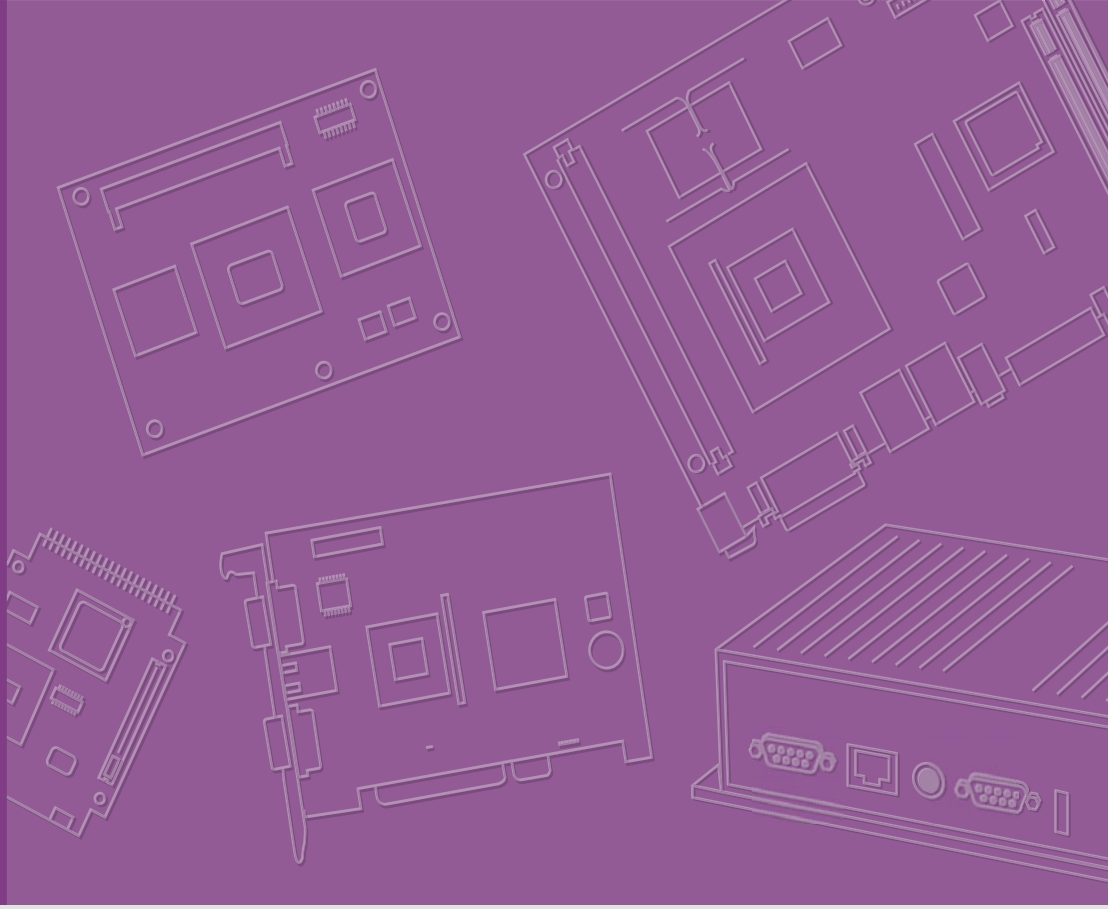

User Manual

ROM-DB5900 A2

Development Board for SMARC v1.0 & V1.1 modules

ADVANTECH

Enabling an Intelligent Planet

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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. 2006B59001 Edition 1

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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.

9696M59010E	SMARC v1.0 & V1.1 Carrier board ROM-DB5900 A2	1
9696ED2000E	debug adapter board	1
1700021882-01	LVDS backlight cable	1
1700021883-01	LVDS cable	1
1700021941-01	SATA power	1
1700004711	SATA signal	1
1700019076	USB OTG to Type A female	1
1700019077	USB OTG to Type A male	1
1701100300	F Cable IDE#3 10P-2.54/D-SUB 9P(M) 30cm for UART and CAN	2
1700022840-01	SPDIF to RCA cable for audio in and out	1
1700022373-01	Debug port cable for ROM-5420	1
1700019474	A Cable D-SUB 9P(F)/D-SUB 9P(F) RS232/RS485 100c	1
2026M59000	China RoHS ROM-DB5900 A2 Electronic Pollution 1st	1

Optional Accessories

Part No.	Description
96PSA-A36W12R1	Adapter 100-240V 36W 12V 3A
170203183C	Power cord 3P EU 183cm
170203180A	Power cord 3P UK 183cm
1700008921	Power Cord 3P PSE 183cm
EWM-W142F01E	802.11 b/g/n, AR9287, 2T2R, Full size Mini PCIe
EWM-C106FT01E	Cellular, HSUPA/WCDMA/GPRS,Full Mini PCIe
1750007156-01	Cellular/GPS SMA Short JACK(9.5MM) L=100mm (3G Cable)
1750007050-01	WiFi RP-SMA short SMA Jack(9.5mm) to U.FL_100mm (WiFi Cable)
1750000318	EMI Antenna 2DBI 2.4GHz SMA (WiFi Antenna)
1750005865	Antenna L=10.9cm 500hm AN8921F-5701SM (3G Antenna)
9680015491	PCIe to miniPCIe adapter card

SMARC CPU Boards

Part No.	Description
ROM-5420CD-MDA1E	Freescale i.mx6 Dual core 1GHz with 1GB memory (0~60° C)
ROM-5420WD-MDA1E	Freescale i.mx6 Dual core 1GHz with 1GB memory (-40~85° C)
ROM-5420WQ-MEB1E	Freescale i.mx6 Quad core 800MHz with 2GB memory (-40~85° C)

For more information please refer to "Advantech Baseboard Check List" and "Evaluation Board Reference Schematic".

You can download "Advantech Baseboard Check List" and "Evaluation Board Reference Schematic" from http://com.advantech.com/

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-DB5900.

Sections include:

- **Introduction**
- **Specification**

1.1 Introduction

ROM-DB5900 is an evaluation carrier board designed for the Advantech SMARC module. It is compatible with SMARC module ROM-5420 and has rich I/O interface for evaluation and development. It supports wide range operating temperatures, 4 power input interfaces (one of them is designed for lithium-ion battery) and also supports two MIPI connectors for the camera module. ROM-DB5900 is an ideal development board for mobile applications, such as portable device, industrial tablet or HMI systems.

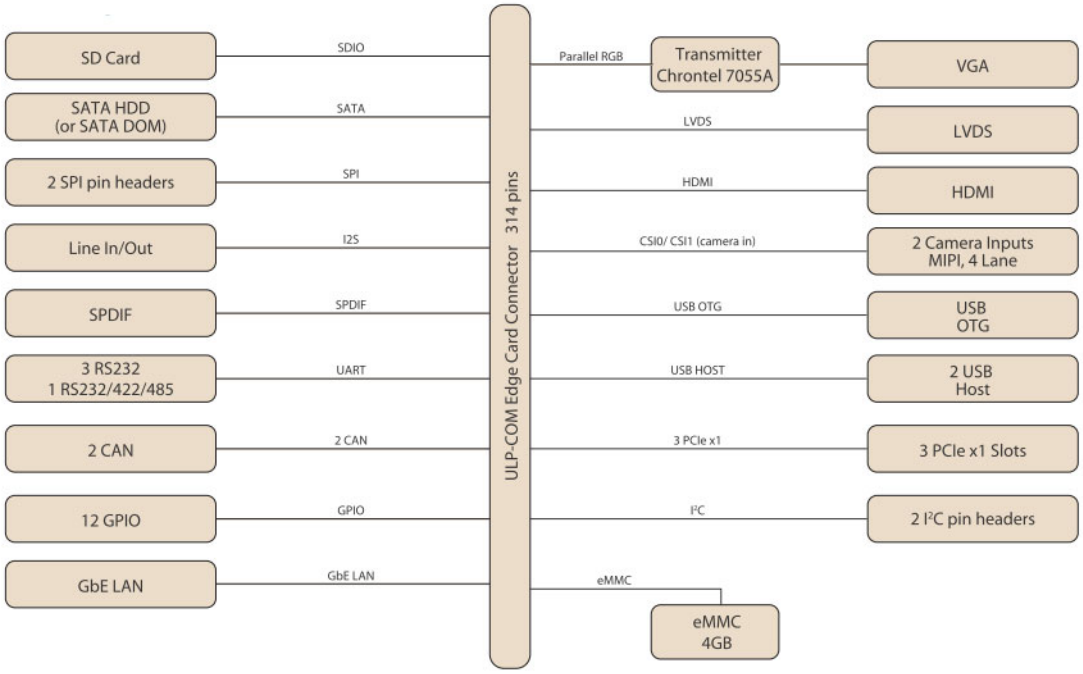
ROM-DB5900 comes with RISC SMARC carrier board design documents: Carrier Board Design Guide, Layout, Schematic checklist, and also the reference board schematics ready for you to start your own carrier board design.

