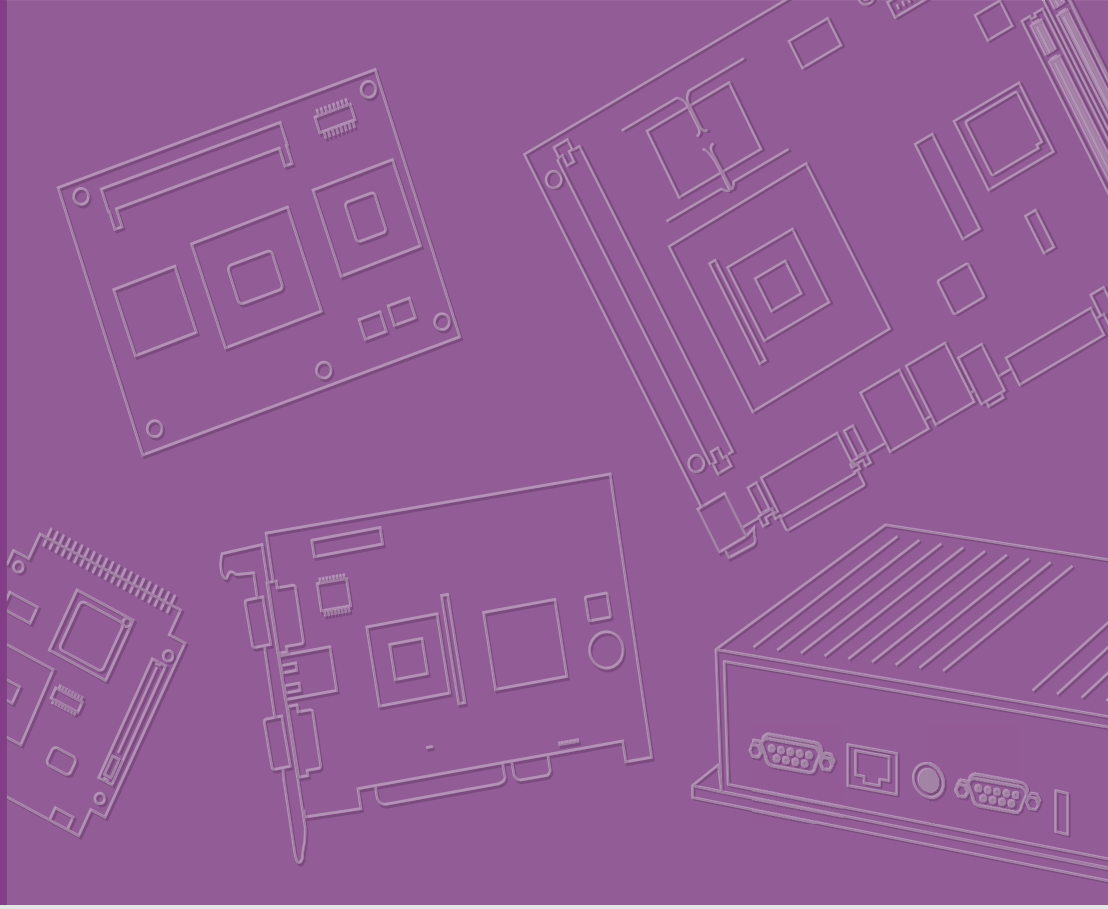

User Manual

ROM-DB5901

Development Board for SMARC v2.0 RISC Module Series

ADVANTECH

Enabling an Intelligent Planet

Copyright

Acknowledgements

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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 an RMA (return merchandize authorization) 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.

Part No. 2006590100 Edition 1

Printed in Taiwan February 2020

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.

Warnings, Cautions and Notes

Warning! *Warnings indicate conditions, which if not observed, can cause personal injury!*

Caution! *Cautions are included to help you avoid damaging hardware or losing data. e.g.*

There is a danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

Note! *Notes provide optional additional information.*

Packing List

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

96965901000	ASS'Y ROM-DB5901 A101-2 SMARC carry board	1
1700023138-01	M cable micro USB 5P(M)/USB-A 4P(F) 40cm for APS	1
1700023619-01	A cable USB-A 4P(M)/micro USB 5P(M) 1m ADAM-T212	1
1700019474	M cable D-SUB 9P(F)/D-SUB 9P(F) RS232/R	1
1701100300	COM port/ debug port cable	1
1700021941-01	SATA power	1
1700004711-11	SATA signal	1
1700021882-01	LVDS backlight cable	1
1700021883-01	LVDS cable	1

Optional Accessories

Part No.	Description
9696EG56000	Daughter board for DSI to HDMI
9696MEG510E	Daughter board for audio codec
9696EG55000	Daughter board for MIPI camera
9680015487	Camera 5M MIPI I/F CCM module HAC-002005-B3A
9680015491	PCIe to miniPCIe adapter card
96LEDK- A070WV40NB1	7" LCD AUO G070VW01 V0 w/o touch

SMARC CPU Boards

Part No.	Description
ROM-5720CD-PEA1E	SMARC2.0 NXP i.MX8M Dual 1.5GHz, 2GB, 0~60°C
ROM-5720CQ-PEA1E	SMARC2.0 NXP i.MX8M Quad 1.5GHz, 2GB, 0~60°C
ROM-5720WD-OEA1E	SMARC2.0 NXP i.MX8M Dual 1.3GHz, 2GB, -40~85°C
ROM-5720WQ-OEA1E	SMARC2.0 NXP i.MX8M Quad 1.3GHz, 2GB, -40~85°C

Designed to be compatible with all further Advantech ROM SMARC 2.0 modules (Ex: ROM-5620, ROM-5721)

Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it 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. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. 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 by transient overvoltage.
12. Never pour any 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 one of the following situations arises, get the equipment checked by service personnel:
    - The power cord or plug is damaged.
    - Liquid has penetrated into the equipment.
    - The equipment has been exposed to moisture.
    - The equipment does not work well, or you cannot get it to work according to the user's manual.
    - The equipment has been dropped and damaged.
    - The equipment has obvious signs of breakage.
15. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -20° C (-4° F) OR ABOVE 60° C (140° F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.
16. CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER, DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.

The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70 dB (A).

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 Introduction

This chapter gives background information on the ROM-DB5901

Sections include:

- Introduction
- Specifications

1.1 Introduction

ROM-DB5901 is an Evolution Carrier Board (EVB) designed for SMARC 2.0 module. Compatible with ROM-5720 (i.MX 8M), ROM-5620 (i.MX 8X) and ROM-5721 (i.MX 8M Mini), its multiple I/O interfaces are suitable for embedded designers to get started and evaluate the SMARC 2.0 modular platform.ROM-DB5901 comes with RISC SMARC carrier board design documents: Carrier Board Design Guide, Layout, Schematic checklist, and also the reference board schematics ready for you to start your own carrier board design.

- Supports SGeT SMARC v2.0 CPU Module Board
- ATX Form Factor
- Wide Temp. Supports: -40~85°C
- 2 x MIPI CSI-2 Interface for Camera Module
- 4 Display Outputs: HDMI, 2 single 24-bits LVDS or MIPI-DSI, DP
- 2 x RJ-45, 1 x USB 3.0 Type C, 1 x USB 2.0 OTG,
- 1 x USB 3.0, 1 x USB 2.0, 2 x USB 2.0 Pin Headers,
- 4 x UARTs, 2 x CAN Bus, 12 x GPIOs,
- 1 x SATA/SATA-DOM, 3 x PCIe by 1 Slots
- Supports HD Audio Codec
- Supports +12V DC and Lithium-ion Battery Power Input

1.2 Product Specifications

Compatible Module		Advantech SMARC v2.0 CPU Module Series
Graphic	HDMI	1 HDMI TypeA
	LVDS / MIPI-DSI	2 Single Channel 24-bit LVDS / 2 MIPI-DSI
	DP	1 DP
Ethernet	10/100/100 Mbps	2 RJ45
Storage	SD	1 SD Card Slot
	SATA	1 SATAIII Connector (with SATA-DOM Support)
I/O	USB	1 USB 3.0 Type C Connector
		(Output: 5V/9V/12V@3A, Input: 12V/15V/20V@3A)
		1 Micro USB Type AB (USB 2.0 OTG)
		1 USB Type A Stacking Conn.(USB3.0 & USB2.0 Host)
		2 USB 2.0 Pin Header
	UART	2 4-wire RS-232/422/485, 2 RS-232 Pin Headers
	Audio	1 1/8 Audio Jack (I2S HD Audio)
	CAN	2 CAN 2.0B Ports, Differential Mode +5V
	GPIO	12 GPIO Ports
	I2C	1 I2C Pin Header
	SPI	1 SPI, 1 ESPI
	Camera input	1 2-Lane, 1 4-Lane MIPI-CSI2
	M.2	1 M.2 Key E Conn.
		(USB, PCIe, SDIO, I2S & UART)
Expansion	PCIe slot	3 PCIe x1
Power input	Power	2 Power Inputs (+12V DC-Jack, Lithium-ion battery)
Environment	Operation	-40~85° C
	Operating Humidity	0% ~ 90% Relative Humidity, Non-condensing
Physical Characteris-tics	Dimensions	305 x 244 mm (12" x 9.6")

Chapter 2

H/W Installation

This chapter gives mechanical and connector information on the ROM-DB5901 carrier board

Sections include:

- Connector Information
- Mechanical Drawing
- Hardware Installation

2.1 Module Form Factor

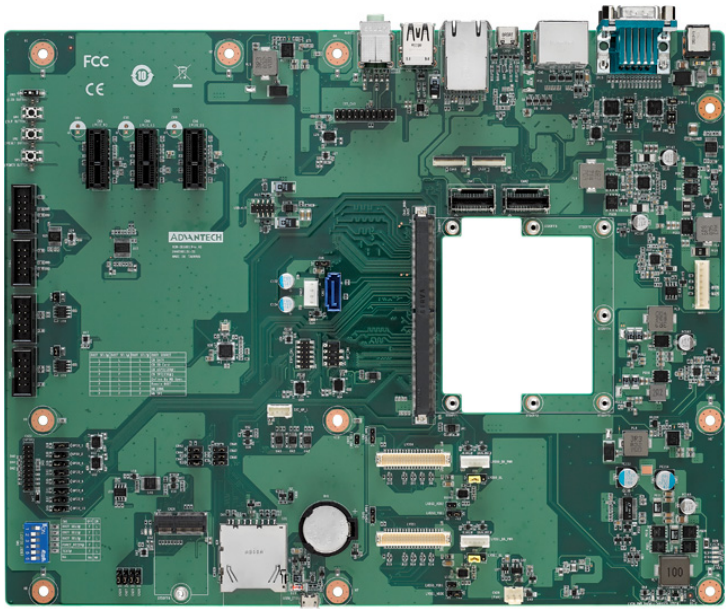
SMARC form factor size, 82mm(W)*50mm(D) or 82mm(W)*80mm(D).

