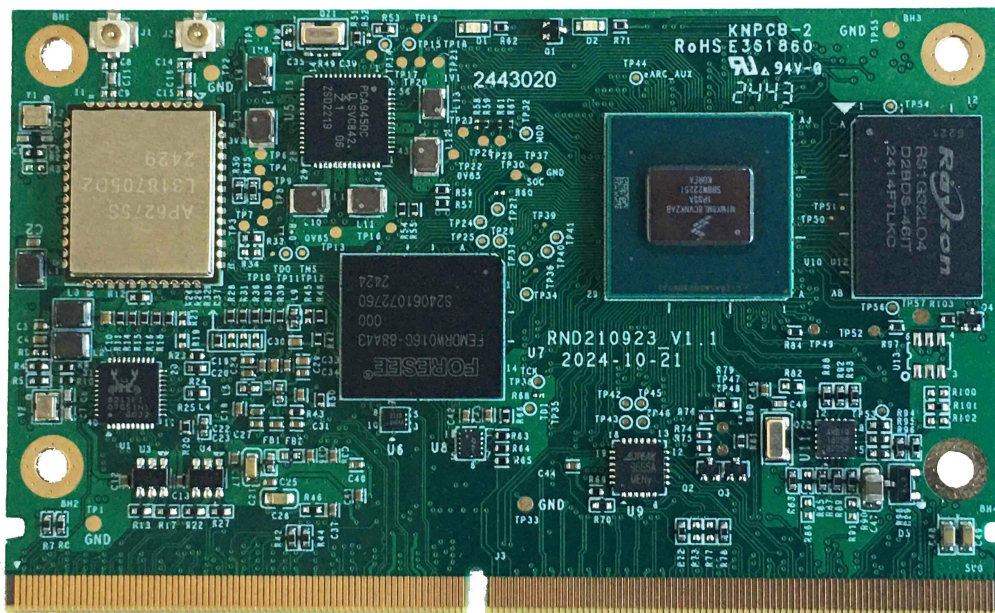


Shenzhen Geniatech Co.,Ltd.

SPECIFICATION

MODEL: SoM-MX8MP-SMARC



REVISION HISTORY					
VERSION	DATE	BOARD ID	PAGE	DESCRIPTION	AUTHOR
V1.0	2022/5/6	RND210923_V1.0	9	Specification	
V1.1	2024/11/23	RND210923_V1.1	11	Change the WiFi module and modify the PIN definition	

Confirmation

APPROVED BY GENIATECH		
PREPARED BY 编写	CHECKED BY 审核	APPROVED BY 批准

Please return the original copy after approved by your company with seal and signature.
请在贵公司盖章并签字后寄回正本一份。