- 2 power inputs. +12V DC-IN and lithium battery
- 2 camera input support
- 12 GPIO
- 4 UART and 2 CAN ports

1.2 Product Specification

Compatible Module		Advantech SMARC v1.0 & v1.1 CPU Modules
Graphic	HDMI	1 HDMI TypeA
	LVDS	1 Dual 24-bit LVDS
	TTL	1 20 pins with female connector
Ethernet	10/100/100 Mbps	1 RJ45
Storage	eMMC	Onboard 4GB eMMC
	EEPROM	Onbard 4MB EEPROM
	SD	1 SD card slot
	SATA	1 SATAII Connector (with SATA-DOM support)
I/O	USB	2 USB 2.0 Type A (Host), 1 min USB Type AB (OTG)
	UART	4 UART Ports
	Audio	1 1/8 Audio Jack (I2S HD Audio), 1 SPDIF Pin header
	CAN	2 CAN 2.0B ports, Differential mode +5V
	GPIO	12 GPIO Ports
	I2C	2 I2C pin header
	SPI	2 SPI pin header
	Camera input	2 MIPI connectors
	AFB	1 30pin AFB connector
Expansion	PCIe slot	3 PCIe x1
Power input	Power	2 Power Inputs (+12V DC-Jack, Lithium-ion battery)
Environment	Operation	0~60C (32~140°F)
	Operating Humidity	0% ~ 90% relative humidity, non-condensing
Physical Characteristics	Dimensions	305 x 244 mm (12" x 9.6")

1.3 Block Diagram



Chapter 2

H/W Installation

This chapter gives mechanical and connector information on the ROM-DB5900 carrier board.

Sections include:

- **Connector Information**
- **Mechanical Drawing**
- **Hardware Installation**

2.1 Module Form Factor

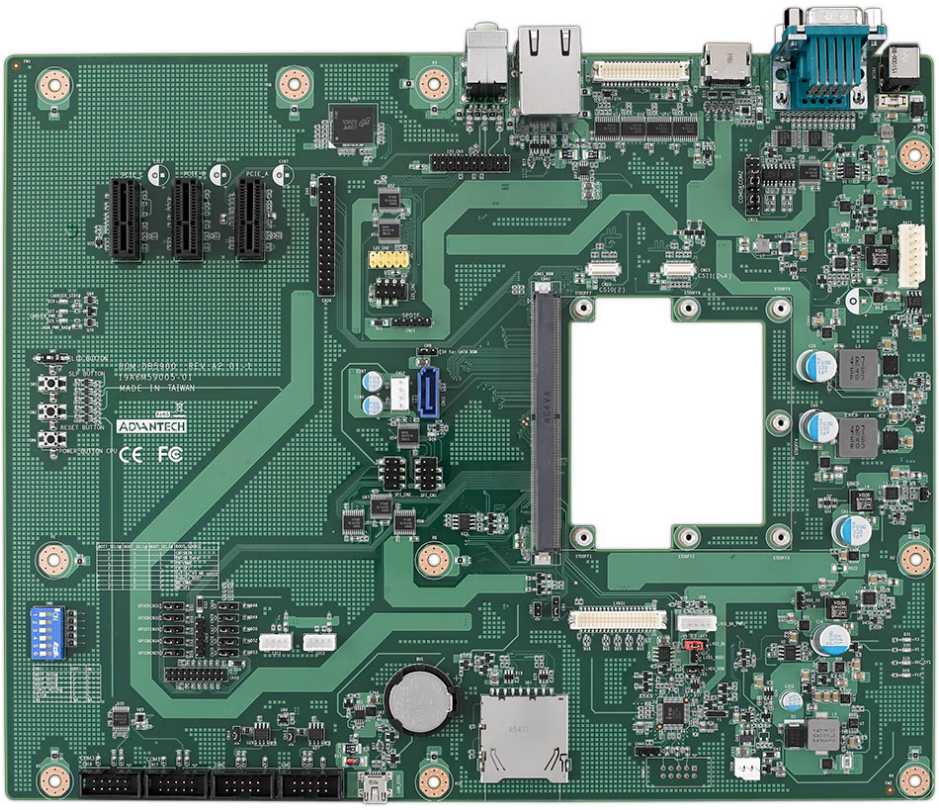
SMARC form factor size, 82mm(W)*50mm(D) or 82mm(W)*80mm(D)

2.2 Environmental Specifications

- **Operating temperature:** 0~60° C (32~140°F)
  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% @ 60° C
- **Weight (g):** 80 g (weight of total package)

2.3 ROM-DB5900 Looks

2.3.1 ROM-DB5900 Overview



2.3.2 I/O Connectors

2.4 Connector, Jumper setting, Switch and LED

2.4.1 Rear I/O panel

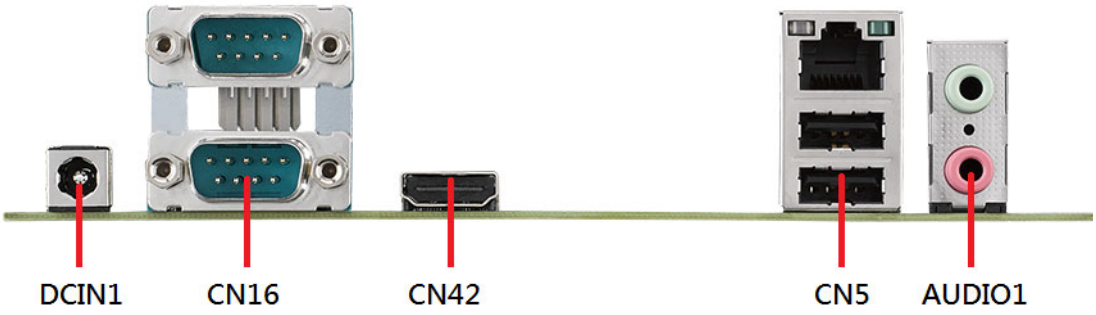


Table 2.1: External IO Connector

Position	Description
DCIN1	DC Jack
CN16	UART Port 1/2
CN42	HDMI Port
CN5	Ethernet/ USB port 1/2
Audio1	MIC Input/ Audio Output

Table 2.2: DCIN1 (DC-Jack, +12V power input)

Pin	Signal	Pin	Signal
1	+12V	Shield	GND

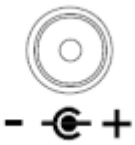


Table 2.3: CN16A (UART0, 2 wires)			
Pin	**Signal**	**Pin**	**Signal**
1	-	2	RX
3	TX	4	-
5	GND	6	-
7	RTS	8	CTS
9	-		

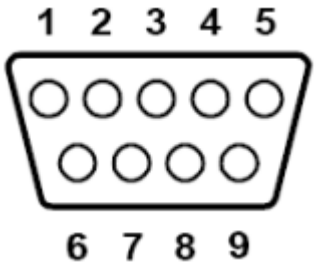


Table 2.4: CN16B (UART2, 4 wires)			
Pin	**Signal**	**Pin**	**Signal**
1	TXD485-	2	TXD485+
3	RXD485+	4	RXD485-
5	GND	6	DSR
7	RTS	8	CTS
9	RI		

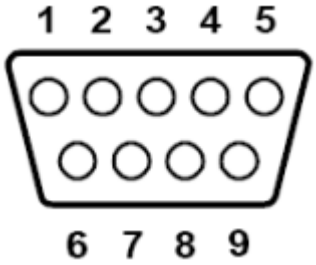


Table 2.5: CN42 (HDMI)

Pin	Signal	Pin	Signal
1	TMDS_D2+	2	GND
3	TMDS_D2-	4	TMDS_D1+
5	GND	6	TMDS_D1-
7	TMDS_D0+	8	GND
9	TMDS_D0-	10	TMDS_CLK+
11	GND	12	TMDS_CLK-
13	CEC	14	-
15	CTRL_CLK	16	CTRL_DAT
17	GND	18	+5V
19	HPD		

