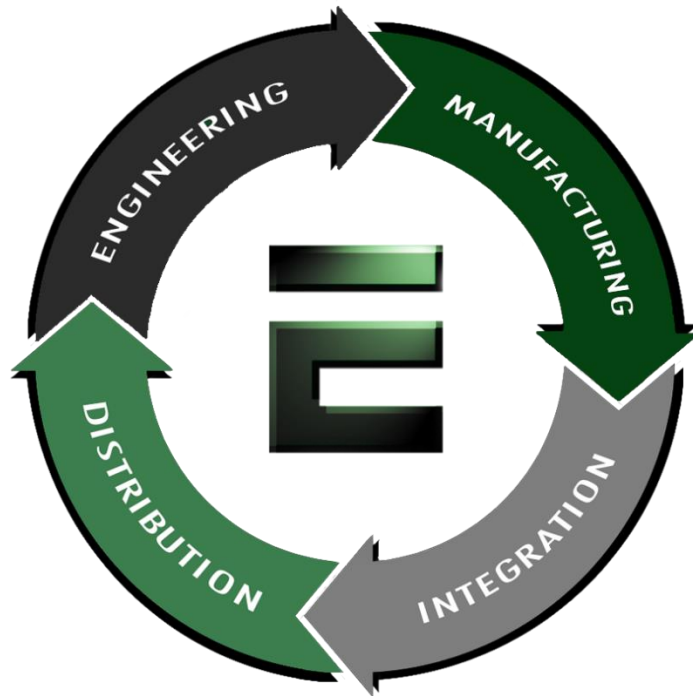


Our Products Make Your Product Better®

To learn more about EMAC's products and services and how they can help your project

http://ftp.emacinc.com/Tech_Info/About_EMAC_Products_and_Services.pdf



Authorized Distributor, Integrator, and Value-Added Reseller

Manual downloaded from <ftp.emacinc.com>

For purchase information please contact info@emacinc.com

For technical support please submit a ticket at www.emacinc.com/support

AOM-5721

Qualcomm QCS6490 2.7GHz
Gold Plus 8 Cores
AOM Nano (SMARC Compatible)

Copyright

The documentation and the software included with this product are copyrighted 2026 by Advantech Co., Ltd. All rights are reserved. Advantech Co., Ltd. reserves the right to make improvements in the products described in this manual at any time without notice. No part of this manual may be reproduced, copied, translated or transmitted in any form or by any means without the prior written permission of Advantech Co., Ltd. Information provided in this manual is intended to be accurate and reliable. However, Advantech Co., Ltd. assumes no responsibility for its use, nor for any infringements of the rights of third parties, which may result from its use.

Acknowledgments

Arm is trademark of Arm Corporation.

NXP is trademark of NXP Corporation.

All other product names or trademarks are properties of their respective owners.

Product Warranty (2 years)

Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain a return merchandise authorization (RMA) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Declaration of Conformity

FCC Class B

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to 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 in accordance with 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 receiver.
- Connect the equipment into 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.

CE

CE compliance was validated at Advantech's system level using an internally designed enclosure. EMC behavior of the bare board is dependent on enclosure design and installation conditions.

Ordering Information

Part No.	Description
AOM-5721BO-649AA1	AOM-Nano, QCS6490, -20 ~ 70° C, 8 cores

Packing List

Before installation, please ensure the following items have been shipped:

- AOM-5721BO-649AA1

Optional Accessories

Part No.	Description
AOM-DB6700	Carrier board of AOM-5721
96PSA-A60W24T2-3	ADP A/D 100-240V 60W 24V C14 CORD END 2PIN 62368
1700008921	Power Cord 3P PSE 183 cm (72 in)
ROM-EG51	Audio Codec board
9696AEC9100	AOM-EC91 A101 camera evb for AOM-DB6700
1970005260T001	Semi Heat Sink (-20 ~ 70 °C)
1970005259T001	Semi Heat Sink (0 ~ 60 °C)
1970006306N001	Heat Spreader

*Please contact us for suggestions on suitable cellular modules for your region.

Safety Instructions

1. Read these safety instructions carefully.
2. Retain this user manual for future reference.
3. Disconnect the equipment from all power outlets before cleaning. Use only a damp cloth for cleaning. Do not use liquid or spray detergents.
4. For pluggable equipment, the power outlet socket must be located near the equipment and easily accessible.
5. Protect the equipment from humidity.
6. Place the equipment on a reliable surface during installation. Dropping or letting the equipment fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. Do not cover the openings.
8. Ensure that the voltage of the power source is correct before connecting the equipment to a power outlet.
9. Position the power cord away from high-traffic areas. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage from transient overvoltage.
12. Never pour liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If any of the following occurs, have the equipment checked by service personnel:
 - The power cord or plug is damaged.
 - Liquid has penetrated the equipment.
 - The equipment has been exposed to moisture.
 - The equipment is malfunctioning, or does not operate according to the user manual.
 - The equipment has been dropped and damaged.
 - The equipment shows obvious signs of breakage.

DISCLAIMER: This set of instructions is given according to IEC 704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

Safety Precaution - Static Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

- To avoid electrical shock, always disconnect the power from your PC chassis before you work on it. Don't touch any components on the CPU card or other cards while the PC is on.
- Disconnect power before making any configuration changes. The sudden rush of power as you connect a jumper or install a card may damage sensitive electronic components.

Contents

Chapter 1	General Information	1
1.1	Introduction	2
1.2	Product Features.....	2
	Table 1.1: Product Features	2
Chapter 2	H/W Installation.....	5
2.1	AOM-5721 Board Dimensions	6
2.2	Block Diagram.....	6
2.3	Pin Define.....	6
	Table 2.1: P-Pin.....	6
	Table 2.2: S-Pin.....	10
2.4	Quick Start Guide.....	14
2.4.1	I/O Description of AOM-DB6700.....	14
2.4.2	Switch Setting for AOM-DB6700.....	15
2.4.3	UART Debug Console	18
	Table 2.3: A Cable D-SUB 9P(F)/D-SUB 9P(F) 100cm.....	19
Chapter 3	Software Functionality	21
3.1	Display	22
3.1.1	eDP + DP	22
3.1.2	DSI + DP (Need the DSI AOM-5721 top board SKU).....	22
3.1.3	HDMI.....	22
3.1.4	eDP	23
3.1.5	DSI.....	24
3.1.6	DP	24
3.2	Audio	25
3.3	Storages.....	26
3.3.1	EMMC	26
3.3.2	SD Card	26
3.3.3	UFS.....	26
3.3.4	SPI Flash	27
3.4	RS232 Look Back	27
3.4.1	AOM-DB6700 COM 0	27
3.4.2	AOM-DB6700 COM 2	27
3.4.3	AOM-DB6700 COM 1	27
3.5	RS-422.....	27
3.5.1	AOM-DB6700 COM 0	27
3.5.2	AOM-DB6700 COM 2	28
3.6	RS-485.....	28
3.6.1	AOM-DB6700 COM 0	28
3.6.2	AOM-DB6700 COM 2	28
3.7	GPIO	28
3.8	Ethernet.....	30
3.9	CAN FD.....	31
3.9.1	CAN FD Test.....	31
3.9.2	USB.....	31
3.10	I2C.....	32
3.11	External RTC.....	33
3.12	Internal Watchdog	34
3.13	Camera	34
3.14	M.2 Key E.....	36

3.15	M.2 Key B	37
3.16	M.2 Key M	39
3.17	TPM	39
3.18	Power Button	39
3.19	Reset Button	39
Chapter 4	Embedded O.S	41
4.1	Introduction	42
Chapter 5	System Recovery	43
5.1	System Recovery	44
5.1.1	Emergency download (EDL) mode	44
5.1.2	Windows PCAT Tool	45
5.1.3	UFS Provision	46
5.1.4	Flash UFS	47
5.1.5	Flash EMMC	50
5.1.6	Qualcomm Download (QDL) Tool	51
Chapter 6	Advantech Services	55
6.1	RISC Design-In Services	56
6.2	Contact Information	59
	Table 6.1: Contact Information	59
6.3	Technical Support and Assistance	59
6.3.1	Warranty Policy	59
6.3.2	Repair Process	60

Chapter 1

General Information

This chapter details background information on the AOM-5721.

Sections include:

- Introduction
- Specifications

1.1 Introduction

Advantech's AOM-5721 is powered by Qualcomm QCS6490 SoC which includes up to Kryo 8 cores up to 2.7GHz in combination with Adreno GPU 643 and Adreno VPU 633 graphics engine. It provides PCIe, USB 3.2, Giga Ethernet, MIPI-CSI, I2C,SPI, GPIO, and HDMI, DP, 2ch. LVDS display for embedded applications.

AOM-5721 is paired with Advantech OSM carrier board for faster end product peripheral integration and time-to-market. The reference schematics and layout checklists documentations for carrier board development will be provided along with Windows 11, Ubuntu, test utilities, hardware design utilities and reference drivers.

1.2 Product Features

Table 1.1: Product Features

Model Name		AOM-5721
Form Factor		AOM Nano
Processor System	CPU	QCS6490 Kryo 8 Cores up to 2.7GHz
	Technology	Up to 6400MT/s
Memory	Capacity	Up to 16GB LPDDR5 (On-board)
	Flash	128 GB eMMC or 128GB UFS for O.S.
	LVDS/MIPI DSI	1 x 4 lane MIPI DSI (Optional instead of HDMI) (4K30)(Mutually Exclusive)
	eDP	1 x eDP (1080P60)(Mutually Exclusive)
	DP	1 x DP(4K30)
	Graphics Engine	Adreno VPU 633 4K30 encode/Decode Adreno GPU 643, OpenGL ES3.2/OpenCL 2.0
	Chipset	1 x QPS615 integrated RGMII and SGMII
Ethernet	Speed	2 x 10/100/1000 Mbps
	RTC	External RTC
Security		Qualcomm® Trusted Execution Environment (TEE) v5.3
I/O	USB	1 x USB3.2 Gen 1 and 4 x USB2.0
	Serial Port	2 x 4-wire UART, 2 x 2-wire UART 1 x 2-wire UART for debug console
	SPI	2
	CAN-FD	2
	GPIO	14
	SDIO	1
	I2C	5(I2C_GP,I2C_LCD,I2C_PM,I2C_CAM1,I2C_CAM0)
	Camera Input	1 x MIPI CSI 4-lane, 1 x MIPI CSI 2-lane (SMARC Edge Connector), 2 x MIPI CSI 4-lane (Connector)
	Power Supply Voltage	5 V
Power		Power Consumption TBD

Table 1.1: Product Features		
Environment	Storage Temperature	-40° to 85° C
	Stand Temperature	0 ~ 60° C (non-condensing) with 0.7m/s air flow
	Extend Temperature	-20° ~ 70° C (non-condensing) with 0.7m/s air flow
	Operating Humidity	95% @ 40° C (non-condensing)
	Non-Operating Humidity	95% @ 60° C (non-condensing)
Mechanical	Dimensions (W x D)	82 x 50 mm
Operating System	Yocto Linux, Ubuntu Linux, Windows 11 IoT, Android	
Certifications	CE/FCC Class B	

Chapter 2

H/W Installation

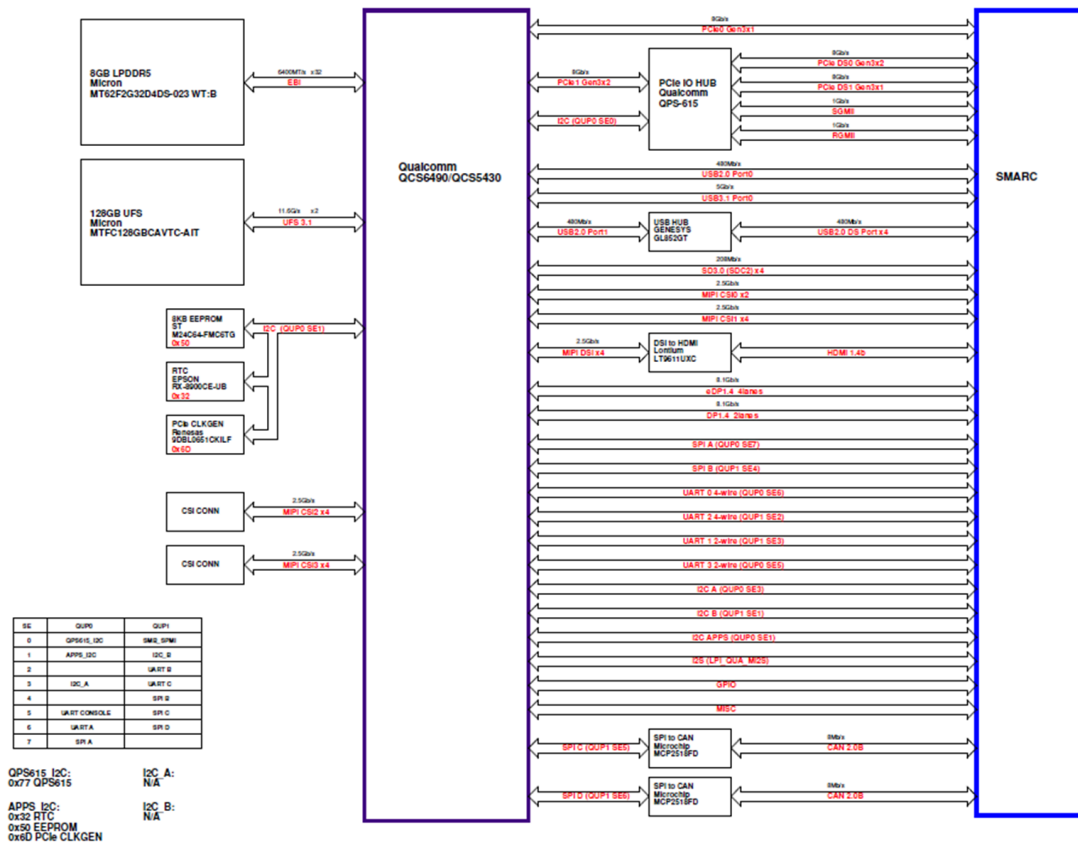
This chapter details mechanical and connector information.

Sections include:

- Mechanical Drawing
- Pin Define
- Quick Start Guide

2.1 AOM-5721 Board Dimensions

2.2 Block Diagram



2.3 Pin Define

Table 2.1: P-Pin

P-Pin	Primary (Top) Side	I/F	AOM-5721 SMARC Schematic Checklist V2.2-Internal
P1	SMB_ALERT#	SMB	N/A
P2	GND	POWER	GND
P3	CSI1_CLK+	SCAM	CSI1_CLK+
P4	CSI1_CLK-	SCAM	CSI1_CLK-
P5	GBE1_SDP	GBE	N/A
P6	GBE0_SDP	GBE	N/A
P7	CSI1_RX0+	SCAM	CSI1_D0+
P8	CSI1_RX0-	SCAM	CSI1_D0-
P9	GND	POWER	GND
P10	CSI1_RX1+	SCAM	CSI1_D1+
P11	CSI1_RX1-	SCAM	CSI1_D1-
P12	GND	POWER	GND
P13	CSI1_RX2+	SCAM	CSI1_D2+
P14	CSI1_RX2-	SCAM	CSI1_D2-
P15	GND	POWER	GND
P16	CSI1_RX3+	SCAM	CSI1_D3+

Table 2.1: P-Pin

P17	CSI1_RX3-	SCAM	CSI1_D3-
P18	GND	POWER	GND
P19	GBE0_MDI3-	GBE	GBE0_MDI3-
P20	GBE0_MDI3+	GBE	GBE0_MDI3+
P21	GBE0_LINK_MID#	GBE	GBE0_LED_100#
P22	GBE0_LINK_MAX#	GBE	GBE0_LED_1000#
P23	GBE0_MDI2-	GBE	GBE0_MDI2-
P24	GBE0_MDI2+	GBE	GBE0_MDI2+
P25	GBE0_LINK_ACT#	GBE	GBE0_LED_ACT#
P26	GBE0_MDI1-	GBE	GBE0_MDI1-
P27	GBE0_MDI1+	GBE	GBE0_MDI1+
P28	GBE0_CTREF	GBE	N/A
P29	GBE_MDI0-	GBE	GBE0_MDI0-
P30	GBE_MDI0+	GBE	GBE0_MDI0+
P31	SPI0_CS1#	SPI	SPI0_CS3#
P32	GND	POWER	GND
P33	SDIO_WP	SDIO	SD_WRITE_PROTECT
P34	SDIO_CMD	SDIO	SDC2_CMD
P35	SDIO_CD#	SDIO	SD_CARD_DET#
P36	SDIO_CK	SDIO	SDC2_CLK
P37	SDIO_PWR_EN	SDIO	SDC2_PWR_EN
P38	GND	POWER	GND
P39	SDIO_D0	SDIO	SDC2_DATA_0
P40	SDIO_D1	SDIO	SDC2_DATA_1
P41	SDIO_D2	SDIO	SDC2_DATA_2
P42	SDIO_D3	SDIO	SDC2_DATA_3
P43	SPI0_CS0#	SPI	SPI0_CS0#
P44	SPI0_CK	SPI	SPI0_SCLK
P45	SPI0_DIN	SPI	SPI0_MISO
P46	SPI0_DO	SPI	SPI0_MOSI
P47	GND	POWER	GND
P48	SATA_TX+	SATA	N/A
P49	SATA_TX-	SATA	N/A
P50	GND	POWER	GND
P51	SATA_RX+	SATA	N/A
P52	SATA_RX-	SATA	N/A
P53	GND	POWER	GND
P54	ESPI_CS0# / SPI1_CS0# / QSPI_CS0#	SPI	SPI1_CS0#
P55	ESPI_CS1# / SPI1_CS1# / QSPI_CS1#	SPI	SPI1_CS3#
P56	ESPI_CK / SPI1_CK / QSPI_CK	SPI	SPI1_SCLK
P57	ESPI_IO_1 / ESPI_IO_1 / QSPI_IO_1	SPI	SPI1_MISO
P58	ESPI_IO_0 / SPI1_DO / QSPI_IO_0	SPI	SPI1_MOSI
P59	GND	POWER	GND

