

RSB-4810

**3.5" Single-board Computer with
Rockchip Arm[®] Cortex[®]-A55
Processor**

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This warranty does not apply to any products that have been repaired or altered by persons other than repair personnel authorized by Advantech, or products that 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.

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If you believe your product to be defective, follow the steps outlined below:

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 on-screen messages displayed when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain a return merchandise authorization (RMA) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a completed Repair and Replacement Order Card, and a proof of purchase date (such as a photocopy of your sales receipt) into a shippable container. Products returned without a proof of purchase date are not eligible for warranty service.
5. Write the RMA number clearly on the outside of the package and ship the package prepaid to your dealer.

Declaration of Conformity

FCC Class B

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 when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference. In such cases, users are required to correct the interference at their own expense.

Packing List

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

- 1 x RSB-4810 SBC

Safety Precautions – Static Electricity

Follow this simple precaution to protect yourself from harm and the products from damage:

- To avoid electrical shock, always disconnect the power from the PC chassis before manual handling. Do not touch any components on the CPU card or other cards when the PC is powered on.

Safety Instructions

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

DISCLAIMER: These instructions are provided according to IEC 704-1 standards. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

Ordering Information

Part Number	Description
RSB-4810CQ-MNA1E	RSB-4810, RK3568, 2GB DDR 16GB eMMC, 0 ~ 60 °C/32 ~ 140 °F
RSB-4810WQ-MNA1E	RSB-4810, RK3568J, 2GB DDR 16GB eMMC, -40 ~ 85 °C/-40 ~ 185 °F
RSB-4810CQ-NNA1E	RSB-4810, RK3568, 4GB DDR 32GB eMMC, 0 ~ 60 °C/32 ~ 140 °F

Optional Accessories

Part Number	Description
96PSA-A36W12W7-5	ADP A/D 100-240V 36W 12V C6 lock DC jack 62368
1700008921	Power Cord 3P PSE 183 cm
170203183C	Power cord 3P EU 10A 250V 183 cm
170203180A	Power cord 3P UK 10A 250V 183 cm
1700001524	Power Cord 3P UL 10A 125V 180 cm
1700019146	Power Cord CCC 3P 10A 250V 183 cm
1700026611-01	Debug cable, D-SUB 9P(M)/1*4P-1.25 20 cm
IDK-1107WR-40WVA1E	7" LED PANEL 400N with 4WR touch, 800x480(G)
1700031071-01	For IDK-1107WR LVDS and black light cable
IDK-1115R-40XGC1E	15" LED panel 1024x768(G) with 5W R-touch
1700031073-01	For IDK-1115R LVDS and black light cable
XUTC-B156XTN07.1	AUO 15.6", 1366 x 768, 220nits, for UTC project
1700031103-01	For B156XTN07.1 eDP and black light cable
EWM-W188M201E	Wi-Fi 802.11ac/abgn 2T2R and BT4.2
1750007965-01	Antenna Cable R/P SMA (M) to MHF4, 300 mm
1750008671-01	Dipole Ant.SMA/M-R 2.4/5G 2.5/4dBi BLK 109 mm
968AD00479*	4G module LTE Cat 4 for China
1750006264	Antenna cable SMA(F)/MHF 15 cm
1750007990-01	Antenna 4G/LTE full band L=11 cm 50 Ohm
SQF-ISDM1-16G-21C	SQ Flash SD card UHS-I MLC 16GB (0 ~ 70 °C; 32 ~ 158 °F)
1700023588-01	M Cable USB-A 4P(M)/USB-A 4P(M) 120 cm

*Contact Advantech to obtain a suitable cellular module for your region.

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Chapter 1

General Introduction

This chapter gives background information regarding RSB-4810.

- Introduction
- Specification

1.1 Introduction

Advantech's RSB-4810 is an Arm-based 3.5" single board computer (SBC) powered by Rockchip RK3568 SOC. It leverages 4 x Arm Cortex-A55 cores, a 1.0TOPs NPU, and a Mali-G52 graphics engine. RSB-4810 provides USB 3.0, PCIE 3.0, SATA 3.0, 2 x Gigabit Ethernet ports, a single channel LVDS (shared with MIPI-DSI), 6 x UART, and 2 x CAN FD for embedded applications. RSB-4810 also features Mini-PCle, M.2 E-Key, and SIM card slot for Wi-Fi 6/BT, 5G/LTE, and AI acceleration modules. These features make Advantech's RSB-4810 an ideal solution for entry level edge AI computing in AIoT applications.

1.1.1 Product Features

Specifications		RSB-4810
Form Factor		3.5" SBC
Processor	CPU	Rockchip RK3568/RK3568J Arm Quad Cortex-A55, up to 2.0GHz
	NPU	Up to 1.0 Tops
Memory	Technology	LPDDR4
	Capacity	Onboard 2/4GB
	Flash	16/32GB eMMC NAND Flash for OS
Display	LVDS	1 x single channel LVDS(Default)or 1 x 4Lane MIPI-DSI
	HDMI	1 x HDMI 2.0, up to 4096x2304@60fps
	VGA	-
	eDP	1, max 2.7Gbps
	Graphics Engine	Mali-G52 support OpenGL ES 1.1/2.0/3.2, Vulkan 1.0/1.1, OpenCL 2.0
	H/W Video Codec	Decoder: H.265 HEVC/MVC Main10/H.264 AVC/MVC Main10/VP9 Profile0/2 up to 4096x2304@60fps; VP8,VC1,MPEG-4/2/1, up to 1920x1088@60fps Encoder: H.264/AVC H.265/HEVC MP@level4.1, up to 1920x1080@100fps. Support YUV/RGB video source with rotation and mirror
Video In	MIPI CSI	-
Ethernet	Chipset	RTL8211FS
	Speed	2 10/100/1000 Mbps
Watchdog Timer		0 ~ 60s, default 60s

I/O	SATA	1 x SATA 3.0
	SATA Power	1
	USB	1 x USB 3.2 Gen 1 by 1 Type A 1 x USB 3.2 Gen 1 by 1 Type A/OTG 2 x USB 2.0 Pin header
	Audio	1 x Mic in, HP, and Speaker out via pin header
	Serial Port	1 x RS-232 w/2wire via DB9; 2 x RS-232/RS-485 by pin header;(SW config) 3 x RS-232 by pin header; 1 x Debug by pin header
	SPI	-
	CAN	2 x CAN FD
	GPIO	6 x GPIO via pin header (3.3V TTL level)
	I2C	1 x can be configured to GPIO via software
	Button	1 x Reset button
Indicator	LED	1 x Power LED 1 x HDD LED
Expansion	Mini-PCle	1 x Mini PCIe slot, w/USB 2.0 and 1 x PCIe 3.0
	M.2	1 x M.2 2230 Key E slot, w/SIDO*UART*PCIe 3.0 x1, and 1 x USB 2.0
	SD	1 x Micro SD
	SIM	1 x Nano SIM
Power	Power Supply Voltage	12V
	Power Type	DC-in
	Power Consumption	Boost 13.1W@12V
Environment	Operating Temperature	0 ~ 60 °C/32 ~ 140 °F -40 ~ 85 °C/-40 ~ 185 °F
	Operating Humidity	5 ~ 95% Relative Humidity, non-condensing
Mechanical	Dimensions (W x D x H)	146 x 102 x 20 mm/5.74 x 4.01 x 0.78 in
Operating System		Linux Debian, Android
Certifications		CE/FCC Class B

1.1.2 Mechanical Specifications

- Dimensions: 146 x 102 mm/5.74 x 4.01 in
- Height: 20 mm/0.78 in
- Reference Weight: 200 g; 0.44 lb

