SMARC IQ-615 SOM Datasheet

Document History

Version	Date	Changes
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1. Introduction

Tessolve has developed a reliable Qualcomm® Dragonwing™ IQ-615 based System-on-Module (SoM) compliant with the SMARC® 2.2 (Smart Mobility Architecture) standard. The module is compatible with most SMARC® 2.1 and SMARC® 2.0 carrier boards, enabling easy integration and faster product development.

Designed for Industrial Edge AI, Robotics, Machine Vision, Gateways, HMI, and Industrial Controllers, the IQ615 SoM combines high performance, rich connectivity, low power consumption, and long product lifecycle support in a compact form factor.

2. Qualcomm® Dragonwing™ IQ-615 SoC

The Qualcomm® Dragonwing™ IQ-615 is an industrial-grade AI-enabled processor optimized for edge computing and intelligent vision applications. It integrates an Octa-Core Kryo™ 460 CPU, Adreno™ 612 GPU, Hexagon™ DSP, and Spectra™ ISP to deliver efficient AI, graphics, and multimedia performance.

The IQ-615 supports the Qualcomm® Linux® software stack and is backed by a product longevity program with 10+ years of lifecycle support, making it a dependable platform for long-term industrial deployments.

3. Product Overview (IQ615 SOM)

The IQ615 SOM is a compact SMARC® 2.2 compliant module based on the Qualcomm® Dragonwing™ IQ-615 processor. It integrates processing, graphics, AI acceleration, memory, storage, and high-speed I/O interfaces into a compact industrial-grade computing platform.

The module supports LPDDR4x memory, eMMC/UFS storage, PCIe, USB, Gigabit Ethernet, MIPI CSI, MIPI, DSI/LVDS, Display Port, UART, I²C, SPI, CAN, Wi-Fi, and Bluetooth interfaces to simplify carrier-board design and accelerate product development.

Variants:

1. LVDS
2. DSI



4. Key Features

- Qualcomm® Dragonwing™ IQ-615 SoC
- Octa-Core Qualcomm® Kryo™ 460 CPU up to 1.9 GHz
- Qualcomm® Adreno™ 612 GPU
- Qualcomm® Hexagon™ V66 DSP with AI acceleration
- 4 GB LPDDR4x standard, up to 8 GB supported memory
- eMMC and UFS storage options
- Support for up to 2 concurrent cameras
- Video decode up to 4K60
- Video encode up to 1080p60
- PCIe, USB 3.1, Ethernet, CAN, UART, SPI, I²C, GPIO interfaces
- Wi-Fi 6 and Bluetooth support
- Commercial temperature Compatible
- Qualcomm® Linux® support

5. Applications

- Industrial Automation
- Industrial Controllers
- Robotics
- Machine Vision
- AI Cameras
- Industrial Gateways
- Human Machine Interface (HMI)
- Edge AI Computing
- Autonomous Platforms
- Industrial PCs

6. IQ-615 SoC Specifications

Parameter	Description
Qualcomm® Artificial Intelligence	Integrated Qualcomm® AI Engine
AI Performance	Up to 1.1 TOPs
GPU Name	Qualcomm® Adreno™ 612
CPU Name	Octa-core Qualcomm Kryo 460 (2× Gold @ 1.9 GHz + 6× Silver @ 1.6 GHz)
CPU Number of Cores	8
Qualcomm® Hexagon™ Processor Name	Qualcomm® Hexagon™
CPU	
Name	Octa-core Qualcomm Kryo 460 (2× Gold @ 1.9 GHz + 6× Silver @ 1.6 GHz)
Architecture	64-bit
Clock Speed	Up to 1.9 GHz
Memory	

Density	Up to 8 GB
Bit Width	16-bit
Number of Channels	2
Speed	1555 MHz
Type	LPDDR4x
DSP	
Name	Qualcomm® Hexagon™ V66
Clock Speed	Up to 1.0 GHz
Audio	
Interface Type	I2S
Display	
Display Processing Unit (DPU) Name	Qualcomm® Adreno™ DPU
Number of Concurrent Displays	2
Maximum External Display Resolution	4K @ 60 Hz
Camera	
Inputs	Up to 2 Concurrent Cameras
Image Signal Processor (ISP) Name	Qualcomm® Spectra™ 230
Image Signal Processor (ISP) Type	Image Signal Processor (ISP)
Supported Image Formats	Bayer RGB, YUV, RCCB, Mono
PCIe	
Specification Version	1 Lane PCIe Gen 2
Universal Serial Bus (USB)	
Number of Interfaces	2
Specification Version	1 × USB 3.1 Gen1, 2 × USB 2.0
Ethernet	
Interface	1× Gigabit Ethernet Support (Via SMARC Connector)
Storage	
eMMC	1 × 8-bit eMMC 5.1
SD	1 × 4-bit SD 3.0
UFS	1-Lane UFS 2.1 Gear 3
Wireless Connectivity	
Bluetooth Specification Version	Bluetooth® 5.3
Wi-Fi Support	External Wi-Fi Module Support
Security	
Features	Secure boot, secure debug, TrustZone, Qualcomm® Trusted Execution Environment, hardware supported KeyStore, HDCP v1.4 and 2.2 for DisplayPort, secure I²C and secure SPI, AVB2.0
Video Processing	
Decode	Up to 4K60 (H.265, H.264, VP9)
Encode	Up to 1080p60 (H.265, H.264)
Power Management	
Low Power Modes	Supported
Software Options	
Operating System	Qualcomm® Linux®, Yocto Linux
Package	

Type	FCBGA
Pins	761
Size	23 × 23 × 2.45 mm
Pitch	0.8 mm
Temperature	
Junction Temperature Range	0°C to +105°C