Table 2.1: P-Pin

P60	USB0+	USB	USB0_HS_D+
P61	USB0-	USB	USB0_HS_D-
P62	USB0_EN_OC#	USB	USB0_OC#_GF
P63	USB0_VBUS_DET	USB	USB0_VBUS_DET
P64	USB0_OTG_ID	USB	USB0_ID_GF
P65	USB1+	USB	USB1+
P66	USB1-	USB	USB1-
P67	USB1_EN_OC#	USB	USB1_OC#_GF
P68	GND	POWER	GND
P69	USB2+	USB	USB2+
P70	USB2-	USB	USB2-
P71	USB2_EN_OC#	USB	USB2_OC#_GF
P72	RSVD	RSVD	USB3+
P73	RSVD	RSVD	USB3-
P74	USB3_EN_OC#	USB	USB3_OC#_GF
<Key>			
P75	PCIE_A_RST#	PCIe	PCIe_A_RST#
P76	USB4_EN_OC#	USB	USB4_OC#_GF
P77	PCIE_B_CLKREQ#	PCIe	PCIe_B_CLKREQ#
P78	PCIE_A_CLKREQ#	PCIe	PCIe_A_CLKREQ#
P79	GND	POWER	GND
P80	PCIE_C_REFCK+	PCIe	QPS_DS0_PCIE0_REFCLK+
P81	PCIE_C_REFCK-	PCIe	QPS_DS0_PCIE0_REFCLK-
P82	GND	POWER	GND
P83	PCIE_A_REFCK+	PCIe	PCIE0_REFCLK+
P84	PCIE_A_REFCK-	PCIe	PCIE0_REFCLK-
P85	GND	POWER	GND
P86	PCIE_A_RX+	PCIe	PCIE0_RX+
P87	PCIE_A_RX-	PCIe	PCIE0_RX-
P88	GND	POWER	GND
P89	PCIE_A_TX+	PCIe	PCIE0_TX+
P90	PCIE_A_TX-	PCIe	PCIE0_TX-
P91	GND	POWER	GND
P92	HDMI_D2+ / DP1_LANE0+	HDMI/DP	HDMI_D2+
P93	HDMI_D2- / DP1_LANE0-	HDMI/DP	HDMI_D2-
P94	GND	POWER	GND
P95	HDMI_D1+ / DP1_LANE1+	HDMI/DP	HDMI_D1+
P96	HDMI_D1- / DP1_LANE1-	HDMI/DP	HDMI_D1-
P97	GND	POWER	GND
P98	HDMI_D0+ / DP1_LANE2+	HDMI/DP	HDMI_D0+
P99	HDMI_D0- / DP1_LANE2-	HDMI/DP	HDMI_D0-
P100	GND	POWER	GND
P101	HDMI_CK+ / DP1_LANE3+	HDMI/DP	HDMI_CK+
P102	HDMI_CK- / DP1_LANE3-	HDMI/DP	HDMI_CK-
P103	GND	POWER	GND
P104	HDMI_HPD / DP1_HPD	HDMI/DP	HDMI_HPD

Table 2.1: P-Pin

P105	HDMI_CTRL_CK / DP1_AUX+	HDMI/DP	DDC_CLK_HDMI
P106	HDMI_CTRL_DAT / DP1_AUX+	HDMI/DP	DDC_DATA_HDMI
P107	DP1_AUX_SEL	DP	N/A
P108	GPIO0 / CAM0_PWR#	GPIO/SCAM	CAM0_PWDN
P109	GPIO1 / CAM1_PWR#	GPIO/SCAM	CAM1_PWDN
P110	GPIO2 / CAM0_RST#	GPIO/SCAM	CAM0_RESET#
P111	GPIO3 / CAM1_RST#	GPIO/SCAM	CAM1_RESET#
P112	GPIO4 / HDA_RST#	GPIO/HDA	QCS_GPIO_8
P113	GPIO5 / PWM_OUT	GPIO/FAN	QCS_GPIO_11
P114	GPIO6 / TACHIN	GPIO/FAN	QCS_GPIO_15
P115	GPIO7	GPIO	QCS_GPIO_16
P116	GPIO8	GPIO	QCS_GPIO_18
P117	GPIO9	GPIO	QCS_GPIO_19
P118	GPIO10	GPIO	QCS_GPIO_35
P119	GPIO11	GPIO	QCS_GPIO_44
P120	GND	POWER	GND
P121	I2C_PM_CK	PSM	APPS_I2C_SCL
P122	I2C_PM_DAT	PSM	APPS_I2C_SDA
P123	BOOT_SEL0#	MISC	QCS_GPIO_113
P124	BOOT_SEL1#	MISC	QCS_GPIO_114
P125	BOOT_SEL2#	MISC	QCS_GPIO_115
P126	RESET_OUT#	PSM	QCM_RESOUT#
P127	RESET_IN#	PSM	PM_RESIN#
P128	POWER_BTN#	PSM	PHONE_ON#
P129	SER0_TX	SER	UART_A_TX
P130	SER0_RX	SER	UART_A_RX
P131	SER0_RTS#	SER	UART_A_RTS#
P132	SER0_CTS#	SER	UART_A_CTS#
P133	GND	?	GND
P134	SER1_TX	SER	UART_C_TX
P135	SER1_RX	SER	UART_C_RX
P136	SER2_TX	SER	UART_B_TX
P137	SER2_RX	SER	UART_B_RX
P138	SER2_RTS#	SER	UART_B_RTS#
P139	SER2_CTS#	SER	UART_B_CTS#
P140	SER3_TX	SER	UART_CON_TX
P141	SER3_RX	SER	UART_CON_RX
P142	GND	POWER	GND
P143	CAN0_TX	CAN	CAN0_TX
P144	CAN0_RX	CAN	CAN0_RX
P145	CAN1_TX	CAN	CAN1_TX
P146	CAN1_RX	CAN	CAN1_RX
P147	VDD_IN	POWER	VDD_IN
P148	VDD_IN	POWER	VDD_IN
P149	VDD_IN	POWER	VDD_IN

Table 2.1: P-Pin

P150	VDD_IN	POWER	VDD_IN
P151	VDD_IN	POWER	VDD_IN
P152	VDD_IN	POWER	VDD_IN
P153	VDD_IN	POWER	VDD_IN
P154	VDD_IN	POWER	VDD_IN
P155	VDD_IN	POWER	VDD_IN
P156	VDD_IN	POWER	VDD_IN

Table 2.2: S-Pin

S-Pin	Secondary (Bottom) Side	I/F	AOM-5721 SMARC Schematic Checklist V2.2-Internal
S1	CSI1_TX+ / I2C_CAM1_CK	SCAM	CCI_I2C1_SCL
S2	CSI1_TX- / I2C_CAM1_DAT	SCAM	CCI_I2C1_SDA
S3	GND	POWER	GND
S4	RSVD	RSVD	CAM_MCLK1
S5	CSI0_TX+ / I2C_CAM0_CK	SCAM	CCI_I2C0_SCL
S6	CAM_MCK	SCAM	CAM_MCLK0
S7	CSI0_TX- / I2C_CAM0_DAT	SCAM	CCI_I2C0_SDA
S8	CSI0_CK+	SCAM	CSI0_CLK+
S9	CSI0_CK-	SCAM	CSI0_CLK-
S10	GND	POWER	GND
S11	CSI0_D0+	SCAM	CSI0_D0+
S12	CSI0_D0-	SCAM	CSI0_D0-
S13	GND	POWER	GND
S14	CSI0_D1+	SCAM	CSI0_D1+
S15	CSI0_D1-	SCAM	CSI0_D1-
S16	GND	POWER	GND
S17	GBE1_MDI0+	GBE	GBE1_MDI0+
S18	GBE1_MDI0-	GBE	GBE1_MDI0-
S19	GBE1_LINK_MID#	GBE	GBE1_LED_100#
S20	GBE1_MDI1+	GBE	GBE1_MDI1+
S21	GBE1_MDI1-	GBE	GBE1_MDI1-
S22	GBE1_LINK_MAX#	GBE	GBE1_LED_1000#
S23	GBE1_MDI2+	GBE	GBE1_MDI2+
S24	GBE1_MDI2-	GBE	GBE1_MDI2-
S25	GND	POWER	GND
S26	GBE1_MDI3+	GBE	GBE1_MDI3+
S27	GBE1_MDI3-	GBE	GBE1_MDI3-
S28	GBE1_CTREF	GBE	N/A
S29	PCIE_D_TX+ / SER-DES_0_TX+	GBE	QPS_DS0_PCIE0_TX1+
S30	PCIE_D_TX- / SER-DES_0_TX-	GBE	QPS_DS0_PCIE0_TX1-
S31	GBE1_LINK_ACT#	GBE	GBE1_LED_ACT#
S32	PCIE_D_RX+ / SER-DES_0_RX+	PCIe	QPS_DS0_PCIE0_RX1+

Table 2.2: S-Pin

S33	PCIE_D_RX- / SER-DES_0_RX-	PCIe	QPS_DS0_PCIE0_RX1-
S34	GND	POWER	GND
S35	USB4+	USB	USB4+
S36	USB4-	USB	USB4-
S37	USB3_VBUS_DET	USB	N/A
S38	AUDIO_MCK	I2S	I2S_MCLK
S39	I2S0_LRCK	I2S	LPI_I2S2_WS
S40	I2S0_SDOUT	I2S	LPI_I2S2_DATA1
S41	I2S0_SDIN	I2S	LPI_I2S2_DATA0
S42	I2S0_CK	I2S	LPI_I2S2_CLK
S43	ESPI_ALERT0#	SPI	N/A
S44	ESPI_ALERT1#	SPI	N/A
S45	MDIO_CLK	MDIO	N/A
S46	MDIO_DAT	MDIO	N/A
S47	GND	POWER	GND
S48	I2C_GP_CK	I2C	I2C_A_SCL
S49	I2C_GP_DAT	I2C	I2C_A_SDA
S50	HDA_SYNC / I2S2_LRCK / SNDW_CLK1	I2S	SWR_TX_CLK
S51	HDA_SDO / I2S2_SDOUT / SNDW_DAT1	I2S	SWR_TX_DATA0
S52	HDA_SDI / I2S2_SDIN / SNDW_DAT0	I2S	SWR_RX_DATA0
S53	HDA_CK / I2S2_CK / SNDW_-CLK0	I2S	SWR_RX_CLK
S54	SATA_ACT#	SATA	N/A
S55	USB5_EN_OC#	USB	N/A
S56	ESPI_IO_2 / QSPI_IO_2	SPI	N/A
S57	ESPI_IO_3 / QSPI_IO_3	SPI	N/A
S58	ESPI_RESET#	SPI	N/A
S59	USB5+	USB	N/A
S60	USB5-	USB	N/A
S61	GND	POWER	GND
S62	USB3_SSTX+	USB	N/A
S63	USB3_SSTX-	USB	N/A
S64	GND	POWER	GND
S65	USB3_SSRX+	USB	N/A
S66	USB3_SSRX-	USB	N/A
S67	GND	POWER	GND
S68	USB3+	USB	USB3+
S69	USB3-	USB	USB3-
S70	GND	POWER	GND
S71	USB2_SSTX+	USB	USB0_SS_TX1+
S72	USB2_SSTX-	USB	USB0_SS_TX1-
S73	GND	POWER	GND
S74	USB2_SSRX+	USB	USB0_SS_RX1+
S75	USB2_SSRX-	USB	USB0_SS_RX1-

Table 2.2: S-Pin**<Key>**

S76	PCIE_B_RST#	PCle	PCle_B_RST#
S77	PCIE_C_RST# / SER- DES_RST#	PCle	PCle_C_RST#
S78	PCIE_C_RX+ / SER- DES_1_RX+	PCle	QPS_DS0_PCIE0_RX0+
S79	PCIE_C_RX- / SER- DES_1_RX-	PCle	QPS_DS0_PCIE0_RX0-
S80	GND	POWER	GND
S81	PCIE_C_TX+ / SER- DES_1_TX+	PCle	QPS_DS0_PCIE0_TX0+
S82	PCIE_C_TX- / SER- DES_1_TX-	PCle	QPS_DS0_PCIE0_TX0-
S83	GND	POWER	GND
S84	PCIE_B_REFCK+	PCle	QPS_DS1_PCIE1_REFCLK+
S85	PCIE_B_REFCK-	PCle	QPS_DS1_PCIE1_REFCLK-
S86	GND	POWER	GND
S87	PCIE_B_RX+	PCle	QPS_DS1_PCIE1_RX0+
S88	PCIE_B_RX-	PCle	QPS_DS1_PCIE1_RX0-
S89	GND	POWER	GND
S90	PCIE_B_TX+	PCle	QPS_DS1_PCIE1_TX0+
S91	PCIE_B_TX-	PCle	QPS_DS1_PCIE1_TX0-
S92	GND	POWER	GND
S93	DP0_LANE0+	DP	USB0_SS_RX0+
S94	DP0_LANE0-	DP	USB0_SS_RX0-
S95	DP0_AUX_SEL	DP	N/A
S96	DP0_LANE1+	DP	USB0_SS_TX0+
S97	DP0_LANE1-	DP	USB0_SS_TX0-
S98	DP0_HPD	DP	DP_HOT_PLUG_DETECT
S99	DP0_LANE2+	DP	N/A
S100	DP0_LANE2-	DP	N/A
S101	GND	POWER	GND
S102	DP0_LANE3+	DP	N/A
S103	DP0_LANE3-	DP	N/A
S104	USB3_OTG_ID	USB	N/A
S105	DP0_AUX+	DP	USB0_DP_AUX_CONN+
S106	DP0_AUX-	DP	USB0_DP_AUX_CONN-
S107	LCD1_BKLT_EN	LVDS	QCS_GPIO_110
S108	LVDS1_CK+ / EDP1_AUX+ / DSI1_CLK+	LVDS/eDP/DSI	DSI_GF_CLK+
S109	LVDS1_CK- / EDP1_AUX- / DSI1_CLK-	LVDS/eDP/DSI	DSI_GF_CLK-
S110	GND	POWER	GND
S111	LVDS1_0+ / EDP1_TX0+ / DSI1_D0+	LVDS/eDP/DSI	DSI_GF_D0+
S112	LVDS1_0- / EDP1_TX0- / DSI1_D0-	LVDS/eDP/DSI	DSI_GF_D0-
S113	eDP1_HPD / DSI1_TE	eDP/DSI	DSI0_TE

Table 2.2: S-Pin

S114	LVDS1_1+ / EDP1_TX1+ / DSI1_D+	LVDS/eDP/DSI	DSI_GF_D1+
S115	LVDS1_1- / EDP1_TX1- / DSI1_D1-	LVDS/eDP/DSI	DSI_GF_D1-
S116	LCD1_VDD_EN	LCD	QCS_GPIO_109
S117	LVDS1_2+ / EDP1_TX2+ / DSI1_D2+	LVDS/eDP/DSI	DSI_GF_D2+
S118	LVDS1_2- / EDP1_TX2- / DSI1_D2-	LVDS/eDP/DSI	DSI_GF_D2-
S119	GND	POWER	GND
S120	LVDS1_3+ / EDP1_TX3+ / DSI1_D3+	LVDS/eDP/DSI	DSI_GF_D3+
S121	LVDS1_3- / EDP1_TX3- / DSI1_D3-	LVDS/eDP/DSI	DSI_GF_D3-
S122	LCD1_BKLT_PWM	LCD	N/A
S123	GPIO13	GPIO	QCS_GPIO_104
S124	GND	POWER	GND
S125	LVDS0_0+ / EDP0_TX0+ / DSI0_D0+	LVDS/eDP/DSI	EDP0_TX0_FLT+
S126	LVDS0_0- / EDP0_TX0- / DSI0_D0-	LVDS/eDP/DSI	EDP0_TX0_FLT-
S127	LCD0_BKLT_EN	LCD	PMC_GPIO_07_CONN_ED-P_BL_EN
S128	LVDS0_1+ / EDP0_TX1+ / DSI0_D1+	LVDS/eDP/DSI	EDP0_TX1_FLT+
S129	LVDS0_1- / EDP0_TX1- / DSI0_D1-	LVDS/eDP/DSI	EDP0_TX1_FLT-
S130	GND	POWER	GND
S131	LVDS0_2+ / EDP0_TX2+ / DSI0_D2+	LVDS/eDP/DSI	EDP0_TX2_FLT+
S132	LVDS0_2- / EDP0_TX2- / DSI0_D2-	LVDS/eDP/DSI	EDP0_TX2_FLT-
S133	LCD0_VDD_EN	LCD	QCS_GPIO_80
S134	LVDS0_CK+ / EDP0_AUX+ / DSI0_CLK+	LVDS/eDP/DSI	EDP0_AUX_CONN+
S135	LVDS0_CK- / EDP0_AUX- / DSI0_CLK-	LVDS/eDP/DSI	EDP0_AUX_CONN-
S136	GND	POWER	GND
S137	LVDS0_3+ / EDP0_TX3+ / DSI0_D3+	LVDS/eDP/DSI	EDP0_TX3_FLT+
S138	LVDS0_3- / EDP0_TX3- / DSI0_D3-	LVDS/eDP/DSI	EDP0_TX3_FLT-
S139	I2C_LCD_CK	LCD	I2C_B_SCL
S140	I2C_LCD_DAT	LCD	I2C_B_SDA
S141	LCD0_BKLT_PWM	LCD	PMC_GPIO_08_CONN_ED-P_PWM
S142	GPIO12	GPIO	QCS_GPIO_68
S143	GND	POWER	GND
S144	eDP0_HPD / DSI0_TE	eDP/DSI	EDP_HOT_PLUG_DETECT
S145	WDT_TIME_OUT#	WDT	QCS_GPIO_17
S146	PCIE_WAKE#	PCIe	PCIE_WAKE#

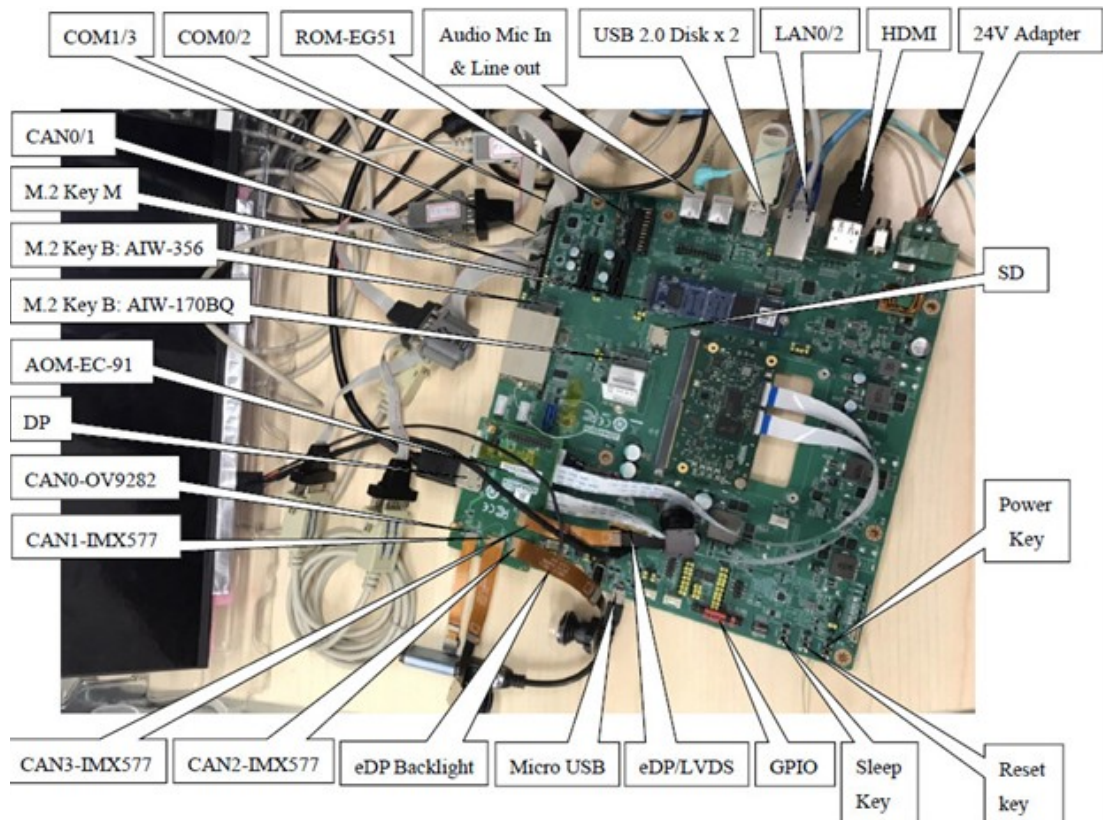
Table 2.2: S-Pin

S147	VDD_RTC	POWER	+RTC_PWR
S148	LID#	PSM	QCS_GPIO_112
S149	SLEEP#	PSM	QCS_GPIO_116
S150	VIN_PWR_BAD#	PSM	VIN_PWR_BAD#
S151	CHARGING#	PSM	PCIe_C_CLKREQ#
S152	CHARGER_PRSENT#	PSM	QCS_GPIO_9
S153	CARRIER_STBY#	PSM	QCS_GPIO_10
S154	CARRIER_PWR_ON	PSM	CARRIER_PWR_EN
S155	FORCE_RECOV#	MISC	FORCE_RECOV#
S156	BATLOW#	PSM	QCS_GPIO_111
S157	TEST#	PSM	KYPD_VOL_UP#
S158	GND	POWER	GND