APPROVED BY CUSTOMER		
COMMENTS 确认意见	APPROVED BY 批准签字	COMPANY SEAL 盖章

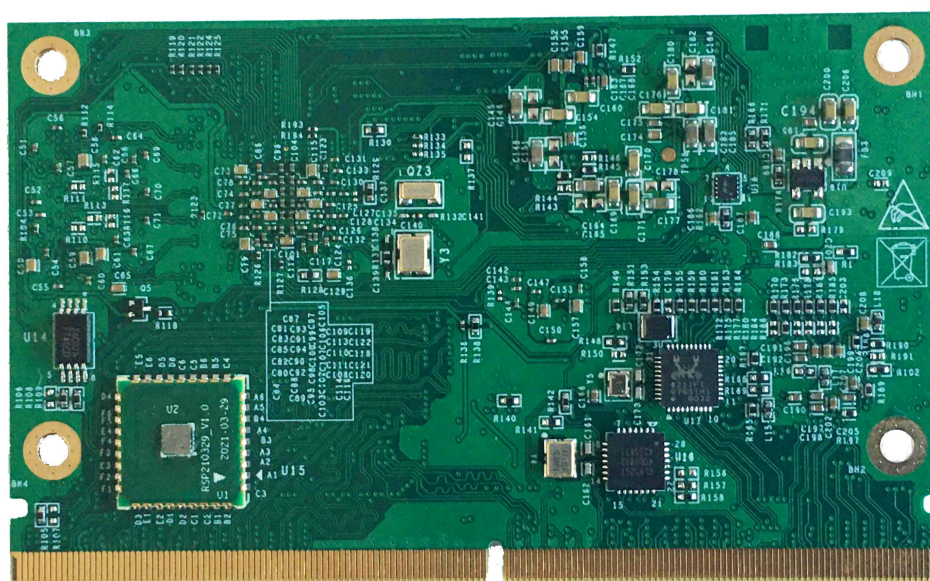
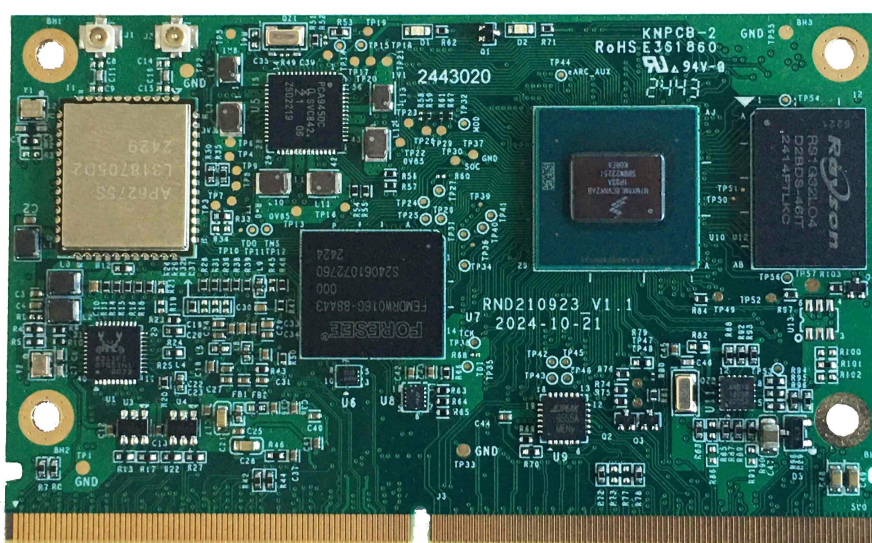
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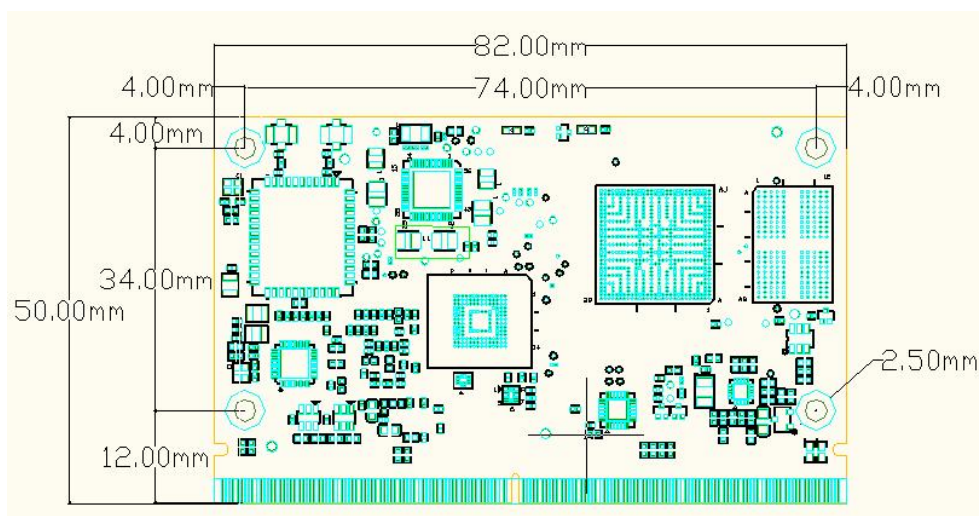
1. General Description

SoM-MX8MP-SMARC is using NXP i.MX8M Plus processor, based on Quad Arm® Cortex®-A53 and Cortex-M7 cores, with a Neural Processing Unit (NPU) operating at up to 2.3 TOPS and dual image signal processors (ISP) and two camera inputs for an effective advanced vision system and industry-leading audio, voice and video processing functions, Integrated 2.4G / 5G dual-band WiFi and Bluetooth, suitable for consumer audio to widely used in machine learning and vision, advanced multimedia, and industrial automation with high reliability. The core board and development board developed by Geniatech are based on the i.MX8M Plus series application processor design, and the core board is based on "SMARC Hardware Technical Specification 2.1" for compatible design, suitable for all development boards on the market with the same interface.