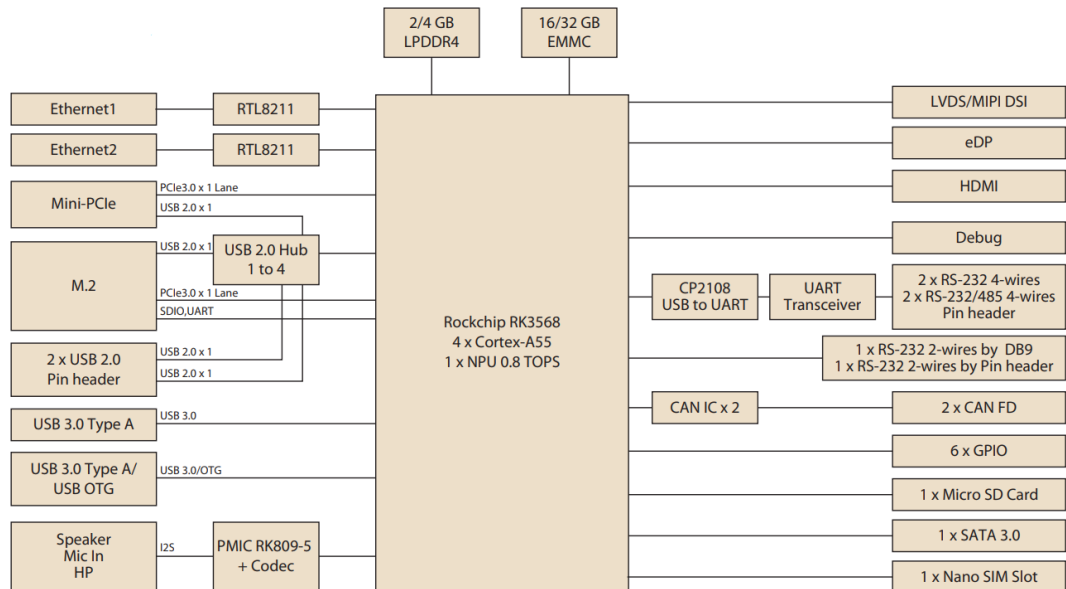
1.1.3 Electrical Specifications

- Power Supply Type: DC-in 12V
- RTC Battery:
 - Typical voltage: 3V
 - Normal discharge capacity: 210mAH

1.1.4 Environmental Specifications

- Operating Temperature: 0 ~ 60 °C/32 ~ 140 °F; -40 ~ 85 °C/-40 ~ 185 °F
- Operating Humidity: 5 ~ 95% relative humidity, non-condensing
- Storage Temperature: -40 ~ 85 °C/-40 ~ 185 °F
- Storage Humidity: 60 °C/140 °F @ 95% RH non-condensing

1.1.5 Block Diagram



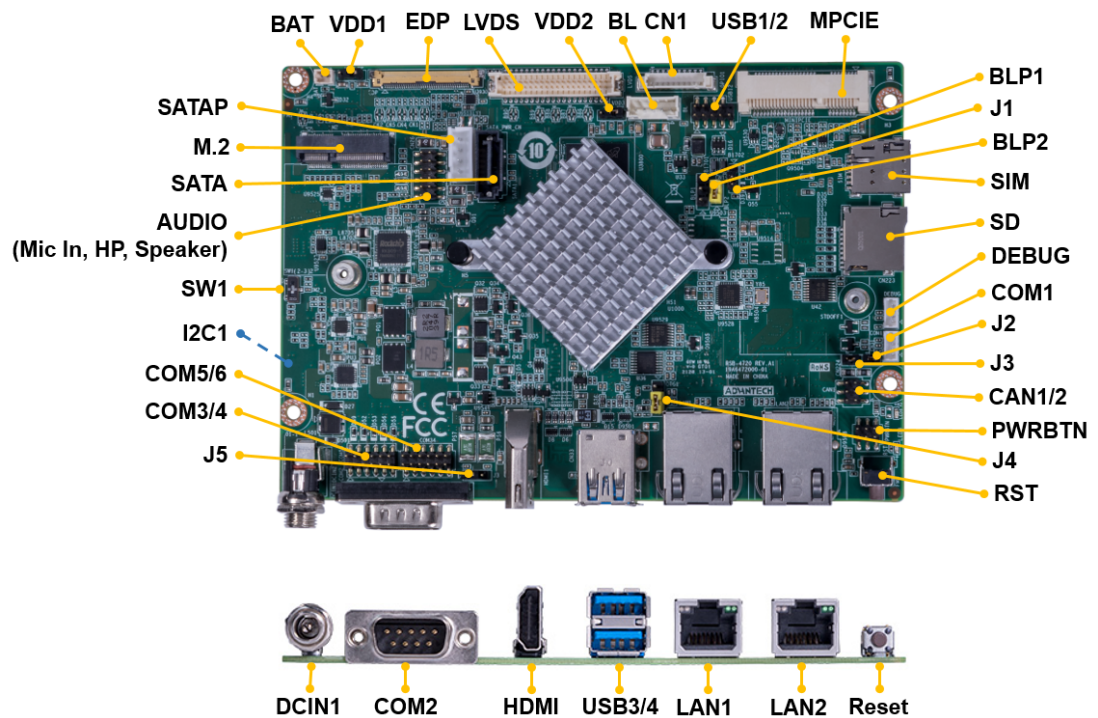
Chapter 2

Hardware Installation

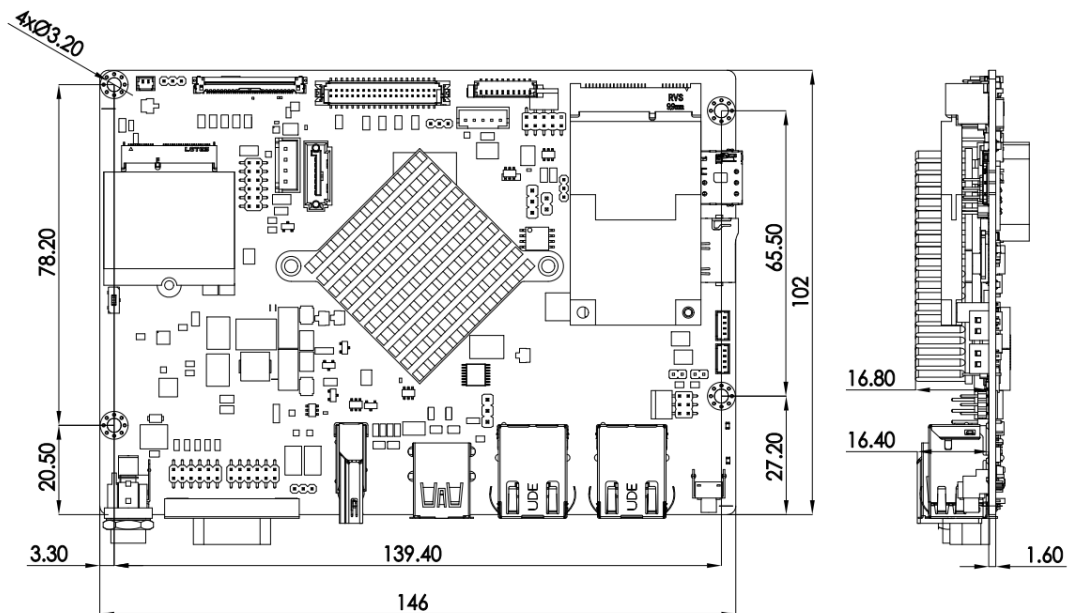
This chapter details mechanical and connector information.