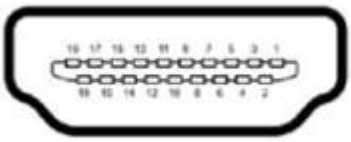


Table 2.6: CN5 (RJ-45 & USB 1/2)

Pin	Signal	Pin	Signal
1	CT	2	MDI0+
3	MDI0-	4	MDI1+
5	MDI1-	6	MDI2+
7	MDI2	8	MDI3+
9	MDI3-	10	GND
11	Active LED-	12	Active LED+
13	Link 1000-	14	Link 100-
15	+5V	16	USB Port2-
17	USB Port2+	18	GND
19	+5V	20	USB Port1-
21	USB Port1+	22	GND
1	TMDS_D2+	2	GND
3	TMDS_D2-	4	TMDS_D1+
5	GND	6	TMDS_D1-
7	TMDS_D0+	8	GND
9	TMDS_D0-	10	TMDS_CLK+
11	GND	12	TMDS_CLK-
13	CEC	14	-
15	CTRL_CLK	16	CTRL_DAT
17	GND	18	+5V
19	HPD		

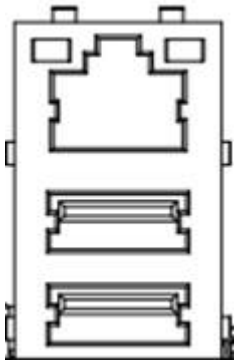


Table 2.7: Audio1 (Audio output)			
Pin	**Signal**	**Pin**	**Signal**
1	GND	2	-
3	-	4	-
5	MIC-IN	6	-
7	Audio_L	8	-
9	Audio_R		

2.4.2 Internal I/O

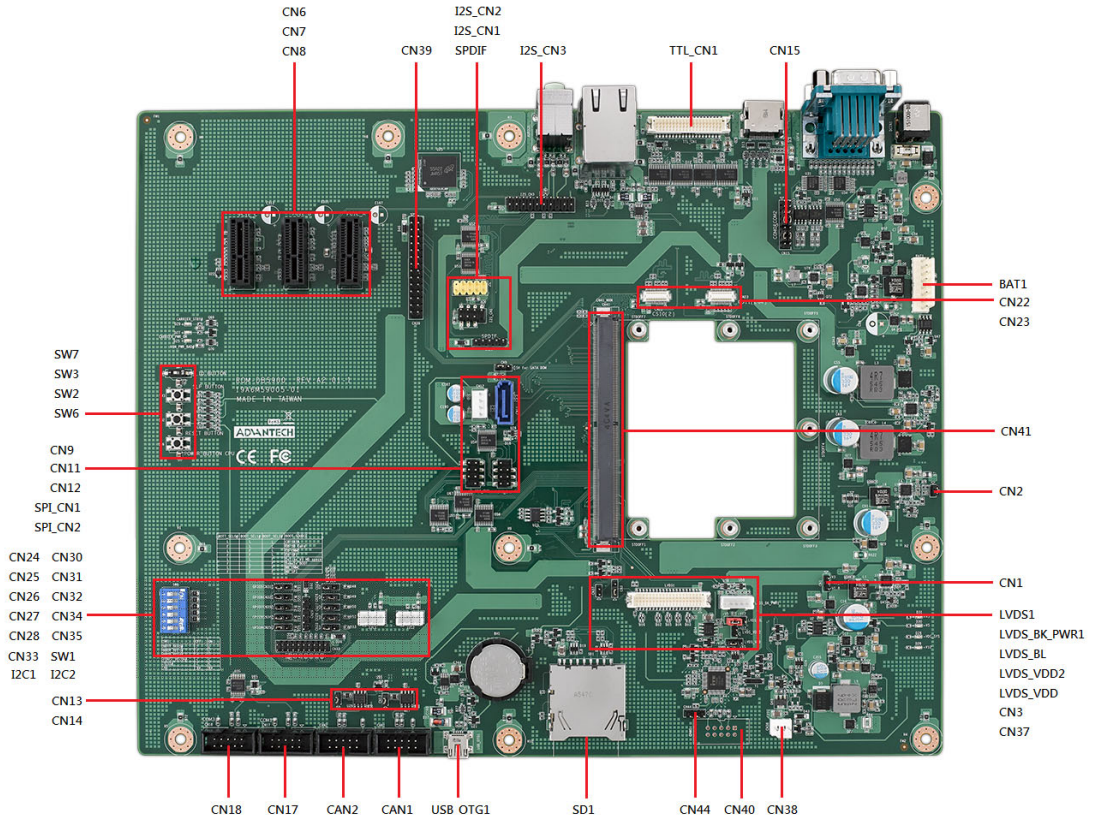


Table 2.8: Internal IO Connector

Position	Description	Connector Type
CN1	VDD_IO +3V/1.8V selection	PIN HEADER 3x1P 2.0mm 180D(M) DIP 2000-13 WS
CN2	VMODA	PIN HEADER 2*1P 180D(M)SQUARE 2.0mm DIP W/O Pb
CN3	EDP_HPD for LVDS	PIN HEADER 3x1P 2.0mm 180D(M) DIP 2000-13 WS
CN5B	USB Port1	PhoneJack RJ45+USB 22P 90D(F) DIP RU1-196A9WGF
CN5C	USB Port2	PhoneJack RJ45+USB 22P 90D(F) DIP RU1-196A9WGF
CN6	PCIex1 connector 1	PCIEXPRESS 36P 180D(F) DIP 2EG01817-D2D-DF
CN7	PCIex1 connector 2	PCIEXPRESS 36P 180D(F) DIP 2EG01817-D2D-DF
CN8	PCIex1 connector 3	PCIEXPRESS 36P 180D(F) DIP 2EG01817-D2D-DF
CN9	SATA-DOM Jumper (Power +5V pin7)	PIN HEADER 3x1P 2.0mm 180D(M) DIP 2000-13 WS
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
CN13	CAN1 bus, 120om terminal resistor	PIN HEADER 2*1P 180D(M)SQUARE 2.0mm DIP W/O Pb

CN14	CAN2 bus, 120om terminal resistor	PIN HEADER 2*1P 180D(M)SQUARE 2.0mm DIP W/O Pb
CN15	UART2 selection jumper (RS232/422/485)	PIN HEADER 9x2P 2.0mm 180D(M) DIP 21N22050-18S10
CN16A	UART0 (RS232)	D-SUB Conn. 18P 90D(M) DIP DM10151-H531-4F
CN16B	UART2 (RS232/422/485)	D-SUB Conn. 18P 90D(M) DIP DM10151-H531-4F
CN17	UART1 (RS232, 2wires)	BOX HEADER 5x2P 2.54mm 180D(M) DIP 23N6960-10S10
CN18	UART3 (RS232, 2wires)	BOX HEADER 5x2P 2.54mm 180D(M) DIP 23N6960-10S10
CN21	SPDIF	PIN HEADER 1X5P 2.54mm 180D 210-91-05GB01
CN22	Camera 1 connector (MIPI)	B/B CONN. 2x15P 0.5mm 180D(M) SMD DF12 (3.0)-30D
CN23	Camera 2 connector (MIPI)	B/B CONN. 2x15P 0.5mm 180D(M) SMD DF12 (3.0)-30D
CN24	GPIO0 (Reserved for multi-function)	PIN HEADER 3x1P 2.0mm 180D(M) DIP 2000-13 WS
CN25	GPIO9 (Reserved for multi-function)	PIN HEADER 3x1P 2.0mm 180D(M) DIP 2000-13 WS
CN26	GPIO1 (Reserved for multi-function)	PIN HEADER 3x1P 2.0mm 180D(M) DIP 2000-13 WS
CN27	GPIO2 (Reserved for multi-function)	PIN HEADER 3x1P 2.0mm 180D(M) DIP 2000-13 WS
CN28	GPIO3 (Reserved for multi-function)	PIN HEADER 3x1P 2.0mm 180D(M) DIP 2000-13 WS
CN29	Reserved for CAN	PIN HEADER 1X5P 2.54mm 180D 210-91-05GB01
CN30	GPIO4 (Reserved for multi-function)	PIN HEADER 3x1P 2.0mm 180D(M) DIP 2000-13 WS
CN31	GPIO5 (Reserved for multi-function)	PIN HEADER 3x1P 2.0mm 180D(M) DIP 2000-13 WS
CN32	GPIO6 (Reserved for multi-function)	PIN HEADER 3x1P 2.0mm 180D(M) DIP 2000-13 WS
CN33	GPIO connector	PIN HEADER 10x2P 2.0mm 180D(M) DIP 21N22050
CN34	GPIO8	PIN HEADER 3x1P 2.0mm 180D(M) DIP 2000-13 WS
CN35	GPIO7	PIN HEADER 3x1P 2.0mm 180D(M) DIP 2000-13 WS
CN37	External WDT out	PIN HEADER 2*1P 180D(M)SQUARE 2.0mm DIP W/O Pb
CN38	System Fan	Wafer 2.54mm 3P 180D(M) DIP 22-27-2031
CN39	AFB	PIN HEADER 2x15P 2.54mm 180D(M) 21N22564-30S10B-
CN40	Reserved for EC programming	BOX HEADER 5x2P 2.54mm 180D(M) DIP 23N6960-10S10
CN41	MXM 3.0 connector	
CN42	HDMI connector	HDMI Conn. 19P 0.5mm 90D(F) SMD QJ51191-LFB4-7F
I2C1	I2C pin header	WAFER BOX 2.0mm 4P 180D(M) W/LOCK A2001WV2-4P