7. SOM Specifications

Parameter	Description
Form Factor	SMARC® 2.2
Backward Compatibility	SMARC® 2.1 / 2.0
Module Dimensions	82 mm × 50 mm
Memory Options	4 GB LPDDR4x standard, up to 8 GB supported memory
Storage Options	eMMC / UFS
Ethernet	Gigabit Ethernet
Camera Interface	MIPI CSI-2
Display Interface	MIPI DSI or LVDS, DisplayPort 1.4
USB	USB 3.1, USB 2.0
PCIe	PCIe Gen2
UART	Supported
SPI	Supported
I²C	Supported
CAN	Supported
GPIO	Supported
Wireless Connectivity	Wi-Fi 6, Bluetooth 5.3
Operating Systems	Qualcomm Linux®, Yocto Linux
Operating Temperature	0^0C to +70^0C

8. Interfaces Overview

Feature	Sub Feature	SMARC Spec	IQ615 Module	Notes	I/O Voltages
Wireless Module	Wireless Module	May	Yes	Wi-Fi 6 + Bluetooth 5.3	1.8V
Size	82 × 50 mm	Shall	Yes	SMARC Short Size	-
	82 × 80 mm	May	Not Available		
LVDS LCD	LVDS0 18-bit Single Channel	Should	Yes		As per LVDS

	LVDS0 24-bit Single Channel (18-bit Compatible)	Should	Yes		standards
	LVDS0 24-bit Single Channel Standard Color Map	May	Yes		
	LVDS1 24-bit Single Channel	May	Not Available		
	LVDS0 Dual Channel 18-bit	May	Not Available		
	LVDS0 Dual Channel Standard Color Map	May	Not Available		
	eDP0 on LVDS0 (4 Diff Pairs)	May	Not Available		
	eDP1 on LVDS1 (4 Diff Pairs)	May	Not Available		
DSI	DSI0 2-Lane Implementation	May	Not Available		As per DSI standards (1.2V)
	DSI0 4-Lane Implementation	May	Available	Primary Display	
	DSI1 2-Lane Implementation	May	Not Available		
	DSI1 4-Lane Implementation	May	Not Available		
HDMI	HDMI Display Interface	Should	Not Available		-
DP on HDMI Pins	DP1	May	Not Available		-
DP++	DisplayPort++	May	Not Available		-
DisplayPort	DisplayPort 1.4	May	Available	Up to 4K@60Hz	As per Display Port 1.4 standards
CSI	CSI0 2-Lane	May	Available	MIPI CSI0	As per CSI standards (1.2V)
	CSI1 2-Lane	Should	Available	MIPI CSI1	
	CSI1 4-Lane	Should	Available	MIPI CSI1	
	CSI2 2-Lane	May	Not Available		
	CSI2 4-Lane	May	Not Available		
	CSI3 2-Lane	May	Not Available		
	CSI3 4-Lane	May	Not Available		

SDIO	SDIO (4-bit for SD Cards)	Should	Available		As per SDIO standards
SPI	SPI0	Should	Available		1.8V
	SPI1	Should	Available		
	QuadSPI	Should	Available		
	eSPI	Should	Not Available		
Audio	I2S0	Should	Available		-
	HDA or I2S2	Should	Available	I2S2	
I²C	Power Management	Shall	Available		1.8V
	General Purpose	Shall	Available		
	Camera0	Should	Available		
	Camera1	Should	Available		
	Camera2	Should	Available		
	Camera3	Should	Available		
	LCD Display I/D	Should	Available		
	HDMI	Should	Not Available		
Serial Ports	SER0 (4 Wire)	Shall	Available	4-Wire UART	1.8V
	SER1 (2 Wire)	Shall	Available	2-Wire UART	
	SER2 (4 Wire)	Should	Available	4-Wire UART	
	SER3 (2 Wire)	Should	Available	2-Wire UART	
CAN Bus	CAN0	May	Available	Native CAN	1.8V
	CAN1	May	Available	Native CAN	
USB	USB0 (2.0 OTG)	Shall	Available	Recovery Mode Support	As per USB standards
	USB1 (2.0 Host)	Should	Available		
	USB2 (2.0)	May	Available		
	USB2 SuperSpeed	Should	Available	USB 3.1 Gen1	
	USB3 (2.0)	May	Available		
	USB3 SuperSpeed	May	Available	USB 3.1 Gen1	
	USB4 (2.0)	May	Available		
	USB5 (2.0)	May	Not Available		
PCIe	PCIe_A (x1 Gen1 Root)	Should	Available	PCIe Gen2 x1	-

	PCIe_B (x1 Gen1 Root)	May	Not Available		
	PCIe_C (x1 Gen1 Root)	May	Not Available		
	PCIe_D (x1 Gen1 Root)	May	Not Available		
	PCIe Gen1 Operation	Should	Available		
	PCIe Gen2 Operation	May	Available	Maximum Supported	
	PCIe Gen3 Operation	May	Not Available		
SERDES	Alternative use of PCIE_C and/or PCIE_D	May	Not Available		-
SATA	SATA Gen1	Should	Not Available		-
	SATA Gen2 Operation	May	Not Available		
	SATA Gen3 Operation	May	Not Available		
GBE	GBE0	Should	Available	Gigabit Ethernet	As per ethernet standards
	GBE1	May	Not Available		
	IEEE1588 Triggers (GBE[0:1]_SDP)	May	Not Available		
Watchdog	WDT Out	Should	Available		-
GPIO	GPIO[0:11]	Shall	Available		1.8V
	GPIO[12:13]	Should	Available		
	GPIO[0:11] Interrupt Capability	Shall	Available		
	GPIO[12:13] Interrupt Capability	Should	Available		
	GPIO Camera Support	Shall	Available		
	GPIO5 PWM Capability	Should	Available		
	GPIO6 Tachin Capability	Should	Not Available		
Management	System and Power Management Features	Shall	Available	SMARC 2.2 Compliant	-
	BATLOW#	Shall	Available		1.8V
	CARRIER_PWR_ON	Shall	Available		3.3V
	CARRIER_STBY#	Should	Available		1.8V