2.2 Environmental Specifications

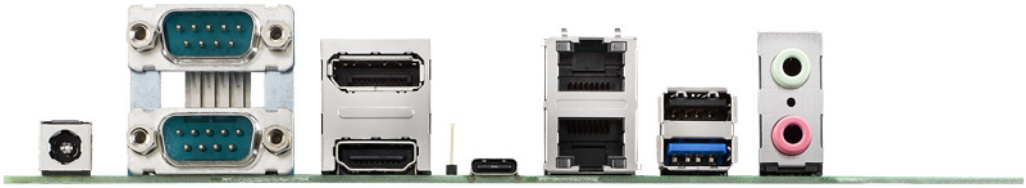
- **Operating temperature:** -40~85° C
  The operating temperature refers to the environmental temperature for the model.
- **Operating humidity:** 0% ~ 90% relative humidity, non-condensing
- **Storage temperature:** -40~85° C
- **Relative humidity:** 95%
- **Weight (g):** 80 g (weight of total package)

2.3 ROM-DB5901 Looks

2.3.1 ROM-DB5901 Overview



2.3.2 I/O Connectors



2.4 Connector, Jumper Settings, Switch and LED

2.4.1 Rear I/O Panel

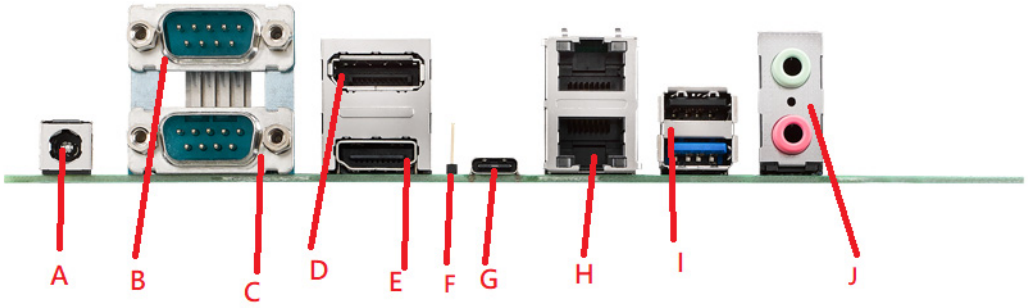


Table 2.1: External I/O Connector

Position	Description	Name
DCIN1	DC Jack	A
CN15A	UART Port 0	B
CN15B	UART Port 2	C
CN1A	DP Port	D
CN1B	HDMI Port	E
CN33	Type C Controller Programming Header (Reserved Only)	F
CN34	USB Type C	G
CN8	GbE Ethernet Connector Port	H
CN3	USB Port 1/ 2	I
Audio1	MIC Input/ Audio Output	J

Table 2.2: DCIN1 (DC-Jack, +12v Power Input)

Pin	Signal	Pin	Signal
1	+12V	Shield	GND

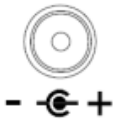


Table 2.3: CN15A (UART0, RS232/RS422/RS485)			
Pin	**Signal**	**1Pin**	**Signal**
1	422/485TX-	2	RS232 RXD or 422/485TX+
3	RS232 TXD or 422/485RX+	4	422/485RX-
5	GND	6	-
7	RTS#	8	CTS#
9	-		

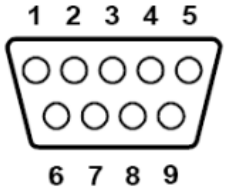


Table 2.4: CN15B (UART2, RS232/RS422/RS485)			
Pin	**Signal**	**Pin**	**Signal**
1	422/485TX-	2	RS232 RXD or 422/485TX+
3	RS232 TXD or 422/485RX+	4	422/485RX-
5	GND	6	-
7	RTS#	8	CTS#
9	-		

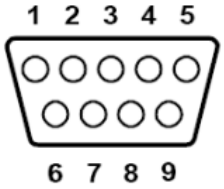


Table 2.5: CN1A (DP)			
Pin	**Signal**	**Pin**	**Signal**
1	DP0_LAN0_+	2	GND
3	DP0_LAN0_-	4	DP0_LAN1_+
5	GND	6	DP0_LAN1_-
7	DP0_LAN2_+	8	GND
9	DP0_LAN2_-	10	DP0_LAN3_+
11	GND	12	DP0_LAN3_-
13	DP0_CONFIG_1	14	DP0_CONFIG_2
15	DP0_AUX+	16	GND
17	DP0_AUX-	18	DP0_HPD
19	GND	20	+3V

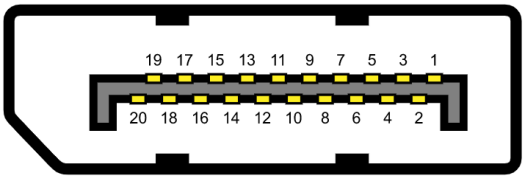


Table 2.6: CN1B(HDMI)			
Pin	**Signal**	**Pin**	**Signal**
1	HDMI_D2+	2	GND
3	HDMI_D2-	4	HDMI_D1+
5	GND	6	HDMI_D1-
7	HDMI_D0+	8	GND
9	HDMI_D0-	10	HDMI_CK+
11	GND	12	HDMI_CK-
13	HDMI_CEC	14	-
15	CTRL_CK	16	CTRL_DAT
17	GND	18	+5V
19	HPD		

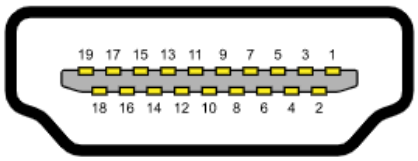


Table 2.7: CN33 (SWD Programming Header Reserved Only)			
Pin	**Signal**	**Pin**	**Signal**
1	V3P3	2	GND
3	CCG5_XRES	4	CCG5_SWD_CLK
5	CCG5_SWD_IO		

Table 2.8: CN34 (USB Type C)			
Pin	**Signal**	**Pin**	**Signal**
A1	GND	A2	SSTX+1
A3	SSTX-1	A4	VBUS_C
A5	CCG5_CC1	A6	USB3_D+
A7	USB3_D-	A8	-
A9	VBUS_C	A10	SSRX-2
A11	SSRX+2	A12	GND
B1	GND	B2	SSTX+2
B3	SSTX-2	B4	VBUS_C
B5	CCG5_CC2	B6	USB3_D+
B7	USB3_D-	B8	-
B9	VBUS_C	B10	SSRX-1
B11	SSRX+1	B12	GND

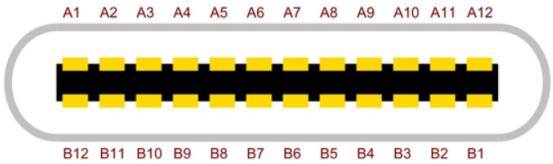


Table 2.9: CN8 (CN8A: GbE0, CN8B: GbE1)			
Pin	**Signal**	**Pin**	**Signal**
A1	GBE_MDI0+	A2	GBE_MDI0-
A3	GBE_MDI1+	A4	GBE_MDI1-
A5	GBE_MDI2+	A6	GBE_MDI2-
A7	GBE_MDI3+	A8	GBE_MDI3-
A9	GBE_CTREF	A10	GND
B1	GBE1_MDI0+	B2	GBE1_MDI0-
B3	GBE1_MDI1+	B4	GBE1_MDI1-
B5	GBE1_MDI2+	B6	GBE1_MDI2-
B7	GBE1_MDI3+	B8	GBE1_MDI3-
B9	GBE1_CTREF	B10	GND
11	+V3	12	GBE1_LINK_ACT#
13	GBE1_LINK100#	14	GBE1_LINK1000#
15	+V3	16	GBE_LINK_ACT#
17	GBE_LINK100#	18	GBE_LINK1000#

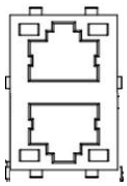


Table 2.10: CN3 (USB Port 1/2)			
Pin	**Signal**	**Pin**	**Signal**
1	+VBUS_USB2	2	USB2-
3	USB2+	4	GND
5	USB2_SSRX-	6	USB2_SSRX+
7	GND	8	USB2_SSTX-
9	USB2_SSTX+	10	+VBUS_USB1
11	USB_D-1	12	USB_D+1
13	GND		

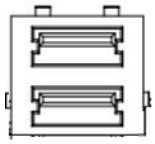


Table 2.11: Audio1 (Audio Output)			
Pin	**Signal**	**Pin**	**Signal**
1	GND	2	-
3	-	4	-
5	MIC-IN	22	HP_L
23	-	24	-
25	HP_R		