I2C2	I2C pin header	WAFER BOX 2.0mm 4P 180D(M) W/LOCK A2001WV2-4P
I2C_CN1	I2S1	PIN HEADER 2x4P 2.54mm 180D(M) SMD 21N22564
I2C_CN2	I2S2	PIN HEADER 2x5P 2.54mm 180D(M) DIP 21N22564-10S1
I2C_CN3	Audio codec connector	PIN HEADER 2x10P 2.54mm 180D(M) DIP 21N22564
SPI_CN1	SPI connector 1	PIN HEADER 2x4P 2.54mm 180D(M) SMD 21N22564
SPI_CN2	SPI connector 0	PIN HEADER 2x4P 2.54mm 180D(M) SMD 21N22564
SW1	Boot Selection	DIP SW EDG106S DIP 6P Radial SPST
SW2	Reset button	TACT SW STS-091 SMD 4P H=3.8mm
SW3	Sleep button	TACT SW STS-091 SMD 4P H=3.8mm
SW6	Power on (CPU module)	TACT SW STS-091 SMD 4P H=3.8mm
SW7	LID Switch	SW ESD101E65Z SMD 2P 2.5x6.6x3.1mm
LVDS1	LVDS 24bit	B/B Conn. 40P 1.25mm 90D SMD DF13-40DP-1.25V(91)
LVDS_BK_PWR1	LVDS backlight power	WAFER BOX 2.0mm 5P 180D(M) DIP WO/Pb JIH VEI
LVDS_BL	LVDS backlight selection (+12V/5V)	PIN HEADER 3x1P 2.54mm 180D(M) DIP 205-1x3GS
LVDS_VDD	LVDS VDD power selection (+3.3V/+5V)	PIN HEADER 3x1P 2.0mm 180D(M) DIP 2000-13 WS
LVDS_VDD2	LVDS VDD power selection2(+12V)	PIN HEADER 2*1P 180D(M)SQUARE 2.0mm DIP W/O Pb
USB_OTG1	USB OTG	MINI USB 5P 180D(F) SMD UH51543-CS7-7F
CAN1	CAN0 pin header	WAFER BOX 5P 2.5mm 180D(M) DIP A2501WV2-5P
CAN2	CAN1 pin header	WAFER BOX 5P 2.5mm 180D(M) DIP A2501WV2-5P
BAT1	Lithium-ion Battery power input	WAFER 8P 2.54mm 180D(M) DIP A2543WV2-8P
BH1	CR-2032 connector	BATTERY HOLDER 24.9*23.4*8.9 CR2032 BH800.4GG
SD1	SD socket	SD CONN 9P 90D(F) SMD DM1AA-SF-PEJ(82)
DCIN1	DC Power in (+12V)	DC POWER JACK 2.5mm 90D(M) DIP 2DC-G213B200
TTL_CN1	TTL connector	B/B Conn. 40P 1.25mm 90D SMD DF13-40DP-1.25V(91)

2.4.3 Connectors

Table 2.9: CN6 (PCIex1 connector1)

Pin	Signal	Pin	Signal
B1	+12V	A1	+12V
B2	+12V	A2	+12V
B3	+12V	A3	+12V
B4	GND	A4	GND
B5	PCIE_A_CK	A5	PCIEX_A_JTAG2
B6	PCIE_A_DAT	A6	PCIEX_A_JTAG3
B7	GND	A7	PCIEX_A_JTAG4
B8	+3V	A8	PCIEX_A_JTAG5
B9	PCIEX_A_JTAG1	A9	+3V
B10	+3V	A10	+3V
B11	+3V	A11	PWRGD
		Mechanical Key	
B12	Reserved	A12	GND
B13	GND	A13	PCIE_A_REFCK+
B14	PCIE_A_X_TX+	A14	PCIE_A_REFCK-
B15	PCIE_A_X_TX-	A15	GND
B16	GND	A16	PCIE_A_X_RX+
B17	+3V	A17	PCIE_A_X_RX-
B18	GND	A18	GND

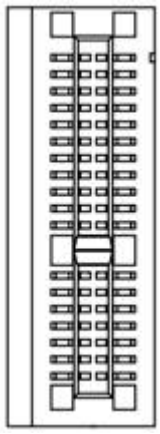


Table 2.10: CN7 (PCIex1 connector2)			
Pin	**Signal**	**Pin**	**Signal**
B1	+12V	A1	+12V
B2	+12V	A2	+12V
B3	+12V	A3	+12V
B4	GND	A4	GND
B5	PCIE_B_CK	A5	PCIEX_B_JTAG2
B6	PCIE_B_DAT	A6	PCIEX_B_JTAG3
B7	GND	A7	PCIEX_B_JTAG4
B8	+3V	A8	PCIEX_B_JTAG5
B9	PCIEX_B_JTAG1	A9	+3V
B10	+3V	A10	+3V
B11	+3V	A11	PWRGD
		Mechanical Key	
B12	Reserved	A12	GND
B13	GND	A13	PCIE_B_REFCK+
B14	PCIE_B_X_TX+	A14	PCIE_B_REFCK-
B15	PCIE_B_X_TX-	A15	GND
B16	GND	A16	PCIE_B_X_RX+
B17	+3V	A17	PCIE_B_X_RX-
B18	GND	A18	GND
1	GND	2	-
3	-	4	-
5	MIC-IN	6	-
7	Audio_L	8	-
9	Audio_R		

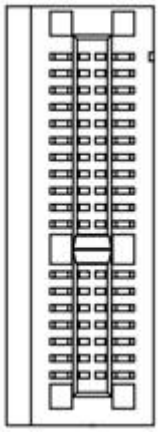


Table 2.11: CN8 (PCIex1 connector3)			
Pin	**Signal**	**Pin**	**Signal**
B1	+12V	A1	+12V
B2	+12V	A2	+12V
B3	+12V	A3	+12V
B4	GND	A4	GND
B5	PCIE_C_CK	A5	PCIEX_C_JTAG2
B6	PCIE_C_DAT	A6	PCIEX_C_JTAG3
B7	GND	A7	PCIEX_C_JTAG4
B8	+3V	A8	PCIEX_C_JTAG5
B9	PCIEX_C_JTAG1	A9	+3V
B10	+3V	A10	+3V
B11	+3V	A11	PWRGD
		Mechanical Key	
B12	Reserved	A12	GND
B13	GND	A13	PCIE_C_REFCK+
B14	PCIE_C_X_TX+	A14	PCIE_C_REFCK-
B15	PCIE_C_X_TX-	A15	GND
B16	GND	A16	PCIE_C_X_RX+
B17	+3V	A17	PCIE_C_X_RX-
B18	GND	A18	GND
1	GND	2	-
3	-	4	-
5	MIC-IN	6	-
7	Audio_L	8	-
9	Audio_R		

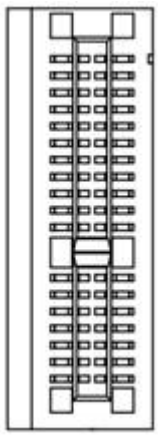


Table 2.12: CN11 (SATA connector)			
Pin	**Signal**	**Pin**	**Signal**
1	GND	2	SATA_TX+
3	SATA_TX-	4	GND
5	SATA_RX-	6	SATA_RX+
7	SATA DOM PIN7		