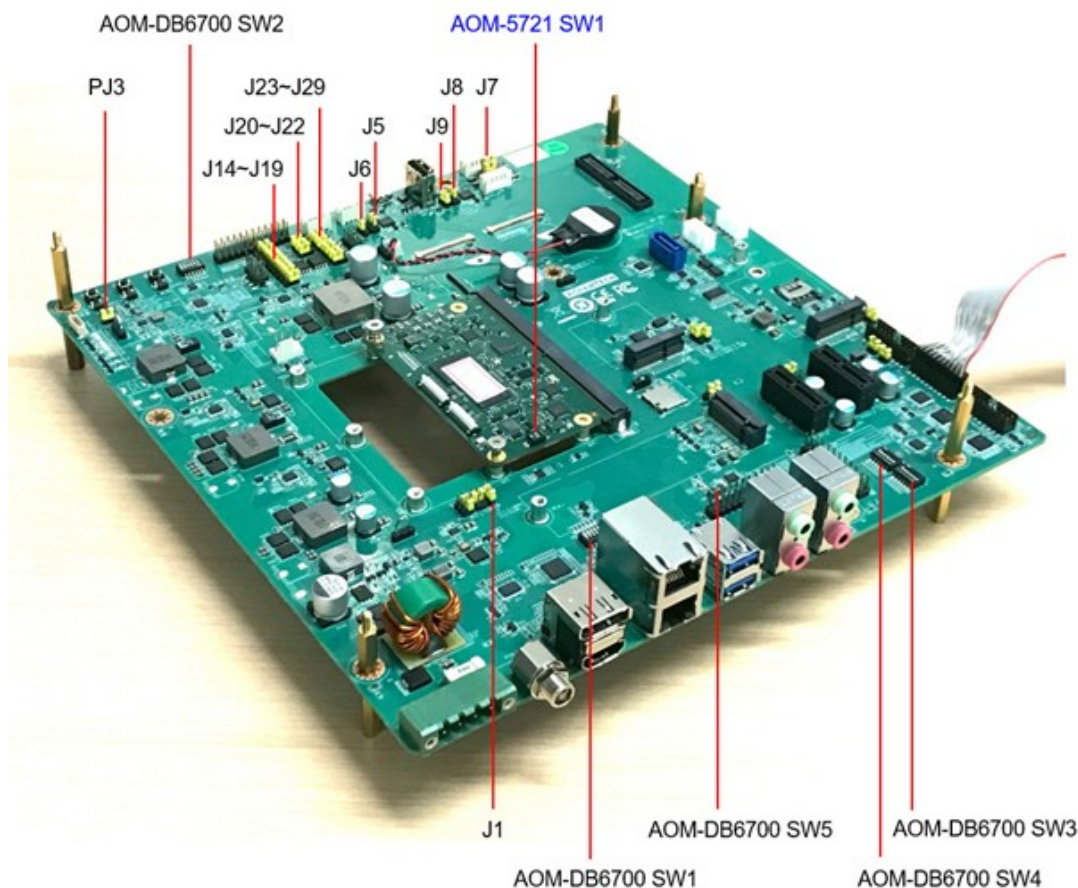
2.4 Quick Start Guide

2.4.1 I/O Description of AOM-DB6700

AOM-DB6700 is an evaluation board for AOM-5721. Please see the I/O description of AOM-DB6700 below.

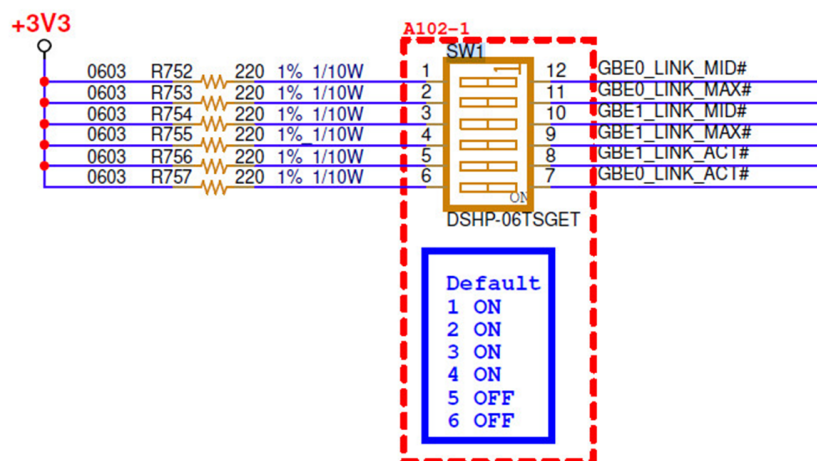


2.4.2 Switch Setting for AOM-DB6700



2.4.2.1 AOM-DB6700 SW1 (LAN LED HW Setting)

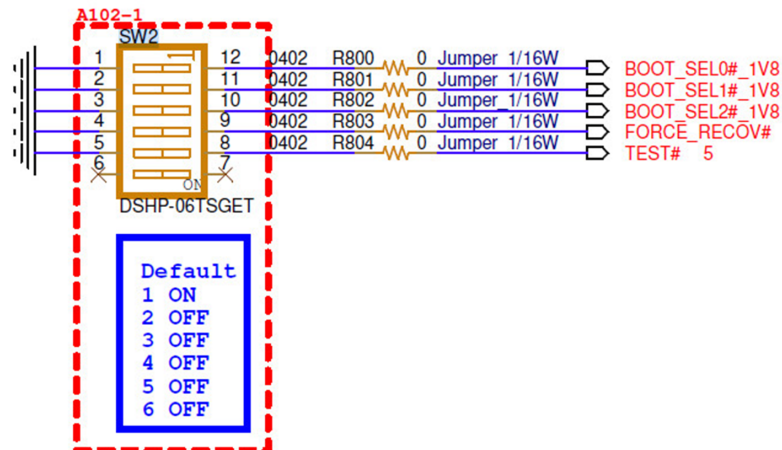
- SW1 set to default 1-on, 2-on, 3-on, 4-on, 5-off, 6-off



2.4.2.2 AOM-DB6700 SW2 (BOOT Selection)

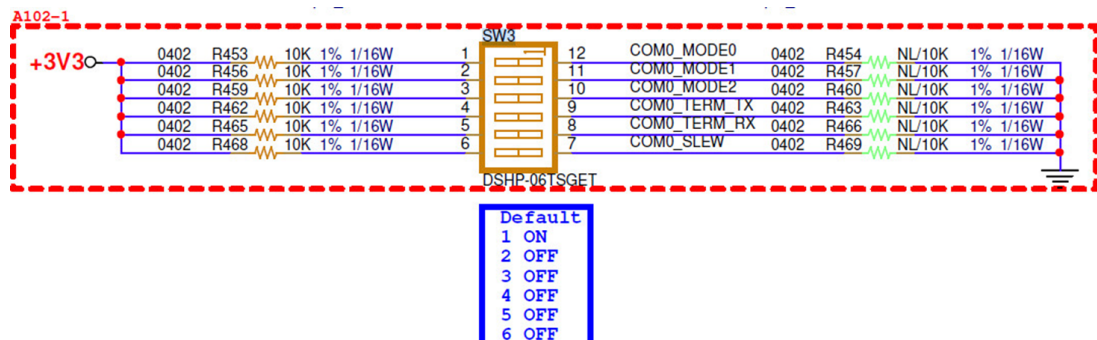
- Normal Boot: SW2 set to default 1-on, 2-off, 3-off, 4-off, 5-off, 6-off
- Force Recovery (QDL Download): SW2 set to 1-on, 2-off, 3-off, 4-on, 5-off, 6-off

BOOT Select



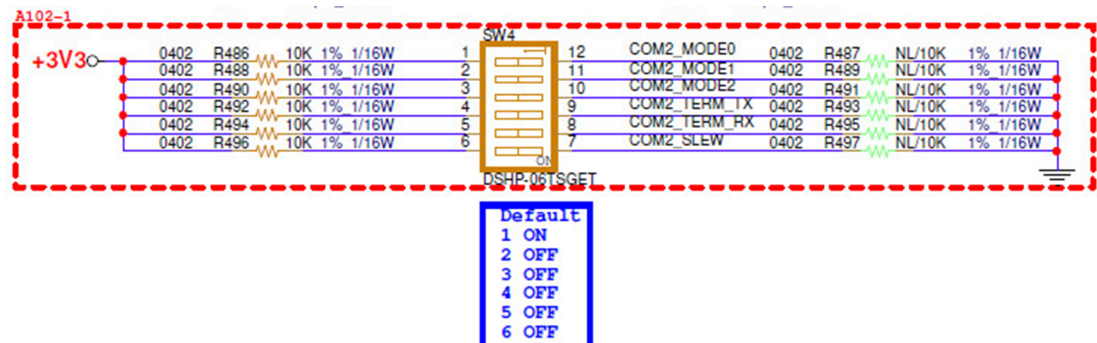
2.4.2.3 AOM-DB6700 SW3 (COM0 HW Setting)

- RS232 Loopback Mode: SW3 set to 1-off, 2-off, 3-off, 4-off, 5-off, 6-off
- RS232 Mode: SW3 set to default 1-on, 2-off, 3-off, 4-off, 5-off, 6-off
- RS485 Half-Duplex Mode: SW3 set to 1-off, 2-on, 3-off, 4-on, 5-on, 6-off
- RS485 Full-Duplex (RS422) Mode: SW3 set to 1-on, 2-on, 3-off, 4-on, 5-on, 6-off



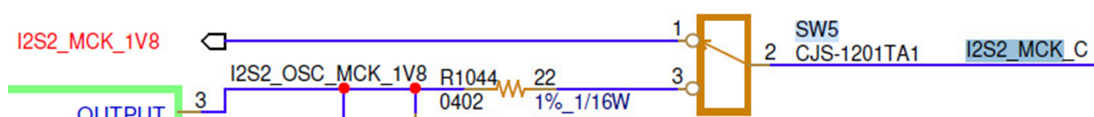
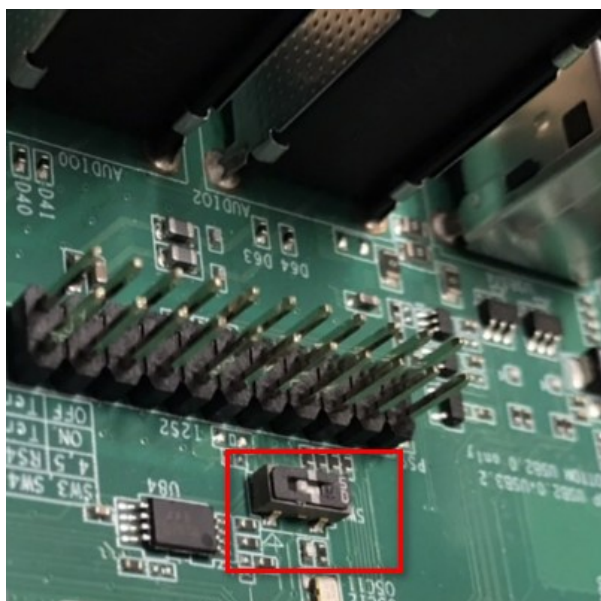
2.4.2.4 AOM-DB6700 SW4 (COM2 HW Setting)

- RS232 Loopback Mode: SW4 set to 1-off, 2-off, 3-off, 4-off, 5-off, 6-off
- RS232 Mode: SW4 set to default 1-on, 2-off, 3-off, 4-off, 5-off, 6-off
- RS485 Half-Duplex Mode: SW4 set to 1-off, 2-on, 3-off, 4-on, 5-on, 6-off
- RS485 Full-Duplex (RS422) Mode: SW4 set to 1-on, 2-on, 3-off, 4-on, 5-on, 6-off



2.4.2.5 AOM-DB6700 SW5 (I2S2 MCK Selection)

- CPU MCLK: SW5 set to 1 (Use the default)
- OSC MCLK: SW5 set to 2

**2.4.2.6 AOM-DB6700 PJ3 (ATX Mode Or AT Mode Selection)**

- ATX Mode: Jumper set to (1-2)
- AT Mode (Default): Jumper set to (2-3)

2.4.2.7 AOM-DB6700 J1 (Carrier HDMI0 Or DP1 Selection)

- HDMI0 (Default): Jumper set to (1-2)
- DP1: Jumper set to (2-3)

2.4.2.8 AOM-DB6700 J5 (LVDS0 PWR Selection)

- +5V: Jumper set to (1-3)
- +12V: Jumper set to (3-4)
- +3V3 (Default): Jumper set to (3-5)

2.4.2.9 AOM-DB6700 J6 (LVDS0/EDP0 HPD Selection)

- LVDS: Jumper set to (1-2)
- EDP_HPDP (Default): Jumper set to (2-3)

2.4.2.10 AOM-DB6700 J7 (LVDS0 Backlight PWR Selection)

- +5V: Jumper set to (1-2)
- +12V: Jumper set to (2-3)

2.4.2.11 AOM-DB6700 J8 (LVDS1 PWR Selection)

- +5V: Jumper set to (1-3)
- +12V: Jumper set to (3-4)
- +3V3 (Default): Jumper set to (3-5)

2.4.2.12 AOM-DB6700 J9 (LVDS1/EDP1 HPD Selection)

- LVDS (Default): Jumper set to (1-2)
- EDP_HPDP: Jumper set to (2-3)

2.4.2.13 AOM-DB6700 J14 (SPI0 CS Selection)

- CS0 (Default): Jumper set to (1-2)
- CS1: Jumper set to (2-3)

2.4.2.14 AOM-DB6700 J15~J19 (SPI0 Flash Selection)

- Flash (Default): Jumper set to (1-2)
- PIN HEADER: Jumper set to (2-3)

2.4.2.15 AOM-DB6700 J20 (ESPI/SPI1/QSPI CS Selection)

- CS0 (Default): Jumper set to (1-2)
- CS1: Jumper set to (2-3)

2.4.2.16 AOM-DB6700 J21,J22 (SPI1/QSPI Selection)

- SPI1 (Default): Jumper set to (1-2)
- QSPI: Jumper set to (2-3)

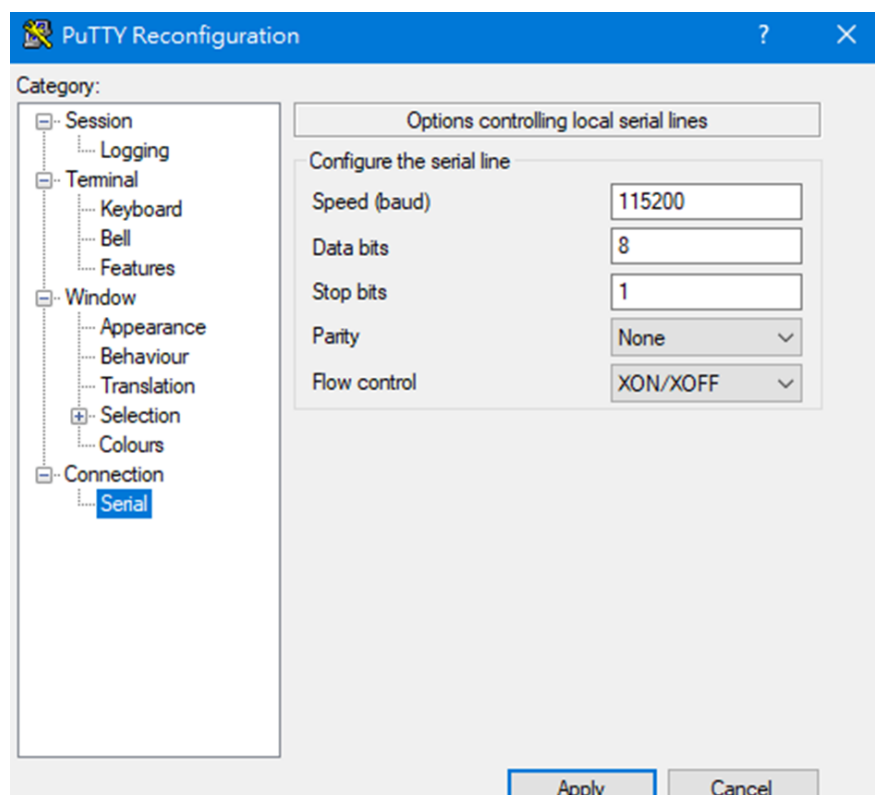
2.4.2.17 AOM-DB6700 J23~J29 (SPI1/ESPI Flash Selection)

- Flash (Default): Jumper set to (1-2)
- PIN HEADER: Jumper set to (2-3)

2.4.3 UART Debug Console

Follow these steps to connect the device to the host machine through UART.

- Use the serial COM tool, such as PuTTY or Tera Term and set "Speed" to 115200
- Connect the debug cable to the "COM3" and connect the device to the host machine
- Connect the 24V power adapter to "24V DC-IN"
- Push the "Power Button" to power on the device for the ATX mode
- View the serial log dump on your console
- Log in with account and password
- Account: root
- Password: oelinux123



Note! The debug cable needs to be purchased separately.



Table 2.3: A Cable D-SUB 9P(F)/D-SUB 9P(F) 100cm

Part Number	Description	Picture
1700019474	A Cable D-SUB 9P(F)/D-SUB 9P(F) 100cm RS232/RS48	

1. AOM-5721 can communicate with a host server using serial cables. Common serial communication programs such as HyperTerminal, Tera Term or PuTTY can be used in such applications. The example demonstrated below describes the serial terminal setup using Tera Term on a Windows host: Open Tera Term on your Windows PC, and select the settings as shown in figure.
2. Connect a Display:
The default display is the HDMI + DP output and the Weston UI will be displayed on the screen. If you need the eDP + DP or DSI + DP (Need the DSI AOM-5721 top board SKU) output, you can use the following tool to change it.
 - eDP + DP
/tools/cdt/eMMCChangeToEDPwithSGTL5000.sh

```
or
# /tools/cdt/ufsChangeToEDPwithSGTL5000.sh
– DSI + DP (Need the DSI AOM-5721 top board SKU)
# /tools/cdt/eMMCChangeToDSIwithWCD9385.sh
or
# /tools/cdt/ufsChangeToDSIwithWCD9385.sh
```

If you need to change back to HDMI + DP, you can use the following tool to change it.

```
# /tools/cdt/eMMCChangeToHDMI.sh
or
# /tools/cdt/ufsChangeToHDMI.sh
```

3. Connect the Power Source:
AOM-DB6700's power input is 24VDC. Please choose a suitable adapter and power cord to connect the board (please refer to P/Ns on datasheet and Optional Accessories of this manual) as shown in Figure 2.25.
4. When switching on the power, the green LED indicator on BOT side of the board will light up to indicate that the board has booted up normally.
5. Power on and login
Follow these steps to connect the device to the host machine through UART.
 - Connect the debug cable to the "COME Debug" and connect the device to the host machine
 - Connect the 12V power adapter to "12V DC-IN"
 - Push the "Power Button" to power on the device
 - Use the serial COM tool, such as PuTTY or Tera Term and set "Speed" to 115200
 - View the serial log dump on your console
 - Log in with account and password

Account: **root**

Password: **oelinux123**

Chapter 3

Software Functionality

This chapter details the software functions on the AOM-5721.