	CHARGER_PRSNT#	Should	Available		1.8V
	CHARGING#	Should	Available		1.8V
	VIN_PWR_BAD#	Should	Available		5V
	SLEEP#	Should	Available		1.8V
	LID#	Should	Available		1.8V
	POWER_BTN#	Should	Available		1.8V
	RESET_OUT#	Should	Available		1.8V
	RESET_IN#	Should	Available		1.8V
	SMB_ALERT#	Should	Not Available		-
	TEST#	Should	Available		-
Boot Select	BOOT_SEL0# / BOOT_SEL1# / BOOT_SEL2#	Shall	Available		1.8V
Force Recovery	FORCE_RECOV#	Shall	Available	Qualcomm Recovery Mode	1.8V
JTAG	JTAG Connector on Module	May	Available	Header Available on SOM	1.8V
RTC	VDD_RTC	Should	Available	RTC with Backup Support	3.3V
AI Features	Qualcomm® AI Engine	N/A	Available	Up to 1 TOPS	-
	Qualcomm® Hexagon™ V66 DSP	N/A	Available	AI Acceleration	
	Qualcomm® Spectra™ 230 ISP	N/A	Available	Vision Processing	
	Concurrent Cameras	N/A	Up to 6	Supported by IQ615	
Security	Qualcomm® TrustZone®	N/A	Available		-
	Secure Boot	N/A	Available		
	Cryptographic Accelerator	N/A	Available		
Storage	eMMC 5.1	N/A	Available		-
	UFS 2.1 Gear 3	N/A	Available		
Software	Qualcomm® Linux®	N/A	Available		-
	Yocto Linux	N/A	Available		
Physical	Operating Temperature	N/A	0°C to +70°C	Industrial Grade	-

	Memory Capacity	N/A	4 GB LPDDR4 x standard, up to 8GB LPDDR4 x		
	AI Performance	N/A	Up to 1 TOPS		
	Display Support	N/A	Up to 3 Displays		
	Maximum Display Resolution	N/A	4K @ 60Hz		

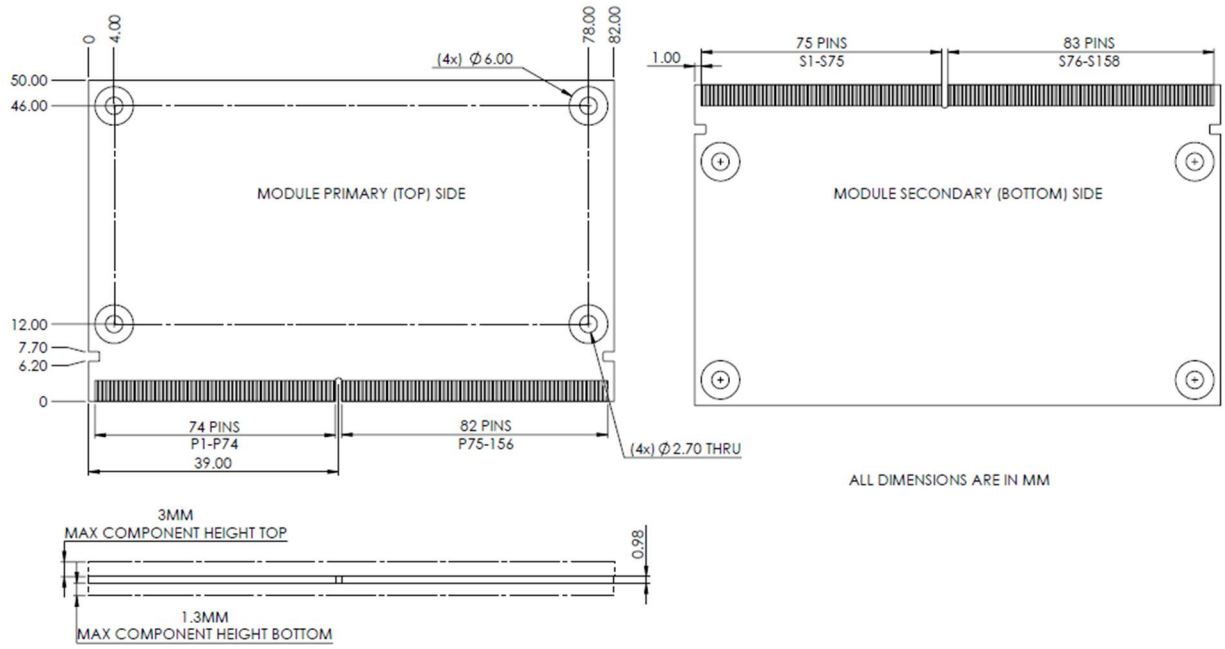
9. Reference Documents

SMARC Specification

IQ-615 SMARC SoM design follows SMARAC 2.2 specification

- **SMARC Hardware Specification 2.2**
- **SMARC Design Guide 2.2**

10. Mechanical Specifications



11. High-Speed Connectivity

Interface	Specification
PCIe	1 × PCIe 2.0
USB	1 × USB 3.1 Gen1, 1 × USB 2.0
Ethernet	1×Ethernet
DisplayPort	DP 1.4
Camera	MIPI CSI
Display	MIPI DSI