Table 2.13: CN12 (SATA Power connector)			
1	+5V	2	GND
3	GND	4	GND
5	+12V	-	-

Table 2.14: CN41 (CN41A, MXM 3.0 connector)			
Pin	**Signal**	**Pin**	**Signal**
P1	PCAM_PXL_CK1	S1	PCAM_VSYNC
P2	GND	S2	PCAM_HSYNC
P3	CSI1_CK+	S3	GND
P4	CSI1_CK-	S4	PCAM_PXL_CK0
P5	-	S5	I2C_CAM_CK
P6	PCAM_MCK	S6	CAM_MCK
P7	CSI1_D0+	S7	I2C_CAM_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	AFB0_OUT
P18	GND	S18	AFB1_OUT
P19	GBE_MDI3-	S19	AFB2_OUT
P20	GBE_MDI3+	S20	AFB3_IN
P21	GBE_LINK100#	S21	AFB4_IN
P22	GBE_LINK1000#	S22	AFB5_IN
P23	GBE_MDI2-	S23	AFB6_PTIO
P24	GBE_MDI2+	S24	AFB7_PTIO
P25	GBE_LINK_ACT#	S25	GND
P26	GBE_MDI1-	S26	SDMMC_D0
P27	GBE_MDI1+	S27	SDMMC_D1
P28	GBE_CTREF	S28	SDMMC_D2
P29	GBE_MDI0-	S29	SDMMC_D3
P30	GBE_MDI0+	S30	SDMMC_D4
P31	SPI0_CS1#	S31	SDMMC_D5
P32	GND	S32	SDMMC_D6
P33	SDIO_WP	S33	SDMMC_D7
P34	SDIO_CMD	S34	GND
P35	SDIO_CD#	S35	SDMMC_CK
P36	SDIO_CK	S36	SDMMC_CMD
P37	SDIO_PWR_EN	S37	SDMMC_RST#
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	I2S1_LRCK
P44	SPI0_CK	S44	I2S1_SDOUT
P45	SPI0_DIN	S45	I2S1_SDIN

Table 2.14: CN41 (CN41A, MXM 3.0 connector)			
P46	SPI0_DO	S46	I2S1_CK
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	SPI1_CS0#	S54	SATA_ACT#
P55	SPI1_CS1#	S55	AFB8_PTIO
P56	SPI1_CK	S56	AFB9_PTIO
P57	SPI1_DIN	S57	PCAM_ON_CSI0#
P58	SPI1_DO	S58	PCAM_ON_CSI1#
P59	GND	S59	SPDIF_OUT
P60	USB0+	S60	SPDIF_IN
P61	USB0-	S61	GND
P62	USB0_EN_OC#	S62	AFB_DIFF0+
P63	USB0_VBUS_DET	S63	AFB_DIFF0-
P64	USB0_OTG_ID	S64	GND
P65	USB1+	S65	AFB_DIFF1+
P66	USB1-	S66	AFB_DIFF1-
P67	USB1_EN_OC#	S67	GND
P68	GND	S68	AFB_DIFF2+
P69	USB2+	S69	AFB_DIFF2-
P70	USB2-	S70	GND
P71	USB2_EN_OC#	S71	AFB_DIFF3+
P72	PCIE_C_PRSNT#	S72	AFB_DIFF3-
P73	PCIE_B_PRSNT#	S73	GND
P74	PCIE_B_PRSNT#	S74	AFB_DIFF4+
P75	PCIE_A_RST#	S75	AFB_DIFF4-
P76	PCIE_C_CKREQ#	S76	PCIE_B_RST#
P77	PCIE_B_CKREQ#	S77	PCIE_C_RST#
P78	PCIE_A_CKREQ#	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 2.14: CN41 (CN41A, MXM 3.0 connector)			
P93	HDMI_D2-	S93	LCD_D0
P94	GND	S94	LCD_D1
P95	HDMI_D1+	S95	LCD_D2
P96	HDMI_D1-	S96	LCD_D3
P97	GND	S97	LCD_D4
P98	HDMI_D0+	S98	LCD_D5
P99	HDMI_D0-	S99	LCD_D6
P100	GND	S100	LCD_D7
P101	HDMI_CK+	S101	GND
P102	HDMI_CK-	S102	LCD_D8
P103	GND	S103	LCD_D9
P104	HDMI_HPD	S104	LCD_D10
P105	HDMI_CTRL_CK	S105	LCD_D11
P106	HDMI_CTRL_DAT	S106	LCD_D12
P107	HDMI_CEC	S107	LCD_D13
P108	GPIO0	S108	LCD_D14
P109	GPIO1	S109	LCD_D15
P110	GPIO2	S110	GND
P111	GPIO3	S111	LCD_D16
P112	GPIO4	S112	LCD_D17
P113	GPIO5	S113	LCD_D18
P114	GPIO6	S114	LCD_D19
P115	GPIO7	S115	LCD_D20
P116	GPIO8	S116	LCD_D21
P117	GPIO9	S117	LCD_D22
P118	GPIO10	S118	LCD_D23
P119	GPIO11	S119	GND
P120	GND	S120	LCD_DE
P121	I2C_PM_CK	S121	LCD_VS
P122	I2C_PM_DAT	S122	LCD_HS
P123	BOOT_SEL0#	S123	LCD_PCK
P124	BOOT_SEL1#	S124	GND
P125	BOOT_SEL2#	S125	LVDS0+
P126	RESET_OUT#	S126	LVDS0-
P127	RESET_IN#	S127	LCD_BKLT_EN
P128	POWER_BTN#	S128	LVDS1+
P129	SER0_TX	S129	LVDS1-
P130	SER0_RX	S130	GND
P131	SER0_RTS#	S131	LVDS2+
P132	SER0_CTS#	S132	LVDS2-
P133	GND	S133	LCD_VDD_EN
P134	SER1_TX	S134	LVDS_CK+
P135	SER1_RX	S135	LVDS_CK-
P136	SER2_TX	S136	GND
P137	SER2_RX	S137	LVDS3+
P138	SER2_RTS#	S138	LVDS3-
P139	SER2_CTS#	S139	I2C_LCD_CK

Table 2.14: CN41 (CN41A, MXM 3.0 connector)			
P140	SER3_TX	S140	I2C_LCD_DAT
P141	SER3_RX	S141	LCD_BKLT_PWM
P142	GND	S142	LCD_DUAL_PCK
P143	CAN0_TX	S143	GND
P144	CAN0_RX	S144	EDP_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#
P157		S157	TEST#
P158		S158	VDD_IO_SEL#

Table 2.15: LVDS1 (LVDS 24bit)			
Pin	**Signal**	**Pin**	**Signal**
1	+VDD_LVDS	2	+VDD_LVDS
3	GND	4	GND
5	+VDD_LVDS	6	+VDD_LVDS
7	LVDS_D0-	8	-
9	LVDS_D0+	10	-
11	GND	12	GND
13	LVDS_D1-	14	-
15	LVDS_D1+	16	-
17	GND	18	GND
19	LVDS_D2-	20	-
21	LVDS_D2+	22	-
23	GND	24	GND
25	VLDS_CK-	26	-
27	LVDS_CK+	28	-
29	GND	30	GND
31	DID_CK	32	DID_DAT
33	GND	34	GND
35	LVDS D3-	36	-
37	LVDS D3+	37	-
39	GND	40	LVDS_CTRL

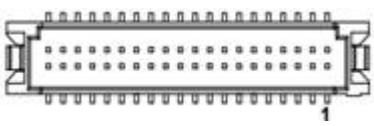


Table 2.16: TTL_CN1 (TTL)			
Pin	**Signal**	**Pin**	**Signal**
1	GND	2	+5V
3	GND	4	GND
5	+3V_VGA_VDDA	6	+3V_VGA_VDDA
7	-	8	GND
9	LCDB0	10	LCDB1
11	LCDB2	12	LCDB3
13	LCDB4	14	LCDB5
15	LCDB6	16	LCDB7
17	LCDG0	18	LCDG1
19	LCDG2	20	LCDG3
21	LCDG4	22	LCDG5
23	LCDG6	24	LCDG7
25	LCDR0	26	LCDR1
27	LCDR2	28	LCDR3
29,	LCDR4	30	LCDR5
31	LCDR6	32	LCDR7
33	GND	34	GND
35	LCD_PCLK_C	36	LCD_VSYNC
37	VGA_DE	38	LCD_HSYNC
39	I2C_VGA_DAT	40	I2C_VGA_CLK