- Jumper Information
- Connector Information
- Mechanical Drawing
- Quick Start Guide

2.1 Jumper and Connector Locations



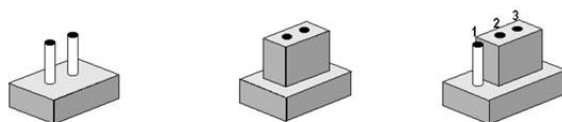
2.2 Board Dimensions



2.3 Jumpers

2.3.1 Jumper Description

Cards can be configured by setting jumpers. A jumper is a metal bridge used to close an electric circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To close a jumper, connect the pins with the clip. To open a jumper, remove the clip. Sometimes a jumper will have three pins labeled 1, 2, and 3. In such cases, connect either pins 1 and 2 or pins 2 and 3.



The jumper settings are schematically depicted in this manual as follows:



A pair of needle-nose pliers may be helpful when working with jumpers. If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before making any changes. Generally, only a standard cable is required to make most connections.

Warning! To avoid damaging the computer, always turn off the power supply before setting jumpers.



2.3.2 Jumper List

Table 2.1: Jumper List

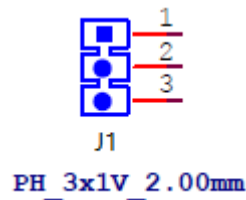
J1	MASKROM mode select
J2	CAN impedance matching
J3	CAN impedance matching
J4	OTG Mode selection, default USB3.0 host
SW1	AT & ATX Mode Switch, default AT mode
BLP1	LVDS BKL PWR 3.3V&5V level select, default 5V
BLP2	LVDS BKL PWR 12V select
VDD1	EDP VDD 3.3V & 5V level select, default 3.3V
VDD2	LVDS VDD 3.3V & 5V level select, default 3.3V
J5	COM5,COM6 power 12/5V level select, default 5V

2.3.3 Jumper Settings

2.3.3.1 J1

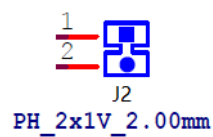
J1	MASKROM mode select
Part Number	1653003101
Footprint	HD_3x1P_79_D
Description	Pin header 3 x 1P 2.0 mm 180D(M) DIP 2000-13 WS
Setting	Function
(1-2)	Disable eMMC
(2-3)	Enable eMMC (default)

This pin header is designed for entering MASKROM mode when need to update image by using Rockchip AndroidTool.



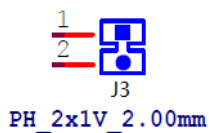
2.3.3.2 J2

J2	CAN impedance matching
Part number	1653002101-02
Footprint	HD_2x1P_79_D
Description	PIN HEADER 2x1P 2.0mm 180D(M) DIP 21N12050
Setting	Function
1	CAN1_D+
2	CAN1_D-



2.3.3.3 J3

J3	CAN impeachment matching
Part Number	1653002101-02
Footprint	HD_2x1P_79_D
Description	PIN HEADER 2x1P 2.0mm 180D(M) DIP 21N12050
Setting	Function
1	CAN0_D+
2	CAN0_D-

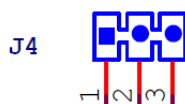


2.3.3.4 J4

J4 is designed for USB3/4 OTG Mode Selection.

J4	OTG Mode Selection
Part Number	1653003100
Footprint	HD_3x1P_79_D
Description	PIN HEADER 3x1P 2.54mm 180D(M) DIP 1130-000-03S
Pin	Function
(1-2)	Host
(2-3)	Device

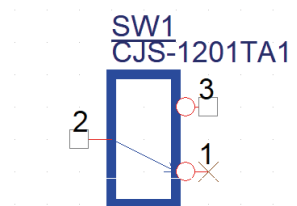
PH_3x1V_2.54mm



2.3.3.5 SW1

SW1 is designed for AT mode or ATX mode selection.

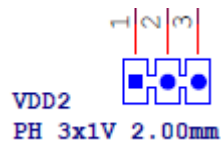
SW1	AT and ATX mode switch
Part Number	1600000071
Footprint	SW_3P_CJS-1201TA1
Description	Slide SW CJS-1201TA1 SMD 3P SPDT P = 6.0 mm W = 2.5 mm
Setting	Function
(1-2)	ATX Mode
(2-3)	AT Mode (Default)



2.3.3.6 VDD2

VDD2 is designed for LVDS VDD 3.3V and 5V level selection.

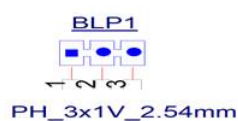
VDD2	LVDS VDD 3.3/5V level select
Part Number	1653003101
Footprint	HD_3x1P_79_D
Description	Pin header 3 x 1P 2.0 mm 180D(M) DIP 2000-13 WS
Setting	Function
(1-2)	3.3V (Default)
(2-3)	5V



2.3.3.7 BLP1

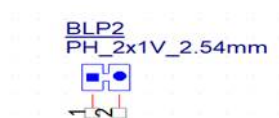
RSB-4810 LVDS backlight supports 3.3V/5V/12V power supply via BLP1/BLP2 selection.

BLP1	LVDS BKLT PWR 3.3/5V level select
Part number	1653003100
Footprint	PH3x1P-2.54
Description	Pin header 3 x 1P 2.54 mm 180D(M) DIP 1130-000-03S
Setting	Function
(1-2)	5V (Default)
(2-3)	3.3V

**2.3.3.8 BLP2**

RSB-4810 LVDS backlight supports 3.3V/5V/12V power supply via BLP1/BLP2 selection.

BLP2	LVDS BKLT PWR 12V level select
Part Number	1653002100
Footprint	PH2x1P-2.54
Description	Pin header 2 x 1P 2.54 mm 180D(M) DIP 21N12564-
Setting	Function
(1-2)	12V

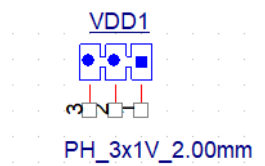


2.3.3.9 VDD1

VDD1 is designed for EDP VDD 3.3/5V level selection.

VDD1	EDP VDD 3.3/5V level select
Part Number	1653003101
Footprint	HD_3x1P_79_D
Description	Pin header 3 x 1P 2.0 mm 180D(M) DIP 2000-13 WS
Setting	Function
(1-2)	3.3V (Default)
(2-3)	5V

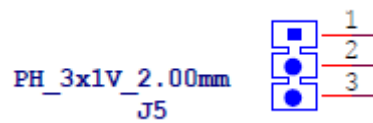
This pin header is designed for EDP panel VDD level selection.



2.3.3.10 J5

RSB-4810 supports 12/5V power supply via COM5 and COM6. The power level can be selected via J5.

J5	COM5 and COM6 power 12/5V level select
Part Number	1653003101
Footprint	HD_3x1P_79_D
Description	Pin header 3 x 1P 2.0 mm 180D(M) DIP 2000-13 WS
Setting	Function
(1-2)	5V
(2-3)	12V



2.4 Connectors

2.4.1 Connector List

AUDIO	Audio pin header (Headphone, Mic in, Speaker)
EDP	eDP CONN
LVDS	LVDS CONN
BL	LVDS Back light Control
SATA	SATA 3.0
MINIPCIE	MINI PCIe 52P
SIM	Nano SIM card
M2	M.2 E-Key CONN
SD	Micro SD slot
PWRBTN	Power button and LED
DCIN1	12V DC jack
COM1	RS-232 pin header
COM2	RS-232 DB9
HDMI	HDMI CONN
CAN1/2	CAN FD CONN
USB1/2	USB pin header
USB3/4	USB Type A ((2 x USB3.0, the lower Type A connector can be configured to OTG by jumper setting))
SATAP	SATA Power
LAN1	LAN1
LAN2	LAN2
BAT	RTC CONN
COM3/4	COM3 and COM4 with RS-232 or RS-485
COM5/6	COM5 and COM6 with RS-232
RST	Reset button
CN1	GPIO CONN
I2C1	I2C pin header

2.4.2 Connector Settings

2.4.2.1 Audio (AUDIO)

RSB-4810 supports Headphone, Mic-in and Speaker-out by pin header. Use a cable (Advantech part number: 1700031093-01) for Line-Out and Mic-In tests. Headphone supports class-D PA to drive speaker, 1.3W.