12. Recommended Operating Conditions

Parameter	Min	Typical	Max
Input Voltage	4.75 V	5 V	5.25 V
Operating Temperature	0°C	25°C	+70°C
Relative Humidity	5%	50%	95%
Storage Temperature	0°C	-	+70°C

13. Absolute Maximum Ratings

Parameter	Rating
Junction Temperature	+105°C
Storage Temperature	0°C to +70°C
Relative Humidity	95% non-condensing
ESD Rating	TBD
Input Voltage	TBD

14. Thermal Specifications

Parameter	Specification
Operating Temperature	0°C to +70°C
Junction Temperature	Up to +105°C
Storage Temperature	0°C to +70°C

15. Carrier Board Design Guidelines

High-Speed Routing	• PCIe Differential Impedance: 85 Ω • USB Differential Impedance: 90 Ω • MIPI CSI/DSI Differential Impedance: 100 Ω • Match differential pair lengths. • Minimize via transitions.
Power Design	• Follow PMIC sequencing requirements. • Use dedicated power and ground planes. • Provide adequate decoupling

Thermal Design	• Use thermal vias below processor area. • Heatsink recommended sustained AI workloads. • Ensure proper airflow.

16. Software Support

Component	Support
Qualcomm® Linux®	Yes
Yocto Linux	Yes
BSP Package	Yes
SDK Support	Yes
AI Framework Support	Yes

17. Pin Assignments

MXM 3 Pin	SMARC Signal	SoC Signal	Note	Signal Type	Voltage
P1	SMB_ALERT#	NC		-	-
P2	GND	GND		Power	0
P3	CSI1_CK+	MIPI_CSI1_CLK_P		Input	100–300 mV
P4	CSI1_CK-	MIPI_CSI1_CLK_N		Input	100–300 mV
P5	GBE1_SDP	NC		-	-
P6	GBE0_SDP	NC		-	-
P7	CSI1_RX0+	MIPI_CSI1_LANE0_P		Input	100–300 mV
P8	CSI1_RX0-	MIPI_CSI1_LANE0_N		Input	100–300 mV
P9	GND	GND		Power	0
P10	CSI1_RX1+	MIPI_CSI1_LANE1_P		Input	100–300 mV
P11	CSI1_RX1-	MIPI_CSI1_LANE1_N		Input	100–300 mV
P12	GND	GND		Power	0
P13	CSI1_RX2+	MIPI_CSI1_LANE2_P		Input	100–300 mV
P14	CSI1_RX2-	MIPI_CSI1_LANE2_N		Input	100–300 mV
P15	GND	GND		Power	0

P16	CSI1_RX3+	MIPI_CSI1_LANE3_P		Input	100–300 mV
P17	CSI1_RX3-	MIPI_CSI1_LANE3_N		Input	100–300 mV
P18	GND	GND		Power	0
P19	GBE0_MDI3-	GIGE_CH1_TXRX3_N	From Eth Phy KSZ9031RNXIA	Bidirectional	1.8/3.3V
P20	GBE0_MDI3+	GIGE_CH1_TXRX3_P	From Eth Phy KSZ9031RNXIA	Bidirectional	1.8/3.3V
P21	GBE0_LINK_MID#	NC		-	-
P22	GBE0_LINK_MAX#	GIGE_CH1_LED_LINK1000_N	From Eth Phy KSZ9031RNXIA	Input	3.3V
P23	GBE0_MDI2-	GIGE_CH1_TXRX2_N	From Eth Phy KSZ9031RNXIA	Bidirectional	1.8/3.3V
P24	GBE0_MDI2+	GIGE_CH1_TXRX2_P	From Eth Phy KSZ9031RNXIA	Bidirectional	1.8/3.3V
P25	GBE0_LINK_ACT#	GIGE_CH1_LED_ACT_N	From Eth Phy KSZ9031RNXIA	Input	3.3V
P26	GBE0_MDI1-	GIGE_CH1_TXRX1_N	From Eth Phy KSZ9031RNXIA	Bidirectional	1.8/3.3V
P27	GBE0_MDI1+	GIGE_CH1_TXRX1_P	From Eth Phy KSZ9031RNXIA	Bidirectional	1.8/3.3V
P28	GBE0_CTREF	NC		-	-
P29	GBE0_MDI0-	GIGE_CH1_TXRX0_N	From Eth Phy KSZ9031RNXIA	Bidirectional	1.8/3.3V
P30	GBE0_MDI0+	GIGE_CH1_TXRX0_P	From Eth Phy KSZ9031RNXIA	Bidirectional	1.8/3.3V
P31	SPI0_CS1#	NC		-	-
P32	GND	GND		Power	0

P33	SDIO_WP	SOC_GPIO_24_SDIO_WP		Output	1.8V
P34	SDIO_CMD	SDC2_uSD_CMD		Output	2.96V
P35	SDIO_CD#	SDC_DET_S4A_1P8_N		Input	1.8V
P36	SDIO_CK	SDC2_uSD_CLK		Output	2.96V
P37	SDIO_PWR_EN	SDIO_PWR_EN_3P3		Output	3.3V
P38	GND	GND		Power	0
P39	SDIO_D0	SDC2_uSD_DATA_0		Bidirectional	2.96V
P40	SDIO_D1	SDC2_uSD_DATA_1		Bidirectional	2.96V
P41	SDIO_D2	SDC2_uSD_DATA_2		Bidirectional	2.96V
P42	SDIO_D3	SDC2_uSD_DATA_3		Bidirectional	2.96V
P43	SPI0_CS0#	SOC_GPIO_23_SPI_CS#		Input	1.8V
P44	SPI0_CK	SOC_GPIO_22_SPI_CLK		Input	1.8V
P45	SPI0_DIN	SOC_GPIO_20_SPI_MISO		Output	1.8V
P46	SPI0_DO	SOC_GPIO_21_SPI_MOSI		Input	1.8V
P47	GND	GND		Power	0
P48	SATA_TX+	NC		-	-
P49	SATA_TX-	NC		-	-
P50	GND	GND		Power	0
P51	SATA_RX+	NC		-	-
P52	SATA_RX-	NC		-	-
P53	GND	GND		Power	0