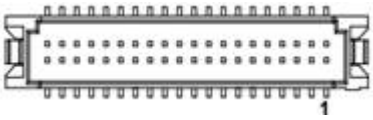


Table 2.17: LVDS_BK_PWR1 (LVDS backlight power)			
Pin	**Signal**	**Pin**	**Signal**
1	+VDD_BKLT_LVDS	2	GND
3	BLK_EN	4	Brightness
5	+5V		

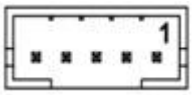


Table 2.18: USB_OTG1 (USB OTG)			
Pin	**Signal**	**Pin**	**Signal**
1	+5V	2	USB_OTG D-
3	USB_OTG D+	4	OTG ID
5	GND	6	GND

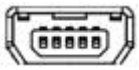


Table 2.19: SD1 (SD slot)			
Pin	**Signal**	**Pin**	**Signal**
1	SDIO_DATA3_X	2	SDIO_CMD
3	GND	4	+3V
5	SDIO_CK	6	GND
7	SDIO_DATA0	8	SDIO_DATA1
9	SDIO_DATA2	10	SDIO_CD#
11	GND	12	+3V_SDIO
H1	-	H2	-
H3	-	H4	GND
H5	GND	H6	GND

Table 2.20: BAT1 (Lithium-ion Battery power input)			
Pin	**Signal**	**Pin**	**Signal**
1	GND	2	GND
3	BAT_THER	4	BAT_ID_CN
5	I2C_DAT_BAT	6	I2C_CK_BAT
7	+VBATT	8	+VBATT

Table 2.21: BH1 (CR-2032)			
Pin	**Signal**	**Pin**	**Signal**
1	BAT_RTC	2	GND

2.4.4 Jumpers

Table 2.22: CN1 (VDD_IO+3V/1.8V selection)			
Pin	**Signal**	**Pin**	**Signal**
1	+3V	2	+VDD_IO
3	+1.8V		

Table 2.23: CN2 (WMODA)			
Pin	**Signal**	**Pin**	**Signal**
1	+VMODA	2	GND

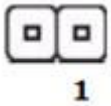


Table 2.24: CN3 (EDP_HPD for LVDS)			
Pin	**Signal**	**Pin**	**Signal**
1	GND	2	EDP_HDP_A
3	EDP_HPD		

Table 2.25: CN9 (SATA-DOM Jumper, default 2-3)			
Pin	**Signal**	**Pin**	**Signal**
1	+5V	2	SATA-DOM Pin7
3	GND	-	-

Table 2.26: CN13 (CAN0 bus, 120OM terminal resistor)			
Jumper	**Mode**	**Jumper**	**Mode**
1-2	120 OM (Default)	-	Without 120 OM

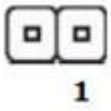
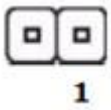


Table 2.27: CN14 (CAN1 bus, 120OM terminal resistor)			
Jumper	**Mode**	**Jumper**	**Mode**
1-2	120 OM (Default)	-	Without 120 OM



Jumper	**Mode**	**Jumper**	**Mode**
1-2	120 OM (Default)	-	Without 120 OM

Table 2.28: CN18 (UART2 function selection)			
Pin	**Signal**	**Pin**	**Signal**
1	SER2_RX	2	RXD485_A
3	SER2_RX	4	RXD422_A
5	SER2_RX	6	RXD232_A
7	-	8	COM2_RXD
9	NDCD#TXD485-	10	NRXD2TXD485+
11	TXD485-_A	12	TXD485+_A
13	COM2_TXD	14	-
15	NTXD2_RXD485+	16	NDTR#2_RXD485-
17	RSD485+_A	18	RSD485-_A

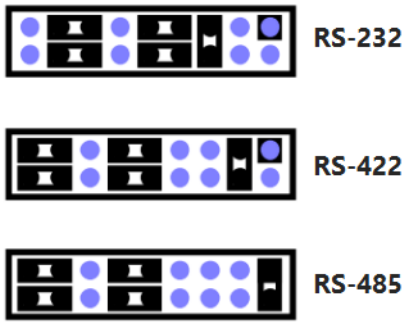


Table 2.29: CN17 (UART1, 2wires)			
Pin	**Signal**	**Pin**	**Signal**
1	-	2	-
3	COM1_RX	4	-
5	COM1_TX	6	-
7	-	8	-
9	GND	10	-

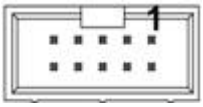


Table 2.30: CN17 (UART3, 2wires)			
Pin	**Signal**	**Pin**	**Signal**
1	-	2	-
3	COM3_RX	4	-
5	COM3_TX	6	-
7	-	8	-
9	GND	10	-

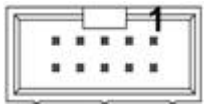


Table 2.31: CN21 (SPDIF)			
Pin	**Signal**	**Pin**	**Signal**
1	SPDIF_IN	2	GND
3	SPDIF_OUT	4	-
5	+5V_SPDIF		

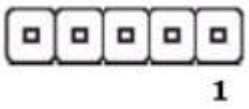


Table 2.32: CN22 (Camera 1, MIPI)			
Pin	**Signal**	**Pin**	**Signal**
1	PCAM_ON_CSI0	2	GND
3	PCAM_MCK	4	GND
5	GND	6	GND
7	PCAM_HSYNC	8	I2C_CSI0_DAT
9	PCAM_VSYNC	10	I2C_CSI0_CK
11	GND	12	GND
13	CAM0_PWR	14	CSI0_X_CK+
15	CAM0_RST	16	CSI0_X_CK-
17	GND	18	GND
19	CAM_MCK	20	CSI0_X_D+
21	GND	22	CSI0_X_D-
23	+3V	24	GND
25	+3V	26	CSI0_D0+
27	+3V	28	CSI0_X_D0-
29	+3V	30	GND

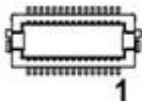


Table 2.33: CN23 (Camera 2, MIPI)			
Pin	**Signal**	**Pin**	**Signal**
1	PCAM_FLD	2	PCAM_ON_CSI1
3	PCAM_DE	4	PCAM_PXL_CK0
5	CAM1_PWR	6	GND
7	GND	8	I2C_CSI1_DAT
9	GND	10	I2C_CSI1_CK
11	CSI1_X_D3+	12	GND
13	CIS1_X_D3-	14	CSI1_X_CK+
15	GND	16	CSI1_X_CK-
17	CSI1_X_D2+	18	GND
19	CSI1_X_D2-	20	CSI1_X_D1+
21	GND	22	CSI1_X_D1-
23	CAM1_X_MCK	24	GND
25	+3V	26	CSI1_X_D0+
27	+3V	28	CSI1_X_D0-
29	+3V	30	GND

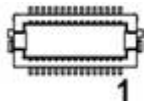


Table 2.34: CN24 (Reserved for GPIO0, multi-pin)			
Jumper	**Mode**	**Jumper**	**Mode**
1-2	GPIO0 (Default)	2-3	CAM0_PWR#

Table 2.35: CN25 (Reserved for GPIO9, multi-pin)			
Jumper	**Mode**	**Jumper**	**Mode**
1-2	GPIO9 (Default)	2-3	CAN1_ERR#

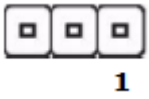


Table 2.36: CN26 (Reserved for GPIO1, multi-pin)

Jumper	Mode	Jumper	Mode
1-2	GPIO1 (Default)	2-3	CAM1_PWR

Table 2.37: CN27 (Reserved for GPIO2, multi-pin)

Jumper	Mode	Jumper	Mode
1-2	GPIO2 (Default)	2-3	CAM0_RST#

Table 2.38: CN28 (Reserved for GPIO3, multi-pin)

Jumper	Mode	Jumper	Mode
1-2	GPIO3 (Default)	2-3	CAM1_RST#

Table 2.39: CN29 (Reserved for CAN, multi-pin)

Pin	Signal	Pin	Signal
1	+3V	2	CAN0_ERR#
3	CAN1_ERR#	4	-
5	GND		

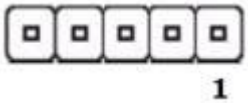


Table 2.40: CN30 (Reserved for GPIO4, multi-pin)