The audio connector pins are defined below.

Pin	Pin Name	Pin	Pin Name
1	HPR_OUT_R	2	HPL_OUT_R
3	NC	4	HP_DET_L
5	GND_A	6	GND_A
7	MIC_IN1_P	8	MIC_IN1_N
9	NC	10	NC
11	SPKP_OUT	12	SPKN_OUT

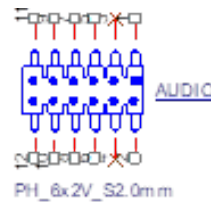


Figure 2.1 Audio Connector

2.4.2.2 EDP Connector (EDP)

RSB-4810 supports one 40-pin EDP connector. The pin definitions are provided below.

Pin	Signal Name	Pin	Signal Name
1	NC	2	GND
3	EDP_z_TXN3	4	EDP_z_TXP3
5	GND	6	EDP_z_TXN2
7	EDP_z_TXP2	8	GND
9	EDP_z_TXN1	10	EDP_z_TXP1
11	GND	12	EDP_z_TXN0
13	EDP_z_TXP0	14	GND
15	EDP_z_AUX+	16	EDP_z_AUX-
17	GND	18	VDD_EDP
19	VDD_EDP	20	VDD_EDP
21	VDD_EDP	22	TEST Point
23	GND	24	GND
25	GND	26	GND
27	EDP_HPD	28	GND
29	GND	30	GND
31	GND	32	BL_ENABLE
33	BL_PWM_DIM	34	Test Point
35	TEST Point	36	BL_PWR
37	BL_PWR	38	BL_PWR
39	BL_PWR	40	NC

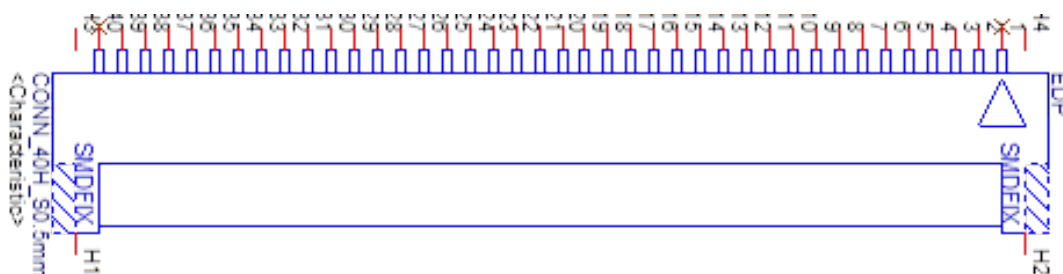


Figure 2.2 EDP Connector

2.4.2.3 LVDS Connector (LVDS)

RSB-4810 supports 1 x single channel LVDS+1 4-Lane MIPI-DSI (single MIPI mode) by one 20 x 2-pin board-to-board. To avoid damaging the LCD panel, ensure that the voltage is correct before connecting an LVDS panel (refer to Section 2.3.3.6 for the VDD2 jumper settings and the LCD datasheet).

Pin	Pin Name	Pin	Pin Name
1	VDD_LVDS	2	VDD_LVDS
3	GND	4	GND
5	VDD_LVDS	6	VDD_LVDS
7	MIPI_DSI/LVDS_TX-0_D0N	8	MIPI_DSI_TX1_D0N
9	MIPI_DSI/LVDS_TX-0_D0P	10	MIPI_DSI_TX1_D0P
11	GND	12	GND
13	MIPI_DSI/LVDS_TX-0_D1N	14	MIPI_DSI_TX1_D1N
15	MIPI_DSI/LVDS_TX-0_D1P	16	MIPI_DSI_TX1_D1P
17	GND	18	GND
19	MIPI_DSI/LVDS_TX-0_D2N	20	MIPI_DSI_TX1_D2N
21	MIPI_DSI/LVDS_TX-0_D2P	22	MIPI_DSI_TX1_D2P
23	GND	24	GND
25	MIPI_DSI/LVDS_TX0_-CLKN	26	MIPI_DSI_TX1_CLKN
27	MIPI_DSI/LVDS_TX0_-CLKP	28	MIPI_DSI_TX1_CLKP
29	GND	30	GND
31	NC	32	NC
33	GND	34	GND
35	MIPI_DSI/LVDS_TX-0_D3N	36	MIPI_DSI_TX1_D3N
37	MIPI_DSI/LVDS_TX-0_D3P	38	MIPI_DSI_TX1_D3P
39	GND	40	VDD_LVDS

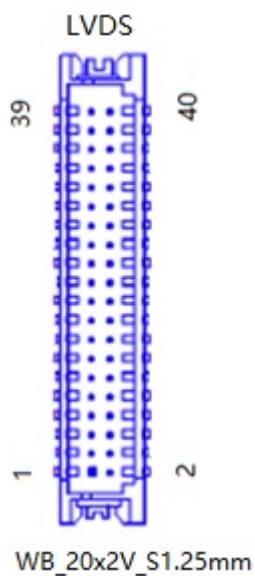


Figure 2.3 LVDS Connector

2.4.2.4 LVDS Inverter Power Connector (BL)

To avoid damaging the LCD panel, ensure that the voltage is correct before connecting an LVDS panel (refer to Section 2.3.3.7 and 2.3.3.8 for the BLP1 and BLP2 jumper settings and the LCD datasheet).

Pin	Description
1	+VDD_BKLT
2	GND
3	LVDS_BLEN
4	LVDS_PWM
5	+5V

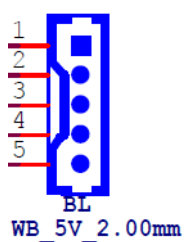


Figure 2.4 LVDS Backlight Connector

2.4.2.5 SATA Connector (SATA)

Pin	Signal Name
1	GND
2	SATA2_z_TX+
3	SATA2_z_TX-
4	GND
5	SATA2_z_RX-
6	SATA2_z_RX+
7	GND

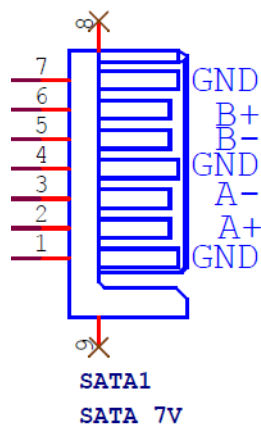


Figure 2.5 SATA Connector

2.4.2.6 SATA Power Connector (SATAP)

Pin	Signal Name
1	+V5
2	GND
3	GND
4	+V12

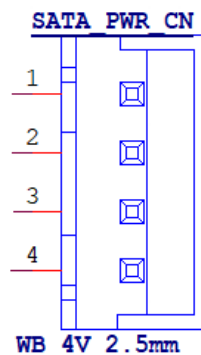


Figure 2.6 SATA Power Connector

2.4.2.7 Mini PCIe (MINIPCE)

Pin	Signal Name	Pin	Signal Name
1	PCIE30X2_WAKEn_M1	2	+3.3V_PcIe
3	NC	4	GND
5	NC	6	NC
7	NC	8	UIM_PWR
9	GND	10	UIM_DATA
11	MINI_REFCLKN	12	UIM_CLK
13	MINI_REFCLKP	14	UIM_RST
15	GND	16	UIM_VPP
17	NC	18	GND
19	NC	20	W_DISABLE#
21	GND	22	PERST_M#
23	PCIE30_RX1NR	24	NC
25	PCIE30_RX1PR	26	GND
27	GND	28	NC
29	GND	30	NC
31	PCIE30_TX1NR	32	NC
33	PCIE30_TX1PR	34	GND
35	GND	36	USB_MINIPCE_N
37	GND	38	USB_MINIPCE_P
39	+3.3V_PcIe	40	GND
41	+3.3V_PcIe	42	LED_WWAN#
43	GND	44	NC
45	NC	46	NC
47	NC	48	NC
49	NC	50	GND
51	NC	52	+3.3V_PcIe