P54	SPI1_CS0# / ESPI_CS0# / QSPI_CS0#	SOC_SSC_CS0#_S4A_1P8		Output	1.8V
P55	SPI1_CS1# / ESPI_CS1# / QSPI_CS1#	SOC_SSC_CS1#_S4A_1P8		Output	1.8V
P56	SPI1_CK / ESPI_CK / QSPI_CK	SOC_SSC_SCLK_S4A_1P8		Output	1.8V
P57	SPI1_DIN / ESPI_IO_1 / QSPI_IO_1	SOC_SSC_MISO_S4A_1P8		Output	1.8V
P58	SPI1_DO / ESPI_IO_0 / QSPI_IO_0	SOC_SSC_MOSI_S4A_1P8		Input	1.8V
P59	GND	GND		Power	0
P60	USB0+	PORT0_USB0_HS_DP		Bidirectional	±400mV
P61	USB0-	PORT0_USB0_HS_DM		Bidirectional	±400mV
P62	USB0_EN_OC#	USB0_PORT_EN_OC#		Output	3.3V
P63	USB0_VBUS_DET	USB0_VBUS_DETECT		Input	5V
P64	USB0_OTG_ID	USB0_OTG_ID		Input	3.3V
P65	USB1+	NC		-	-
P66	USB1-	NC		-	-
P67	USB1_EN_OC#	NC		-	-
P68	GND	GND		Power	0
P69	USB2+	PORT2_USB0_HS_DP		Bidirectional	±400mV

P70	USB2-	PORT2_USB0_HS_DM		Bidirectional	±400mV
P71	USB2_EN_OC#	USB2_PORT_EN_OC#		Output	3.3V
P72	RSVD	NC		-	-
P73	RSVD	NC		-	-
P74	USB3_EN_OC#	USB3_PORT_EN_OC#		Output	3.3V
key					
P75	PCIE_A_RST#	PCIE_A_RST#		Input	3.3V
P76	USB4_EN_OC#	NC		-	-
P77	PCIE_B_CKREQ#	NC		-	-
P78	PCIE_A_CKREQ#	PCIE_A_CLK_REQ#		Bidirectional	3.3V
P79	GND	GND		Power	0
P80	PCIE_C_REFCK+	NC		-	-
P81	PCIE_C_REFCK-	NC		-	-
P82	GND	GND		Power	0
P83	PCIE_A_REFCK+	QCS_PCIE_REFCLK_P		Output	±800mV
P84	PCIE_A_REFCK-	QCS_PCIE_REFCLK_M		Output	±800mV
P85	GND	GND		Power	0
P86	PCIE_A_RX+	QCS_PCIE_RX_P		Input	±1.2V
P87	PCIE_A_RX-	QCS_PCIE_RX_M		Input	±1.2V
P88	GND	GND		Power	0
P89	PCIE_A_TX+	QCS_PCIE_TX_P		Output	±1.2V
P90	PCIE_A_TX-	QCS_PCIE_TX_M		Output	±1.2V
P91	GND	GND		Power	0

P92	HDMI_D2+ / DP1_LANE0+	NC		-	-
P93	HDMI_D2- / DP1_LANE0-	NC		-	-
P94	GND	GND		Power	0
P95	HDMI_D1+ / DP1_LANE1+	NC		-	-
P96	HDMI_D1- / DP1_LANE1-	NC		-	-
P97	GND	GND		Power	0
P98	HDMI_D0+ / DP1_LANE2+	NC		-	-
P99	HDMI_D0- / DP1_LANE2-	GND		Power	0
P100	GND	GND		Power	0
P101	HDMI_CK+ / DP1_LANE3+	NC		-	-
P102	HDMI_CK- / DP1_LANE3-	NC		-	-
P103	GND	GND		Power	0
P104	HDMI_HPD / DP1_HPD	NC		-	-
P105	HDMI_CTRL_CK / DP1_AUX+	NC		-	-
P106	HDMI_CTRL_DAT / DP1_AUX-	NC		-	-
P107	DP1_AUX_SEL	NC		-	-

P108	GPIO0 / CAM0_PWR#	CCI0_PWR_EN_S4A_1P8		Output	1.8V
P109	GPIO1 / CAM1_PWR#	CCI1_PWR_EN_S4A_1P8		Output	1.8V
P110	GPIO2 / CAM0_RST#	SOC_GPIO_74_CAM0_RST#		Output	1.8V
P111	GPIO3 / CAM1_RST#	SOC_GPIO_75_CAM1_RST#		Output	1.8V
P112	GPIO4 / HDA_RST#	SOC_GPIO_67_S4A_1P8		Output	1.8V
P113	GPIO5 / PWM_OUT	SOC_GPIO_69_S4A_1P8		Output	1.8V
P114	GPIO6 / TACHIN	SOC_GPIO_41_CAM_CTRL		Output	1.8V
P115	GPIO7	SOC_GPIO_31_S4A_1P8		Bidirectional	1.8V
P116	GPIO8	SOC_GPIO_84_S4A_1P8		Bidirectional	1.8V
P117	GPIO9	SOC_GPIO_85_S4A_1P8		Bidirectional	1.8V
P118	GPIO10	SOC_GPIO_91_S4A_1P8		Bidirectional	1.8V
P119	GPIO11	PMM6155AU_GPIO_02_VOL+		Output	1.8V
P120	GND	GND		Power	0
P121	I2C_PM_CK	SOC_SENSOR_I2C_SCL_S4A_1P8		Output	1.8V
P122	I2C_PM_DAT	SOC_SENSOR_I2C_SDA_S4A_1P8		Bidirectional	1.8V