Jumper	Mode	Jumper	Mode
1-2	GPIO4 (Default)	2-3	HAD_RST#

Table 2.41: CN31 (Reserved for GPIO5, multi-pin)			
Jumper	**Mode**	**Jumper**	**Mode**
1-2	GPIO5(Default)	2-3	PWM_OUT

Table 2.42: CN32 (Reserved for GPIO6, multi-pin)			
Jumper	**Mode**	**Jumper**	**Mode**
1-2	GPIO6(Default)	2-3	TACHIN

Table 2.43: CN33 (GPIO)			
Pin	**Signal**	**Pin**	**Signal**
1	+3V	2	GND
3	GPIO0	4	GPIO1
5	GPIO2	6	GPIO3
7	GPIO4	8	GPIO5
9	GPIO6	10	GPIO7
11	GPIO8	12	GPIO9
13	GPIO10	14	GPIO11
15	-	16	-
17	-	18	-
19	-	20	-

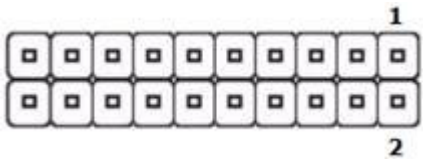


Table 2.44: CN34 (Reserved for GPIO8, multi-pin)			
Jumper	**Mode**	**Jumper**	**Mode**
1-2	GPIO8(Default)	2-3	CAN0_ERR#

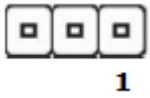


Table 2.45: CN35 (Reserved for GPIO7, multi-pin)			
Jumper	**Mode**	**Jumper**	**Mode**
1-2	GPIO7(Default)	2-3	PCAM_FLD

Table 2.46: CN37 (External WDT)			
Pin	**Signal**	**Pin**	**Signal**
1	WDT_Time_Out#	2	GND

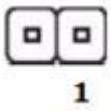


Table 2.47: CN38 (System FAN)			
Pin	**Signal**	**Pin**	**Signal**
1	GND	2	+12V
3	+5V		

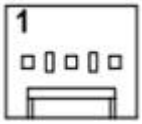


Table 2.48: CN39 (AFB, Reserved)			
Pin	**Signal**	**Pin**	**Signal**
1	+3V	2	+3V
3	AFB0_OUT	4	AFB_DIFF0+
5	AFB1_OUT	6	AFB_DIFF0-
7	AFB2_OUT	8	GND
9	GND	10	AFB_DIFF1+
11	AFB3_IN	12	AFB_DIFF1-
13	AFB4_IN	14	GND
15	AFB5_IN	16	AFB_DIFF2+
17	GND	18	AFB_DIFF2-
19	AFB6_PTIO	20	GND
21	AFB7_PTIO	22	AFB_DIFF3+
23	GND	24	AFB_DIFF3-
25	AFB8_PTIO	26	GND
27	AFB9_PTIO	28	AFB_DIFF4+
29	GND	30	AFB_DIFF4-

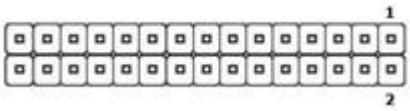


Table 2.49: CN40 (Reserved for EC, programming pin)

Pin	Signal	Pin	Signal
1	-	2	-
3	EC_RXD	4	-
5	EC_TXD	6	-
7	-	8	-
9	GND	10	-

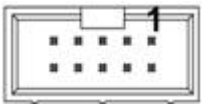


Table 2.50: I²C_CN1 (I2S1)

Pin	Signal	Pin	Signal
1	Audio_VDDA1	2	GND
3	I2S1_SDOUT_C	3	I2S1_SDIN_C
5	I2S1_CK_C	6	I2S1_LRCK_C
7	-	8	AUDIO_MCK_C

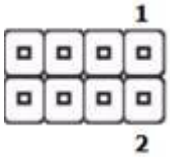


Table 2.51: I²C_CN2 (I2S2)

Pin	Signal	Pin	Signal
1	Audio_VDDA2	2	GND
3	I2S2_SDOUT_C	3	I2S2_SDIN_C
5	I2S2_CK_C	6	I2S2_LRCK_C
7	-	8	AUDIO_MCK_C

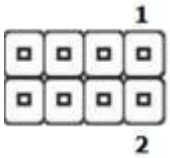


Table 2.52: I²C_CN3 (I2S0, audio codec)			
Pin	**Signal**	**Pin**	**Signal**
1	Audio_VDDA	2	GND
3	Audio_VDDA	4	I2S0_SDIN_C
5	I2S0_SDOUT_C	6	I2S0_LRCK_C
7	I2S0_CK_C	8	AUDIO_MCK_C
9	-	10	GND
11	Audio_I2C_CK	12	MIC_BIAS
13	Audio_I2C_DAT	14	GND
15	-	16	HP_R
17	MIC_IN	18	GND
19	GND	20	HP_L

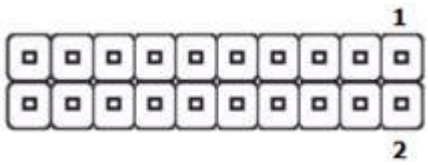


Table 2.53: SPI_CN1 (SPI1)			
Pin	**Signal**	**Pin**	**Signal**
1	+3V	2	GND
3	SPI1_CS0#	3	SPI1_CK
5	SPI1_DO_C	6	SPI1_DIN_C
7	-	8	SPI1_CS1#_C

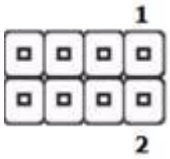


Table 2.54: SPI_CN2 (SPI0)			
Pin	**Signal**	**Pin**	**Signal**
1	+3V	2	GND
3	SPI0_CS0#	3	SPI0_CK
5	SPI0_DO_C	6	SPI0_DIN_C
7	-	8	SPI0_CS1#_C

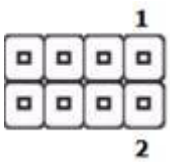


Table 2.55: LVDS_BL (LVDS backlight selection)			
Jumper	**Mode**	**Jumper**	**Mode**
1-2	+5V (Default)	2-3	+12V

* +VDD_BKLT_LVDS, pin1

Table 2.56: LVDS_VDD (LVDS VDD Power selection)			
Jumper	**Mode**	**Jumper**	**Mode**
1-2	+12V (Default)	2-3	+5V

Table 2.57: LVDS_VDD2 (LVDS VDD Power selection2)			
Jumper	**Mode**	**Jumper**	**Mode**
1-2	+12V (Default)		

Table 2.58: CAN1 (CAN0)			
Pin	**Signal**	**Pin**	**Signal**
1	-	2	-
3	CAN0_D-	4	CAN0_D+
5	GND		

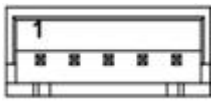
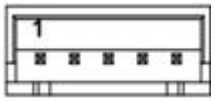


Table 2.59: CAN2 (CAN1)			
Pin	**Signal**	**Pin**	**Signal**
1	-	2	-
3	CAN1_D-	4	CAN1_D+
5	GND		



2.4.5 Switches and buttons

Table 2.60: Boot Selection for SMARC, SPI

1	2	3	4	5	Feature
ON	ON	ON	OFF	OFF	Carrier SATA
OFF	ON	ON	OFF	OFF	Carrier SD
ON	OFF	OFF	OFF	OFF	Carrier eMMC
OFF	OFF	ON	OFF	OFF	Carrier SPI
ON	ON	OFF	OFF	OFF	Module device (reserved)
OFF	ON	OFF	OFF	OFF	Remote boot (reserved)
ON	OFF	OFF	OFF	OFF	Module eMMC
OFF	OFF	OFF	OFF	OFF	Module SPI

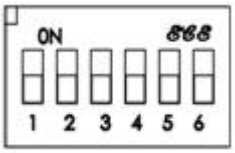


Table 2.61: SW2 (Reset button)

Pin	Signal	Pin	Signal
1	RESET_IN#	2	GND

Table 2.62: SW3 (Sleep button)

Pin	Signal	Pin	Signal
1	SLEEP#	2	GND

Table 2.63: SW6 (Power button, CPU)

Pin	Signal	Pin	Signal
1	POWER_BTN#	2	GND

Table 2.64: SW7 (LID Switch)