2. Product Pictures



Dimension Drawing



3. Features

CHIPSET	NXP i.MX8M Plus	
MARKET AREA	Global	
OSD LANGUAGE	English/Chinese (multi language OSD)	
Processor	OS	Android 10.0 and Linux(Yocto)
	CPU	Quad ARM Cortex-A53 up to 1.8GHz& Cortex M7 up to 800MHz
	GPU	GC7000UL with OpenCL and Vulkan support
	NPU	2.3 TOP/s Neural Network performance
	LPDDR4	4GB(1-4G Optional)
	EMMC FLASH	16GB (16-128G Optional)
Wireless Network	WiFi	2.4G/5G IEEE802.11 a/b/g/n/ac/ax
	Bluetooth	BT5.0
SMARC 2.1	Ethernet	2 x RGMII
	PCIe	1 x PCIe Gen3(single lane)
	USB2.0	*4
	USB 3.0	*2
	MIPI CSI	*2(1*4 lane and 1*2 lane)
	HDMI	*1(HDMI 2.0)
	LVDS	*2(LVDS0 multiplex with MIPI DSI)
	LVDS Backlight	*1
	I2S	*2
	MIPI DSI	*1(multiplex with LVDS0)
	GPIO	*12
	SDIO	*1
	UART	*4
	SPI	*2
	I2C	*4