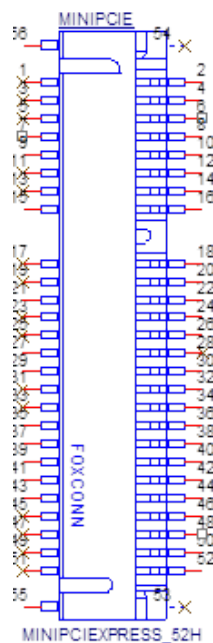


Figure 2.7 Mini PCIe Connector

2.4.2.8 Nano SIM Card (SIM)

Pin	Description
C1	SIM_VCC
C2	SIM_RST
C3	SIM_CLK
C5	GND
C6	NC
C7	SIM_DATA
CD	GND

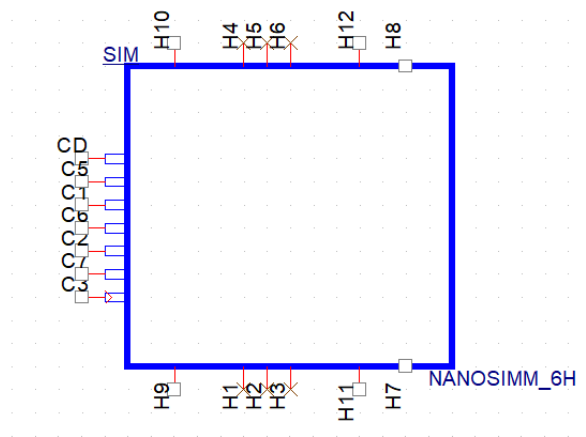


Figure 2.8 Nano SIM Card

2.4.2.9 M.2 (M2)

RSB-4810 supports a socket1 connectivity type 2230 S1, S2, S3 E-key M.2 interface. The pin definitions are provided below.

Pin	Signal Name	Pin	Signal Name
1	GND	2	+V3.3A_M.2
3	USB_M.2+	4	+V3.3A_M.2
5	USB_M.2-	6	NC
7	GND	8	NC
9	SDIO0_z_CLK	10	NC
11	SDIO0_z_CMD	12	NC
13	SDIO0_z_D0	14	NC
15	SDIO0_z_D1	16	NC
17	SDIO0_z_D2	18	GND
19	SDIO0_z_D3	20	BT_z_WAKE_L
21	WIFI_z_WAKE_L	22	UART0_z_RXD
23	NGFF_WIFI_REG_ON		
Mechanical Key	Mechanical key	Mechanical key	Mechanical key
		32	UART0_z_TXD
33	GND	34	UART0_z_CTS
35	NGFF_PCIE_TX+	36	UART0_z_RTS
37	NGFF_PCIE_TX-	38	NC
39	GND	40	NC
41	NGFF_PCIE_RX+	42	NC
43	NGFF_PCIE_RX-	44	NC
45	GND	46	NC
47	CK_z_NGFF+	48	NC
49	CK_z_NGFF-	50	CLKO_z_WIFI
51	GND	52	PERST#
53	PCIE_z_REQ#	54	NGFF_BT_DISABLE#
55	NC	56	NGFF_WIFI_DISABLE#
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	GND	64	NC
65	NC	66	NC
67	NC	68	NC
69	GND	70	NC
71	NC	72	+V3.3A_M.2
73	NC	74	+V3.3A_M.2
75	GND		

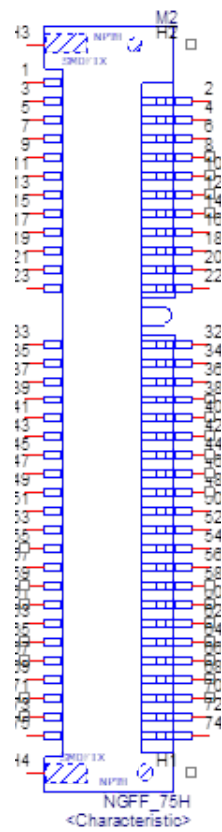


Figure 2.9 M.2 Connector

2.4.2.10 Micro SD (SD)

RSB-4810 supports one Micro SD, compatible with SD3.0, and MMC ver4.51.

Pin	Signal Name
1	SDMMC0_z_D2
2	SDMMC0_z_D3
3	SDMMC0_z_CMD
4	VCC3V3_SD
5	SDMMC0_z_CLK
6	GND
7	SDMMC0_z_D0
8	SDMMC0_z_D1
SW1	SD_CD

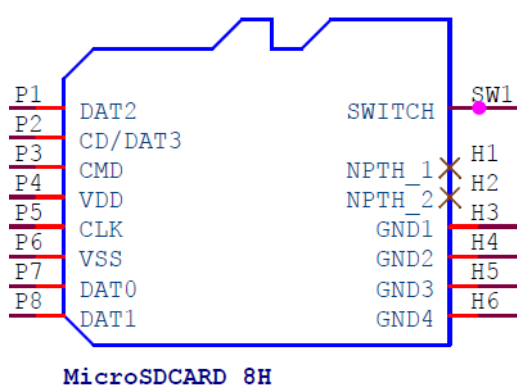


Figure 2.10 Micro SD

2.4.2.11 Power Button and LED (PWRBTN)

RSB-4810 supports a power button, power LED light, and SATA LED light via two 3-pin headers. A cable (Advantech part number: 1700033287-01) can be used to connect the power button.

Pin	Pin Name
1	VCC3V3_SYS
2	GND
3	PWR_LED
4	GND
5	+V3.3
6	SATA2_ACT_LED

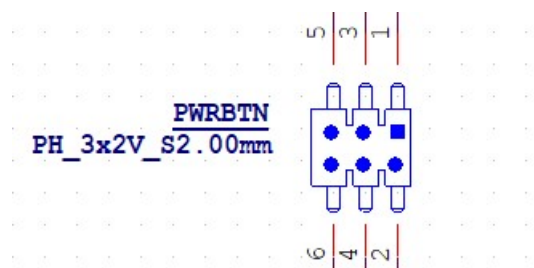


Figure 2.11 Power Button and LED Connector

2.4.2.12 DC Power Jack (DCIN1)

RSB-4810 supports a DC jack header that can be connected to a 12V_{DC} external power input.