3.1 Display

The default display is the HDMI + DP output and the Weston UI will be displayed on the screen. If you need the eDP + DP or DSI + DP (Need the DSI AOM-5721 top board SKU) output, you can use the following tool to change it.

3.1.1 eDP + DP

```
# /tools/cdt/eMMCChangeToEDPwithSGTL5000.sh
or
# /tools/cdt/ufsChangeToEDPwithSGTL5000.sh
```

3.1.2 DSI + DP (Need the DSI AOM-5721 top board SKU)

```
# /tools/cdt/eMMCChangeToDSIwithWCD9385.sh
or
# /tools/cdt/ufsChangeToDSIwithWCD9385.sh
```

If you need to change back to HDMI + DP, you can use the following tool to change it.

```
# /tools/cdt/eMMCChangeToHDMI.sh
or
# /tools/cdt/ufsChangeToHDMI.sh
```

3.1.3 HDMI

AOM-DB6700 HW Setting:

- Connect to HDMI0_DP1
- J1 Jumper set to (1-2) : HDMI0

If you need to change back to HDMI + DP, you can use the following tool to change it.

```
# /tools/cdt/eMMCChangeToHDMI.sh
or
# /tools/cdt/ufsChangeToHDMI.sh
```

LE GA 1.1 can't support the Dynamic Resolution Switch, now. And it only support the 1080P@60 by default.

It can switch the 4K@30, 1080P@60, 720P@60 and 480P@60 timing by the following command.

■ Manually Switch to 4K@30

```
# echo 3840 2160 30 > /sys/bus/i2c/drivers/lt9611uxc/1-002b/edid_mode
# systemctl restart init_display.service
```

■ Manually Switch to 1080P@60

```
# echo 1920 1080 60 > /sys/bus/i2c/drivers/lt9611uxc/1-002b/edid_mode
# systemctl restart init_display.service
```

■ Manually Switch to 720P@60

```
# echo 1280 720 60 > /sys/bus/i2c/drivers/lt9611uxc/1-002b/edid_mode
# systemctl restart init_display.service
```

■ Manually Switch to 480P@60

```
# echo 720 480 60 > /sys/bus/i2c/drivers/lt9611luxc/1-002b/edid_mode
# systemctl restart init_display.service
```

For the HDMI plug-in/plug-out status, you can check the following

```
# cat /sys/class/drm/card0-DSI-1/status
```

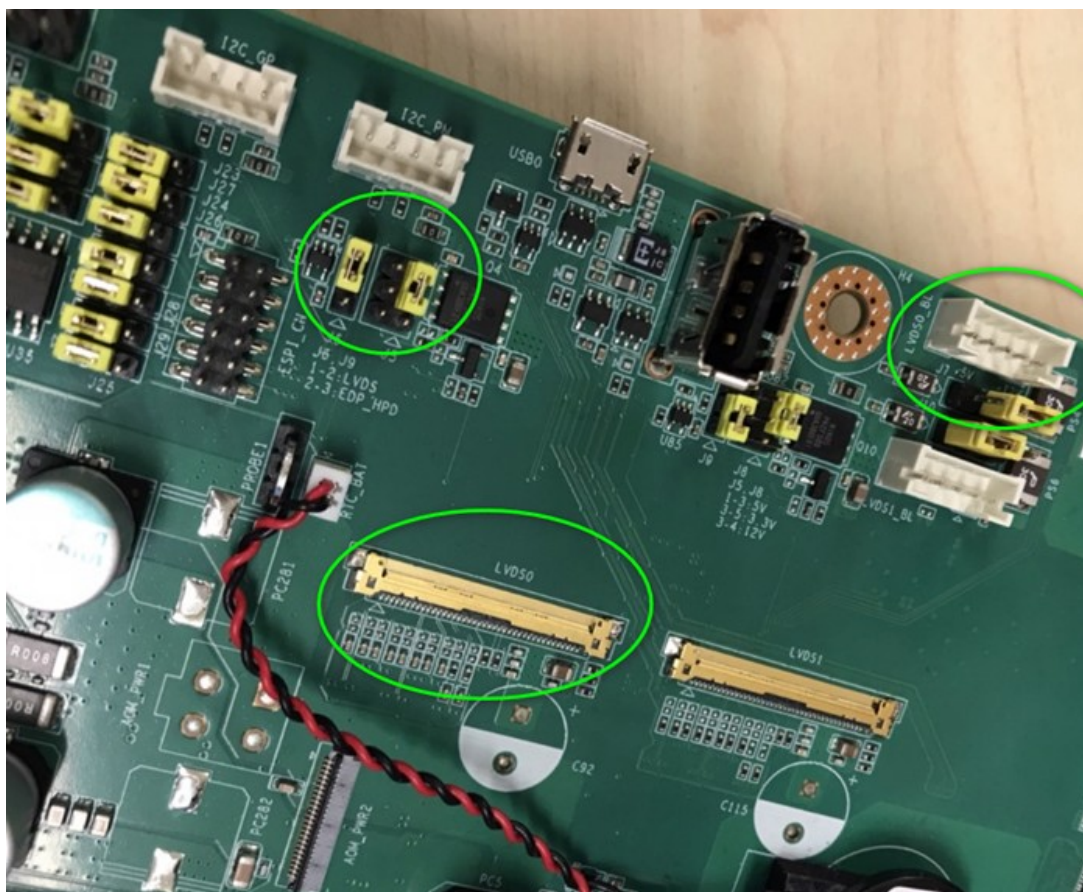
3.1.4 eDP

It can support the following eDP panels:

15.6" Innolux N156HCE-EN1 (VDD:3.3V, Backlight Power:12V)

AOM-DB6700 HW Setting for this panel:

- Connect to LVDS0, LVDS0_BL
- J5 Jumper set to (3-5): +3V3
- J6 Jumper set to (2-3): EDP_HPDP
- J7 Jumper set to (2-3): +12V



If you need the eDP + DP output, you can use the following tool to change it.

```
# /tools/cdt/eMMCChangeToEDPwithSGTL5000.sh
or
# /tools/cdt/ufsChangeToEDPwithSGTL5000.sh
```

Backlight control function

```
# echo 0 > /sys/class/backlight/panel-backlight/brightness
# echo 50 > /sys/class/backlight/panel-backlight/brightness
# echo 100 > /sys/class/backlight/panel-backlight/brightness
```

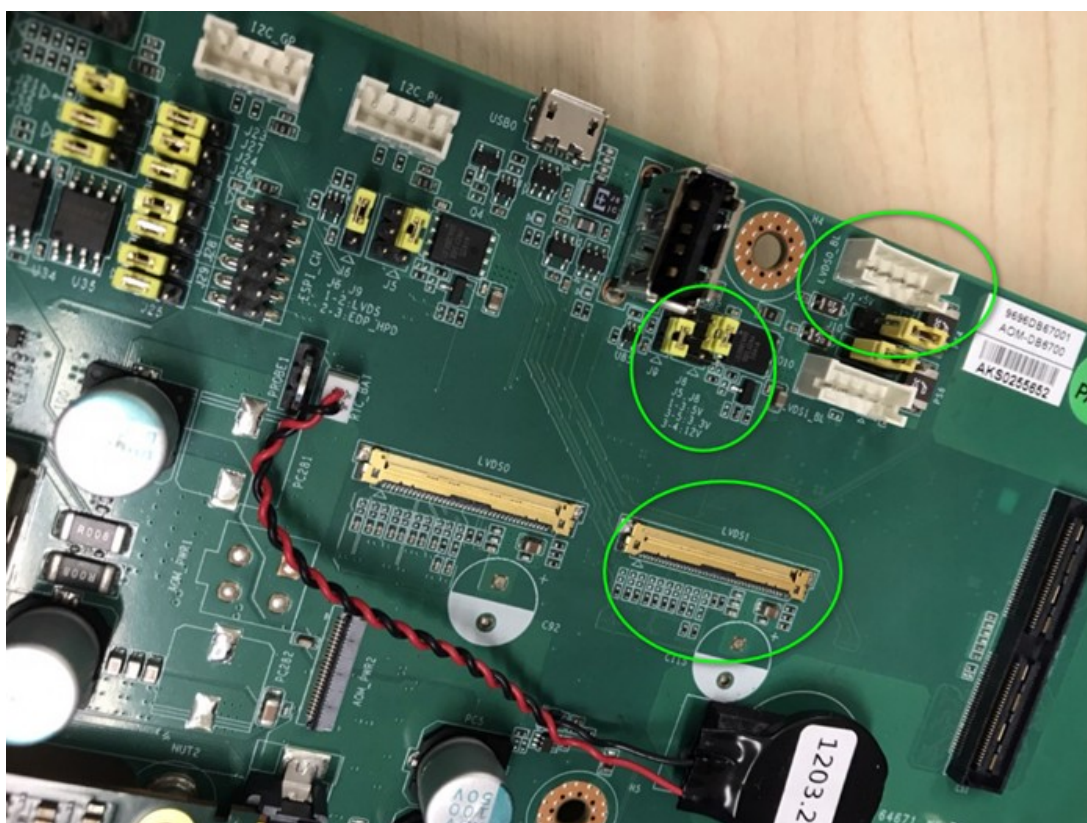
3.1.5 DSI

It can support the following DSI panels:

10.1" Auo G101UAN02.0 (VDD:3.3V, Backlight Power:12V)

AOM-DB6700 HW Setting for this panel:

- Connect to LVDS1, LVDS0_BL
- J8 Jumper set to (3-5): +3V3
- J9 Jumper set to (1-2): LVDS
- J7 Jumper set to (2-3): +12V



If you need the DSI + DP output, you can use the following tool to change it.

```
# /tools/cdt/eMMCChangeToDSIwithWCD9385.sh
or
# /tools/cdt/ufsChangeToDSIwithWCD9385.sh
```

Backlight control function

```
# echo 0 > /sys/class/backlight/panel-backlight/brightness
# echo 50 > /sys/class/backlight/panel-backlight/brightness
# echo 100 > /sys/class/backlight/panel-backlight/brightness
```

3.1.6 DP

It can support the maximum resolution is 4K@30.

For the DP plug-in/plug-out status, you can check the following

```
# cat /sys/class/drm/card0-DP-1/status
```

Switch to other resolution:

```
# echo 1920 1080 60 0 > /sys/kernel/debug/drm_dp/edid_modes
# echo 0 > /sys/kernel/debug/drm_dp/hpd
# echo 1 > /sys/kernel/debug/drm_dp/hpd
```

3.2 Audio

Connect the ROM-EG51 to the AOM-DB6700 I2S0 and boot up the device.

Connect the Mic In and Line Out to AOM-DB6700 AUDIO0

Default audio is hdmi audio.

For the SGTL5000, SW need to change to the CDT:

```
# /tools/cdt/ufsChangeToEDPwithSGTL5000.sh
or
# /tools/cdt/emmcChangeToEDPwithSGTL5000.sh
```

HDMI

```
# pactl set-sink-port 0 headset
# pactl set-sink-port 1 headset
# paplay /tmp/audio_48k.wav
or
# pactl set-sink-port 0 headset
# pactl set-sink-port 1 headset
# source /opt/qcom/qirp-sdk/qirp-setup.sh
# gst-launch-1.0 -e filesrc location=/tmp/audio_48k.wav ! wavparse !
audioconvert ! pulsesink volume=5
```

Line-Out

```
# pactl set-sink-port 0 speaker
# pactl set-sink-port 1 speaker
# paplay /tmp/audio_48k.wav
or
# pactl set-sink-port 0 speaker
# pactl set-sink-port 1 speaker
# source /opt/qcom/qirp-sdk/qirp-setup.sh
# gst-launch-1.0 -e filesrc location=/tmp/audio_48k.wav ! wavparse !
audioconvert ! pulsesink volume=1
```

Mic-In

```
# tinymix set "Mic Volume" 3
# pactl set-source-port regular2 speaker-mic
# parec -v --rate=48000 --format=s16le --channels=1 --file-format=wav /tmp/audio_48k.wav --device=regular2
or
# tinymix set "Mic Volume" 3
# pactl set-source-port regular2 speaker-mic
# source /opt/qcom/qirp-sdk/qirp-setup.sh
# gst-launch-1.0 -v pulsesrc volume=1 ! audioconvert ! wavenc !
filesink location=/tmp/audio_48k.wav
```

3.3 Storages

eMMC: /dev/mmcblk0

SD Card: /dev/mmcblk1

UFS: /dev/sda, /dev/sdb ...

SPI Flash: /dev/mtd0, /dev/mtd1, /dev/mtd2, /dev/mtd3, /dev/mtd4 and /dev/mtd5

3.3.1 EMMC

```
# dd if=/dev/urandom of=data bs=1 count=1024
# dd if=/dev/mmcblk0 of=backup bs=1 count=1024 skip=4096
# dd if=data of=/dev/mmcblk0 bs=1 seek=4096
# dd if=/dev/mmcblk0 of=data1 bs=1 count=1024 skip=4096
# diff data data1
# dd if=backup of=/dev/mmcblk0 bs=1 seek=4096
```

3.3.2 SD Card

Connect the Micro SD card to the AOM-DB6700 SD.

```
# dd if=/dev/urandom of=data bs=1 count=1024
# dd if=/dev/mmcblk1 of=backup bs=1 count=1024 skip=4096
# dd if=data of=/dev/mmcblk1 bs=1 seek=4096
# dd if=/dev/mmcblk1 of=data1 bs=1 count=1024 skip=4096
# diff data data1
# dd if=backup of=/dev/mmcblk1 bs=1 seek=4096
```

3.3.3 UFS

Need to do the UFS Provision, first.

```
# dd if=/dev/urandom of=data bs=1 count=1024
# dd if=/dev/sda of=backup bs=1 count=1024 skip=4096
# dd if=data of=/dev/sda bs=1 seek=4096
# dd if=/dev/sda of=data1 bs=1 count=1024 skip=4096
# diff data data1
# dd if=backup of=/dev/sda bs=1 seek=4096
```


3.3.4 SPI Flash

```
# dd if=/dev/urandom of=data bs=1 count=1024
# dd if=/dev/mtd0 of=backup bs=1 count=1024 skip=4096
# dd if=data of=/dev/mtd0 bs=1 seek=4096
# dd if=/dev/mtd0 of=data1 bs=1 count=1024 skip=4096
# diff data data1
# dd if=backup of=/dev/mtd0 bs=1 seek=4096
```

3.4 RS232 Look Back

3.4.1 AOM-DB6700 COM 0

Set AOM-DB6700 SW3 to 1-on, 2-off

```
# stty -F /dev/ttyHS1 -echo -onlcr 115200 raw
# cat /dev/ttyHS1 &
# echo "Serial Port Test" > /dev/ttyHS1
```

3.4.2 AOM-DB6700 COM 2

Set AOM-DB6700 SW4 to 1-on, 2-off

```
# stty -F /dev/ttyHS2 -echo -onlcr 115200 raw
# cat /dev/ttyHS2 &
# echo "Serial Port Test" > /dev/ttyHS2
```

3.4.3 AOM-DB6700 COM 1

```
# stty -F /dev/ttyHS3 -echo -onlcr 115200 raw
# cat /dev/ttyHS3 &
# echo "Serial Port Test" > /dev/ttyHS3
```

3.5 RS-422

Test RS-422 with AOM-DB6700: COM0 and AOM-DB6700: COM2 by RS-422 cable

Set AOM-DB6700 SW3 to 1-on, 2-on, 3-off, 4-on, 5-on, 6-off

Set AOM-DB6700 SW4 to 1-on, 2-on, 3-off, 4-on, 5-on, 6-off

3.5.1 AOM-DB6700 COM 0

Set AOM-DB6700 SW4 to 1-on, 2-on, 3-off, 4-on, 5-on, 6-off

```
# stty -F /dev/ttyHS1 speed 115200 ignbrk -brkint -icrnl -imaxbel -
opost -onlcr -isig -icanon -iexten -echo -echoe -echok -echoctl -
echoke
# cat /dev/ttyHS1 &
# echo "Serial Test" > /dev/ttyHS1
# echo -e "123456789-123456789-123456789-123456789-123456789-\r" |
tee /dev/ttyHS1
```

3.5.2 AOM-DB6700 COM 2

```
# stty -F /dev/ttyHS1 speed 115200 ignbrk -brkint -icrnl -imaxbel -
opost -onlcr -isig -icanon -iexten -echo -echoe -echok -echoctl -
echoke
# cat /dev/ttyHS2 &
# echo "Serial Test" > /dev/ttyHS2
# echo -e "123456789-123456789-123456789-123456789-123456789-\r" |
tee /dev/ttyHS2
```

3.6 RS-485

Test RS-485 with AOM-DB6700: COM0 and AOM-DB6700: COM2 by RS-485 cable (parallel cable)

Set AOM-DB6700 SW3 to 1-off, 2-on, 3-off, 4-on, 5-on, 6-off

Set AOM-DB6700 SW4 to 1-off, 2-on, 3-off, 4-on, 5-on, 6-off

3.6.1 AOM-DB6700 COM 0

```
# stty -F /dev/ttyHS1 speed 115200 ignbrk -brkint -icrnl -imaxbel -
opost -onlcr -isig -icanon -iexten -echo -echoe -echok -echoctl -
echoke
# cat /dev/ttyHS1 &
# echo "Serial Test" > /dev/ttyHS1
# echo -e "123456789-123456789-123456789-123456789-123456789-\r" |
tee /dev/ttyHS1
```

3.6.2 AOM-DB6700 COM 2

```
# stty -F /dev/ttyHS1 speed 115200 ignbrk -brkint -icrnl -imaxbel -
opost -onlcr -isig -icanon -iexten -echo -echoe -echok -echoctl -
echoke
# cat /dev/ttyHS2 &
# echo "Serial Test" > /dev/ttyHS2
# echo -e "123456789-123456789-123456789-123456789-123456789-\r" |
tee /dev/ttyHS2
```

3.7 GPIO

AOM-DB6700: GPIO (17 pins)

GPIO0_1V8: gpio 676 (GPIO_141)

GPIO1_1V8: gpio 677 (GPIO_142)

GPIO2_1V8: gpio 555 (GPIO_20)

GPIO3_1V8: gpio 556 (GPIO_21)

GPIO4_1V8: gpio 543 (GPIO_8)

GPIO5_1V8: gpio 546 (GPIO_11)

GPIO6_1V8: gpio 550 (GPIO_15)

GPIO7_1V8: gpio 551 (GPIO_16)

GPIO8_1V8: gpio 553 (GPIO_18)

GPIO9_1V8: gpio 554 (GPIO_19)

GPIO10_1V8: gpio 570 (GPIO_35)

GPIO11_1V8: gpio 579 (GPIO_44)
GPIO12_1V8: gpio 603 (GPIO_68)
GPIO13_1V8: gpio 639 (GPIO_104)
GPIO14_1V8: gpio 647 (GPIO_112)
GPIO16_1V8: gpio 544 (GPIO_9)
GPIO17_1V8: gpio 646 (GPIO_111)

GPIO0_1V8 and GPIO1_1V8 Loopback Test

1. Connect the GPIO_A_0 and GPIO_A_1
2. Export the GPIO interface

```
# echo 676 > /sys/class/gpio/export  
# echo 677 > /sys/class/gpio/export
```

3. Set the GPIO direction

```
# echo out > /sys/class/gpio/gpio676/direction  
# echo in > /sys/class/gpio/gpio677/direction
```

