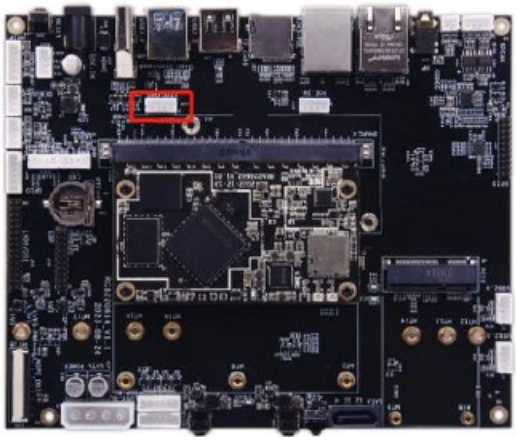
J31		MIC1	
Pin NO	Definition	Pin NO	Definition
1	SPKR_LN_CONN	1	LIN2
2	SPKR_LP_CONN	2	RIN2
3	SPKR_RN_CONN		
4	SPKR_RP_CONN		

POE IN Connector (J18)



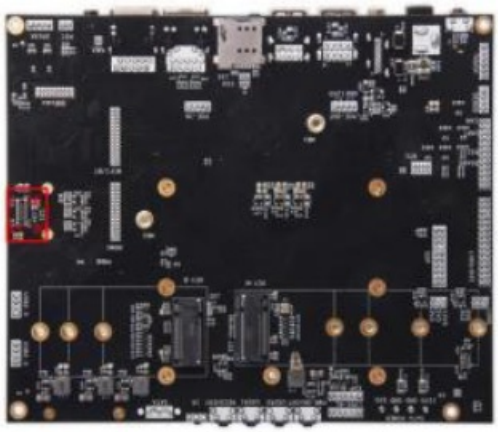
Pin NO	Definition
1	TR0_TAP
2	TR1_TAP
3	TR2_TAP
4	TR3_TAP

POE12V OUT connector(J19)



Pin NO	Definition
1	VCC12V_POE
2	VCC12V_POE
3	GND
4	GND

MIPI-CSI Camera Connector (J34)



Pin NO	Definition	Pin NO	Definition
1	GND	16	GND
2	MIPI_CSI_RX_D0P	17	VCC2V8_AVDD_DVP0
3	MIPI_CSI_RX_D0N	18	VCC2V8_DVP0
4	GND	19	GND
5	MIPI_CSI_RX_D2P	20	I2C2_SCL_M1
6	MIPI_CSI_RX_D2N	21	I2C2_SDA_M1
7	GND	22	VDD1V2_DVDD_DVP0
8	MIPI_CSI_RX_D3P	23	GND
9	MIPI_CSI_RX_D3N	24	VCC1V8_DOVDD_DVP0
10	GND	25	GND
11	CIF_CLKOUT	26	MIPI_CSI_RX_D1N
12	MIPI_CSI_X4_RST	27	MIPI_CSI_RX_D1P
13	GND	28	GND
14	MIPI_CAM0_PDN_L_GPIO3_D5	29	MIPI_CSI_RX_CLK0P
15	GND	30	MIPI_CSI_RX_CLK0N

Multimedia

Video

Video Decoder

- H.265 HEVC/MVC Main10 Profile yuv420@L5.1 up to 4096×2304@60fps
- H.264 AVC/MVC Main10 Profile yuv400/yuv420/yuv422/@L5.1 up to 4096×2304@60fps
- VP9 Profile0/2 yuv420@L5.1 up to 4096×2304@60fps
- VP8 verision2, up to 1920×1088@60fps
- VC1 Simple Profile@low, medium, high levels, Main Profile@low, medium, high levels, Advanced
- Profile@level0~3, up to 1920×1088@60fps
- MPEG-4 Simple Profile@L0~6, Advanced Simple Profile@L0~5, up to 1920×1088@60fps
- PEG-2 Main Profile, low, medium, and high levels, up to 1920×1088@60fps
- MPEG-1 Main Profile, low, medium, and high levels, up to 1920×1088@60fps
- H.263 Profile0, levels 10-70, up to 720×576@60fps