Pin	Description
1	V_DC_IN (12V)
2	GND
3	GND

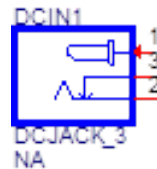


Figure 2.12 DC Power Jack

2.4.2.13 RS-232 (COM1)

Pin	Description
1	NC
2	COM5_TXD
3	COM5_RXD
4	GND

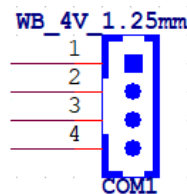


Figure 2.13 COM1 Connector

2.4.2.14 RS232 (COM2)

Pin	Description
1	NC
2	COM4_RXD
3	COM4_TXD
4	NC
5	GND
6	NC
7	NC
8	NC
9	NC
10	NC
11	NC
12	NC
13	GND_F

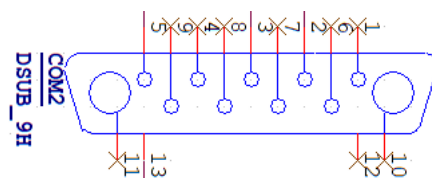


Figure 2.14 COM2/Debug Connector

2.4.2.15 HDMI Connector

Pin	Description	Pin	Description
1	HDMI1_z_DATA2+	11	GND
2	GND	12	HDMI1_z_CLK-
3	HDMI1_z_DATA2-	13	HDMI1_z_CEC
4	HDMI1_z_DATA1+	14	NC
5	GND	15	HDMI1_DDC_CLK
6	HDMI1_z_DATA1-	16	HDMI1_DDC_DATA
7	HDMI1_z_DATA0+	17	GND
8	GND	18	+5V_HDMI
9	HDMI1_z_DATA0-	19	HDMI1_HPD
10	HDMI1_z_CLK+		

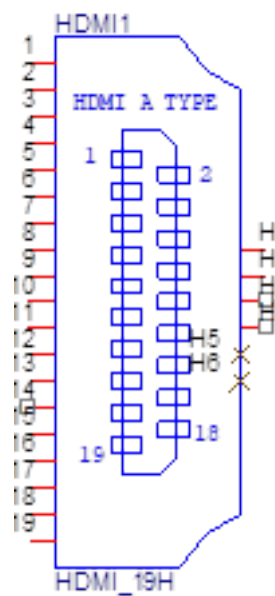


Figure 2.15 HDMI Connector

2.4.2.16 USB Type A Connector (USB3/4: USB 3.0 on TOP + USB 3.0/USB.0 OTG on BOT)

RSB-4810 supports two USB 3.0 Type A connector on the coastline. The bottom connector supports USB 2.0 OTG mode by J4 jumper setting. (Please refer to 2.3.3.4 J4.)

Pin	Description
1	+USB_OTG_5V
2	OTG0_DM
3	OTG0_DP
4	GND
5	USB3X0_z_RX-
6	USB3X0_z_RX+
7	GND
8	USB3X0_z_TX-
9	USB3X0_z_TX+
10	+USBV3
11	USB_D1-
12	USB_D1+
13	GND
14	USB3X1_z_RX-
15	USB3X1_z_RX+
16	GND
17	USB3X1_z_TX-
18	USB3X1_z_TX+

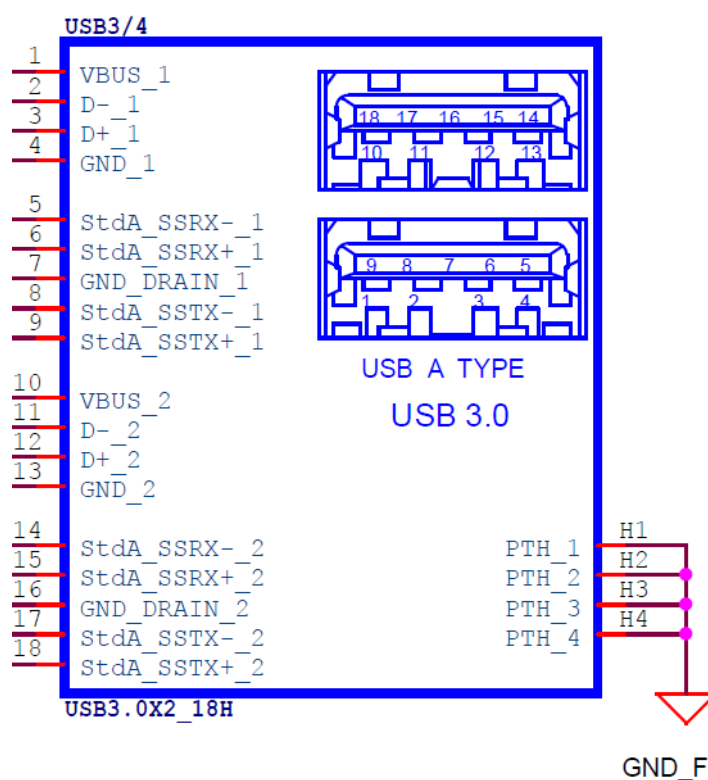


Figure 2.16 USB Connector

2.4.2.17 USB (Internal Pin Header) (USB1/2)

RSB-4810 provides three extra internal USB 2.0 ports via pin header USB 2 and USB 3. The USB 2 pin definitions are provided below.

Pin	Description	Pin	Description
1	+USBV12	2	+USBV12
3	USB1_D-	4	USB2_D-
5	USB1_D+	6	USB2_D+
7	GND	8	GND
9	GND	10	NC

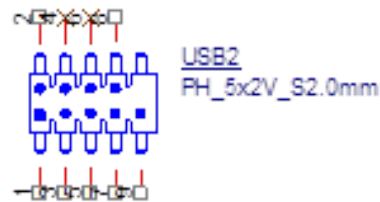


Figure 2.17 USB 2 Pin Header

2.4.2.18 Ethernet Connector (LAN1)

RSB-4810 provides one RJ45 LAN interface connector, which is compliant with 1000 BASE-T IEEE 802.3ab, 100 BASE-TX IEEE 802.3u, and 10 BASE-T IEEE 802.3. The Ethernet ports feature a standard RJ-45 jack connector with LED indicators at the front to indicate the Active/Link and Speed status. POE function can be expanded via this LAN port.

Pin	Description
R1	LAN0_MDI0+
R2	LAN0_MDI0-
R3	LAN0_MDI1+
R4	LAN0_MDI1-
R5	GND
R6	GND
R7	LAN0_MDI2+
R8	LAN0_MDI2-
R9	LAN0_MDI3+
R10	LAN0_MDI3-
L1	LAN0_z_LED0_ACT#
L2	+V3.3
L3	+V3.3
L4	LAN0_LDO0_LED1