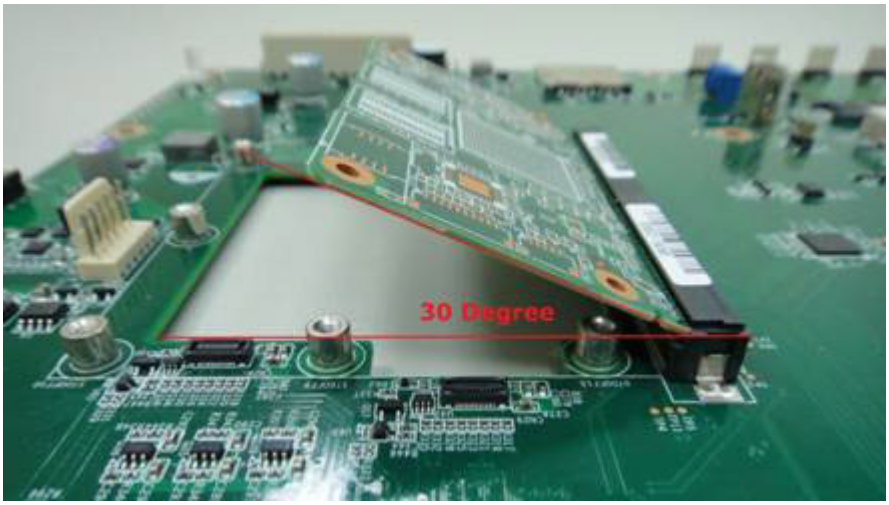
Pin	Signal	Pin	Signal
1	LID#	2	GND

2.4.6 LEDs

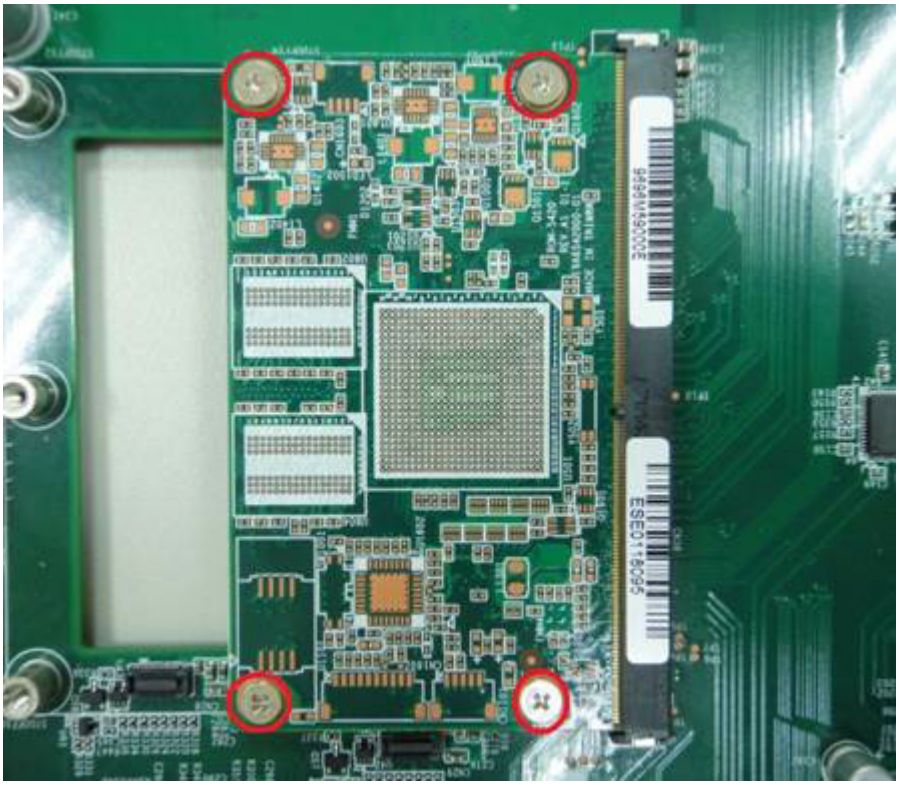
Position	Function	Position	Function
D26	+VDC_SYS	D28	+12V
D30	+5V	D31	+3V

2.4.7 Hardware installation

1. Install the ROM-5420 module board 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

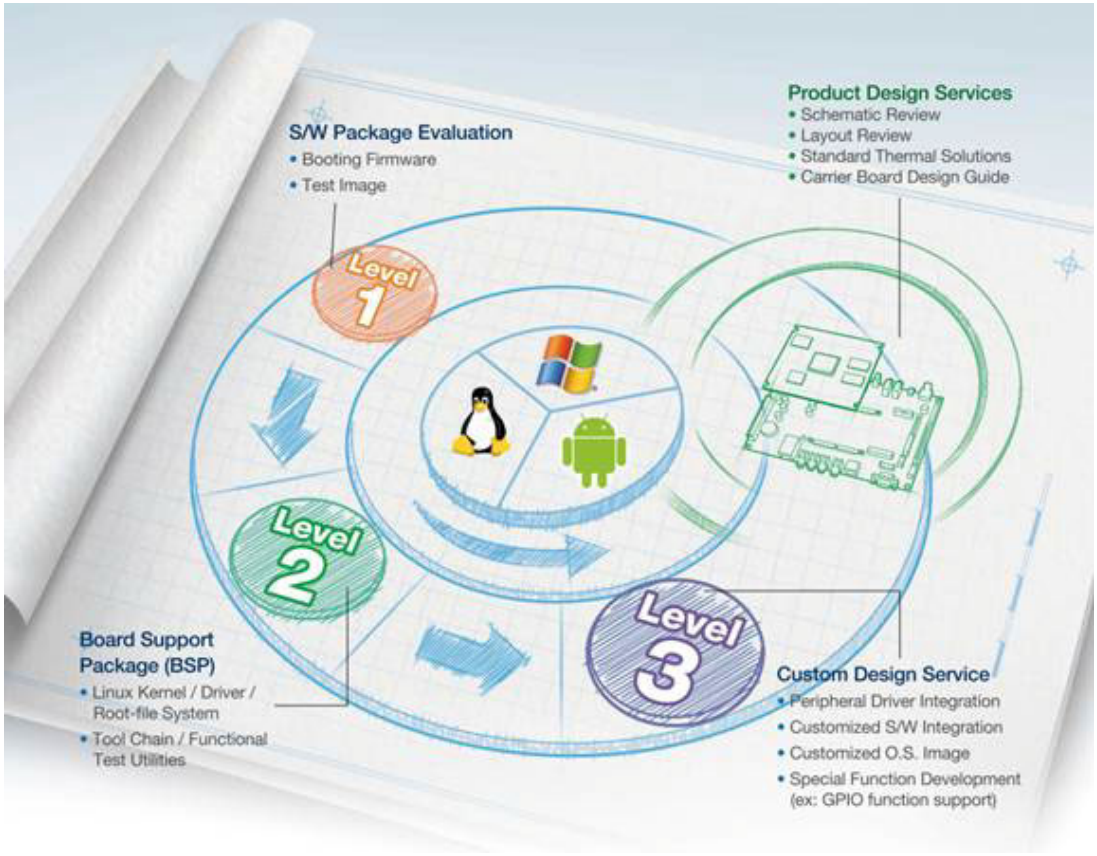


Chapter 3

Advantech Services

This chapter introduces Advantech design in serviceability, technical support and warranty policy for ROM-DB5900.

3.1 RISC Design-in Services



Advantech RISC Design-in Services help customers to reduce the time and work 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 to 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 check list for engineer for easy check their schematics and also review service based on customer carrier board schematics. Those services are pre-ventative, and help to catch design errors before they happen. It helps to save a lot of time and costs 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 image. Customers can save lot of 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 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 not only enable customers to effectively distribute their resources but also reduce R&D manpower cost 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 services.

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. So, 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. What's more, 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 not only offer hardware planning and technology consulting, but also software evaluation and peripheral module recommendations (such as WiFi, 3G, BT). Resolving customer concerns is Advantech's main target at this stage. Since we all know that product evaluation is the key task in the planning period, especially for performance and specification, so 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 their targets.

Integration stage

This phase comprises of 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 on 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 with less fuss. Furthermore, Advantech's team can provide professional consulting services about further testing and equipment usage, so customers can find the right tools to efficiently identify and solve problems to further enhance their products quality and performance.

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

On the other hand, you can reach our service team through below website, our technical support engineer will provide quick response 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 the product.
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 years complete and prompt global warranty service. Product defect 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.

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

All product specifications are subject to change without notice.