2.4.2 Internal I/O

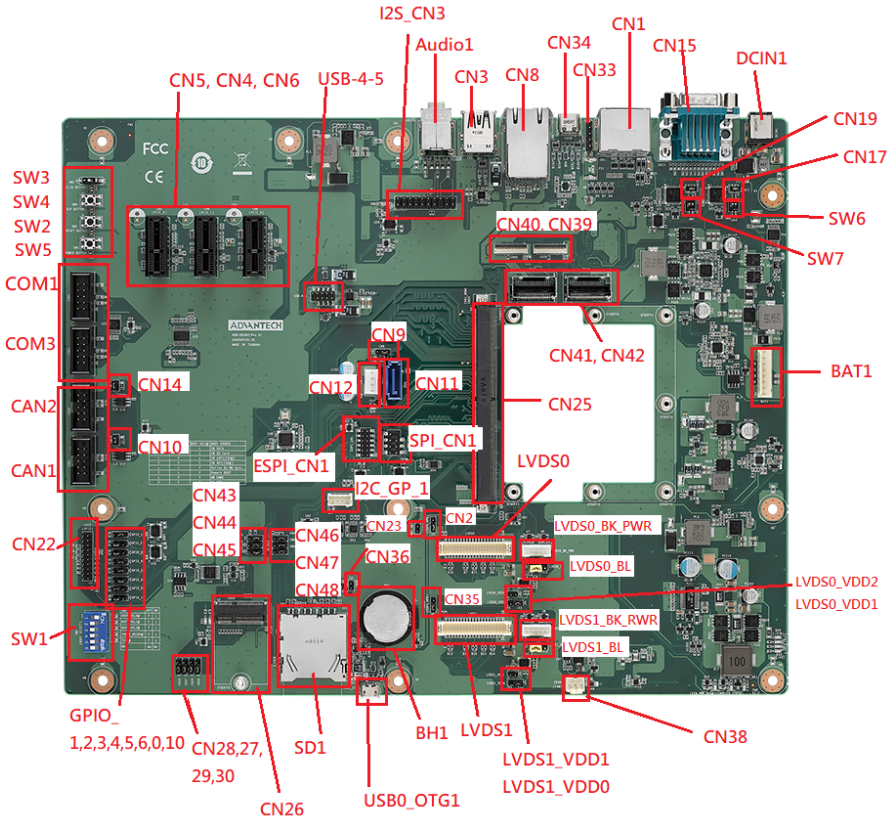


Table 2.12: Internal I/O Connector

Position	Description	Connector Type
BAT1	PIN Header for Battery	WAFER 8P 2.54mm 180D(M) DIP A2543WV2-8P
BH1	RTC Battery Holder	BATTERY HOLDER 24.9*23.4*8.9 CR2032 BH800.4GG
CAN1	CANBus Port 1	BOX HEADER 5x2P 2.54mm 180D(M) DIP 23N6960-10S10
CAN2	CANBus Port 2	BOX HEADER 5x2P 2.54mm 180D(M) DIP 23N6960-10S10
COM1	COM Port 1	BOX HEADER 5x2P 2.54mm 180D(M) DIP 23N6960-10S10
COM3	COM Port 3 (Debug Port)	BOX HEADER 5x2P 2.54mm 180D(M) DIP 23N6960-10S10
CN4	PCIex1 Connector 1	PCIEXPRESS 36P 180D(F) DIP 2EG01817-D2D-DF
CN5	PCIex1 Connector 2	PCIEXPRESS 36P 180D(F) DIP 2EG01817-D2D-DF
CN6	PCIex1 Connector 3	PCIEXPRESS 36P 180D(F) DIP 2EG01817-D2D-DF
CN11	SATA Connector	Serial ATA 7P 1.27mm 180D(M) DIP WATM-07DBN4A3B8
CN12	SATA Power Connector	WAFER 4P 2.5mm 180D(M) DIP 24W1161-04S10-01T
CN22	GPIOx8 sets	PIN HEADER 10x2P 2.0mm 180D(M) DIP 21N22050

CN25	MXM 3.0 Connector	MXM Conn. 314P 90D(F) SMD AS0B821-S78B-7H
CN26	M.2 Key E Slots	NGFF 75P 0.5mm 90D(F) H=4.2mm SMD AS0BC21-S40BE
CN38	FAN (Reserved)	WTB Con. 3P 2.54mm 180D(M) DIP A2543WV0-3P-6T-5e
CN39	MIPI-CSI1 (FPC, 4-Lane)	FPC 39P, 0.6mm, H0.9mm
CN40	MIPI-CSI0 (FPC, 2-Lane)	FPC 39P, 0.6mm, H0.9mm
CN41	MIPI-CSI0 (Mini-SAS, 2-Lane)	Mini SAS 36P/0.8mm/(M)/LCP/VA/G15u/ S/BK/W
CN42	MIPI-CSI1 (Mini-SAS, 4-Lane)	Mini SAS 36P/0.8mm/(M)/LCP/VA/G15u/ S/BK/W
ESPI_CN1	ESPI	PIN HEADER 6x2P 2.0mm180D(M) SMD 21N22050-12M00B
I2C_GP_1	I2C Pin Header	WAFER BOX 4P 2.00mm 180D(M) DIP 721-81-04TW00
I2S_CN3	Audio Codec Board	PIN HEADER 2x10P 2.54mm 180D(M) DIP 21N22564
LVDS0	LVDS0	Wafer 2x20P/1.25mm/(M)/NY9T/VA/GFL/ S/WH/W
LVDS0_BK_PWR	LVDS0 Back Light	WAFER BOX 5P 2.0mm 180D(M) DIP A2001WV2-5P
LVDS1	LVDS1	Wafer 2x20P/1.25mm/(M)/NY9T/VA/GFL/ S/WH/W
LVDS1_BK_PWR	LVDS1 Back Light	WAFER BOX 5P 2.0mm 180D(M) DIP A2001WV2-5P
SD1	SD Card Slot	SD CARD 9P 90D(F) SMD WK2192C-S3D-7H
SPI_CN1	SPI Pin Header	PIN HEADER 4x2P 2.54mm 180D(M) SMD 21N22564
SW2	Reset Button	TACT SW STS-091 SMD 4P H=3.8mm
SW4	SLP Button	TACT SW STS-091 SMD 4P H=3.8mm
SW5	Power Button	TACT SW STS-091 SMD 4P H=3.8mm
USB0_OTG1	USB OTG	Micro USB 5P/0.65mm/(F)/NY9T/GFL/ RA/S/BK/B
USB-4-5	USB Port 4, Port 5	PIN HEADER 2x5P 2.0mm 180D(M) SMD 21N22050

2.4.3 Connectors

Table 2.13: BAT1 (Lithium-ion Battery Power Input)

Pin	Signal	Pin	Signal
1	GND	2	GND
3	BAT_TEMP	4	BAT_ID_CN
5	I2C_DAT_BAT	6	I2C_CK_BAT
7	+VBATT	8	+VBATT

Table 2.14: BH1 (RTC Battery Holder)

Pin	Signal	Pin	Signal
1	BAT_RTC	2	GND

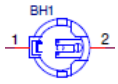


Table 2.15: CAN1 (CAN0 Port)

Pin	Signal	Pin	Signal
1	-	2	-
3	CAN0_D-	4	-
5	CAN0_D+	6	-
7	-	8	-
9	GND	10	-

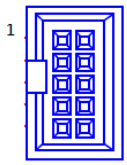


Table 2.16: CAN2 (CAN1 Port)			
Pin	**Signal**	**Pin**	**Signal**
1	-	2	-
3	CAN1_D-	4	-
5	CAN1_D+	6	-
7	-	8	-
9	GND	10	-

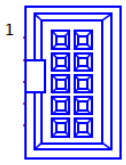


Table 2.17: COM1 (COM1 Port)			
1	-	2	-
3	COM1_RX	4	-
5	COM1_TX	6	-
7	-	8	-
9	GND	10	-

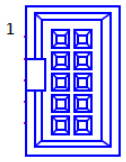


Table 2.18: COM3 (COM3 Port, Debug Port)			
Pin	**Signal**	**Pin**	**Signal**
1	-	2	-
3	COM3_RX	4	-
5	COM3_TX	6	-
7	-	8	-
9	GND	10	-

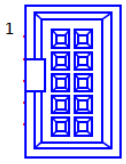


Table 2.19: CN4 PCIex1 Connector 1 (PCIe_C)			
Pin	**Signal**	**Pin**	**Signal**
B1	+12V	A1	PCIE_C_X_PRSNT#
B2	+12V	A2	+12V
B3	+12V	A3	+12V
B4	GND	A4	GND
B5	PCIE_C_CK	A5	PCIEX_C_JTAG2
B6	PCIE_C_DAT	A6	PCIEX_C_JTAG3
B7	GND	A7	-
B8	+3V3_PCIE	A8	PCIEX_C_JTAG5
B9	PCIEX_C_JTAG1	A9	+3V3_PCIE
B10	+3V3_PCIE	A10	+3V3_PCIE
B11	PCIE_C_WAKE#	A11	PCIE_C_RST#
		Mechanical Key	
B12	-	A12	GND
B13	GND	A13	PCIE_C_X_REFCK+
B14	PCIE_C_X_TX+	A14	PCIE_C_X_REFCK-
B15	PCIE_C_X_TX-	A15	GND
B16	GND	A16	PCIE_C_X_RX+
B17	+3V3_PCIE	A17	PCIE_C_X_RX-
B18	GND	A18	GND

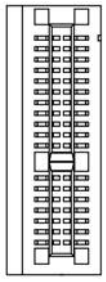


Table 2.20: CN5 PCIex1 Connector 2 (PCIe_B)			
Pin	**Signal**	**Pin**	**Signal**
B1	+12V	A1	PCIE_B_X_PRSNT#
B2	+12V	A2	+12V
B3	+12V	A3	+12V
B4	GND	A4	GND
B5	PCIE_B_CK	A5	PCIEX_B_JTAG2
B6	PCIE_B_DAT	A6	PCIEX_B_JTAG3
B7	GND	A7	-
B8	+3V3_PCIE	A8	PCIEX_B_JTAG5
B9	PCIEX_B_JTAG1	A9	+3V3_PCIE
B10	+3V3_PCIE	A10	+3V3_PCIE
B11	PCIE_B_WAKE#	A11	PCIE_B_RST#
		Mechanical Key	
B12	-	A12	GND
B13	GND	A13	PCIE_B_X_REFCK+
B14	PCIE_B_X_TX+	A14	PCIE_B_X_REFCK-
B15	PCIE_B_X_TX-	A15	GND
B16	GND	A16	PCIE_B_X_RX+
B17	+3V3_PCIE	A17	PCIE_B_X_RX-
B18	GND	A18	GND

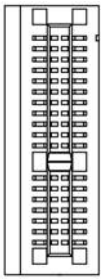


Table 2.21: CN6 PCIex1 Connector 3 (PCIe_D)			
Pin	**Signal**	**Pin**	**Signal**
B1	+12V	A1	PCIE_D_X_PRSNT#
B2	+12V	A2	+12V
B3	+12V	A3	+12V
B4	GND	A4	GND
B5	PCIE_D_CK	A5	PCIEX_D_JTAG2
B6	PCIE_D_DAT	A6	PCIEX_D_JTAG3
B7	GND	A7	-
B8	+3V3_PCIE	A8	PCIEX_D_JTAG5
B9	PCIEX_D_JTAG1	A9	+3V3_PCIE
B10	+3V3_PCIE	A10	+3V3_PCIE
B11	PCIE_D_WAKE#	A11	PCIE_D_RST#
	Mechanical Key		
B12	-	A12	GND
B13	GND	A13	PCIE_D_CK+
B14	PCIE_D_X_TX+	A14	PCIE_D_CK-
B15	PCIE_D_X_TX-	A15	GND
B16	GND	A16	PCIE_D_X_RX+
B17	+3V3_PCIE	A17	PCIE_D_X_RX-
B18	GND	A18	GND