	CAN	*2
	Vin	5V/3A
Dimensions	82 x 50 mm	

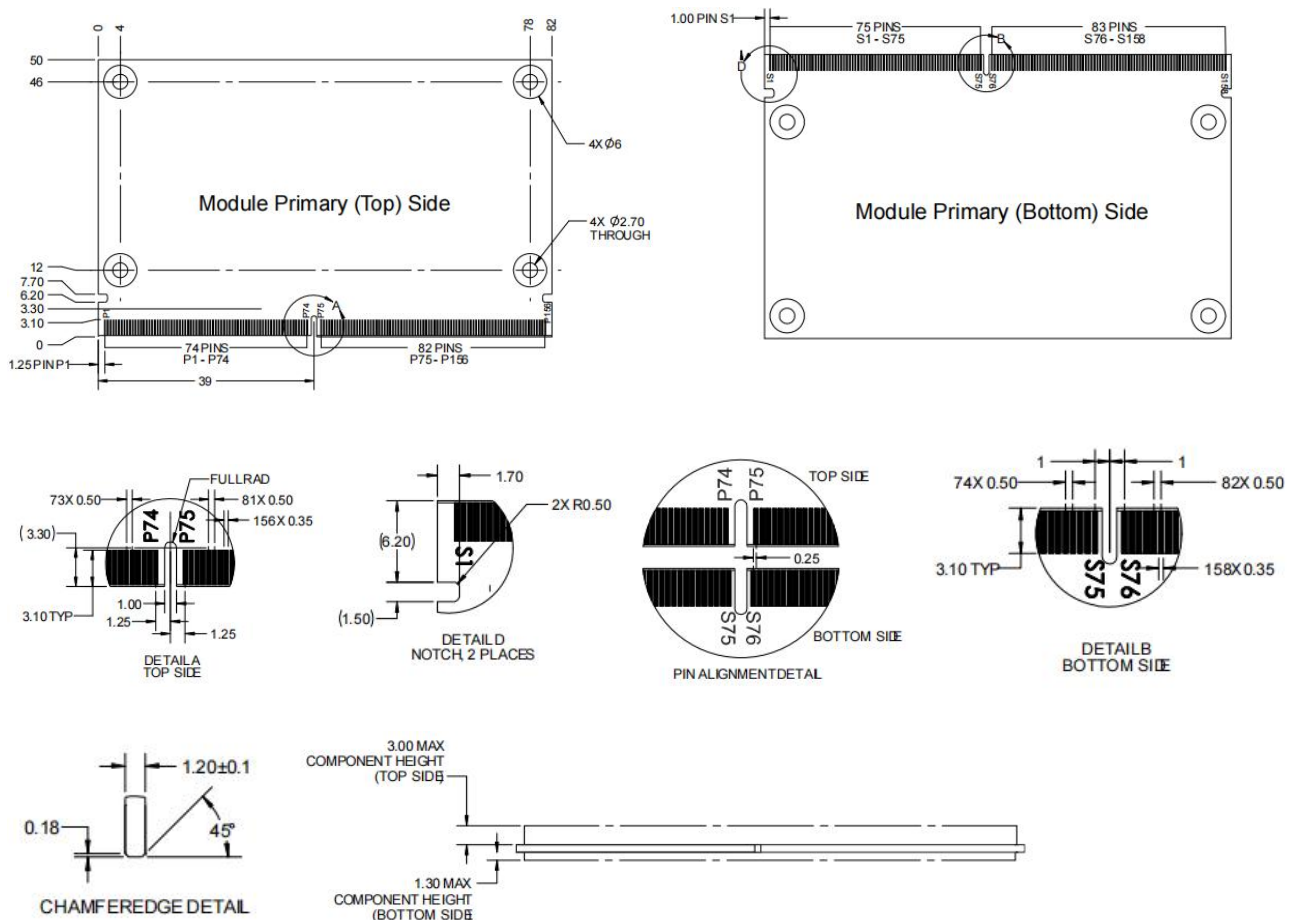
4. SOM Module Specs

4.1 SMARC2.1 specification

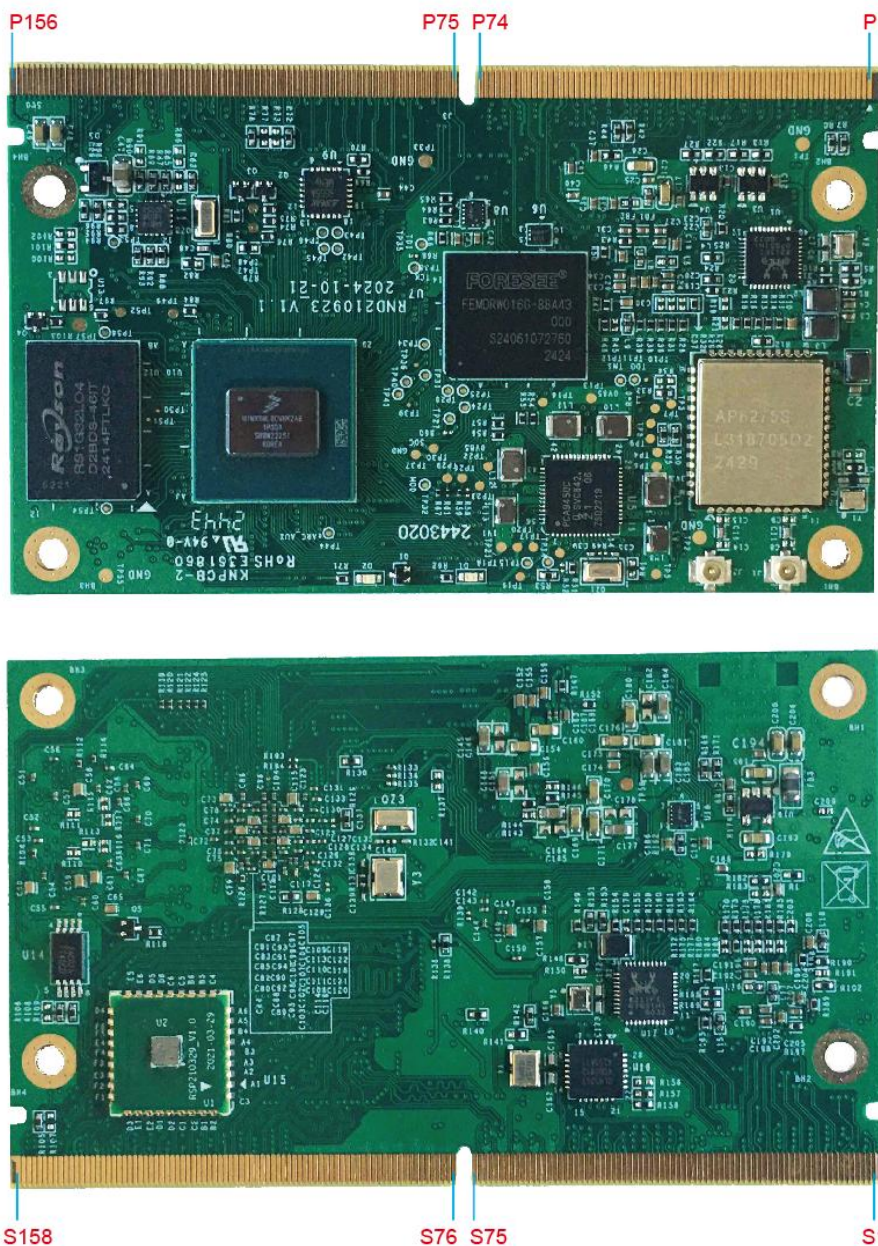
The SMARC (“Smart Mobility ARChitecture”) is a versatile small form factor computer Module definition targeting applications that require low power, low costs, and high performance. The Modules will typically use ARM SOCs similar or the same as those used in many familiar devices such as tablet computers and smart phones. Alternative low power SOCs and CPUs, such as tablet oriented x86 devices and other RISC CPUs may be used as well. The Module power envelope is typically under 6W although designs up to about 15W are possible.