4. Set output value and check

```
# cat /sys/class/gpio/gpio677/value  
0  
# echo 1 > /sys/class/gpio/gpio676/value  
# cat /sys/class/gpio/gpio677/value  
1
```


3.8 Ethernet

Check Ethernet

```
# ifconfig
enP1p5s0f0 Link encap:Ethernet  HWaddr EE:A9:36:72:A7:B9
      inet addr:172.22.12.138  Bcast:172.22.15.255
Mask:255.255.252.0
      inet6 addr: fe80::2009:4a63:5a32:d2ab/64 Scope:Link
      inet6 addr: fe80::eca9:36ff:fe72:a7b9/64 Scope:Link
UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
RX packets:118 errors:0 dropped:10 overruns:0 frame:0
TX packets:37 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:1000
RX bytes:27625 (26.9 KiB)  TX bytes:6142 (5.9 KiB)
Interrupt:239

enP1p5s0f1 Link encap:Ethernet  HWaddr EE:51:3E:06:D5:3C
      UP BROADCAST MULTICAST  MTU:1500  Metric:1
      RX packets:0 errors:0 dropped:0 overruns:0 frame:0
      TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
      collisions:0 txqueuelen:1000
      RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
      Interrupt:244

lo        Link encap:Local Loopback
      inet addr:127.0.0.1  Mask:255.0.0.0
      inet6 addr: ::1/128 Scope:Host
      UP LOOPBACK RUNNING  MTU:65536  Metric:1
      RX packets:18 errors:0 dropped:0 overruns:0 frame:0
      TX packets:18 errors:0 dropped:0 overruns:0 carrier:0
      collisions:0 txqueuelen:1000
      RX bytes:2272 (2.2 KiB)  TX bytes:2272 (2.2 KiB)
```

Ping Test

```
# ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8): 56 data bytes
64 bytes from 8.8.8.8: icmp_seq=0 ttl=113 time=5.320 ms
64 bytes from 8.8.8.8: icmp_seq=1 ttl=113 time=7.445 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=113 time=7.367 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=113 time=7.431 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=113 time=6.394 ms
```

Ethernet LED Lights Test

■ Link LED Light

1. 10M - orange and green light: always off
2. 100M - orange light: always on
3. 1000M - green light: always on

■ Active LED Light

1. 10M - green light: flashing on
2. 100M - green light: flashing on
3. 1000M - green light: flashing on

10M Speed Setting

```
# ethtool -s enP1p5s0f0 speed 10 duplex full
# ethtool -s enP1p5s0f1 speed 10 duplex full
```

100M Speed Setting

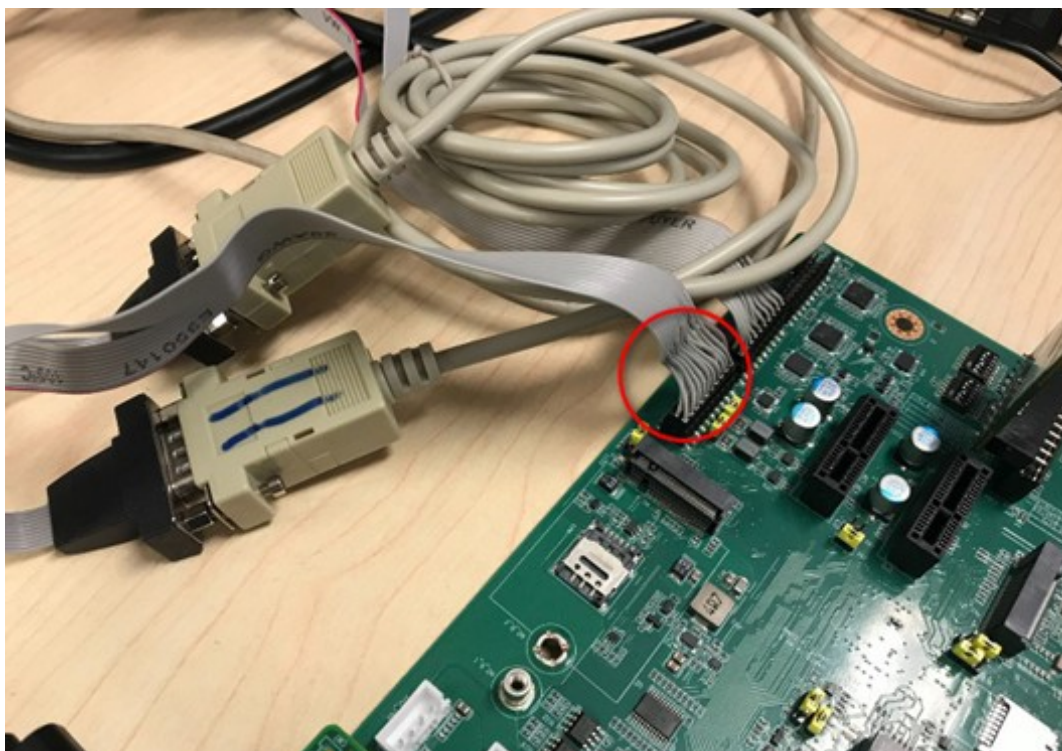
```
# ethtool -s enP1p5s0f0 speed 100 duplex full
# ethtool -s enP1p5s0f1 speed 100 duplex full
```

1000M Speed Setting

```
# ethtool -s enP1p5s0f0 speed 1000 duplex full
# ethtool -s enP1p5s0f1 speed 1000 duplex full
```

3.9 CAN FD

You can connect the AOM-DB6700 CAN0/1 to a parallel cable.



3.9.1 CAN FD Test

```
# ip link set can0 up type can bitrate 1000000 dbitrates 8000000 fd on
# ip link set can1 up type can bitrate 1000000 dbitrates 8000000 fd on
# candump can0 &
# cansend can1 123##300112233445566778899aabbccddeeff
can0 123 [16] 00 11 22 33 44 55 66 77 88 99 AA BB CC DD EE FF
```

3.9.2 USB

- Micro USB: AOM-DB6700 USB0
- USB 2.0 Type A: AOM-DB6700 USB3/4

Micro USB

Micro USB can be used for the EDL download. If you need to use the adb or fastboot, you need to set the Micro USB to device mode.

```
# echo 621 > /sys/class/gpio/export
# echo out > /sys/class/gpio/gpio621/direction
# echo 0 > /sys/class/gpio/gpio621/value
# echo device > /sys/kernel/debug/usb/a600000.usb/mode
```

USB 2.0 Type A

You can insert the USB 2.0/3.0 flash drive to the USB 2.0 Type A.

Check the USB Flash Drive

```
# lsusb -t
/: Bus 03.Port 1: Dev 1, Class=root_hub, Driver=xhci-hcd/1p, 5000M
   |__ Port 1: Dev 2, If 0, Class=Hub, Driver=hub/4p, 5000M
      |__ Port 1: Dev 4, If 0, Class=Mass Storage, Driver=usb-storage, 5000M
/: Bus 02.Port 1: Dev 1, Class=root_hub, Driver=xhci-hcd/1p, 480M
/: Bus 01.Port 1: Dev 1, Class=root_hub, Driver=xhci-hcd/1p, 480M
   |__ Port 1: Dev 2, If 0, Class=Hub, Driver=hub/4p, 480M
      |__ Port 2: Dev 7, If 0, Class=Mass Storage, Driver=usb-storage, 480M
```

USB Flash Drive Read/Write

```
# dd if=/dev/urandom of=data bs=1 count=1024
# dd if=/dev/sda of=backup bs=1 count=1024 skip=4096
# dd if=data of=/dev/sda bs=1 seek=4096
# dd if=/dev/sda of=data1 bs=1 count=1024 skip=4096
# diff data data1
# dd if=backup of=/dev/sda bs=1 seek=4096
```

3.10 I2C

- I2C 0 (QPS615_I2C):
0x77: QPS615
- I2C 1 (APPS_I2C -> AOM-DB6700: I2C_PM):
0x27: TCA9555PWR GPIO Expander
0x2B: LT9611UXC (DSI to HDMI bridge)
0x2E: TPM
0x32: RTC
0x50: EEPROM
0x53: EEPROM
0x6C: PCIe CLKGEN
0x71: ERP_MCU
- I2C 3 (I2C_A -> AOM-DB6700: I2C_GP):
0x0A: SGTL5000 (Audio Codec)
0x27: TCA9555PWR GPIO Expander
0x57: EEPROM
- I2C 9 (I2C_B -> AOM-DB6700: I2C_LCD):

LCD

■ I2C Detect

```
# i2cdetect -y -r 0
    0  1  2  3  4  5  6  7  8  9  a  b  c  d  e  f
00:          -- -- -- -- -- -- -- -- -- -- -- -- --
10: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
20: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
30: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
40: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
50: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
60: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
70: -- -- -- -- -- -- -- -- UU

# i2cdetect -y -r 1
    0  1  2  3  4  5  6  7  8  9  a  b  c  d  e  f
00:          -- -- -- -- -- -- -- -- -- -- -- -- --
10: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
20: -- -- -- -- -- -- -- -- UU -- -- -- UU -- -- UU --
30: -- -- UU -- -- -- -- -- -- -- -- -- -- -- -- --
40: -- -- -- -- 44 -- -- -- -- -- -- -- -- -- -- --
50: UU -- -- 53 -- -- -- -- -- -- -- -- -- -- -- --
60: -- -- -- -- -- -- -- -- -- -- -- -- 6c 6d -- --
70: -- 71 -- -- -- -- -- -- -- -- -- -- -- -- --

# i2cdetect -y -r 3
    0  1  2  3  4  5  6  7  8  9  a  b  c  d  e  f
00:          -- -- UU -- -- -- -- -- -- -- -- --
10: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
20: -- -- -- -- -- -- -- -- UU -- -- -- -- -- -- --
30: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
40: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
50: -- -- -- -- -- -- -- -- 57 -- -- -- -- -- -- --
60: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
70: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --

# i2cdetect -y -r 9
    0  1  2  3  4  5  6  7  8  9  a  b  c  d  e  f
00:          -- -- -- -- -- -- -- -- -- -- -- -- --
10: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
20: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
30: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
40: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
50: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
60: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
70: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
```

3.11 External RTC

Set system time to current, then write to RTC

```
# date 032010452024 && hwclock -w && date
Wed Mar 20 10:45:00 UTC 2024
Wed Mar 20 10:45:01 UTC 2024
```

Set one incorrect time, then read time from RTC to verify

```
# date 010100002000 && hwclock -r && date
Sat Jan  1 00:00:00 UTC 2000
2024-03-20 10:47:33.749407+00:00
Sat Jan  1 00:00:00 UTC 2000
```

Restore the RTC time to system time

```
# hwclock -s && date
Wed Mar 20 10:49:03 UTC 2024
```

3.12 Internal Watchdog

The system will enter the ramdump mode after the system crash about 11 seconds by the following command:

```
# echo c > /proc/sysrq-trigger
```

3.13 Camera

AOM-EC-91 CAN0: 2-lane MIPI CSI (OV9282)

AOM-EC-91 CAN1: 4-lane MIPI CSI (IMX577)

AOM-EC-91 CAN2: 4-lane MIPI CSI (IMX577)

AOM-EC-91 CAN3: 4-lane MIPI CSI (IMX577)

AOM-EC-91 CAN0: 2-lane MIPI CSI (OV9282)

Preview

1280x720@30:

```
# source /opt/qcom/qirp-sdk/qirp-setup.sh
# export XDG_RUNTIME_DIR=/dev/socket/weston && export WAYLAND_DISPLAY=wayland-1 && gst-launch-1.0 -e qtiqmmfsrc camera=0 name=camsrc ! video/x-raw,format=NV12,width=1280,height=720,framerate=30/1 ! waylandsink fullscreen=true async=true sync=false
```

AOM-EC-91 CAN1: 4-lane MIPI CSI (IMX577)

Preview

(1) 3840x2160@30:

```
# source /opt/qcom/qirp-sdk/qirp-setup.sh
# export XDG_RUNTIME_DIR=/dev/socket/weston && export WAYLAND_DISPLAY=wayland-1 && gst-launch-1.0 -e qtiqmmfsrc camera=1 name=camsrc ! video/x-raw,format=NV12,width=3840,height=2160,framerate=30/1 ! waylandsink fullscreen=true async=true sync=false
```

(2) 1920x2160@30:

```
# source /opt/qcom/qirp-sdk/qirp-setup.sh
# export XDG_RUNTIME_DIR=/dev/socket/weston && export WAYLAND_DISPLAY=wayland-1 && gst-launch-1.0 -e qtiqmmfsrc camera=1 name=camsrc ! video/x-raw,format=NV12,width=1920,height=1080,framerate=30/1 ! waylandsink fullscreen=true async=true sync=false
```

AOM-EC-91 CAN2: 4-lane MIPI CSI (IMX577)**Preview****(1) 3840x2160@30:**

```
# source /opt/qcom/qirp-sdk/qirp-setup.sh
# export XDG_RUNTIME_DIR=/dev/socket/weston && export WAYLAND_DISPLAY=wayland-1 && gst-launch-1.0 -e qtiqmmfsrc camera=2 name=camsrc ! video/x-raw,format=NV12,width=3840,height=2160,framerate=30/1 ! waylandsink fullscreen=true async=true sync=false
```

(2) 1920x2160@30:

```
# source /opt/qcom/qirp-sdk/qirp-setup.sh
# export XDG_RUNTIME_DIR=/dev/socket/weston && export WAYLAND_DISPLAY=wayland-1 && gst-launch-1.0 -e qtiqmmfsrc camera=2 name=camsrc ! video/x-raw,format=NV12,width=1280,height=720,framerate=30/1 ! waylandsink fullscreen=true async=true sync=false
```

AOM-EC-91 CAN3: 4-lane MIPI CSI (IMX577)**Preview****(1) 3840x2160@30:**

```
# source /opt/qcom/qirp-sdk/qirp-setup.sh
# export XDG_RUNTIME_DIR=/dev/socket/weston && export WAYLAND_DISPLAY=wayland-1 && gst-launch-1.0 -e qtiqmmfsrc camera=3 name=camsrc ! video/x-raw,format=NV12,width=3840,height=2160,framerate=30/1 ! waylandsink fullscreen=true async=true sync=false
```

(2) 1920x2160@30:

```
# source /opt/qcom/qirp-sdk/qirp-setup.sh
# export XDG_RUNTIME_DIR=/dev/socket/weston && export WAYLAND_DISPLAY=wayland-1 && gst-launch-1.0 -e qtiqmmfsrc camera=3 name=camsrc ! video/x-raw,format=NV12,width=1920,height=1080,framerate=30/1 ! waylandsink fullscreen=true async=true sync=false
```

Multi Camera Preview

```
# source /opt/qcom/qirp-sdk/qirp-setup.sh
# export XDG_RUNTIME_DIR=/dev/socket/weston
# export WAYLAND_DISPLAY=wayland-1
# echo "performance" > /sys/devices/system/cpu/cpu0/cpufreq/scaling_governor
# echo "performance" > /sys/devices/system/cpu/cpu1/cpufreq/scaling_governor
# echo "performance" > /sys/devices/system/cpu/cpu2/cpufreq/scaling_governor
# echo "performance" > /sys/devices/system/cpu/cpu3/cpufreq/scaling_governor
# echo "performance" > /sys/devices/system/cpu/cpu4/cpufreq/scaling_governor
# echo "performance" > /sys/devices/system/cpu/cpu5/cpufreq/scaling_governor
# echo "performance" > /sys/devices/system/cpu/cpu6/cpufreq/scaling_governor
```

```
# echo "performance" > /sys/devices/system/cpu/cpu7/cpufreq/scaling_governor

# gst-launch-1.0 -e qtivcomposer name=mixer \
sink_0::position="<0, 0>" sink_0::dimensions="<1280, 800>" \
sink_1::position="<1280, 0>" sink_1::dimensions="<1280, 720>" \
sink_2::position="<0, 720>" sink_2::dimensions="<1280, 720>" \
sink_3::position="<1280, 720>" sink_3::dimensions="<1280, 720>" \
mixer. ! queue ! waylandsink enable-last-sample=false
fullscreen=true \
qtigmmfsrc video_0::type=preview name=camsrc_0 camera=0 ife-direct-
stream=1 ! 'video/x-raw,format=NV12,width=1280,height=800,framer-
ate=30/1' ! mixer. \
qtigmmfsrc name=camsrc_1 camera=1 ! video/x-raw, format=NV12,
width=1280, height=720, framerate=30/1 ! mixer. \
qtigmmfsrc name=camsrc_2 camera=2 ! video/x-raw, format=NV12,
width=1280, height=720, framerate=30/1 ! mixer. \
qtigmmfsrc name=camsrc_3 camera=3 ! video/x-raw, format=NV12,
width=1280, height=720, framerate=30/1 ! mixer.
```

3.14 M.2 Key E

Support the AIW-170BQ WIFI/BT module.

WIFI Connection

```
# lspci
0000:00:00.0 PCI bridge: Qualcomm Device 010b
0000:01:00.0 Network controller: Qualcomm QCNFA765 Wireless Network
Adapter (rev 01)

# ifconfig wlp1s0
wlp1s0    Link encap:Ethernet  HWaddr 00:0E:8E:BF:DE:0D
          UP BROADCAST MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

# vi /etc/wpa_supplicant.conf
network={
    ssid="Your SSID"
    key_mgmt=WPA-PSK
    proto=WPA RSN
    auth_alg=OPEN
    pairwise=TKIP CCMP
    group=TKIP CCMP
    psk="Your PASSWORD"
}

# wpa_supplicant -i wlp1s0 -Dnl80211 -c /etc/wpa_supplicant.conf &
# ping 8.8.8.8

# ifconfig wlp1s0
wlp1s0    Link encap:Ethernet  HWaddr 00:0E:8E:BF:DE:0D
          inet addr:172.20.10.8  Bcast:172.20.10.15
Mask:255.255.255.240
          inet6 addr: 2401:e180:8880:3d43:16fb:957b:355e:884f/64
Scope:Global
```

```

        inet6 addr: fe80::bleb:b874:c798:be6/64 Scope:Link
        UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
        RX packets:46 errors:0 dropped:0 overruns:0 frame:0
        TX packets:110 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:1000
        RX bytes:5116 (4.9 KiB)  TX bytes:14985 (14.6 KiB)

# ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8): 56 data bytes
64 bytes from 8.8.8.8: icmp_seq=0 ttl=53 time=61.347 ms
64 bytes from 8.8.8.8: icmp_seq=1 ttl=53 time=48.723 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=53 time=46.027 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=53 time=59.144 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=53 time=49.458 ms

```

BT Connection

```

# hciconfig
hci0:   Type: Primary   Bus: USB
        BD Address: 00:0E:8E:BC:4A:78  ACL MTU: 1024:7  SCO MTU:
240:8
        DOWN
        RX bytes:857 acl:0 sco:0 events:59 errors:0
        TX bytes:579 acl:0 sco:0 commands:59 errors:0

# hciconfig hci0 up
# bluetoothctl
# discoverable on
# pairable on
# scan on
[NEW] FC:18:3C:8D:75:F4 myphone
# scan off
# pair FC:18:3C:8D:75:F4
# connect FC:18:3C:8D:75:F4

```

3.15 M.2 Key B

- Support the AIW-356 4G module.
- Need to insert the nano SIM card.