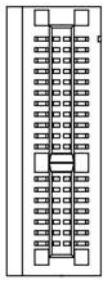


Table 2.22: CN11 (SATA Connector)			
Pin	**Signal**	**Pin**	**Signal**
1	GND	2	SATA_TX+
3	SATA_TX-	4	GND
5	SATA_RX-	6	SATA_RX+
7	SATA_DOM_PIN7	-	-

Table 2.23: CN12 (SATA Power Connector)			
Pin	**Signal**	**Pin**	**Signal**
1	+5V	2	GND
3	GND	4	+12V

Table 2.24: CN22 (GPIO Pin Header)			
Pin	**Signal**	**Pin**	**Signal**
1	+V3_GPIO	2	GND
3	GPIO0_CN33	4	GPIO1_CN33
5	GPIO2_CN33	6	GPIO3_CN33
7	GPIO4_CN33	8	GPIO5_CN33
9	GPIO6_CN33	10	GPIO7_C
11	GPIO8_C	12	GPIO9_C
13	GPIO10_CN33	14	GPIO11_C
15	-	16	-
17	-	18	-
19	-	20	-

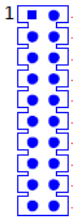


Table 2.25: CN25 (MXM 3.0 Connector)			
Pin	**Signal**	**Pin**	**Signal**
P1	SMB_ALERT_1V8#	S1	I2C_CAM1_CK
P2	GND	S2	I2C_CAM1_DAT
P3	CSI1_CK+	S3	GND
P4	CSI1_CK-	S4	-
P5	GBE1_SDP (TP11)	S5	I2C_CAM0_CK
P6	GBE0_SDP (TP12)	S6	CAM_MCK
P7	CSI1_D0+	S7	I2C_CAM0_DAT
P8	CSI1_D0-	S8	CSI0_CK+
P9	GND	S9	CSI0_CK-
P10	CSI1_D1+	S10	GND
P11	CSI1_D1-	S11	CSI0_D0+
P12	GND	S12	CSI0_D0-
P13	CSI1_D2+	S13	GND
P14	CSI1_D2-	S14	CSI0_D1+
P15	GND	S15	CSI0_D1-
P16	CSI1_D3+	S16	GND
P17	CSI1_D3-	S17	GBE1_MDI0+
P18	GND	S18	GBE1_MDI0-
P19	GBE_MDI3-	S19	GBE1_LINK100#
P20	GBE_MDI3+	S20	GBE1_MDI1+
P21	GBE_LINK100#	S21	GBE1_MDI1-
P22	GBE_LINK1000#	S22	GBE1_LINK1000#
P23	GBE_MDI2-	S23	GBE1_MDI2+
P24	GBE_MDI2+	S24	GBE1_MDI2-
P25	GBE_LINK_ACT#	S25	GND
P26	GBE_MDI1-	S26	GBE1_MDI3+
P27	GBE_MDI1+	S27	GBE1_MDI3-
P28	GBE_CTREF	S28	GBE1_CTREF
P29	GBE_MDI0-	S29	PCIE_D_TX+
P30	GBE_MDI0+	S30	PCIE_D_TX-
P31	SPI0_CS1#	S31	GBE1_LINK_ACT#
P32	GND	S32	PCIE_D_RX+
P33	SDIO_WP	S33	PCIE_D_RX-
P34	SDIO_CMD	S34	GND
P35	SDIO_CD#	S35	USB4+
P36	SDIO_CK	S36	USB4-
P37	SDIO_PWR_EN	S37	USB3_VBUS_DET
P38	GND	S38	AUDIO_MCK
P39	SDIO_D0	S39	I2S0_LRCK
P40	SDIO_D1	S40	I2S0_SDOUT
P41	SDIO_D2	S41	I2S0_SDIN
P42	SDIO_D3	S42	I2S0_CK
P43	SPI0_CS0#	S43	ESPI_ALERT0#
P44	SPI0_CK	S44	ESPI_ALERT1#
P45	SPI0_DIN	S45	(TP5)

Table 2.25: CN25 (MXM 3.0 Connector)			
P46	SPI0_DO	S46	(TP6)
P47	GND	S47	GND
P48	SATA_TX+	S48	I2C_GP_CK
P49	SATA_TX-	S49	I2C_GP_DAT
P50	GND	S50	I2S2_LRCK
P51	SATA_RX+	S51	I2S2_SDOUT
P52	SATA_RX-	S52	I2S2_SDIN
P53	GND	S53	I2S2_CK
P54	ESPI_CS0#	S54	SATA_ACT#
P55	ESPI_CS1#	S55	USB5_EN_OC#
P56	ESPI_CK	S56	ESPI_IO_2
P57	ESPI_IO_0	S57	ESPI_IO_3
P58	ESPI_IO_1	S58	ESPI_RESET#
P59	GND	S59	USB5+
P60	USB0+	S60	USB5-
P61	USB0-	S61	GND
P62	USB0_EN_OC#	S62	USB3_SSTX+
P63	USB0_VBUS_DET	S63	USB3_SSTX-
P64	USB0_OTG_ID	S64	GND
P65	USB1+	S65	USB3_SSRX+
P66	USB1-	S66	USB3_SSRX-
P67	USB1_EN_OC#	S67	GND
P68	GND	S68	USB3_3+
P69	USB2+	S69	USB3_3-
P70	USB2-	S70	GND
P71	USB2_EN_OC#	S71	USB2_SSTX+
P72	-	S72	USB2_SSTX-
P73	-	S73	GND
P74	USB3_EN_OC#	S74	USB2_SSRX+
P75	PCIE_A_RST#	S75	USB2_SSRX-
P76	USB4_EN_OC#	S76	PCIE_B_RST#
P77	-	S77	PCIE_C_RST#
P78	-	S78	PCIE_C_RX+
P79	GND	S79	PCIE_C_RX-
P80	PCIE_C_REFCK+	S80	GND
P81	PCIE_C_REFCK-	S81	PCIE_C_TX+
P82	GND	S82	PCIE_C_TX-
P83	PCIE_A_REFCK+	S83	GND
P84	PCIE_A_REFCK-	S84	PCIE_B_REFCK+
P85	GND	S85	PCIE_B_REFCK-
P86	PCIE_A_RX+	S86	GND
P87	PCIE_A_RX-	S87	PCIE_B_RX+
P88	GND	S88	PCIE_B_RX-
P89	PCIE_A_TX+	S89	GND
P90	PCIE_A_TX-	S90	PCIE_B_TX+
P91	GND	S91	PCIE_B_TX-
P92	HDMI_D2+	S92	GND

Table 2.25: CN25 (MXM 3.0 Connector)			
P93	HDMI_D2-	S93	DP0_LANE0_+
P94	GND	S94	DP0_LANE0_-
P95	HDMI_D1+	S95	DP0_AUX_SEL
P96	HDMI_D1-	S96	DP0_LANE1_+
P97	GND	S97	DP0_LANE1_-
P98	HDMI_D0+	S98	DP0_HPD
P99	HDMI_D0-	S99	DP0_LANE2_+
P100	GND	S100	DP0_LANE2_-
P101	HDMI_CK+	S101	GND
P102	HDMI_CK	S102	DP0_LANE3_+
P103	GND	S103	DP0_LANE3_-
P104	HDMI_HPD	S104	USB3_OTG_ID
P105	HDMI_CTRL_CK	S105	DP0_AUX+
P106	HDMI_CTRL_DAT	S106	DP0_AUX-
P107	-	S107	LCD1_BKLT_EN
P108	GPIO0	S108	LVDS1_DSI1_CK+
P109	GPIO1	S109	LVDS1_DSI1_CK-
P110	GPIO2	S110	GND
P111	GPIO3	S111	LVDS1_DSI1_D0+
P112	GPIO4	S112	LVDS1_DSI1_D0-
P113	GPIO5	S113	EDP_HPD
P114	GPIO6	S114	LVDS1_DSI1_D1+
P115	GPIO7	S115	LVDS1_DSI1_D1-
P116	GPIO8	S116	LCD1_VDD_EN
P117	GPIO9	S117	LVDS1_DSI1_D2+
P118	GPIO10	S118	LVDS1_DSI1_D2-
P119	GPIO11	S119	GND
P120	GND	S120	LVDS1_DSI1_D3+
P121	I2C_PM_CK	S121	LVDS1_DSI1_D3-
P122	I2C_PM_DAT	S122	LCD1_BKLT_PWM
P123	BOOT_SEL0#	S123	-
P124	BOOT_SEL1#	S124	GND
P125	BOOT_SEL2#	S125	LVDS0_DSI0_D0+
P126	RESET_OUT#	S126	LVDS0_DSI0_D0-
P127	RESET_IN#	S127	LCD0_BKLT_EN
P128	POWER_BTN#	S128	LVDS0_DSI0_D1+
P129	SER0_TX	S129	LVDS0_DSI0_D1-
P130	SER0_RX	S130	GND
P131	SER0_RTS#	S131	LVDS0_DSI0_D2+
P132	SER0_CTS#	S132	LVDS0_DSI0_D2-
P133	GND	S133	LCD0_VDD_EN
P134	SER1_TX	S134	LVDS0_DSI0_CK+
P135	SER1_RX	S135	LVDS0_DSI0_CK-
P136	SER2_TX	S136	GND
P137	SER2_RX	S137	LVDS0_DSI0_D3+
P138	SER2_RTS#	S138	LVDS0_DSI0_D3-
P139	SER2_CTS#	S139	I2C_LCD_CK