Two Module sizes are defined: 82mm x 50mm and 82mm x 80mm. The Module PCBs have 314 edge fingers that mate with a low profile 314 pin 0.5mm pitch right angle connector (the connector is sometimes identified as a 321 pin connector, but 7 pins are lost to the key).

The Modules are used as building blocks for portable and stationary embedded systems. The core CPU and support circuits, including DRAM, boot flash, power sequencing, CPU power supplies, Gigabit Ethernet and dual channel LVDS display transmitter are concentrated on the Module. The Modules are used with application specific Carrier Boards that implement other features such as audio CODECs, touch controllers, wireless devices, etc. The modular approach allows scalability, fast time to market and upgradability while still maintaining low costs, low power and small physical size.



4.2 Interface definition



No.	Functional Description	No.	Functional Description	No.	Functional Description
P1	NC	P53	GND	P105	HDMI_DDC_SCL
P2	GND	P54	QSPIA_nSS0	P106	HDMI_DDC_SDA
P3	CSI2_CKP	P55	GPIO1_nSS1	P107	HDMI_CEC
P4	CSI2_CKN	P56	QSPIA_SCLK	P108	CAM1_PWDN
P5	ETH1_CLK125_OUT	P57	QSPIA_DATA0	P109	CAM2_PWDN
P6	ETH_CLK125_OUT	P58	QSPIA_DATA1	P110	CAM1_nRST
P7	CSI2_DP0	P59	GND	P111	CAM2_nRST
P8	CSI2_DN0	P60	USB1_HUB_DP	P112	C_GPIO4
P9	GND	P61	USB1_HUB_DN	P113	C_GPIO5