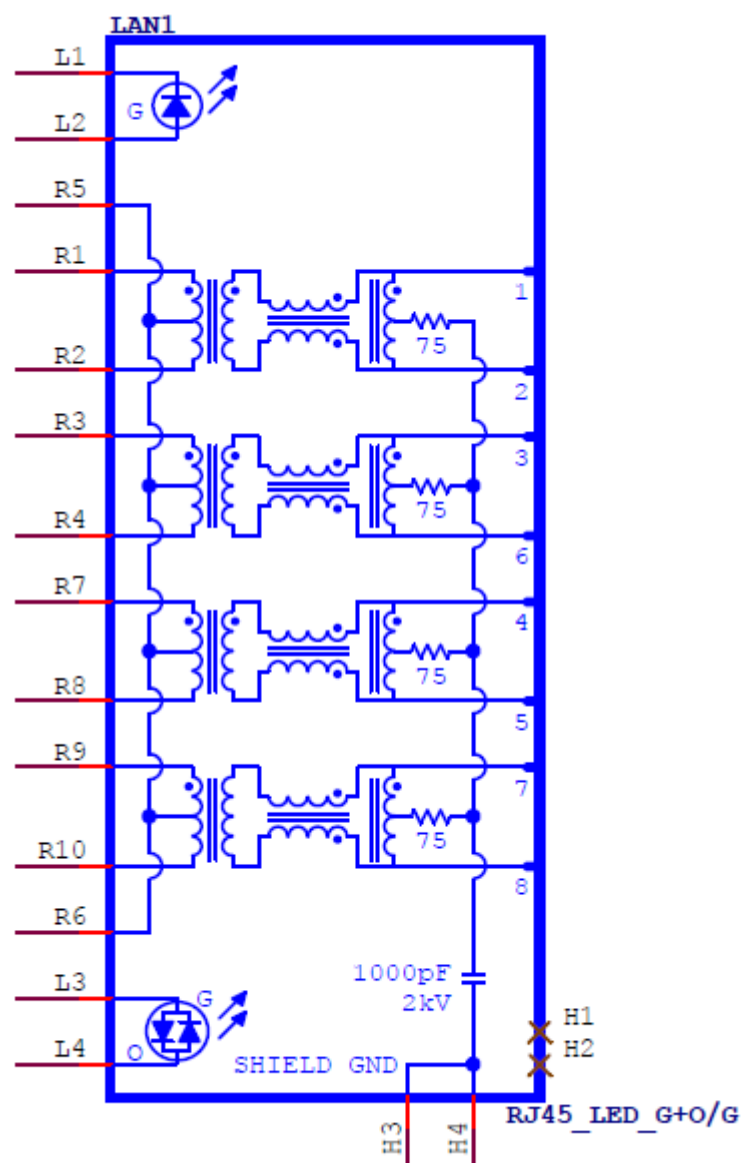


Figure 2.18 LAN1 Ethernet Connector

2.4.2.19 Ethernet Connector (LAN2)

RSB-4810 provides one RJ45 LAN interface connector, which is compliant with 1000 BASE-T IEEE 802.3ab, 100 BASE-TX IEEE 802.3u, and 10 BASE-T IEEE 802.3. The Ethernet ports feature a standard RJ-45 jack connector with LED indicators at the front to indicate the Active/Link and Speed status.

Pin	Description
R1	LAN1_MDI0+
R2	LAN1_MDI0-
R3	LAN1_MDI1+
R4	LAN1_MDI1-
R5	GND
R6	GND
R7	LAN1_MDI2+
R8	LAN1_MDI2-
R9	LAN1_MDI3+
R10	LAN1_MDI3-
L1	LAN1_z_LED0_ACT#
L2	+V3.3
L3	+V3.3
L4	LAN1_LDO0_LED1

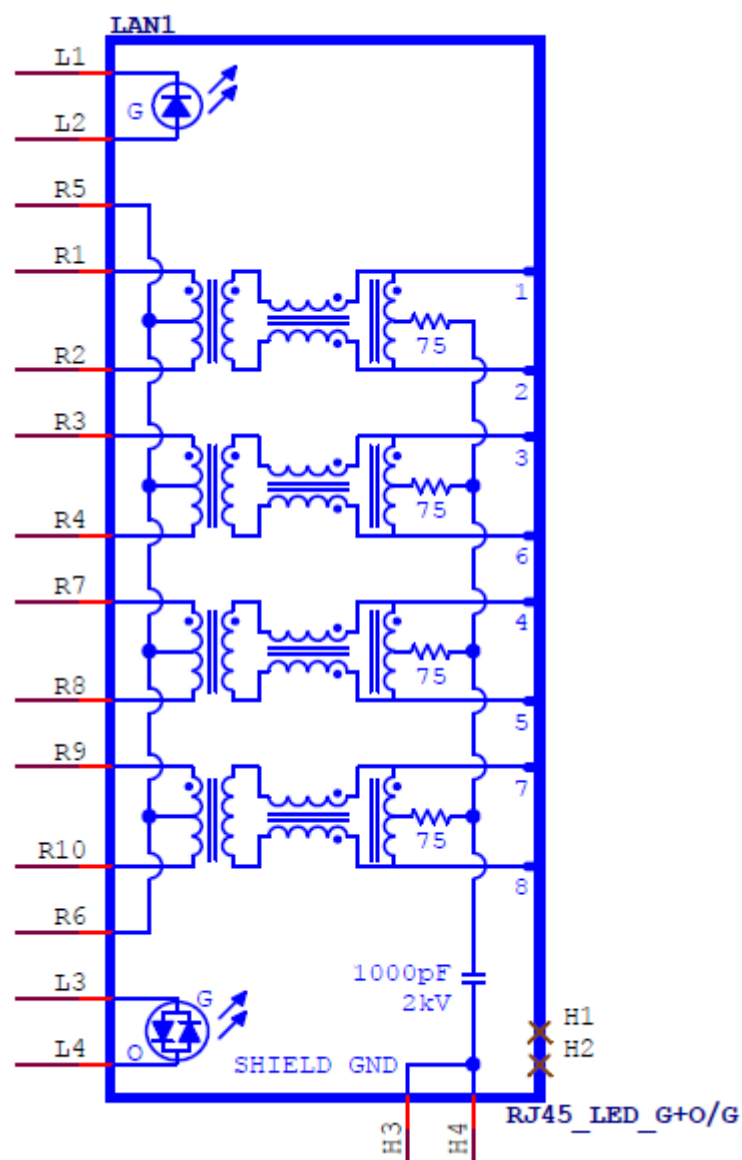


Figure 2.19 LAN2 Ethernet Connector

2.4.2.20 RTC Battery Connector (BAT)

RSB-4810 supports a lithium 3V, 210mAH CR2032 battery with wafer box.

Pin	Description
1	COIN_RTC
2	GND

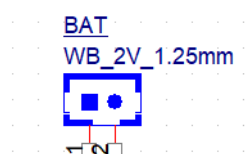


Figure 2.20 RTC Battery Connector

2.4.2.21 RS-232/485 (COM3/4)

RSB-4810 provides a two-port RS-232/485 pin header. Users can configure RS-232/485 mode on uboot. The system must be reset after switching to RS-485 from RS-232. A cable (Advantech part number: 1700031060-01) can be used for connecting a standard D-SUB 9P connector.

Pin	Description
1	COM8_TXD_c
2	COM8_RXD_c (RS-485 data +)
3	COM8_RTS_c
4	COM8_CTS_c
5	COM8_DCD_c (RS-485 data -)
6	GND
7	GND
8	COM9_DCD_c (RS-485 data -)
9	COM9_CTS_c
10	COM9_RTS_c
11	COM9_RXD_c (RS-485 data +)
12	COM9_TXD_c

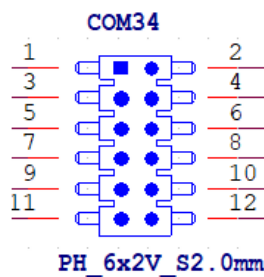


Figure 2.21 Internal RS-232 Pin Header

2.4.2.22 Internal RS-232 (COM5/6)

RSB-4810 provides a two-port RS-232 pin header that can supply 5V or 12V power via J5 selection.

Pin	Description
1	COM6_TXD
2	COM6_RXD
3	COM6_RTS#
4	COM6_CTS#
5	COM6_PWR
6	GND
7	GND
8	COM7_PWR
9	COM7_CTS#
10	COM7_RTS#
11	COM7_RXD
12	COM7_TXD

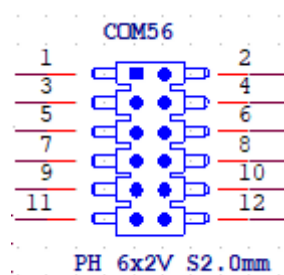


Figure 2.22 Internal RS-232/485 Pin Header

2.4.2.23 Reset Button (RST)

Pin	Description
1	RESETn
2	GND
3	GND
4	GND

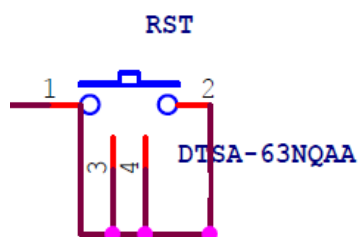


Figure 2.23 Reset Button

2.4.2.24 GPIO (CN1)

RSB-4810 provides one internal GPIO interface via a 10-pin wafer box.