Table 2.25: CN25 (MXM 3.0 Connector)			
P140	SER3_TX	S140	I2C_LCD_DAT
P141	SER3_RX	S141	LCD0_BKLT_PWM
P142	GND	S142	-
P143	CAN0_TX	S143	GND
P144	CAN0_RX	S144	EDP0_HPD
P145	CAN1_TX	S145	WDT_TIME_OUT#
P146	CAN1_RX	S146	PCIE_WAKE#
P147	VDD_IN_1	S147	+VDD_RTC
P148	VDD_IN_2	S148	LID#
P149	VDD_IN_3	S149	SLEEP#
P150	VDD_IN_4	S150	VIN_PWR_BAD#
P151	VDD_IN_5	S151	CHARGING#
P152	VDD_IN_6	S152	CHARGER_PRSNT#
P153	VDD_IN_7	S153	CARRIER_STBY#
P154	VDD_IN_8	S154	CARRIER_PWR_ON
P155	VDD_IN_9	S155	FORCE_RECOV#
P156	VDD_IN_10	S156	BATLOW#
-	-	S157	TEST#
-	-	S158	GND

Table 2.26: CN26 (M.2 Key E Slot)			
Pin	**Signal**	**Pin**	**Signal**
1	GND	2	+V3
3	2412_DP_DN2	4	+V3
5	2412_DM_DN2	6	LED_OUT_WLAN#
7	GND	8	PCM_CLK
9	M2_CK	10	PCM_SYNC
11	M2_CMD	12	PCM_OUT
13	M2_D0	14	PCM_IN
15	M2_D1	16	LED_OUT_BT#
17	M2_D2	18	GND
19	M2_D3	20	BT_WAKE#
21	M2_SDIO_WAKE#	22	M2_TXD
23	M2_SDIO_RST#		
	Mechanical Key		
33	GND	32	M2_RXD
35	PCIE_A_TX+	34	M2_RTS
37	PCIE_A_TX-	36	M2_CTS
39	GND	38	-
41	PCIE_A_RX+	40	-
43	PCIE_A_RX-	42	-
45	GND	44	-
47	M2_PCIE_CK+	46	-
49	M2_PCIE_CK-	48	-
51	GND	50	M2_SYSCLK_R
53	-	52	PCIE_A_D_RST#
55	M2_PCIE_WAKE#	54	W_DISABLE1#
57	GND	56	W_DISABLE2#
59	-	58	-
61	-	60	-
63	GND	62	-
65	-	64	-
67	-	66	-
69	GND	68	-
71	-	70	-
73	-	72	+V3
75	GND	74	+V3

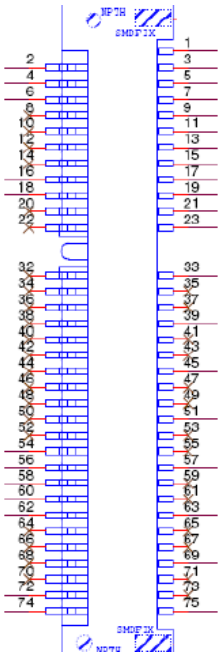


Table 2.27: CN38 (FAN Reserved)			
Pin	**Signal**	**Pin**	**Signal**
1	GND	2	+12V
3	+5V	-	-

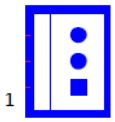


Table 2.28: CN39 (MIPI-CSI 1 FPC, 4-Lane)			
Pin	**Signal**	**Pin**	**Signal**
1	+V3_CAMAF_B	2	+V3_CAMAF_B
3	CSI1_D0+	4	CSI1_D0-
5	GND	6	CSI1_D1+
7	CSI1_D1-	8	GND
9	CSI1_D2+	10	CSI1_D2-
11	CAM1_RST#_C	12	CSI1_D3+
13	CSI1_D3-	14	GND
15	CSI1_CK+	16	CSI1_CK-
17	GND	18	I2C_CSI1_CK
19	I2C_CSI1_DAT	20	CAM1_PWR#_C
21	CAM1_MCK	22	-
23	-	24	-
25	GND	26	-
27	-	28	GND
29	-	30	-
31	-	32	-
33	-	34	GND
35	-	36	-
37	-	38	-
39	-	-	-

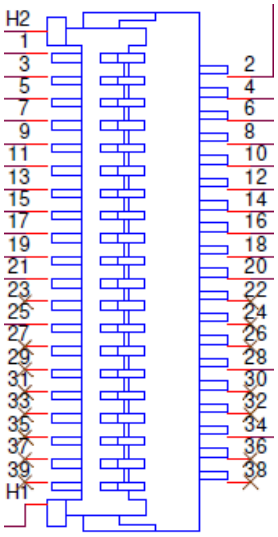


Table 2.29: CN40 (MIPI-CSI 0 FPC, 2-Lane)			
Pin	**Signal**	**Pin**	**Signal**
1	+V3_CAMAF_A	2	+V3_CAMAF_A
3	-	4	-
5	GND	6	-
7	-	8	GND
9	-	10	-
11	-	12	-
13	-	14	GND
15	-	16	-
17	GND	18	-
19	-	20	-
21	CAM0_MCK	22	CAM0_PWR#_C
23	I2C_CAM0_CK	24	I2C_CSI0_DAT
25	GND	26	CSI0_CK+
27	CSI0_CK-	28	GND
29	CSI0_D0+	30	CSI0_D0-
31	CAM0_RST#_C	32	CSI0_D1+
33	CSI0_D1-	34	GND
35	-	36	-
37	-	38	-
39	-		

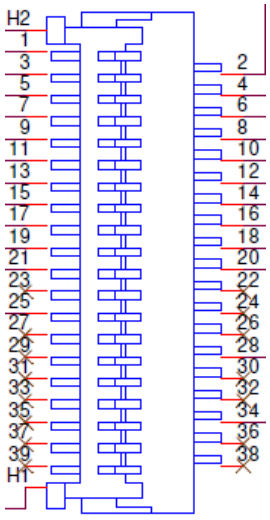


Table 2.30: CN41 (MIPI-CSI 0, Mini-SAS, 2-Lane)			
Pin	**Signal**	**Pin**	**Signal**
A1	GND	A2	CSI0_SAS_CK-
A3	CSI0_SAS_CK+	A4	GND
A5	+V1.8	A6	+V1.8
A7	GND	A8	+V12
A9	+V12	A10	-
A11	CAM0_PWR#_C	A12	GND
A13	+V3	A14	+V3
A15	GND	A16	+V5
A17	+V5	A18	GND
B1	GND	B2	CSI0_SAS_D0-
B3	CSI0_SAS_D0+	B4	GND
B5	CSI0_SAS_D1-	B6	CSI0_SAS_D1+
B7	GND	B8	CAM0_X1_MCK
B9	CAM0_RST#_C	B10	I2C_CAM0_DAT_C
B11	I2C_CAM0_CK_C	B12	GND
B13	-	B14	-
B15	GND	B16	-
B17	-	B18	GND
H1	-	H2	-
H3	GND	H4	GND
H5	GND	H6	GND
H7	GND	H8	GND
H9	GND	H10	GND

Table 2.31: CN42 (MIPI-CSI 1, Mini-SAS, 4-Lane)			
Pin	**Signal**	**Pin**	**Signal**
A1	GND	A2	CSI1_SAS_CK-
A3	CSI1_SAS_CK+	A4	GND
A5	+V1.8	A6	+V1.8
A7	GND	A8	+V12
A9	+V12	A10	-
A11	CAM1_PWR#_C	A12	GND
A13	+V3	A14	+V3
A15	GND	A16	+V5
A17	+V5	A18	GND
B1	GND	B2	CSI1_SAS_D0-
B3	CSI1_SAS_D0+	B4	GND
B5	CSI1_SAS_D1-	B6	CSI1_SAS_D1+
B7	GND	B8	CAM1_X1_MCK
B9	CAM1_RST#_C	B10	I2C_CAM1_DAT_C
B11	I2C_CAM1_CK_C	B12	GND
B13	CSI1_SAS_D2-	B14	CSI1_SAS_D2+
B15	GND	B16	CSI1_SAS_D3-
B17	CSI1_SAS_D3+	B18	GND
H1	-	H2	-
H3	GND	H4	GND
H5	GND	H6	GND
H7	GND	H8	GND
H9	GND	H10	GND

Table 2.32: ESPI_CN1 (ESPI Pin Header)			
Pin	**Signal**	**Pin**	**Signal**
1	+V_ESPI	2	GND
3	ESPI_CS0#_C	4	ESPI_CK_C
5	ESPI_IO_0_C	6	ESPI_IO_1_C
7	ESPI_IO_2_C	8	ESPI_CS1#_C
9	ESPI_RESET#_C	10	ESPI_IO_3_C
11	ESPI_ALERT0#_C	12	ESPI_ALERT1#_C

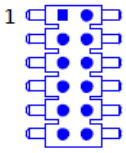


Table 2.33: I2C_GP_1 (I2C)			
Pin	**Signal**	**Pin**	**Signal**
1	GND	2	I2C_GP_DAT_C
3	I2C_GP_DAT_C	4	+V_GP

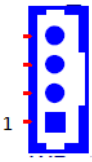


Table 2.34: I2S_CN3 (Audio Codec)			
Pin	**Signal**	**Pin**	**Signal**
1	Audio_VDDA	2	GND
3	Audio_VDDA	4	I2S0_SDIN_C
5	I2S0_SDOUT_C	6	I2S0_LRCK_C
7	I2S0_CK_C	8	AUDIO_MCK_C
9	-	10	GND
11	Audio_I2C_CK	12	MIC_BIAS
13	Audio_I2C_DAT	14	GND
15	-	16	HP_R
17	MIC_IN	18	GND
19	GND	20	HP_L

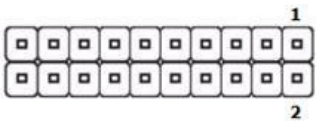


Table 2.35: LVDS0 (LVDS0 / MIPI_DSI0 Shared Pin)			
Pin	**Signal**	**Pin**	**Signal**
1	+VDD_LVDS0	2	+VDD_LVDS_A
3	GND	4	GND
5	+VDD_LVDS0	6	+VDD_LVDS_A
7	LVDS0_D0-	8	-
9	LVDS0_D0+	10	-
11	GND	12	GND
13	LVDS0_D1-	14	-
15	LVDS0_D1+	16	-
17	GND	18	GND
19	LVDS0_D2-	20	-
21	LVDS0_D2+	22	-
23	GND	24	GND
25	LVDS0_CK-	26	-
27	LVDS0_CK+	28	-
29	GND	30	GND
31	I2C_LCD_CK_C	32	I2C_LCD_DAT_C
33	GND	34	EDP0_HPD_A
35	LVDS0_D3-	36	-
37	LVDS0_D3+	38	-
39	GND	40	LVDS_CTRL