P10	CSI2_DP1	P62	USB0_OVCUR	P114	C_GPIO6
P11	CSI2_DN1	P63	NC	P115	C_GPIO7
P12	GND	P64	NC	P116	C_GPIO8
P13	CSI2_DP2	P65	USB2_HUB_DP	P117	C_GPIO9
P14	CSI2_DN2	P66	USB2_HUB_DN	P118	C_GPIO10
P15	GND	P67	USB2_OVCUR	P119	C_GPIO11
P16	CSI2_DP3	P68	GND	P120	GND
P17	CSI2_DN3	P69	USB2_MUX_DP	P121	I2C1_SCL
P18	GND	P70	USB2_MUX_DN	P122	I2C1_SDA
P19	GBE2_MDI3-	P71	NC	P123	BOOT_MODE0_SEL
P20	GBE2_MDI3+	P72	NC	P124	BOOT_MODE1_SEL
P21	GBE2_LINK100	P73	NC	P125	BOOT_MODE2_SEL
P22	GBE2_LINK1000	P74	NC	P126	RTC_RESET_B
P23	GBE2_MDI2-	P75	PCIE_nRST_3V3	P127	RESET_IN
P24	GBE2_MDI2+	P76	USB4_OVCUR	P128	POWER_BTN
P25	GBE2_LINK_ACT	P77	NC	P129	UART3_TXD
P26	GBE2_MDI1-	P78	PCIE_nCLKREQ_3V3	P130	UART3_RXD
P27	GBE2_MDI1+	P79	GND	P131	UART3_RTS
P28	NC	P80	NC	P132	UART3_CTS
P29	GBE2_MDI0-	P81	NC	P133	GND
P30	GBE2_MDI0+	P82	GND	P134	UART2_TXD
P31	NC	P83	PCIE_CLKP	P135	UART2_RXD
P32	GND	P84	PCIE_CLKN	P136	NC
P33	SD2_WP	P85	GND	P137	NC
P34	SD2_CMD	P86	PCIE_RXP	P138	NC
P35	SD2_nCD	P87	PCIE_RXN	P139	NC
P36	SD2_CLK	P88	GND	P140	UART4_TXD
P37	SD2_PWR_EN	P89	PCIE_TXP	P141	UART4_RXD
P38	GND	P90	PCIE_TXN	P142	GND
P39	SD2_DATA0	P91	GND	P143	CAN1_TX
P40	SD2_DATA1	P92	HDMI_TXP2	P144	CAN1_RX
P41	SD2_DATA2	P93	HDMI_TXN2	P145	CAN2_TX
P42	SD2_DATA3	P94	GND	P146	CAN2_RX
P43	ECSPi2_SS0	P95	HDMI_TXP1	P147	VSYS_5V
P44	ECSPi2_SCLK	P96	HDMI_TXN1	P148	VSYS_5V
P45	ECSPi2_MISO	P97	GND	P149	VSYS_5V
P46	ECSPi2_MOSI	P98	HDMI_TXP0	P150	VSYS_5V
P47	GND	P99	HDMI_TXN0	P151	VSYS_5V
P48	NC	P100	GND	P152	VSYS_5V
P49	NC	P101	HDMI_TXCP	P153	VSYS_5V
P50	GND	P102	HDMI_TXCN	P154	VSYS_5V
P51	NC	P103	GND	P155	VSYS_5V