P123	BOOT_SEL0#	SOC_GPIO_88_S4A_1P8		Bidirectional	1.8V
P124	BOOT_SEL1#	SOC_GPIO_27_S4A_1P8		Bidirectional	1.8V
P125	BOOT_SEL2#	SOC_GPIO_120_S4A_1P8		Bidirectional	1.8V
P126	RESET_OUT#	SOC_RESOUT_BUF_S4A_1P8_N		Output	1.8V
P127	RESET_IN#	PMM_RES_IN_VIO_OUT_1P8		Input	1.8V
P128	POWER_BTN#	KPDPWR_BTN#		Input	1.8V
P129	SER0_TX	SOC_DBG_UART_TX_S4A_1P8		Input	1.8V
P130	SER0_RX	SOC_DBG_UART_RX_S4A_1P8		Output	1.8V
P131	SER0_RTS#	NC		-	-
P132	SER0_CTS#	NC		-	-
P133	GND	GND		Power	0
P134	SER1_TX	SSC_QUP3_UART_TX		Input	1.8V
P135	SER1_RX	SSC_QUP3_UART_RX		Output	1.8V
P136	SER2_TX	SSC_QUP5_UART_TX		Input	1.8V
P137	SER2_RX	SSC_QUP5_UART_RX		Output	1.8V
P138	SER2_RTS#	SSC_QUP5_UART_RTS		Output	1.8V
P139	SER2_CTS#	SSC_QUP5_UART_CTS		Input	1.8V
P140	SER3_TX	SMARC_SER3_UART_TX		Input	1.8V
P141	SER3_RX	SMARC_SER3_UART_RX		Output	1.8V
P142	GND	GND		Power	0

P143	CAN0_TX	CAN0_TXD	From SPI to CAN Converter MCP2515	Input	1.8V
P144	CAN0_RX	CAN0_RXD	From SPI to CAN Converter MCP2515	Output	1.8V
P145	CAN1_TX	NC		-	-
P146	CAN1_RX	NC		-	-
P147	VDD_IN	VDD_IN		Power	5V
P148	VDD_IN	VDD_IN		Power	5V
P149	VDD_IN	VDD_IN		Power	5V
P150	VDD_IN	VDD_IN		Power	5V
P151	VDD_IN	VDD_IN		Power	5V
P152	VDD_IN	VDD_IN		Power	5V
P153	VDD_IN	VDD_IN		Power	5V
P154	VDD_IN	VDD_IN		Power	5V
P155	VDD_IN	VDD_IN		Power	5V
P156	VDD_IN	VDD_IN		Power	5V
S1	CSI1_TX+ / I2C_CAM1_CK	CCI1_SCL_S4A_1P8		Output	1.8V
S2	CSI1_TX- / I2C_CAM1_DAT	CCI1_SDA_S4A_1P8		Bidirectional	1.8V
S3	GND	GND		Power	0
S4	RSVD	NC		-	-
S5	I2C_CAM0_CK / CSI0_TX+	CCI0_SCL_S4A_1P8		Output	1.8V
S6	CAM_MCK	CAM_MCLK		Input	1.8V

S7	I2C_CAM0_DAT / CSI0_TX-	CCI0_SDA_S4A_1P8		Input	1.8V
S8	CSI0_CK+	MIPI_CSI0_CLK_P		Input	100–300 mV
S9	CSI0_CK-	MIPI_CSI0_CLK_N		Input	100–300 mV
S10	GND	GND		power	0
S11	CSI0_RX0+	MIPI_CSI0_LANE0_P		Input	100–300 mV
S12	CSI0_RX0-	MIPI_CSI0_LANE0_N		Input	100–300 mV
S13	GND	GND		power	0
S14	CSI0_RX1+	MIPI_CSI0_LANE1_P		Input	100–300 mV
S15	CSI0_RX1-	MIPI_CSI0_LANE1_N		Input	100–300 mV
S16	GND	GND		Power	0
S17	GBE1_MDI0+	NC		-	-
S18	GBE1_MDI0-	NC		-	-
S19	GBE1_LINK_MID #	NC		-	-
S20	GBE1_MDI1+	NC		-	-
S21	GBE1_MDI1-	NC		-	-
S22	GBE1_LINK_MAX #	NC		-	-
S23	GBE1_MDI2+	NC		-	-
S24	GBE1_MDI2-	NC		-	-
S25	GND	GND		Power	0
S26	GBE1_MDI3+	NC		-	-
S27	GBE1_MDI3-	NC		-	-
S28	GBE1_CTREF	NC		-	-

S29	PCIE_D_TX+ / SERDES_0_TX+	NC		-	-
S30	PCIE_D_TX- / SERDES_0_TX-	NC		-	-
S31	GBE1_LINK_ACT#	NC		-	-
S32	PCIE_D_RX+ / SERDES_0_RX+	NC		-	-
S33	PCIE_D_RX- / SERDES_0_RX-	NC		-	-
S34	GND	GND		Power	0
S35	USB4+	NC		-	-
S36	USB4-	NC		-	-
S37	USB3_VBUS_DET	USB3_VBUS_DETECT		Input	5V
S38	AUDIO_MCK	SOC_GPIO_122_MI2S_MCLK		Input	1.8V
S39	I2S0_LRCK	SOC_GPIO_109_MI2S_WS		Input	1.8V
S40	I2S0_SDOUT	SOC_GPIO_111_MI2S_DATA1		Bidirectional	1.8V
S41	I2S0_SDIN	SOC_GPIO_110_MI2S_DATA0		Bidirectional	1.8V
S42	I2S0_CK	SOC_GPIO_108_MI2S_SCK		Input	1.8V
S43	ESPI_ALERT0#	NC		-	-
S44	ESPI_ALERT1#	NC		-	-
S45	MDIO_CLK	RGMII_MDC		Output	1.8V
S46	MDIO_DAT	RGMII_MDIO		Bidirectional	1.8V