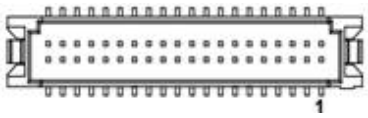


Table 2.36: LVDS0_BK_PWR (LVDS0 Backlight Power)			
Pin	**Signal**	**Pin**	**Signal**
1	+VDD_BKLT_LVDS0	2	GND
3	LCD0_BKLT_EN_C	4	LCD0_BKLT_PWM_C
5	+5V	-	-

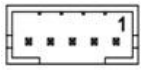


Table 2.37: LVDS1 (LVDS1 / MIPI_DSI1 Shared Pin))			
Pin	**Signal**	**Pin**	**Signal**
1	+VDD_LVDS1	2	+VDD_LVDS1_A
3	GND	4	GND
5	+VDD_LVDS1	6	+VDD_LVDS1_A
7	LVDS1_D0-	8	-
9	LVDS1_D0+	10	-
11	GND	12	GND
13	LVDS1_D1-	14	-
15	LVDS1_D1+	16	-
17	GND	18	GND
19	LVDS1_D2-	20	-
21	LVDS1_D2+	22	-
23	GND	24	GND
25	LVDS1_CK-	26	-
27	LVDS1_CK+	28	-
29	GND	30	GND
31	I2C_LCD_CK_C	32	I2C_LCD_DAT_C
33	GND	34	EDP1_HPD_A
35	LVDS1_D3-	36	-
37	LVDS1_D3+	38	-
39	GND	40	LVDS1_CTRL

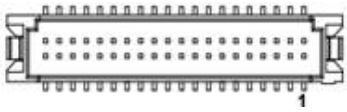


Table 2.38: LVDS1_BK_PWR (LVDS1 Backlight Power)			
Pin	**Signal**	**Pin**	**Signal**
1	+VDD_BKLT_LVDS1	2	GND
3	LCD1_BKLT_EN_C	4	LCD1_BKLT_PWM_C
5	+5V	-	-

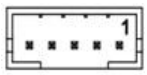


Table 2.39: SD1 (SD Card Slot)			
Pin	**Signal**	**Pin**	**Signal**
1	SD_D3	2	SD_CMD
3	GND	4	+3V_SDIO
5	SD_CK	6	GND
7	SD_D0	8	SD_D1
9	SD_D2	10	CD
11	WP	12	COM
H1	GND	H2	GND
H3	GND	H4	GND

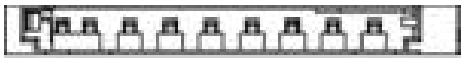


Table 2.40: SPI_CN1 (SPI Pin Header)			
Pin	**Signal**	**Pin**	**Signal**
1	+V_SPI	2	GND
3	SPI0_CS0#_C	4	SPI0_CK_C
5	SPI0_DO_C	6	SPI0_DIN_C
		8	SPI0_CST#_C

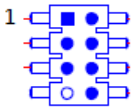


Table 2.41: SW2 (Reset Button)			
Pin	**Signal**	**Pin**	**Signal**
1	GND	2	GND
3	RESET_IN#	4	RESET_IN#

Table 2.42: SW4 (SLP Button)			
Pin	**Signal**	**Pin**	**Signal**
1	GND	2	GND
3	SLEEP#	4	SLEEP#

Table 2.43: SW5 (Power Button, CPU)			
Pin	**Signal**	**Pin**	**Signal**
1	GND	2	GND
3	POWER_BTN#	4	POWER_BTN#

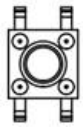
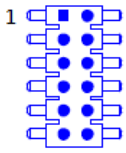


Table 2.44: USB0_OTG1 (USB OTG)			
Pin	**Signal**	**Pin**	**Signal**
1	+USB_OTG_5V	2	USB0-_X
3	USB0+_X	4	USB0_OTG_ID_X
5	GND	-	-

Table 2.45: USB-4-5 (USB Port4 & Port5 Pin Header)			
Pin	**Signal**	**Pin**	**Signal**
1	+VBUS_4	2	+VBUS_5
3	USB4-_C	4	USB5-_C
5	USB4+_C	6	USB5+_C
7	GND	8	GND
9	GND	-	-



2.4.4 Jumpers

Table 2.46: CN2 (EDP0_HPD, Default (1-2))

Pin	Signal	Pin	Signal
1	GND	2	EDP0_HPD
3	EDP0_HPD_A	-	-

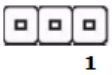


Table 2.47: CN9 (SATA_DOM, Default (2-3))

Pin	Signal	Pin	Signal
1	+V5	2	SATA_DOM_PIN7
3	GND	-	-

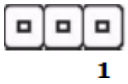


Table 2.48: CN10 (CANBus0, Default (1-2))

Pin	Signal	Pin	Signal
1	CAN0_D+	2	CAN0_D-

Table 2.49: CN14 (CANBus1, Default (1-2))

Pin	Signal	Pin	Signal
1	CAN1_D+	2	CAN1_D-

Table 2.50: CN17 (COM2_TERM1, Default (X))

Jumper	Mode	Jumper	Mode
1	+V5	2	COM2_TERM1

Table 2.51: CN19 (COM0_TERM1, Default (X))			
Jumper	**Mode**	**Jumper**	**Mode**
1	+V5	2	COM0_TERM1

Table 2.52: CN27 (SER0, Default (1-2))			
Pin	**Signal**	**Pin**	**Signal**
1	UART0_RX	2	SER0_RX
3	M2_UART_RX	-	-

Table 2.53: CN28 (SER0, Default (1-2))			
Pin	**Signal**	**Pin**	**Signal**
1	UART0_TX	2	SER0_TX
3	M2_UART_TX	-	-

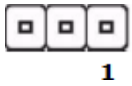


Table 2.54: CN29 (SER0, Default(1-2))			
Pin	**Signal**	**Pin**	**Signal**
1	UART0_RTS#	2	SER0_RTS#
3	M2_UART_RTS#	-	-

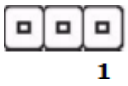


Table 2.55: CN30 (SER0, Default(1-2))			
Pin	**Signal**	**Pin**	**Signal**
1	UART0_CTS#	2	SER0_CTS#
3	M2_UART_CTS#	-	-

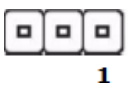


Table 2.56: CN36 (SDIO, Default (X))			
Pin	**Signal**	**Pin**	**Signal**
1	+3V3A	2	SDIO_PWR_EN

Table 2.57: CN43 (SDIO, Default (2-3))			
Pin	**Signal**	**Pin**	**Signal**
1	M2_D0	2	SDIO_D0_X
3	SD_D0	-	-

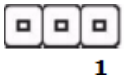


Table 2.58: CN44 (SDIO, Default (2-3))			
Jumper	**Mode**	**Jumper**	**Mode**
1	M2_D1	2	SDIO_D1_X
3	SD_D1	-	-

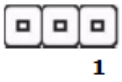


Table 2.59: CN45 (SDIO, Default (2-3))			
Jumper	**Mode**	**Jumper**	**Mode**
1	M2_D2	2	SDIO_D2_X
3	SD_D2	-	-

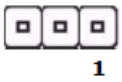


Table 2.60: CN46 (SDIO, Default (2-3))			
Jumper	**Mode**	**Jumper**	**Mode**
1	M2_D3	2	SDIO_D3_X
3	SD_D3	-	-

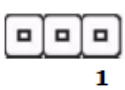


Table 2.61: CN47 (SDIO, Default (2-3))			
Jumper	**Mode**	**Jumper**	**Mode**
1	M2_CMD	2	SDIO_CMD_X1
3	SD_CMD	-	-

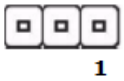


Table 2.62: CN48 (SDIO, Default (2-3)			
Jumper	**Mode**	**Jumper**	**Mode**
1	M2_CK	2	SDIO_CK_X1
3	SD_CK	-	-

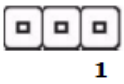


Table 2.63: GPIO_0 (GPIO0, Default (2-3))			
Pin	**Signal**	**Pin**	**Signal**
1	GPIO0_CN33	2	GPIO0_C
3	CAM0_PWR#	-	-

Table 2.64: GPIO_1 (GPIO1, Default (2-3))			
Jumper	**Mode**	**Jumper**	**Mode**
1	GPIO1_CN33	2	GPIO1_C
3	CAM1_PWR#	-	-

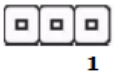


Table 2.65: GPIO_2 (GPIO2, Default (2-3))			
Jumper	**Mode**	**Jumper**	**Mode**
1	GPIO2_CN33	2	GPIO2_C
3	CAM0_RST#	-	-

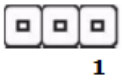


Table 2.66: GPIO_3 (GPIO3, Default (2-3))			
Jumper	**Mode**	**Jumper**	**Mode**
1	GPIO3_CN33	2	GPIO3_C
3	CAM1_RST#	-	-

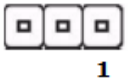


Table 2.67: GPIO_4 (GPIO4, Default (1-2))			
Pin	**Signal**	**Pin**	**Signal**
1	GPIO4_CN33	2	GPIO4_C
3	HDA_RST#	-	-

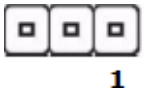


Table 2.68: GPIO_5 (GPIO5, Default(1-2))			
Jumper	**Mode**	**Jumper**	**Mode**
1	GPIO5_CN33	2	GPIO5_C
3	PWM_OUT	-	-

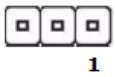


Table 2.69: GPIO_6 (GPIO6, Default (1-2))			
Jumper	**Mode**	**Jumper**	**Mode**
1	GPIO6_CN33	2	GPIO6_C
3	TACHIN	-	-

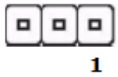


Table 2.70: GPIO_10 (GPIO10, Default(2-3))			
Pin	**Signal**	**Pin**	**Signal**
1	GPIO10_CN33	2	GPIO10_C
3	I2C_GP_INT	-	-