4G Connection

- AIW-356

```

# lspci
0001:04:00.0 Wireless controller [0d40]: MEDIATEK Corp. Device 4d75
(rev 01)

# lsusb
Bus 003 Device 003: ID 2cb7:0104 Fibocom Fibocom FM160
Modem_SN:8AF6F50C (at+gtusbmode=32)
or
Bus 003 Device 004: ID 2cb7:0111 Fibocom Fibocom FM160
Modem_SN:8AF6F50C (at+gtusbmode=30)
# lsusb -t

```



```

/: Bus 03.Port 1: Dev 1, Class=root_hub, Driver=xhci-hcd/1p, 5000M
  |__ Port 1: Dev 2, If 0, Class=Hub, Driver=hub/4p, 5000M
    |__ Port 1: Dev 3, If 0, Class=Mass Storage, Driver=usb-storage, 5000M
      |__ Port 3: Dev 4, If 0, Class=Communications, Driver=cdc_mbm, 5000M
        |__ Port 3: Dev 4, If 1, Class=CDC Data, Driver=cdc_mbm, 5000M
          |__ Port 3: Dev 4, If 2, Class=Vendor Specific Class, Driver=option, 5000M
            |__ Port 3: Dev 4, If 3, Class=Vendor Specific Class, Driver=option, 5000M
              |__ Port 3: Dev 4, If 4, Class=Vendor Specific Class, Driver=option, 5000M
/: Bus 02.Port 1: Dev 1, Class=root_hub, Driver=xhci-hcd/1p, 480M
/: Bus 01.Port 1: Dev 1, Class=root_hub, Driver=xhci-hcd/1p, 480M
  |__ Port 1: Dev 2, If 0, Class=Hub, Driver=hub/4p, 480M

# ifconfig | grep wwan0
wwan0      Link encap:Ethernet  HWaddr 36:B7:D9:18:79:41

1. Change to the MBIM + MODEM + DIAG + AT mode (One-time Prerequisite) for the AIW-356. Default is the DIAG + MODEM + AT + PIPE + RMNET mode.
# microcom -t 15000 -s 115200 /dev/ttyUSB2
at+gtusbmode=30

2. Use the MBIM to connect the internet:
# chmod u+w /sys/bus/usb-serial/drivers/option1/new_id
# echo "2cb7 0111" > /sys/bus/usb-serial/drivers/option1/new_id
# mbimcli -d /dev/cdc-wdm0 -p --query-connection-state
# mbimcli -d /dev/cdc-wdm0 -p --query-subscriber-ready-status
# mbimcli -d /dev/cdc-wdm0 -p --set-radio-state=on
//# mbimcli -d /dev/cdc-wdm0 -p --enter-pin=0000 (If needed)
# mbim-network /dev/cdc-wdm0 start
# mbimcli -d /dev/cdc-wdm0 -p --query-ip-configuration
# /tools/modem/mbim-set-ip /dev/cdc-wdm0 wwan0

# ifconfig wwan0
wwan0      Link encap:Ethernet  HWaddr 36:B7:D9:18:79:41
           inet addr:10.70.116.33  Bcast:10.70.116.35
           Mask:255.255.255.252
           inet6 addr: fe80::b126:f214:f57c:949/64 Scope:Link
           inet6 addr: 2001:b400:e352:e30a:a370:edbb:d419:4996/64
           Scope:Global
           UP BROADCAST RUNNING NOARP MULTICAST MTU:1500 Metric:1
           RX packets:5 errors:0 dropped:0 overruns:0 frame:0
           TX packets:56 errors:81 dropped:0 overruns:0 carrier:0
           collisions:0 txqueuelen:1000
           RX bytes:1230 (1.2 KiB)  TX bytes:7856 (7.6 KiB)

# ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8): 56 data bytes
64 bytes from 8.8.8.8: icmp_seq=0 ttl=114 time=162.628 ms
64 bytes from 8.8.8.8: icmp_seq=1 ttl=114 time=49.067 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=114 time=47.258 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=114 time=50.771 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=114 time=40.334 ms

```

3.16 M.2 Key M

Support the SQF-C8BV2-128GDEDC NVME SSD.

```
# lspci
# lsblk | grep nvme0
# mount /dev/nvme0n1p1 /mnt/
# vi /mnt/test
# cat /mnt/test
```

3.17 TPM

```
# dmesg | grep tpm
# /tools/tpm/tpm_test.bin
[TPM Command]
80010000000C000001440000
[TPM Response]
80010000000A00000100

[TPM Command]
80010000000B0000014301
[TPM Response]
80010000000A00000000

[TPM Command]
8001000000160000017A000000060000010500000001
[TPM Response]
80010000001B000000000100000006000000010000010553544D20

[TPM Command]
8001000000160000017A000000060000010B00000002
[TPM Response]
800100000023000000000100000006000000020000010B000901010000010C000000
000
```

3.18 Power Button

- When the system is in the power off state, it can be power on by short pressing the Power Key.
- When the system is in the power on state, it can be power off by short pressing the Power Key.
- It can force shutdown by pressing and holding the Power Key for 5 seconds.

3.19 Reset Button

The system will reset when pressing the Reset Key.

Chapter 4

Embedded O.S

This chapter details instructions for building Linux systems.

4.1 Introduction

Advantech's AOM-5721 comes preloaded with Yocto 4.0 based embedded O.S., It contains all the system-required shell commands and drivers needed to operate the platform. We do not offer IDE developing environment on AOM-5721 BSP. Users can evaluate and develop their device using the Yocto 4.0 LTS environment.

This chapter introduces the software configuration and development of AOM-5721. It enables users to develop their application(s) efficiently.

For detailed operation, please refer to the Ubuntu Version A User Guide.

The following link directs you to the QCS6490 series Wikipedia page: https://ess-wiki.advantech.com.tw/view/AIM-Linux/BSP/Qualcomm/RISC_QCS_Linux_00011.1

Chapter 5

System Recovery

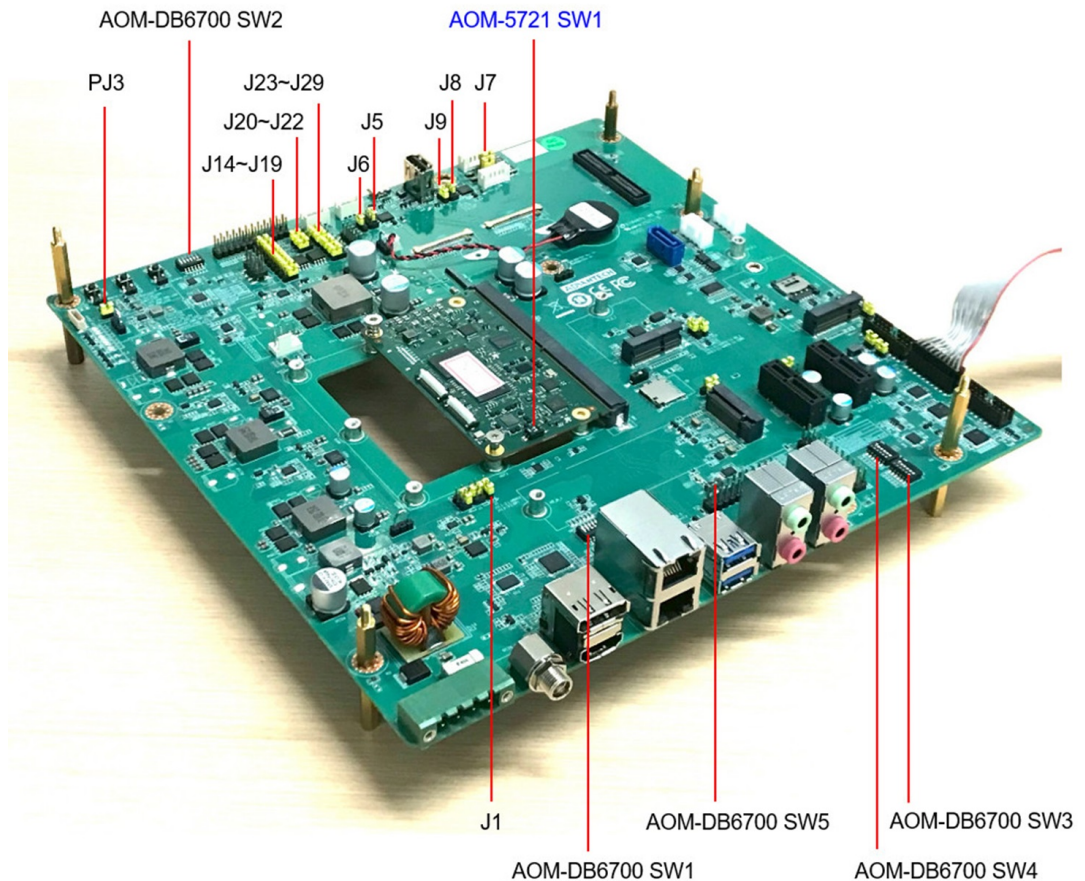
This chapter details system recovery procedures for a damaged Linux OS.

5.1 System Recovery

Using windows PCAT or Qualcomm Download (QDL) tool to flash software images to the device.

5.1.1 Emergency download (EDL) mode

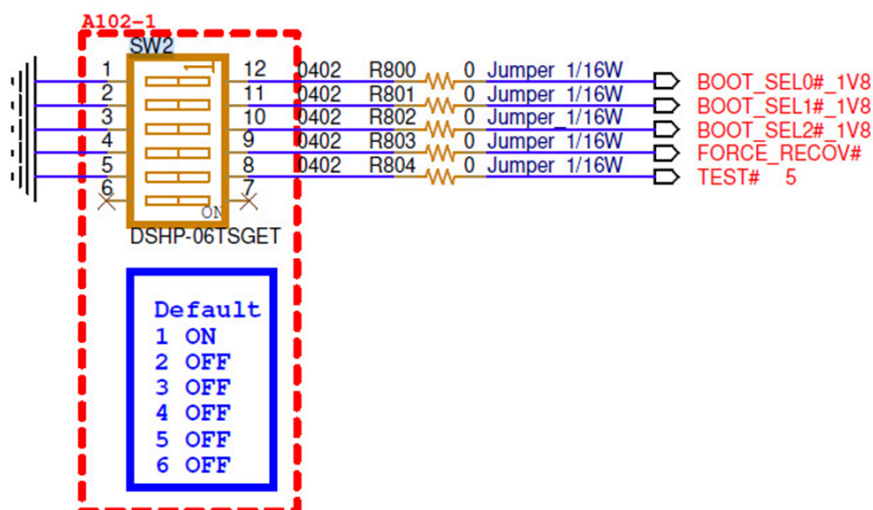
- Connect the Micro USB (EDL) to your linux host computer.



AOM-DB6700 SW2 (BOOT Selection)

- Normal Boot: SW2 set to default 1-on, 2-off, 3-off, 4-off, 5-off, 6-off
- Force Recovery (QDL Download): SW2 set to 1-on, 2-off, 3-off, 4-on, 5-off, 6-off

BOOT Select

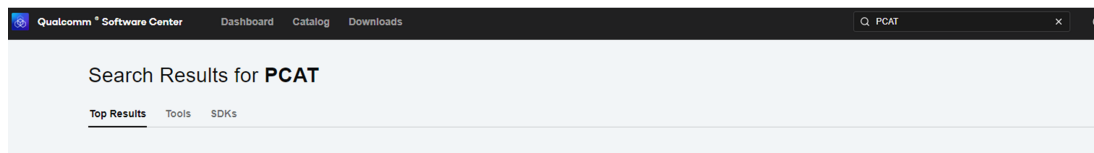


- Connect the adapter and power on the device

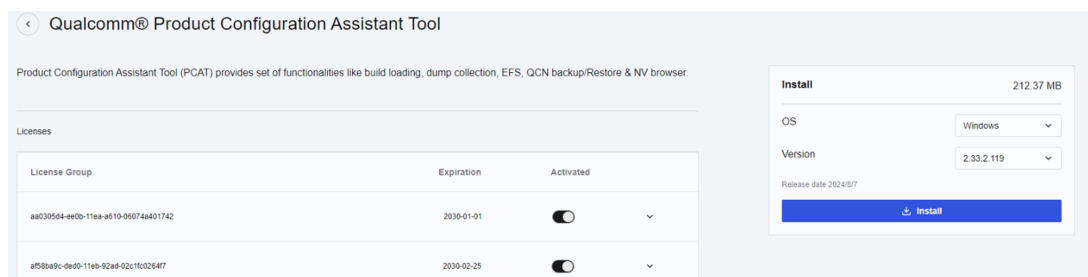
5.1.2 Windows PCAT Tool

Prepare

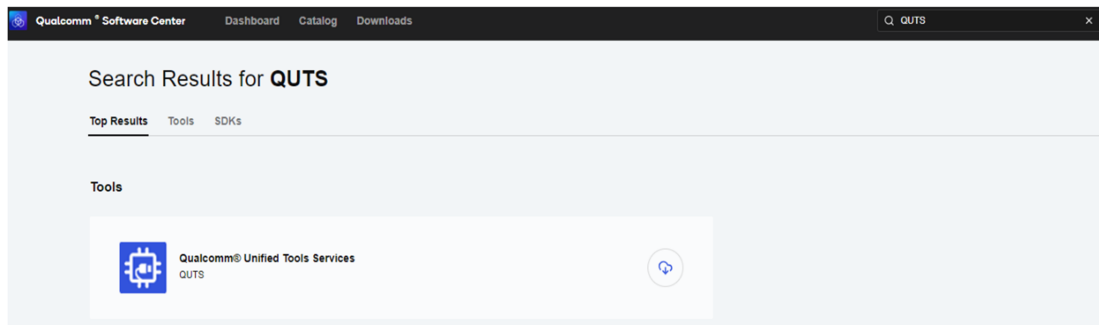
1. Download the Qualcomm Software Center:
https://softwarecenter.qualcomm.com/#/catalog/item/Qualcomm_Software_Center
2. Open the Qualcomm Software Center
3. Search "PCAT" in the search bar



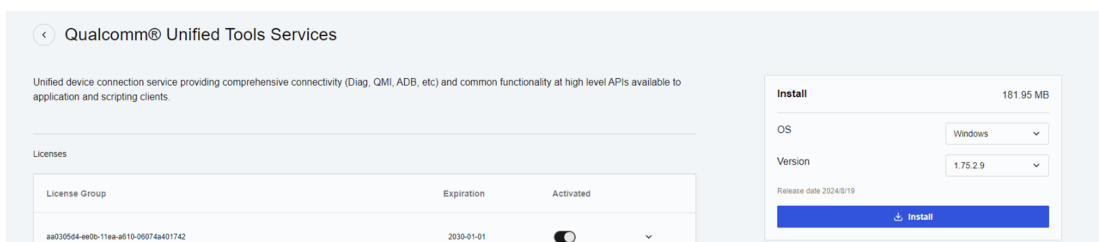
4. Click Qualcomm® Product Configuration Assistant Tool
5. Select Qualcomm® Product Configuration Assistant Tool versio : 2.33.2.119



6. Install Qualcomm® Product Configuration Assistant Tool 2.33.2.119
7. Search "QUTS" in the search bar



8. Click the Qualcomm® Unified Tools Services
9. Select Qualcomm® Unified Tools Services version : 1.75.2.9
10. Install Qualcomm® Unified Tools Services 1.75.2.9



11. You will find the new application in your Windows system .

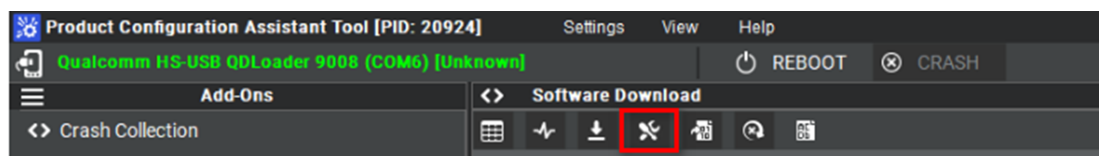


12. Unzip the UFS File and eMMC File
For example :
2860A1AIM38LIV11030_2024-11-18_ufs.tgz
2860A1AIM38LIV11030_2024-11-18_eMMC.tgz

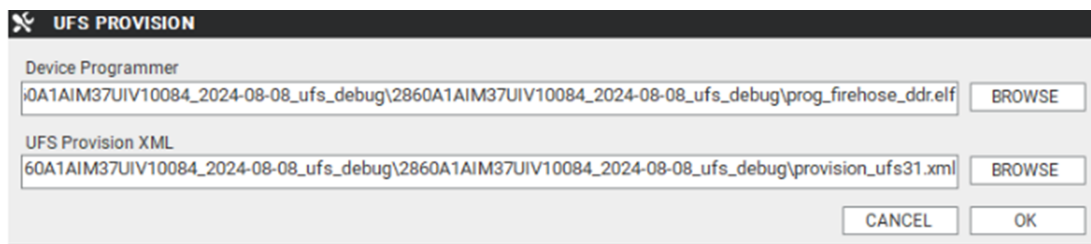
13. Connect your device via Micro USB.

5.1.3 UFS Provision

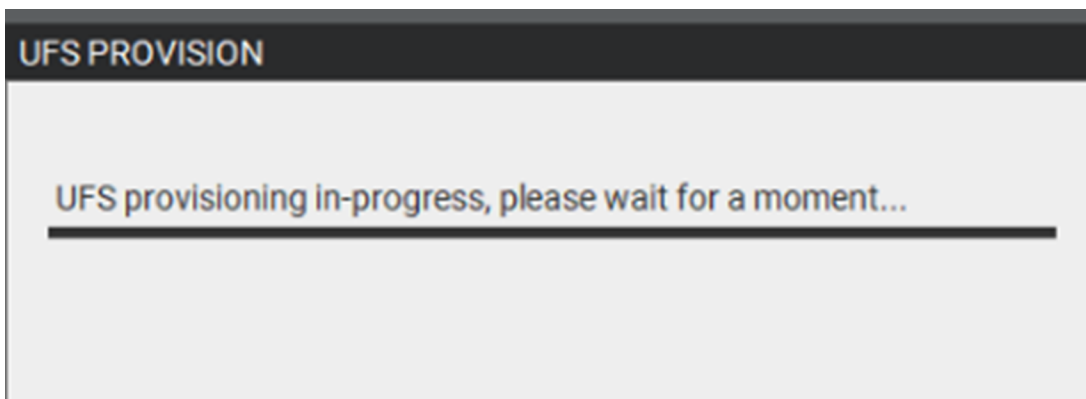
1. Select provision button



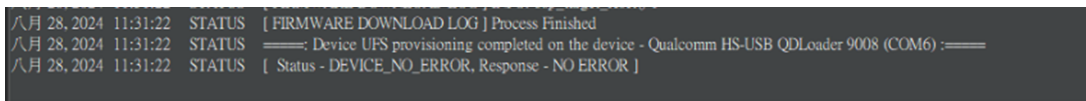
2. Add the prog_firehose_dds.elf and provision_ufs31.xml in UFS folder.