Video Encoder

- H.264/AVC BP/MP/HP@level4.2, up to 1920×1080@60fps
- H.265/HEVC MP@level4.1, up to 1920×1080@60fps (4096×4096@10fps with TILE)
- Support YUV/RGB video source with rotation and mirror

JPEG CODEC

JPEG decoder

- JPEG Baseline interleaved, max resolution up to 8176×8176, performance up to 76 million pixels per second

JPEG encoder

- Baseline Non-progressive
- up to 90 million pixels per second

Display System
Graphics Engine

3D Graphics Engine:

- Mali-G52 1-Core-2EE
- Support OpenGL ES 1.1, 2.0, and 3.2
- Support Vulkan 1.0 and 1.1
- Support OpenCL 2.0 Full Profile
- Support 1600Mpix/s fill rate when 800MHz clock frequency
- Support 38.4GLOPs when 800MHz clock frequency

2D Graphics Engine:
Data format

- Support input of ARGB/RGB888/RGB565/RGB4444/RGB5551/YUV420/YUV422/YUYV
- Support input of YUV422SP10bit/YUV420SP10bit(YUV-8bits out)

- Supports output of ARGB/RGB888/RGB565/RGB4444/RGB5551/YUV420/YUV422/YUYV
- Pixel Format conversion, BT.601/BT.709
- Dither operation, Y dither update;
- Max resolution: 8192×8192 source, 4096×4096 destination

Display interface
Display interface

- Supports RGB Parallel Display interface
- Supports BT656/BT1120 interface
- Supports MIPI_DSI interface ϖ Support LVDS interface
- Supports HDMI interface
- Supports eDP interface
- Supports EBC interface
- Supports three simultaneous displays in the following interfaces RGB/BT1120
- BT656
- MIPI_DSI_TX
- LVDS
- HDMI
- Edp

MIPI DSI TX interface

- Compatible with MIPI Alliance Interface specification v1.2
- Supports 2-channel DSI
- Supports 4 data lanes per channel
- Supports 2.5Gbps maximum data rate per lane
- Up to 1920×1080@60Hz display output for single MIPI mode and 2560*1440@60Hz for dual-MIPI mode
- Supports RGB(up to 8bit) format

LVDS interface

- Compliant with the TIA/EIA-644-A LVDS specification
- Supports RGB888 and RGB666 input for LVDS interface
- Supports VESA/JEIDA LVDS data format transfer

HDMI TX interface

- Single Physical Layer PHY with support for HDMI1.4 and HDMI2.0 operation
- For HDMI operation, support for the following:
    - Up to 10 bits of Deep Color modes
    - Up to 1080p@120Hz and 4096×2304@60Hz
    - 3-D video formats
- Supports RGB/YUV(up to 10bit) format

- Supports HDCP1.4/2.2

eDP interface

- Supports 1 eDP 1.3 interface
- Up to 4 physical lanes of 2.7Gbps/lane
- Supports Panel Self Refresh(PSR)
- Supports up to 2560×1600@60Hz
- Supports RGB(up to 10bit) format

Precautions for use

1. Relative humidity: ≤80%.
2. Operation temperature: Commercial field 0~ 65C Industrial field: -0~85C
3. Keep the Board away from static electricity.
4. Keep the Board away from water and other liquids.
5. Don’t use long connect wires which may affect performance and image quality.

FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, under part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used by the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution: Any changes or modifications to this device not explicitly approved by the manufacturer could void your authority to operate this equipment.
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. this device must accept any interference received, including interference that may cause undesired operation.

RF Exposure Information
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

CONTACT

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Documents / Resources

	Geniatech SOM3568SMARC Smart Module [pdf] Owner's Manual SOM3568SMARC, SOM3568SMARC Smart Module, Smart Module, Module

References

- Industrial Embedded Computers & Edge AI Solutions - Geniatech
- User Manual