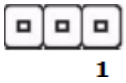


Table 2.71: LVDS0_BL (Default(1-2))			
Pin	**Signal**	**Pin**	**Signal**
1	+5V	2	+VDD_BKLT_LVDS0
3	+12V	-	-

Table 2.72: LVDS0_VDD1 (Default(1-2))			
Pin	**Signal**	**Pin**	**Signal**
1	+3V	2	+VDD_LVDS0_SELECT
3	+5V	-	-

Table 2.73: LVDS0_VDD2 (Default(X))			
Pin	**Signal**	**Pin**	**Signal**
1	+VDD_LVDS0_SELECT	2	+12V

Table 2.74: LVDS1_BL (Default(1-2))			
Pin	**Signal**	**Pin**	**Signal**
1	+5V	2	+VDD_BKLT_LVDS1
3	+12V	-	-

Table 2.75: LVDS1_VDD0 (Default(1-2))			
Pin	**Signal**	**Pin**	**Signal**
1	+3V	2	+VDD_LVDS1_SELECT
3	+5V	-	-

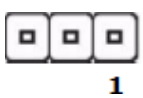


Table 2.76: LVDS1_VDD1 (Default(X))			
Pin	**Signal**	**Pin**	**Signal**
1	+VDD_LVDS1_SELECT	2	+12V

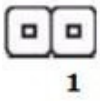
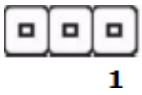


Table 2.77: CN35 (EDP1, Default (1-2))			
Pin	**Signal**	**Pin**	**Signal**
1	GND	2	EDP1_HPD
3	EDP1_HPD_A	-	-



2.4.5 Switches And Buttons

Table 2.78: SW1 (Boot Selection for SMARC, SPI)			
1	**2**	**3**	**Feature**
ON	ON	ON	Carrier SATA
OFF	ON	ON	Carrier SD
ON	OFF	ON	Carrier eSPI (CS0#)
OFF	OFF	ON	Carrier SPI (CS0#)
ON	ON	OFF	Module device (reserved)
OFF	ON	OFF	Remote boot (reserved)
ON	OFF	OFF	Module eMMC Flash
OFF	OFF	OFF	Module SPI

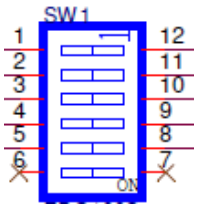


Table 2.79: SW3 (LID Button)			
Pin	**Signal**	**Pin**	**Signal**
1	LID#	2	GND

Table 2.80: SW6 (COM2 SWITCH)			
Pin	**Signal**	**Pin**	**Signal**
1	DB2_MODE_0	2	DB2_MODE_1
3	+5V	4	+5V

Loopback	1 OFF	2 OFF
RS-232	1 ON	2 OFF
RS-422	1 ON	2 ON
RS-485	1 OFF	2 ON

Table 2.81: SW7 (COM0 Switch)

Pin	Signal	Pin	Signal
1	DB0_MODE_0	2	DB0_MODE_1
3	+5V	4	+5V

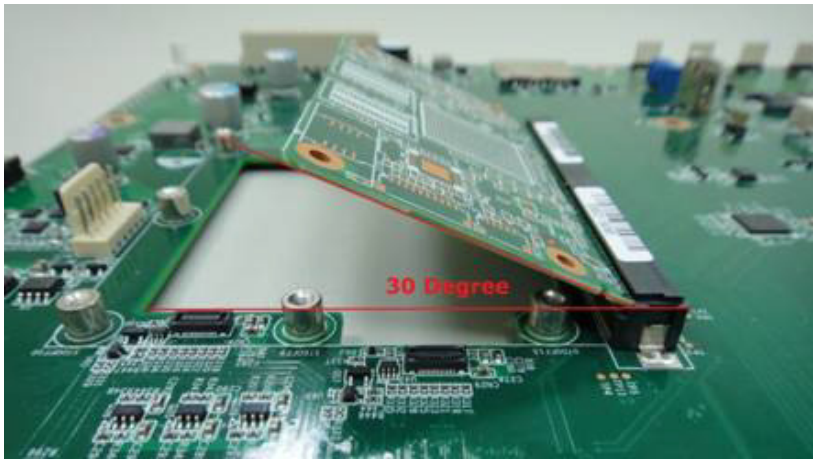
Loopback	1 OFF	2 OFF
RS-232	1 ON	2 OFF
RS-422	1 ON	2 ON
RS-485	1 OFF	2 ON

2.4.6 LEDs

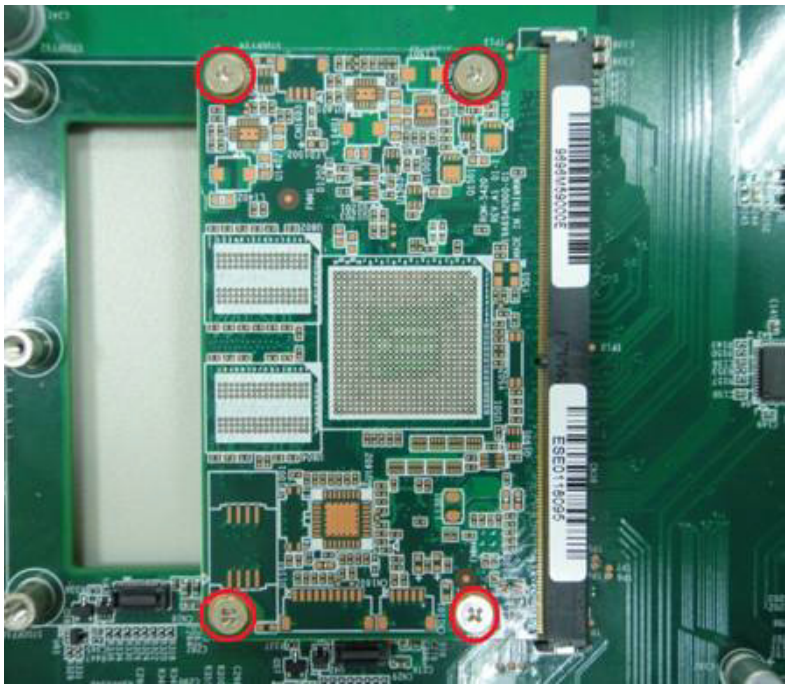
Position	Function	Position	Function
		D24	SATA_ACT#
		D28	VIN_PWR_BAD#
D29	VIN_Ready	D30	CARRIER_PWR_ON
D31	V12_Ready	D32	V5_Ready
D33	V3_Ready	D34	CARRIER_STBY#
D51	LED_OUT_WLAN#	D52	LED_OUT_BT#

2.4.7 Hardware Installation

1. Install the SMARC v2.0 module board (ROM-5720, ROM-5620, ROM-5721) to carrier board at a 30 degree angle.



2. Press down the module board and make sure the 4 screw holes are aligned with the carrier board and adjust the 4 screws clockwise to fix them in place

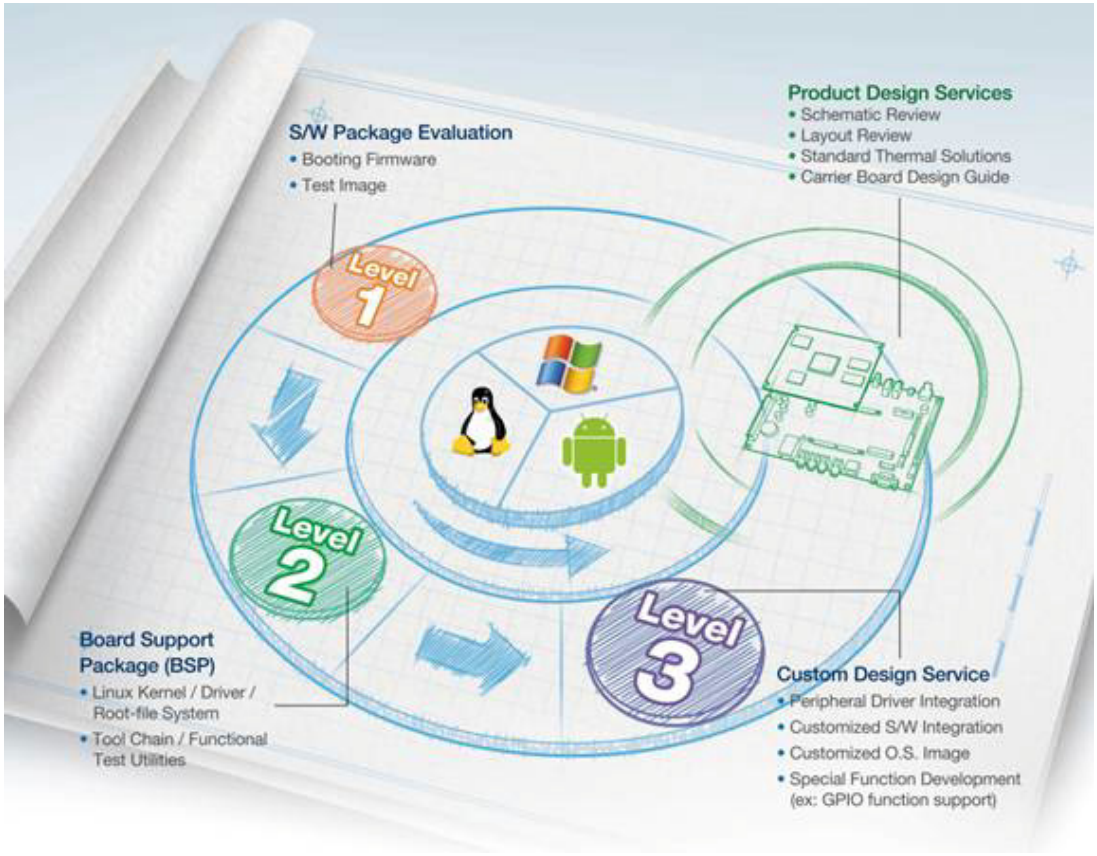


Chapter 3

Advantech Services

This chapter introduces Advantech design-in serviceability, technical support and warranty policy for ROM-DB5901

3.1 RISC Design-in Services



Advantech's RISC Design-in Services helps customers reduce the time and effort involved with designing new carrier boards. We handle the complexities of technical research and greatly minimize the development risk associated with carrier boards.