P52	NC	P104	HDMI_HPD	P156	VSYS_5V
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No.	Functional Description	No.	Functional Description	No.	Functional Description
S1	I2C3_SCL	S54	NC	S107	LCD1_BL_EN
S2	I2C3_SDA	S55	USB3_OVCUR	S108	LVDS1_CLK_P
S3	GND	S56	QSPIA_DATA2	S109	LVDS1_CLK_N
S4	NC	S57	QSPIA_DATA3	S110	GND
S5	I2C5_SCL	S58	NC	S111	LVDS1_TX0_P
S6	CSI_MCLK	S59	USB3_HUB_DP	S112	LVDS1_TX0_N
S7	I2C5_SDA	S60	USB3_HUB_DN	S113	NC
S8	CSI1_CKP	S61	GND	S114	LVDS1_TX1_P
S9	CSI1_CKN	S62	USB1_TXP	S115	LVDS1_TX1_N
S10	GND	S63	USB1_TXN	S116	LCD1_VDD_EN
S11	CSI1_DPO	S64	GND	S117	LVDS1_TX2_P
S12	CSI1_DNO	S65	USB1_RXP	S118	LVDS1_TX2_N
S13	GND	S66	USB1_RXN	S119	GND
S14	CSI1_DP1	S67	GND	S120	LVDS1_TX3_P
S15	CSI1_DN1	S68	USB1_DP	S121	LVDS1_TX3_N
S16	GND	S69	USB1_DM	S122	LCD1_BL_PWM
S17	GBE1_MDIO+	S70	GND	S123	C_GPI013
S18	GBE1_MDIO-	S71	USB2_TXP	S124	GND
S19	GBE1_LINK100	S72	USB2_TXN	S125	LVDS0_MIP1_D0_P
S20	GBE1_MDI1+	S73	GND	S126	LVDS0_MIP1_D0_N
S21	GBE1_MDI1-	S74	USB2_RXP	S127	LCD0_BL_EN
S22	GBE1_LINK1000	S75	USB2_RXN	S128	LVDS0_MIP1_D1_P
S23	GBE1_MDI2+	S76	NC	S129	LVDS0_MIP1_D1_N
S24	GBE2_MDI2-	S77	NC	S130	GND
S25	GND	S78	NC	S131	LVDS0_MIP1_D2_P
S26	GBE1_MDI3+	S79	NC	S132	LVDS0_MIP1_D2_N
S27	GBE2_MDI3-	S80	GND	S133	LCD0_VDD_EN
S28	NC	S81	NC	S134	LVDS0_MIP1_CLK_P
S29	NC	S82	NC	S135	LVDS0_MIP1_CLK_N
S30	NC	S83	GND	S136	GND
S31	GBE1_LINK_ACT#	S84	NC	S137	LVDS0_MIP1_D3_P
S32	NC	S85	NC	S138	LVDS0_MIP1_D3_N
S33	NC	S86	GND	S139	I2C2_SCL
S34	GND	S87	NC	S140	I2C2_SDA
S35	USB4_HUB_DP	S88	NC	S141	LCD0_BL_PWM
S36	USB4_HUB_DM	S89	GND	S142	C_GPI012
S37	USB1_VBUS_3V3	S90	NC	S143	GND
S38	SAI3_MCLK	S91	NC	S144	SAI1_RXC
S39	SAI3_TXFS	S92	GND	S145	Wdt_time_out

S40	SAI3_TXD	S93	NC	S146	PCIe_Nwake__3V3
S41	SAI3_RXD	S94	NC	S147	VDD_RTC
S42	SAI3_TXC	S95	NC	S148	SAI3_RXC
S43	SAI1_RXFS	S96	NC	S149	SAI5_RXC
S44	NC	S97	NC	S150	NC
S45	NC	S98	NC	S151	NC
S46	NC	S99	NC	S152	NC
S47	GND	S100	NC	S153	SAI5_RXFS
S48	I2C3_SCL	S101	GND	S154	CARRIER_PWR_ON
S49	I2C3_SDA	S102	NC	S155	NC
S50	SAI2_TXFS	S103	NC	S156	NC
S51	SAI2_TXD	S104	NC	S157	BOOT_MODE3_SEL
S52	SAI2_RXD	S105	NC	S158	GND
S53	SAI2_TXC	S106	NC		

5. Multimedia

Video Decode

- 1080p60 HEVC/H.265 Main, Main 10 (up to level 5.1)
- 1080p60 VP9 Profile 0, 2
- 1080p60 VP8
- 1080p60 AVC/H.264 Baseline, Main, High decoder

Video Encode

- 1080p60 AVC/H.264 encoder
- 1080p60 HEVC/H.265 encoder

6. Display System

Graphic Processing Unit

- GC7000UL with OpenCL and Vulkan support
- 2 shaders
- 166 million triangles/sec
- 1.0 giga pixel/sec
- 16 GFLOPs 32-bit
- Supports OpenGL ES 1.1, 2.0, 3.0, OpenCL 1.2, Vulkan
- Core clock frequency of 1000 MHz
- Shader clock frequency of 1000 MHz
- GC520L for 2D acceleration
- Render target compatibility between 3D and 2D GPU (super tile status buffer)

HDMI 2.0a Tx

HDMI 2.0a Tx supporting one display

- Resolutions of: 720 x 480p60, 1280 x 720p60, 1920 x 1080p60, 1920 x 1080p120, 3840 x 2160p30
- Pixel clock up to 297 MHz

Audio support

- 32-channel audio output support
- 1 SPDIF audio eARC input support

LCDIF Display Controller

Support up to 1920x1200p60 display per LCDIF if no more than 2 instances used simultaneously, or 2x 1080p60 + 1x 4kp30 on HDMI if all 3 instances used simultaneously.