3. Then press "OK", it will start to do USF Provision.

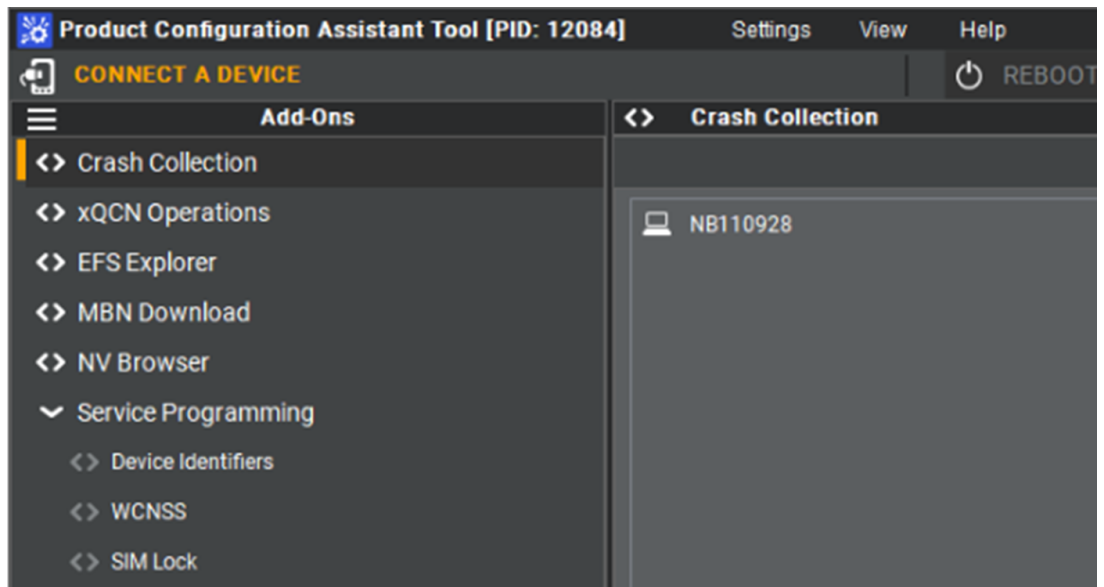


4. When the Provision finished, you can see the result in message window.

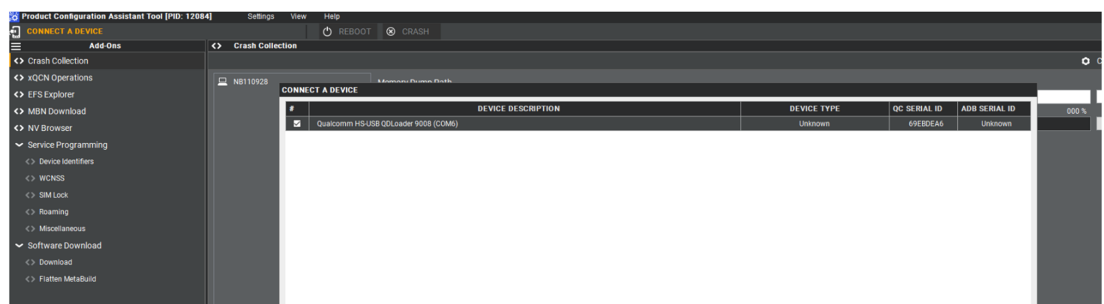


5.1.4 Flash UFS

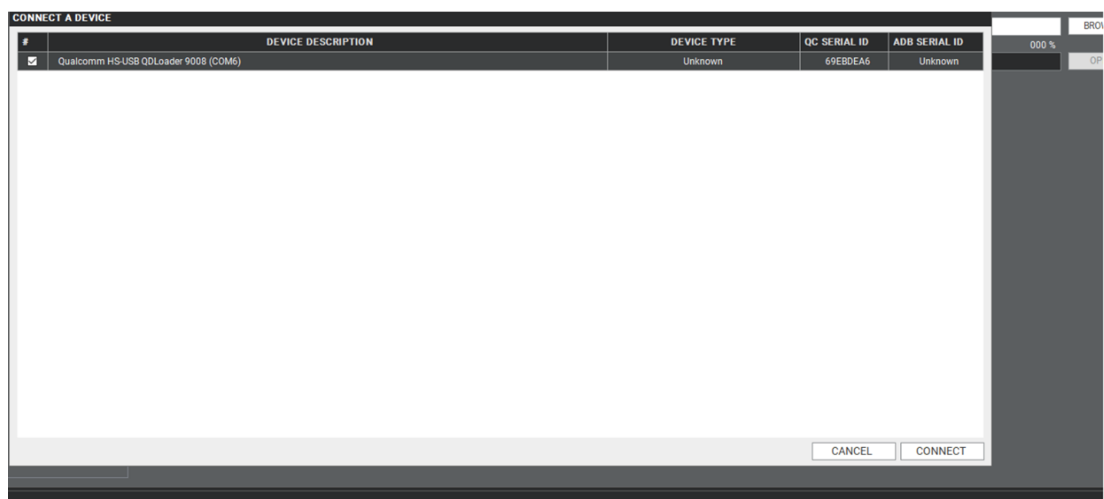
1. Change the SW1 and SW2:
 - Flash UFS: the AOM-5721 SW1 set to 1-off
 - Forced Recovery: the AOM-5721 SW1 set to 2-on or AOM-DB6700 SW2 set to 4-on
2. Turn on the power
3. Open " PCATApp" Tool
4. Click " Connect A Device"



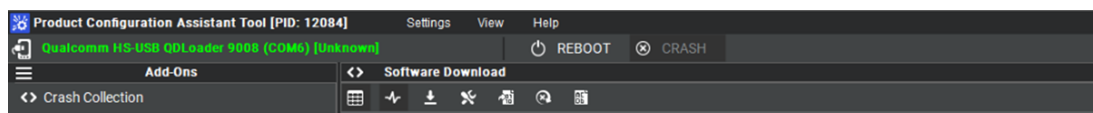
5. Select "Qualcomm HS-USB QDLoader 9008 (COM6)"



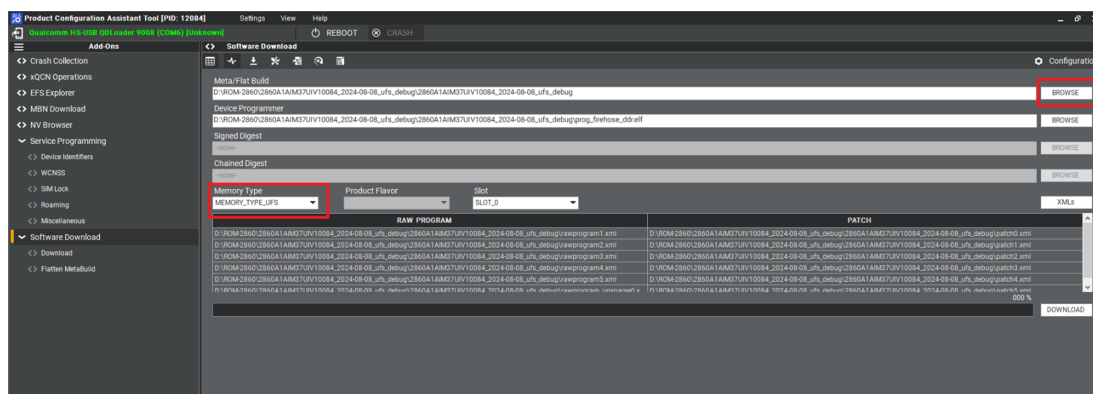
6. Click "Connect" device



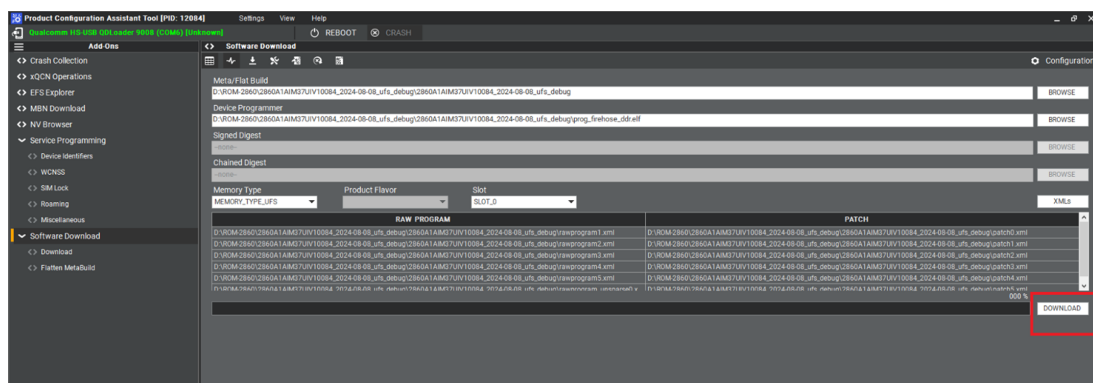
7. When you connected successfully , it will show "green word" - Qualcomm HS-USB QDLoader 9008 (COM 6)



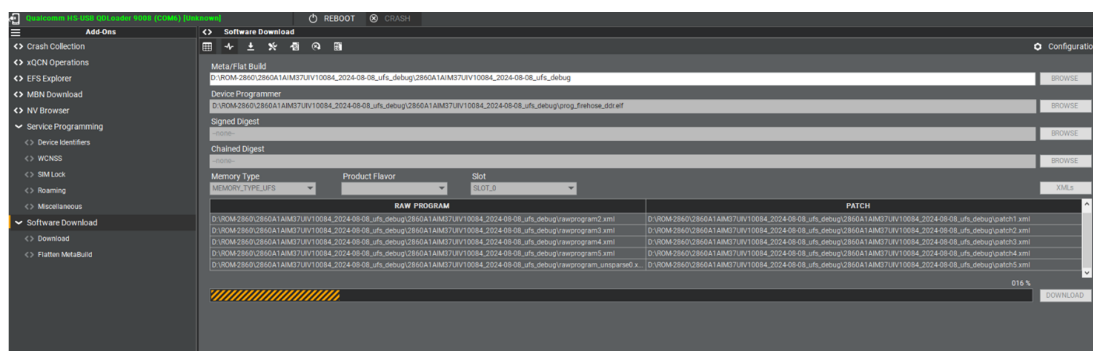
8. Select UFS Folder in PCAT Tool , the Tool will help load Files automatically and Select "MEMORY_TYPE_UFS"



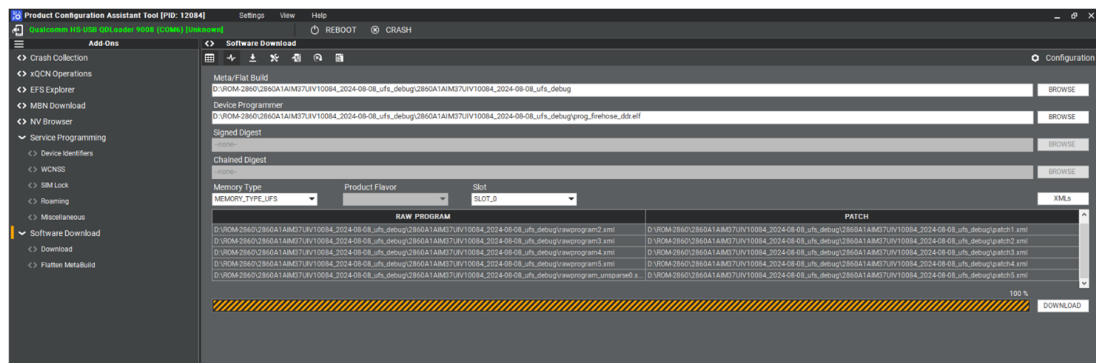
9. Click " Download"



10. UFS Download Status

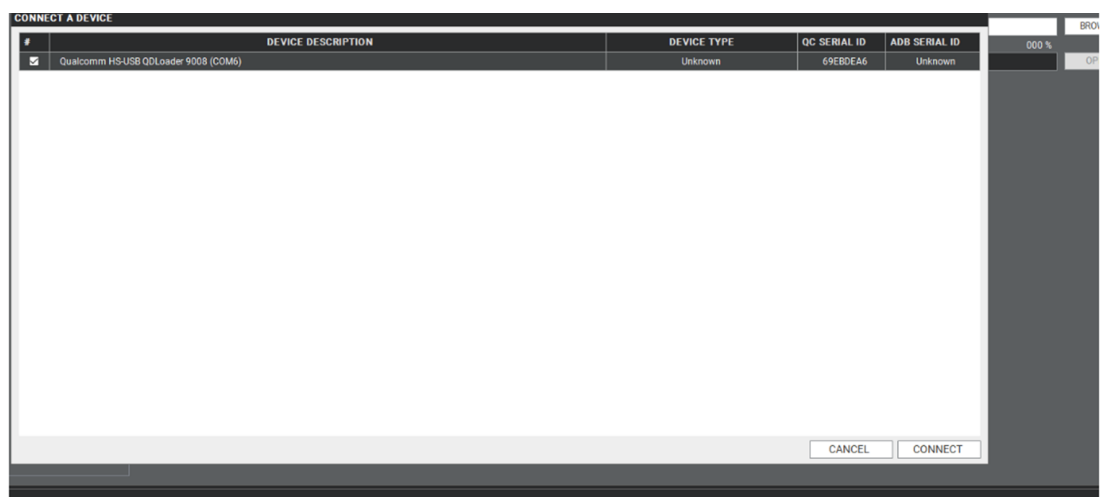


11. UFS Download completed

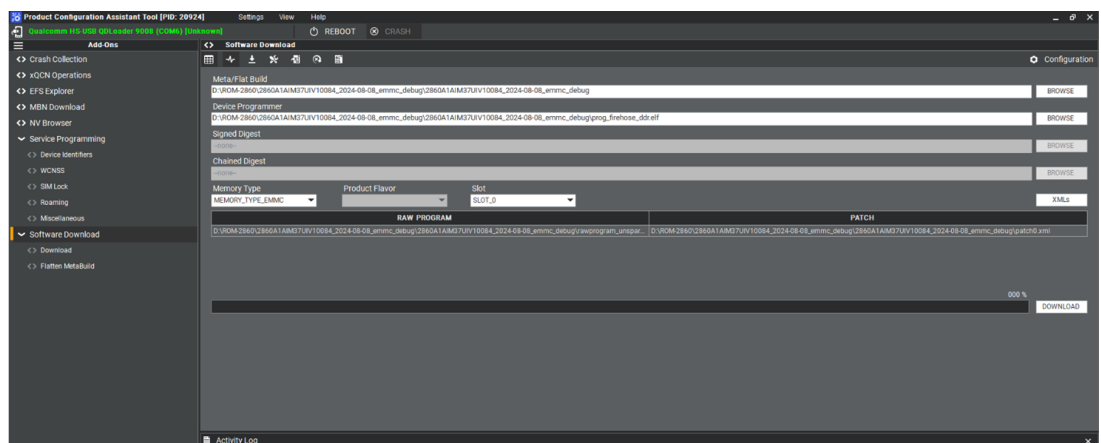


5.1.5 Flash EMMC

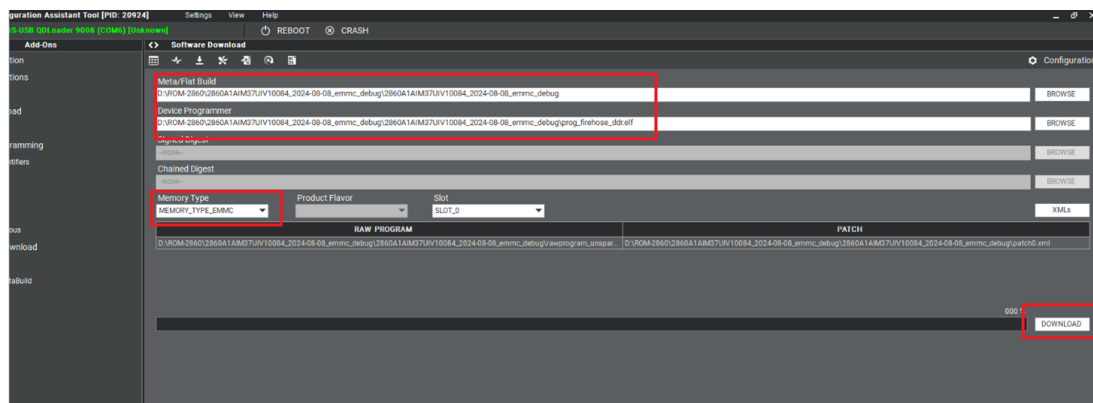
1. Turn off the Power
2. Change the SW1 and SW2
 - Flash eMMC: the AOM-5721 SW1 set to 1-on
 - Forced Recovery: the AOM-5721 SW1 set to 2-on or AOM-DB6700 SW2 set to 4-on
3. Turn on the power
4. Make sure the device connection status.
5. If the device disconnect with PCAT Tool , please connect it again.



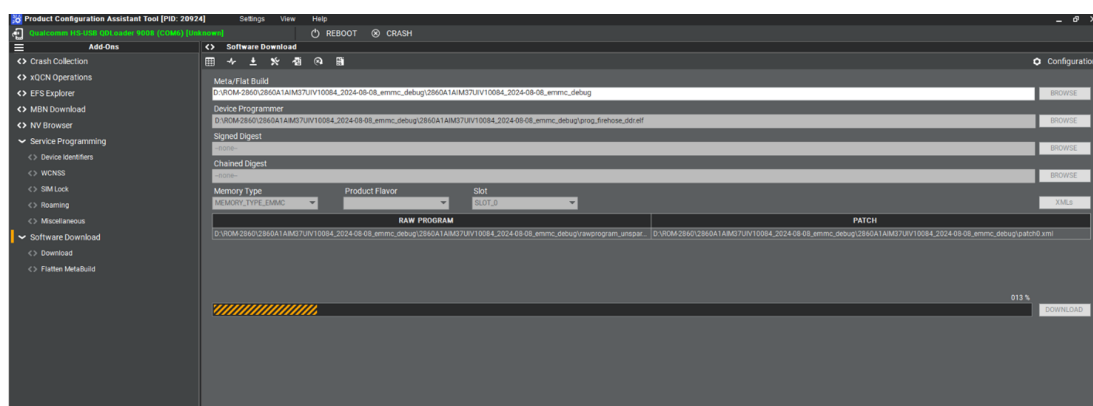
6. Select EMMC Folder.



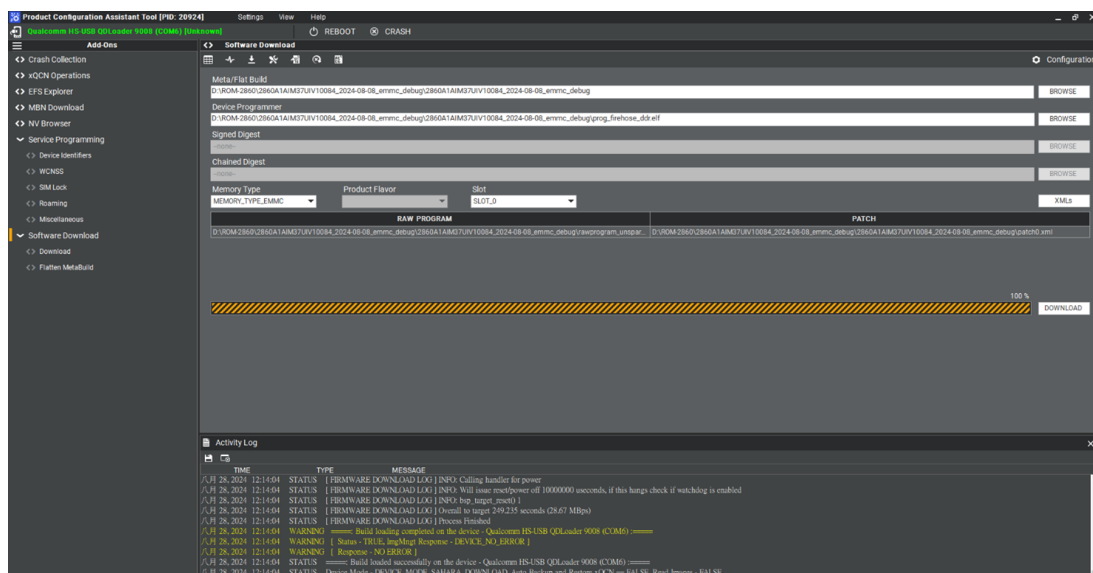
7. Make sure the setting, then press "Download" button.