Easy Development

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

- Full Range of RISC Product Offerings
- Comprehensive Document Support

Design Assistance Service

Advantech provides a check list for engineers to easily check their schematics and review service based on customer carrier board schematics. These services are preventative and help to catch design errors before they happen. It helps saves on time and cost with regard to 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 and more flexible solutions for customer's thermal designs, Advantech provides thermal solution services including modularized thermal solutions and customized thermal solutions.

- Standard Thermal Solutions
- Customized Thermal Solutions

Embedded Software Services

Supports driver, software integration or customized firmware, root file-system and Linux images.

- Embedded Linux/ Android OS
- Advantech Boot Loader Customization

With the spread of industrial computing, a whole range of new applications have been developed, resulting in a fundamental change in the IPC industry. In the past System Integrators (SI) were used to completing projects without outside assistance but now such working models have moved on. Due to diverse market demands and intense competition, cooperation for (both upstream and downstream) vertical integration has become a much more effective way to create competitive advantages. As a result, ARM-based CPU modules were born out of this trend. Concentrating all necessary components on the CPU module and placing other parts on the carrier board in response to market requirements for specialization, provides greater flexibility while retaining its low power consumption credentials.

Advantech has been involved in the industrial computer industry for many years and found that customers usually have the following questions when implementing modular designs.

General I/O Design Capability

Although customers possess the ability for vertical integration and have enough know-how and core competitiveness in the professional application field, the lack of expertise and experience in general power and I/O design causes many challenges for them, especially integrating CPU modules into their carrier board.

The Acquisition of Information

Even if the individual client is able to obtain sufficient information to make the right decision for the specialized vertical application, some customers encounter difficult problems dealing with platform design in general and communicating with CPU or chipset manufacturers, thereby increasing carrier board design difficulties and risk as well as seriously impacting on time-to-market and lost market opportunities.

Software Development and Modification

Compared to x86 architectures, RISC architectures use simpler instruction sets, therefore the software support for x86 platforms cannot be used on RISC platforms. System integrators need to develop software for their system and do the hardware and software integration themselves. Unlike x86 platforms, RISC platforms have less support for Board Support Packages (BSP) and drivers as well. Even though driver support is provided, SIs still have to make a lot of effort to integrate it into the system core. Moreover, the BSP provided by CPU manufacturers are usually for carrier board design, so it's difficult for SIs to have an environment for software development.

In view of this, Advantech proposed the concept of Streamlined Design-in Support Services for RISC-based Computer On Modules (COM). With a dedicated profes-

sional design-in services team, Advantech actively participates in carrier board design and problem solving. Our services enable customers to effectively distribute their resources and reduce R&D manpower costs and hardware investment.

By virtue of a close interactive relationship with leading original manufacturers of CPUs and chipsets such as ARM, TI and Freescale, Advantech helps solve communication and technical support difficulties, and that can reduce the uncertainties of product development too. Advantech's professional software team also focuses on providing a complete Board Support Package and assists customers to build up a software development environment for their RISC platforms.

Advantech RISC Design-in services helps customers overcome their problems to achieve the most important goal of faster time to market through a streamlined RISC Design-in service.

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

Planning Stage

Before deciding to adopt Advantech RISC COM, customers must go through a complete survey process, including product features, specification, 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 Package (BSP) for RISC COM, so that customers can define their product's specifications as well as verifying I/O and performance at the same time. We offer hardware planning and technology consulting, as well as software evaluation and peripheral module recommendations (such as WiFi, 3G, BT). Resolving customer concerns is Advantech's main target at this stage. Since product evaluation is a key task in the planning period, especially for performance and specifications, we try to help our customers conduct all the necessary tests for their RISC COM.

Design Stage

When a product moves into the design stage, Advantech will supply a design guide of the carrier board for reference. The carrier board design guide provides pin definitions of the COM connector with limitations and recommendations for carrier board design, so customers can have a clear guideline to follow during their carrier board development. Regarding different form factors, Advantech offers a complete pin-out check list for different form factors such as Q7, ULP and RTX2.0, so that customers can examine the carrier board signals and layout design accordingly. In addition, our team is able to assist customers to review the placement/layout and schematics to ensure the carrier board design meets their full requirements. For software development, Advantech RISC software team can assist customers to establish an environment for software development and evaluate the amount of time and resources needed. If customers outsource software development to a 3rd party, Advantech can also cooperate with the 3rd party and provide proficient consulting services. With Advantech's professional support, the design process becomes much easier and product quality will be improved to meet targets.

Integration Stage

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

Validation Stage

After customer's ES sample is completed, the next step is a series of verification steps. In addition to verifying a product's functionality, the related test of the product's efficiency is also an important part at this stage especially for RISC platforms.

As a supportive role, Advantech primarily helps customers solve their problems in the testing process and will give suggestions and tips as well. Through an efficient verification process backed by our technical support, customers are able to optimize their applications. Advantech's team can provide professional consulting services regarding further testing and equipment usage.

3.2 Contact Information

Below is the contact information for Advantech Customer Service.

Region/Country	Contact Information
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

You can reach our service team through the website, our technical support engineers will provide quick responses once the form is filled out:

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

3.3 Technical Support and Assistance

For more information about this and other Advantech products, please visit our website at:

<http://www.advantech.com/>

<http://www.advantech.com/ePlatform/>

For technical support and service, please visit our support website at:

<http://support.advantech.com.tw/support/>

1. Visit the Advantech web site at www.advantech.com/support where you can find the latest information about our products.
2. Contact your distributor, sales representative, or Advantech's Customer Service center for technical support if you need additional assistance. Please have the following information ready before you call:
   - Product name and serial number
   - Description of your peripheral attachments
   - Description of your software (operating system, version, application software, etc.)
   - A complete description of the problem
   - The exact wording of any error messages

3.4 Global Service Policy

3.4.1 Warranty Policy

Below is the warranty policy of Advantech products:

3.4.2 Warranty Period

Advantech branded off-the-shelf products and 3rd party off-the-shelf products used to assemble Advantech Configure to Order products are entitled to a 2 year complete and prompt global warranty service. Product defects in design, materials, and workmanship, are covered from the date of shipment.

All customized products will by default carry a 15 months regional warranty service. The actual product warranty terms and conditions may vary based on sales contract.

All 3rd 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.

3.4.3 Repairs under Warranty

It is possible to obtain a replacement (Cross-Shipment) during the first 30 days of the purchase, thru your original ADVANTECH supplier to arrange DOA replacement if the products were purchased directly from ADVANTECH and the product is DOA (Dead-on-Arrival). The DOA Cross-Shipment excludes any shipping damage, customized and/or build-to-order products.

For those products which are not DOA, the return fee to an authorized ADVANTECH repair facility will be at the customers' expense. The shipping fee for reconstructive products from ADVANTECH back to customers' sites will be at ADVANTECH's expense.

3.4.4 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 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 caused which ADVANTECH is not responsible whether by accident or other cause. Such conditions will be determined by ADVANTECH at its sole unfettered discretion.
- The product is damaged beyond repair due to a natural disaster such as a lighting strike, flood, earthquake, etc.
- Product updates/upgrades and tests upon the request of customers who are without warranty.

3.5 Repair Process

3.5.1 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. When requesting an RMA number, please access ADVANTECH's RMA web site: http://erma.ADVANTECH.com.tw with 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 (AE). They may be able to find a solution that does not require sending the product for repair.

The serial number of the whole set is required if only a key defective part is returned for repair. Otherwise, the case will be regarded as out-of-warranty.

3.5.2 Returning the Product for Repair

It's possible customers can save time and meet end-user requirements by returning defective products to an authorized ADVANTECH repair facility without an extra cross-region charge. It is required to contact the local repair center before offering global repair service.

It is recommended to send cards without accessories (manuals, cables, etc.). Remove any unnecessary components from the card, such as CPU, DRAM, and CF Card.If you send all these parts back (because you believe they may be part of the problem), please note clearly that they are included. Otherwise, ADVANTECH is not responsible for any items not listed. Make sure the "Problem Description" is enclosed.

European Customers that are located outside European Community are requested to use UPS as the forwarding company. We strongly recommend adding a packing list to all shipments.Please prepare a shipment invoice according to the following guidelines to decrease 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" on the shipment invoice.
3. Show RMA numbers, product serial numbers and warranty status on the shipment invoice.
4. Add information about Country of origin of goods

In addition, please attach an invoice with RMA number to the carton, then 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 un-repaired items at the customer's cost if inappropriately packed.

What's more, "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 is adopted.

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.

3.5.3 Service Charges

The product is excluded from warranty if:

- The product is repaired after expiry of the warranty period.
- The product is tested or calibrated after expiry of the warranty period, and a No Problem Found (NPF) 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 physical or operating environment; improperly maintained by the customer; or failure caused which ADVANTECH is not responsible whether by accident or other cause. Such conditions will be determined by ADVANTECH at its sole unfettered discretion.
- The product is damaged beyond repair due to a natural disaster such as a lighting strike, flood, earthquake, etc.
- Product updates and tests upon the request of customers who are 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 do this repair free of charge. However, such free repairs do not apply to products which have been misused, abused, or subjected to unauthorized disassembly/modification; placed in an unsuitable physical or operating environment; improperly maintained by the customer; or failure caused which ADVANTECH is not responsible whether by accident or other cause.

Please contact your nearest regional service center for detail service quotation.

Before we start out-of-warranty repairs, we will send you a pro forma invoice (P/I) with the repair charges. When you remit the funds, please reference the P/I number listed under "Our Ref". ADVANTECH reserves the right to deny repair services to customers that do not return the DOA unit or sign the P/I. Meanwhile, ADVANTECH will scrap defective products without prior notice if customers do not return the signed P/I within 3 months.

3.5.4 Repair Report

ADVANTECH returns each product with a "Repair Report" which shows the result of the repair. A "Repair Analysis Report" is also provided to customers upon request. If the defect is not caused by ADVANTECH design or manufacturing, customers will be charged US$60 or US$120 for in-warranty or out-of-warranty repair analysis reports respectively.

3.5.5 Custody of Products Submitted for Repair

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

3.5.6 Shipping Back to Customer

The forwarding company for RMA returns from ADVANTECH to customers is selected by ADVANTECH. Per customer requirement, other express services can be adopted, such as UPS, FedEx etc. The customer must bear the extra costs of such alternative shipment. If you require any special arrangements, please indicate this when shipping the product to us.

ADVANTECH

Enabling an Intelligent Planet

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