S47	GND	GND		Power	0
S48	I2C_GP_CK	SOC_AUX_SCL_S4A_1P8		Output	1.8V
S49	I2C_GP_DAT	SOC_AUX_SDA_S4A_1P8		Bidirectional	1.8V
S50	I2S2_LRCK / HDA_SYNC / **SNDW_CLK1**	SSC_MI2S_WS_S4A_1P8		Output	1.8V
S51	I2S2_SDOUT / HDA_SDO / **SNDW_DAT1**	SSC_MI2S_DOUT_S4A_1P8		Input	1.8V
S52	I2S2_SDIN / HDA_SDI / **SNDW_DAT0**	SSC_MI2S_DIN_S4A_1P8		Output	1.8V
S53	I2S2_CK / HDA_CK / **SNDW_CLK0**	SSC_MI2S_SCK_S4A_1P8		Output	1.8V
S54	SATA_ACT#	NC		-	-
S55	USB5_EN_OC#	NC		-	-
S56	ESPI_IO_2 / QSPI_IO_2	NC		-	-
S57	ESPI_IO_3 / QSPI_IO_3	NC		-	-
S58	ESPI_RESET#	NC		-	-
S59	USB5+	NC		-	-
S60	USB5-	NC		-	-
S61	GND	GND		Power	0
S62	USB3_SSTX+	NC		-	-
S63	USB3_SSTX-	NC		-	-

S64	GND	GND		Power	0
S65	USB3_SSRX+	NC		-	-
S66	USB3_SSRX-	NC		-	-
S67	GND	GND		Power	0
S68	USB3+	USB1_HS_DP		Bidirectional	±400mV
S69	USB3-	USB1_HS_DM		Bidirectional	±400mV
S70	GND	GND		Power	0
S71	USB2_SSTX+	USB0_SS_TX0_P		Bidirectional	±1.2V
S72	USB2_SSTX-	USB0_SS_TX0_M		Bidirectional	±1.2V
S73	GND	GND		Power	0
S74	USB2_SSRX+	USB0_SS_RX0_P		Bidirectional	±1.2V
S75	USB2_SSRX-	USB0_SS_RX0_M		Bidirectional	±1.2V
S76	PCIE_B_RST#	NC		-	-
key					
S77	PCIE_C_RST#	NC		-	-
S78	PCIE_C_RX+ / SERDES_1_RX+	NC		-	-
S79	PCIE_C_RX- / SERDES_1_RX-	NC		-	-
S80	GND	GND		Power	0

S81	PCIE_C_TX+ / SERDES_1_TX+	NC		-	-
S82	PCIE_C_TX- / SERDES_1_TX-	NC		-	-
S83	GND	GND		Power	0
S84	PCIE_B_REFCK+	NC		-	-
S85	PCIE_B_REFCK-	NC		-	-
S86	GND	GND		Power	0
S87	PCIE_B_RX+	NC		-	-
S88	PCIE_B_RX-	NC		-	-
S89	GND	GND		Power	0
S90	PCIE_B_TX+	NC		-	-
S91	PCIE_B_TX-	NC		-	-
S92	GND	GND		Power	0
S93	DP0_LANE0+	DP_LANE0_P		Bidirection	±1.2V
S94	DP0_LANE0-	DP_LANE0_M		Bidirection	±1.2V
S95	DP0_AUX_SEL	SMARC_DP_AUX_SEL		Output	1.8V
S96	DP0_LANE1+	DP_LANE1_P		Bidirection	±1.2V
S97	DP0_LANE1-	DP_LANE1_M		Bidirection	±1.2V
S98	DP0_HPD	DP_HOT_PLUG_DETECT		Input	1.8V
S99	DP0_LANE2+	DP_LANE2_P		Bidirection	±1.2V

S100	DP0_LANE2-	DP_LANE2_M		Bidirection	±1.2V
S101	GND	GND		Power	0
S102	DP0_LANE3+	DP_LANE3_P		Bidirection	±1.2V
S103	DP0_LANE3-	DP_LANE3_M		Bidirection	±1.2V
S104	USB3_OTG_ID	USB3_OTG_ID		Bidirectional	3.3V
S105	DP0_AUX+	DP_AUX_P		Bidirection	±1.2V
S106	DP0_AUX-	DP_AUX_M		Bidirection	±1.2V
S107	LCD1_BKLT_EN	LVDS_B_BKLT_EN		Output	1.8V
S108	LVDS1_CK+ / eDP1_AUX+ / DSI1_CLK+	LVDS_B_CLK_P	From DSI to LVDS converter SN65DSI84ZXHR	Output	±600mV
S109	LVDS1_CK- / eDP1_AUX- / DSI1_CLK-	LVDS_B_CLK_N	From DSI to LVDS converter SN65DSI84ZXHR	Output	±600mV
S110	GND	GND		Power	0
S111	LVDS1_0+ / eDP1_TX0+ / DSI1_D0+	LVDS_B_LANE0_P	From DSI to LVDS converter SN65DSI84ZXHR	Output	±600mV
S112	LVDS1_0- / eDP1_TX0- / DSI1_D0-	LVDS_B_LANE0_N	From DSI to LVDS converter SN65DSI84ZXHR	Output	±600mV