8. EMMC download status



9. EMMC Download completed



5.1.6 Qualcomm Download (QDL) Tool

One-time Prerequisite

To set the udev USB rule with the Qualcomm manufacturing vendor ID 05c6:

```
$ cd /etc/udev/rules.d
$ sudo vi 51-qcom-usb.rules
# add the following
SUBSYSTEMS=="usb", ATTRS{idVendor}=="05c6", ATTRS{idProduct}=="9008", MODE="0666", GROUP="plugdev"
$ sudo systemctl restart udev
```

Use the QDL to flash images (UFS only now)

1. Ensure the QDL mode

```
$ lsusb
Bus 001 Device 028: ID 05c6:9008 Qualcomm, Inc. Gobi Wireless Modem (QDL mode)
```

2. Ensure ModemManager is not running

It is identified as a Qualcomm modem for some Linux distributions when the device is connected in USB mode. Check the status of ModemManager:

```
$ sudo systemctl status ModemManager
```

If the ModemManager is enabling, please help to stop it by:

```
$ sudo systemctl stop ModemManager
```

3. Go to the location of images in the workspace to flash the images:

```
$ cd build-qcom-robotics-ros2-humble/tmp-glibc/deploy/images/qcm6490/qcom-robotics-full-image
$ ./qdl prog_firehose_ddd.elf rawprogram*.xml patch*.xml
HELLO version: 0x2 compatible: 0x1 max_len: 1024 mode: 0
READ64 image: 13 offset: 0x0 length: 0x40
READ64 image: 13 offset: 0x40 length: 0x3f0
READ64 image: 13 offset: 0x1000 length: 0x1000
READ64 image: 13 offset: 0x2000 length: 0x260
READ64 image: 13 offset: 0x3000 length: 0x1000
READ64 image: 13 offset: 0x4000 length: 0x1000
.
.
.
Update Primary Header with CRC of Primary Header.
LOG: INFO: Calling handler for patch
Zero Out Header CRC in Backup Header.
LOG: INFO: Calling handler for patch
Update Backup Header with CRC of Backup Header.
LOG: INFO: Calling handler for patch
LOG: INFO: Calling handler for setbootablestoragedrive
LOG: INFO: Using scheme of value= 1
partition 1 is now bootable
LOG: INFO: Calling handler for power
LOG: INFO: Will issue reset/power off 100 useconds, if this hangs
check if watchdog is enabled
LOG: INFO: bsp_target_reset() 1
```

If you see the "partition 1 is now bootable" in your terminal window, the flash is successful.

Note:

If you get the following issue, please help to download the qdl file (<https://www.dropbox.com/scl/fi/nv65h778rwkhtul1gnwrr/qdl?rlkey=gzy83yt1x2qhnhqz-ra9kukhai&st=p4n42eax&dl=0>) or to build the standalone QDL.

```
$ ./qdl prog_firehose_ddr.elf rawprogram*.xml patch*.xml
-bash: ./qdl: No such file or directory
```

How to build the standalone QDL?

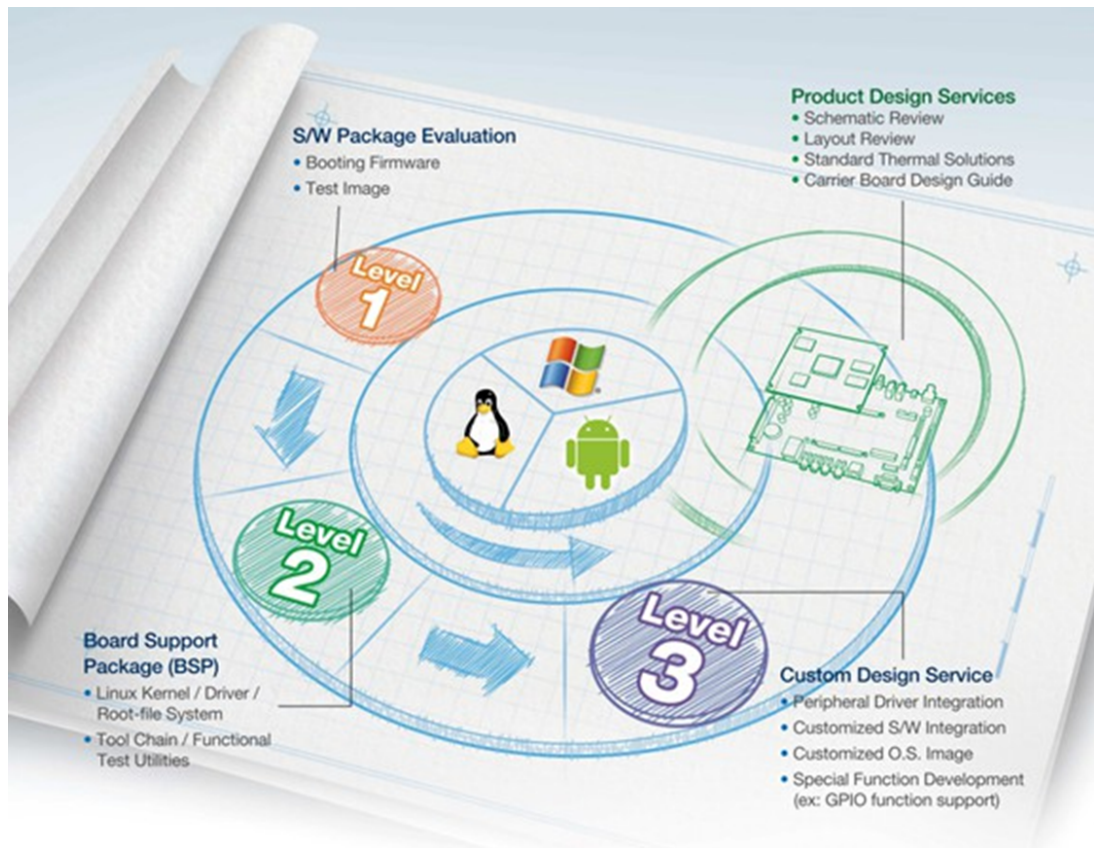
```
$ sudo apt-get install libxml2-dev libudev-dev
$ git clone https://git.code-linaro.org/linaro/qcomlts/qdl.git
$ cd qdl
$ make
```


Chapter 6

Advantech Services

This chapter outlines Advantech's Design-In services, technical support, and warranty policy for AOM-5721.

6.1 RISC Design-In Services



Advantech RISC Design-in Services help customers reduce the time and work involved with designing new carrier boards. We handle the complexities of technical research and greatly minimize the development risks associated with carrier boards.

Easy Development

Advantech has support firmware, root file-system, BSP, and other development tools for customers. These help customers develop their carrier board and differentiate their embedded products and applications.

- Full range of RISC products
- Comprehensive document support

Design Assistance Service

Advantech provides a checklist for engineers to check their schematics and review services based on customer carrier board schematics. These services prevent design errors before they occur. This saves time and reduces costs associated with developing carrier boards.

- Schematic review
- Placement and layout review
- Debugging assistance services
- General/Special reference design database

Thermal Solution Services

In order to provide quicker flexible solutions for customer's thermal designs, Advantech provides services including both modularized thermal solutions and customized thermal solutions

- Standard thermal solutions
- Customized thermal solutions

Embedded Software Services

This service provides support drivers, software integration and customized firmware, root file-system, and Linux image. Users can save time and focus on their core development.

- Embedded Linux/ Android OS
- Advantech boot loader customization

With the spread of industrial computing, a whole range of new applications has been developed, resulting in a fundamental change in the IPC industry. Due to diverse market demands and intense competition, cooperation on vertical integration is an effective way to create competitive advantages. As a result, ARM-based CPU modules have grown in popularity. Concentrating all necessary components on CPU modules and placing other parts on the carrier board provides greater flexibility while retaining low power consumption credentials.

Advantech has identified the following common questions concerning the implementation of modular designs.

Data Acquisition

Despite obtaining sufficient information for making decisions concerning specialized vertical applications, some customers encounter difficulties dealing with platform design, and communicating with the CPU/chipset manufacturers. These challenges in carrier board design can negatively impact time-to-market at the expense of market opportunities.

Software Development and Modification

Compared to x86 architectures, RISC architectures use simpler instruction sets. Software support for x86 platforms cannot be used on RISC platforms. System integrators (SI) need to develop software for their system and integrate it with hardware themselves. Unlike x86 platforms, RISC platforms are not well supported by Board Support Packages (BSP) and drivers. While driver support is provided, system integration still requires a lot of effort. The BSP provided by CPU manufacturers is usually tailored for carrier board design, making system integration for software difficult.

Addressing this, Advantech introduced Streamlined Design-in Support Services for RISC-based Computer on Modules (COM). With a dedicated professional design-in services team, Advantech actively participates in carrier board design and problem solving. Advantech's services not only enable customers to effectively distribute their resources, but also reduce R&D costs and hardware investment.

By virtue of a cooperative relationship with leading original manufacturers of CPUs and chipsets - such as ARM, TI, and NXP - Advantech helps solve communication and technical support difficulties. This can reduce the uncertainties in product development. Advantech's professional software team focuses on providing complete Board Support Packages. They also help customers create a software development environment for their RISC platforms.

Advantech RISC design-in services helps customers reduce time to market by overcoming their problems through streamlined services.

Along with our multi-stage development process which includes: planning, design, integration, and validation, Advantech's RISC design-in service provides comprehensive support during the following different phases:

Planning Stage

Before deciding to adopt Advantech RISC COM, customers must go through a complete survey process, detailing product features, specifications, and compatibility testing with software. Advantech offers a RISC Customer Solution Board (CSB) as an evaluation tool for carrier boards which are simultaneously designed when developing RISC COMs. In the planning stage, customers can use this evaluation board to assess RISC modules and test peripheral hardware. Advantech provides standard software Board Support Packages (BSP) for RISC COM, so that customers can define their product's specifications while simultaneously verifying I/O and performance. Advantech also offers software evaluation and peripheral module recommendations (such as WiFi, 3G, BT). At this stage, Advantech seeks to resolve customer concerns. Product evaluation with a focus on performance and specification is vital during the planning period. Therefore, Advantech helps their customers conduct all the necessary tests for their RISC COM.

Design Stage

Advantech will supply a reference carrier board design guide when a product moves into the design stage. The carrier board design guide provides pin definitions for the COM connectors with limitations and recommendations for carrier board design. This design guide gives customers clear guidelines during their carrier board development. Advantech offers a complete pin-out check list for different form factors such as Q7, ULP and RTX2.0, enabling carrier board signals and layout design examination. Advantech's team helps customers review the placement/layout and schematics. This helps carrier board designs fulfill customers' requirements. Advantech's RISC software team assists in establishing an environment for software development while evaluating the time and resources needed. Advantech can also cooperate with a third party to provide proficient consulting services in software development. With Advantech's professional support, the design process is eased and product quality is improved; thus meeting customer targets.

Integration Stage

This phase comprises HW/SW integration, application development, and peripheral module implementation. Due to the lack of knowledge and experience using platforms, customers need to spend a certain amount of time on analyzing integration problems. In addition, peripheral module implementation is relevant to driver designs on carrier boards. RISC platforms usually have less support for ready-made drivers on carrier boards, therefore users need to learn by trial and error to get the best solution with the least effort. Advantech's team has years of experience in customer support and HW/SW development. Advantech supports customers with professional advice and information shortening development time and enabling effective product integration.

Validation Stage

After the completion of a customer's ES sample there is a series of verification steps. In addition to verifying a product's functionality, testing a product's efficiency is an important stage for RISC platforms. Through an efficient verification process, backed by Advantech's technical support, customers optimize their applications with ease. Advantech's team can provide professional consulting services regarding further testing and equipment usage. This helps customers find the right tools to efficiently identify and solve problems to enhance product quality and performance.

6.2 Contact Information

The contact information for Advantech customer service is below:

Table 6.1: Contact Information	
Region/Country	Contact Information
United States of America	1-888-576-9688
Brazil	0800-770-5355
Mexico	01-800-467-2415
Europe (Toll Free)	00800-2426-8080
Singapore & SAP	65-64421000
Malaysia	1800-88-1809
Australia (Toll Free)	1300-308-531
China (Toll Free)	800-810-0345 800-810-8389 Sales@advantech.com.cn
India (Toll Free)	1-800-425-5071
Japan (Toll Free)	0800-500-1055
Korea (Toll Free)	080-363-9494 080-363-9495
Taiwan (Toll Free)	0800-777-111
Russia (Toll Free)	8-800-555-01-50

Alternatively, you can contact the Advantech service team via our website.

http://www.advantech.com.tw/contact/default.aspx?page=contact_form2&subject=Technical+Support

Our technical support engineers will provide a quick response to your queries

6.3 Technical Support and Assistance

6.3.1 Warranty Policy

The warranty policy for Advantech products is provided below.

6.3.1.1 Warranty Period

Advantech branded off-the-shelf products and third-party off-the-shelf products used to assemble Advantech's Configure-to-Order products are entitled to a two-year global warranty. Products defect in design, materials, or workmanship are covered from the date of shipment.

All customized products will have a 15-month regional warranty by default. The actual product warranty terms and conditions may vary based on the sales contract.

All third-party products purchased separately will be covered by the original manufacturer's warranty and time period, and shall not exceed one year of coverage through Advantech.

6.3.1.2 Repairs under Warranty

It is possible to obtain a replacement product (cross-shipment) within the first 30 days after purchase. Contact your original Advantech supplier to arrange a replacement if the product was purchased directly from Advantech and was DOA (dead-on-arrival). The DOA cross-shipment excludes any shipping damage, customized and/or build-to-order products.

For products that are not DOA, the return fee to an authorized Advantech repair facility will be at the customer's expense. The shipping fee for reconstructed products from Advantech back to the customer will be at Advantech's expense.

6.3.1.3 Exclusions from Warranty

The product is excluded from warranty if:

- The product has been found to be defective after expiry of the warranty period.
- Warranty has been voided by removal or alternation of the product or part identification labels.
- The product has been misused, abused, or subjected to unauthorized disassembly/modification; placed in an unsuitable physical or operating environment; improperly maintained by the customer; or failure from which Advantech is not responsible whether by accident or other cause. Such conditions will be determined by Advantech at its sole discretion.
- The product is damaged beyond repair due to a natural disaster, such as a lightning strike, flood, earthquake, etc.
- The product is sent for updates, upgrades, or tests at the request of the customer who is without warranty.

6.3.2 Repair Process

6.3.2.1 Obtaining an RMA Number

All returns from customers must be authorized with an Advantech RMA (return merchandise authorization) number. Any returns of defective units or parts without valid RMA numbers will not be accepted; they will be returned to the customer at the customer's cost without prior notice.

An RMA number is only an authorization for returning a product; it is not an approval for repair or replacement. To request an RMA number, visit Advantech's RMA website: <http://erma.advantech.com.tw> and use an authorized user ID and password.

You must fill out basic product and customer information and describe the problems encountered in detail in "Problem Description". Vague entries such as "does not work" and "failure" are not acceptable.

If you are uncertain about the cause of the problem, please contact Advantech's application engineers. They may be able to find a solution that does not require sending the product in for repair.

The serial number of the entire product is required even if only a component is returned for repair. Otherwise, the case will be regarded as out-of-warranty.

6.3.2.2 Returning Products for Repair

Customers may be able to save time and meet end-user requirements by returning defective products to any authorized Advantech repair facility without an extra cross-region charge. Customers are required to contact their local repair center before global repair service will be offered.

We recommend sending cards without accessories (manuals, cables, etc.). Remove any unnecessary components from the card, such as the CPU, DRAM, and CF card. If you send all these parts back (because you believe they may be part of the problem), please clearly state that they are included. Otherwise, Advantech will not be responsible for any items not listed. Ensure that the Problem Description is enclosed.

European customers who are located outside the European community are requested to use UPS as the shipping company. We strongly recommend adding a packing list to all shipments. Please prepare a shipment invoice according to the following guidelines to minimize goods clearance time:

1. Give a low value to the product on the invoice, or additional charges will be levied by customs that will be borne by the sender.
2. Add information "Invoice for customs purposes only with no commercial value" to the shipment invoice.
3. Show RMA numbers, product serial numbers, and warranty status on the shipment invoices.
4. Add information about the goods Country of origin.

In addition, attach an invoice with the RMA number to the carton, write the RMA number on the outside of the carton, and attach the packing slip to save handling time. Please also address the parts directly to the Service Department and mark the package "Attn. RMA Service Department".

All products must be returned in properly packed ESD material or anti-static bags. Advantech reserves the right to return unrepaired items at the customer's cost if inappropriately packed.

Door-to-Door transportation, such as speed post, is recommended for delivery. Otherwise, the sender should bear additional charges such as clearance fees if air cargo shipment methods are used.

Should DOA cases fail, Advantech will take full responsibility for the product and transportation charges. If the items are not DOA, but fail within warranty, the sender will bear the freight charges. For out-of-warranty cases, customers must cover the cost and take care of both outward and inward transportation.

6.3.2.3 Service Charges

The product is excluded from warranty if:

- The product is sent for repair after the warranty period is expired.
- The product is tested or calibrated after the warranty period is expired, and a NPF (no problem found) result is obtained.
- The product, though repaired within the warranty period, has been misused, abused, or subjected to unauthorized disassembly/modification; placed in an unsuitable environment; improperly maintained by the customer; or failure for which Advantech is not responsible whether by accident or other cause. Such conditions will be determined by Advantech at its sole discretion.
- The product is damaged beyond repair due to a natural disaster, such as a lightning strike, flood, earthquake, etc.
- The product is sent for updates, upgrades, or tests at the request of the customer who is without warranty.

If a product has been repaired by Advantech, and within three months after such a repair the product requires another repair for the same problem, Advantech will conduct the repair free of charge. However, free repairs do not apply to products that have been misused, abused, or subjected to unauthorized disassembly/modification; placed in an unsuitable environment; improperly maintained by the customer; or failure for which Advantech is not responsible whether by accident or other cause. Please contact your nearest regional service center for detailed service quotations.

Before beginning out-of-warranty repairs, we will send you a pro forma invoice (P/I) with the repair charges stated. When you remit the funds, reference the P/I number listed under "Our Ref". Advantech reserves the right to deny repair services to customers who do not return the DOA unit or sign the P/I. Additionally, Advantech will scrap defective products without prior notice if customers do not return the signed P/I within three months.

6.3.2.4 Repair Report

Advantech returns each product with a repair report that shows the result of the repair. A repair analysis report can also be provided upon request. If the defect is not caused by Advantech's design or manufacturing, customers will be charged US\$60 or US\$120 for in-warranty or out-of-warranty repair analysis reports, respectively.

6.3.2.5 Custody of Products Submitted for Repair

Advantech will retain custody of a product submitted for repair for one month while waiting for the return of a signed P/I or payment (A/R). If the customer fails to respond within this period, Advantech will close the case automatically. Advantech will take reasonable measures to contact the customer during this one month period.

6.3.2.6 Shipping Back to Customer

The forwarding company for RMA returns from Advantech to customers is selected by Advantech. Other express services, such as UPS or FedEx, can be used upon request. However, the customer must bear the extra costs of alternative shipment methods. If you require any special arrangements, please specify this when shipping the product to us.



Enabling an Intelligent Planet

www.advantech.com

Please verify specifications before quoting. This guide is intended for reference purposes only.

All product specifications are subject to change without notice.

No part of this publication may be reproduced in any form or by any means, electronic, photocopying, recording or otherwise, without prior written permission from the publisher.

All brand and product names are trademarks or registered trademarks of their respective companies.

© Advantech Co., Ltd. 2026