- One LCDIF drives MIPI DSI, up to UWHD and WUXGA
- One LCDIF drives LVDS Tx, up to 1920x1080p60
- One LCDIF drives HDMI Tx, up to 4kp3

MIPI Interface

Two instances of 4-lane MIPI CSI interface and HDR ISP

- For single Camera, MIPI CSI 1 can support up to 400/500 MHz pixel clock in the Nominal/Overdrive mode.
- For single Camera, MIPI CSI 2 can support up to 277 MHz pixel clock.
- For dual Camera, both MIPI CSI can support up to 266 MHz pixel clock.
- 2x ISP supporting 375 Mpixel/s aggregate performance and up to 3-exposure HDR processing.
- When one camera is used, support up to 12MP@30fps or 4kp45
- When two cameras are used, each supports up to 1080p80

4-lane MIPI DSI interface

- Maximum resolution limited to resolutions achievable with a 250 MHz pixel clock and active pixel rate of 200 Mpixel/s with 24-bit RGB. This includes resolutions such as:
- 1080 p60
- WUXGA (1920x1200) at 60 Hz
- 1920x1440 at 60 Hz
- UWHD (2560x1080) at 60 Hz
- MIPI DSI: WQHD (2560x1440) can be supported by reduced blanking mode

7. Product Ordering Information

Part No.	CPU	Memory	Flash Memory	Temperature
SOM-iMX8MP-A1.1-2GD32GE-S-C	i.MX 8M Mini	2GB	32GB	0~70℃
SOM-iMX8MP-A1.1-2GD32GE-S-I	i.MX 8M Mini	2GB	32GB	-40~85℃
SOM-iMX8MP-A1.1-4GD32GE-S-C	i.MX 8M Mini	4GB	32GB	0~70℃
SOM-iMX8MP-A1.1-4GD32GE-S-I	i.MX 8M Mini	4GB	32GB	-40~85℃

Note: SOM-iMX8MP-A1.1-4GD32GE-S-I is standard, for other models, please contact the relevant sales staff.

7.1 Model parameter description

SOM-iMX8MP-A1.1-4GD16GE-S-I

Hardware Type	Product Model	Hardware Version No.	RAM Size	ROM Size	Core Board Interface Type
SOM: Core Board DB: Development Board APC: ARM PC XPI: Raspberry Pi class GTW: Gateway ATV: Android Box	() ()	()	1GD: 1GByte DDR 2GD: 2GByte DDR 4GD: 4GByte DDR 8GD: 8GByte DDR 64MD: 64MByte DDR 128MD: 128MByte DDR	4GE: 4GByte eMMC 8GE: 8GByte eMMC 16GE: 16GByte eMMC 32GE: 32GByte eMMC 64GE: 64GByte eMMC 128GE: 128GByte eMMC 128MN: 128MByte Nand Flash 256MN: 256MByte Nand Flash 512MN: 512MByte Nand Flash	Temperature Grade C: Commercial grade (0~85℃) I: Industrial grade (-40~85℃) L: Little stamp hole B: B2B Connector O: OSM Package S: SMARC S1: SODIMM Q: Q-seven 96: 96Board

8. Precautions For Use

- Relative humidity: 5~95 % .
- Operation temperature: Commercial field: 0~ 85℃; Industrial field: -40~85℃
- Do not squeeze、 distort or disassemble the PC.
- Keep the Board away from static electricity .
- Keep the Board away from water and other liquid.
- Don't use long connect wires which may affect performance and image quality.

More Help

Sales E-mail: sales@geniatech.com

Technical E-mail: support@geniatech.com

Technical Hotline: (+86)0755-8602-8588

Official Website: www.geniatech.com

Official Mall: <https://shop.geniatech.com>