S113	eDP1_HPD / DSI1_TE	LVDS_B_HOT_PLUG_DET		Output	1.8V
S114	LVDS1_1+ / eDP1_TX1+ / DSI1_D1+	LVDS_B_LANE1_P	From DSI to LVDS converter SN65DSI84ZXHR	Output	±600mV
S115	LVDS1_1- / eDP1_TX1- / DSI1_D1-	LVDS_B_LANE1_N	From DSI to LVDS converter SN65DSI84ZXHR	Output	±600mV
S116	LCD1_VDD_EN	LCD1_VDD_EN	From DSI to LVDS converter SN65DSI84ZXHR	Output	1.8V
S117	LVDS1_2+ / eDP1_TX2+ / DSI1_D2+	LVDS_B_LANE2_P	From DSI to LVDS converter SN65DSI84ZXHR	Output	±600mV
S118	LVDS1_2- / eDP1_TX2- / DSI1_D2-	LVDS_B_LANE2_N	From DSI to LVDS converter SN65DSI84ZXHR	Output	±600mV
S119	GND	GND		Power	0
S120	LVDS1_3+ / eDP1_TX3+ / DSI1_D3+	LVDS_B_LANE3_P	From DSI to LVDS converter SN65DSI84ZXHR	Output	±600mV
S121	LVDS1_3- / eDP1_TX3- / DSI1_D3-	LVDS_B_LANE3_N	From DSI to LVDS converter SN65DSI84ZXHR	Output	±600mV

S122	LCD1_BKLT_PWM	LCD1_BKLT_PWM		Input	1.8V
S123	GPIO13	SOC_GPIO_26_S4A_1P8		Output	1.8V
S124	GND	GND		Power	0
S125	LVDS0_0+ / eDP0_TX0+ / DSI0_D0+	LVDS_A_LANE0_P	From DSI to LVDS converter SN65DSI84ZXHR	Output	±600mV
S126	LVDS0_0- / eDP0_TX0- / DSI0_D0-	LVDS_A_LANE0_N	From DSI to LVDS converter SN65DSI84ZXHR	Output	±600mV
S127	LCD0_BKLT_EN	LVDS_A_BKLT_EN		Input	1.8V
S128	LVDS0_1+ / eDP0_TX1+ / DSI0_D1+	LVDS_A_LANE1_P	From DSI to LVDS converter SN65DSI84ZXHR	Output	±600mV
S129	LVDS0_1- / eDP0_TX1- / DSI0_D1-	LVDS_A_LANE1_N	From DSI to LVDS converter SN65DSI84ZXHR	Output	±600mV
S130	GND	GND		Power	0
S131	LVDS0_2+ / eDP0_TX2+ / DSI0_D2+	LVDS_A_LANE2_P	From DSI to LVDS converter SN65DSI84ZXHR	Output	±600mV
S132	LVDS0_2- / eDP0_TX2- / DSI0_D2-	LVDS_A_LANE2_N	From DSI to LVDS converter SN65DSI84ZXHR	Output	±600mV
S133	LCD0_VDD_EN	DISP0_PWR_EN_S4A_1P8		Output	1.8V

S134	LVDS0_CK+ / eDP0_AUX+ / DSI0_CLK+	LVDS_A_CLK_P	From DSI to LVDS converter SN65DSI84ZXHR	Output	±600mV
S135	LVDS0_CK- / eDP0_AUX- / DSI0_CLK-	LVDS_A_CLK_N	From DSI to LVDS converter SN65DSI84ZXHR	Output	±600mV
S136	GND	GND		Power	0
S137	LVDS0_3+ / eDP0_TX3+ / DSI0_D3+	LVDS_A_LANE3_P	From DSI to LVDS converter SN65DSI84ZXHR	Output	±600mV
S138	LVDS0_3- / eDP0_TX3- / DSI0_D3-	LVDS_A_LANE3_N	From DSI to LVDS converter SN65DSI84ZXHR	Output	±600mV
S139	I2C_LCD_CK	DISP_SCL_S4A_1P8		Output	1.8V
S140	I2C_LCD_DAT	DISP_SDA_S4A_1P8		Bidirectional	1.8V
S141	LCD0_BKLT_PWM	LCD0_BKLT_PWM		Output	1.8V
S142	GPIO12	DISP0_RST_S4A_1P8_N		Output	1.8V
S143	GND	GND		Power	0
S144	eDP0_HPD / DSI0_TE	LVDS_A_HOT_PLUG_DET		Output	1.8V
S145	WDT_TIME_OUT#	SOC_GPIO106_WDT_TIME_OUT#		Output	1.8V
S146	PCIE_WAKE#	PCIE_WAKE#		Output	3.3V
S147	VDD_RTC	VCOIN_PMIC		Power	3.3V

S148	LID#	SOC_GPIO_51_LID#		Input	1.8V
S149	SLEEP#	SOC_GPIO_50_SLEEP#		Input	1.8V
S150	VIN_PWR_BAD#	VIN_PWR_BAD#		Input	1.8V
S151	CHARGING#	SOC_GPIO_107_CHARGING#		Input	1.8V
S152	CHARGER_PRSNT#	SOC_GPIO_62_CHARGER_PRSNT#		Input	1.8V
S153	CARRIER_STBY#	SOC_GPIO_52_CARRIER_STBY#		Output	1.8V
S154	CARRIER_PWR_ON	CARRIER_PWR_ON		Output	1.8V
S155	FORCE_RECOV#	FORCED_USB_BOOT		Input	1.8V
S156	BATLOW#	SOC_GPIO_80_BATLOW#		Input	1.8V
S157	TEST#	NC		-	-
S158	GND	GND		Power	0

Note:

- Input means input to SoM.
- Output means output from SoM.