Pin	Pin Name	Pin	Pin Name
1	GND	2	NC
3	GPIO3	4	NC
5	GPIO2	6	GPIO6
7	GPIO1	8	GPIO5
9	+V3.3_GPIO	10	GPIO4

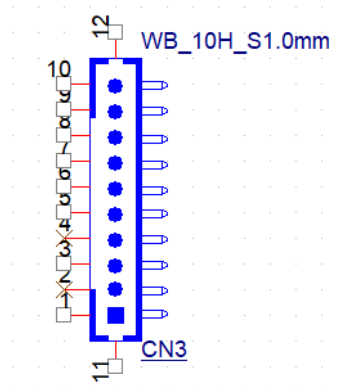


Figure 2.24 GPIO Pin Header

2.4.2.25 CAN FD (CAN1/2)

Pin	Description
1	CAN0_D+
2	GND
3	CAN0_D-
4	CAN1_D-
5	GND
6	CAN1_D+

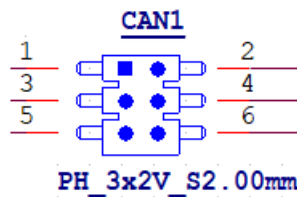


Figure 2.25 SPI Pin Header

2.4.2.26 I2C (I2C1)

Pin	Description
1	+3.3V
2	I2C_SCL_CONN
3	I2C_SDA_CONN
4	Touch_INT#
5	GND

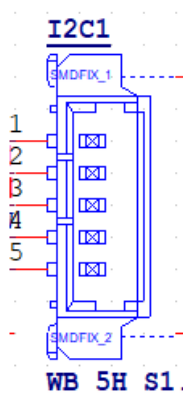


Figure 2.26 I2C Connector



2.5 LED

Name	Description
LED6	Power LED
LED3	WWAN LED
LED8	SATA LED

2.6 Quick Start Guide

2.6.1 Debug Port Connection

1. Connect the debug cable to the RSB-4810 debug port (see Figure 2.3).

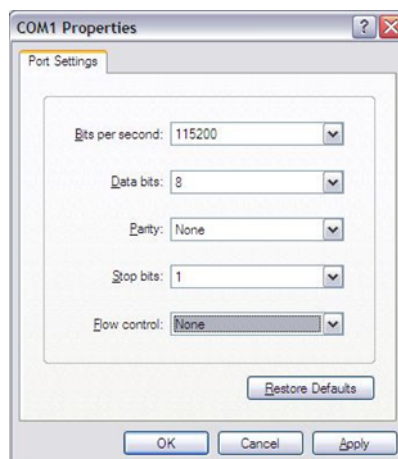
Item	Part Number	Picture
Debug cable	1700021565-11	
Debug cable	1700026611-01	

2. Connect the other end of the debug cable to the PC directly or via a USB-to-RS-232 cable.

2.6.2 Debug Port Setting

RSB-4810 can communicate with a host server via serial cables. Common serial communication programs such as HyperTerminal, Tera Term, or PuTTY can be used. The following example explains serial terminal setup using HyperTerminal on a Windows host:

1. Open HyperTerminal on the Windows PC and configure the settings as shown below.



2. Insert a power adapter connector into the DC jack on RSB-4810 to supply power to the board. The bootloader prompt will be displayed on the terminal screen.

Chapter 3

Software Functionality

This chapter details the software functions on RSB-4810.

3.1 Introduction

This chapter explains how to develop software for RSB-4810 to enable users to develop unique applications efficiently.

RSB-4810 is designed to be developed in a Linux host environment. For now, the officially supported host OS is Ubuntu 18.04 LTS (64 bit). Compatibility problems may occur when using a Windows or Android environment for application development. Therefore, we strongly recommend installing Ubuntu 18.04 LTS (64 bit) on your host PC before attempting to develop RSB-4810.

3.2 Build Environment

3.2.1 Install Docker

Currently, we adopt Docker (<https://www.docker.com>) as build environment. You can get the latest version of advrisc/u18.04-rklbv1 Docker image for developing Rockchip RK3568 projects.

Docker command:

```
docker pull advrisc/u18.04-rklbv1
```

3.2.2 Obtaining the Linux Source Code

Related version information:

- Debian10.x
- Kernel 4.19.172

```
$ cd ~/BSP
$ sudo git clone https://github.com/rockchip-linux/repo.git
$ mkdir rk3568_linux_risc
$ cd rk3568_linux_risc
$ git config --global user.name "Your Name"
$ git config --global user.email you@example.com
$ ../repo/repo init -u https://AIM-Linux@dev.azure.com/AIM-Linux/RISC-RK3568-Linux/_git/manifest -b rk356x_v110_risc -m default.xml
$ ../repo/repo sync
$ ../repo/repo forall -c git checkout -b local --track advantech-azure/rk356x_v110_risc
$
```

3.2.3 Building an Debian 10.x Image

Start Docker Container

```
sudo docker run -it --name rk3568_linux_risc -v /home/bsp/myLinux:/home/adv/BSP:rw --privileged advrisc/u18.04-rklbv1:latest /bin/bash
```

In container, change the user.

```
adv@7cc0fa834366:~$ sudo chown adv:adv -R BSP
```

Install Tools

```
$sudo apt-get install expect
$
```

To build U-boot

```
$ export TOP=`pwd`
$ cd $TOP
$ cd u-boot
$ ./make.sh rk3568_rsb4810a2
```

To build a kernel image

Perform the following command in the terminal console.

```
$ cd $TOP
$ cd kernel
$ make ARCH=arm64 rk3568_adv_defconfig -j8
$ make ARCH=arm64 rk3568-rsb4810-a2.img -j12
```

To build recovery

```
$ cd $TOP
$ rm buildroot/output/rockchip_rk356x_recovery -rf
$ source envsetup.sh rockchip_rk356x_recovery
$ ./build.sh recovery
```

To build a system image

Perform the following command in the terminal console.

```
$ cd $TOP
$ source envsetup.sh rockchip_rk3568
$ sudo BUILD_IN_DOCKER=TRUE ./mk-debian.sh
```

Push all image to rockdev folder

```
$ ./mkfirmware.sh
```

All image in rockdev/ ./mkfirmware.sh at previous step will repack boot.img and rootfs.img, and copy other related image files to the rockdev/ directory. The common image files are listed below:

```
# boot.img
# misc.img
# oem.img
# recovery.img
# rootfs.img
# uboot.img
# userdata.img
# MiniLoaderAll.bin
# parameter.txt
#
```

3.3 GPIO

The RK3568 bank/bit notation for GPIOs must be formed as "GPIO<GPIO_bank>_<gpio_bit>".

The numeric value of GPIO is calculated as follows:

```
32 x (gpio_bank) + gpio_bit
```

gpio_bit: A0~A7 0-7 B0~B7 8-15 C0~C7 16-23 D0~D7 24-31

E.g. GPIO3_A0 becomes 96

GPIO Number	GPIO formed	Numeric Representation
GPIO1	GPIO3_A0	96
GPIO2	GPIO3_A2	98
GPIO3	GPIO3_A3	99
GPIO4	GPIO3_A4	100
GPIO5	GPIO3_A5	101
GPIO6	GPIO3_A6	102

Export GPIO in order to use control GPIO from the user space through sysfs.

Export GPIO.

```
$ echo 96 > /sys/class/gpio/export
```

Set GPIO direction to in/out.

```
$ echo "out" > /sys/class/gpio/gpio96/direction
```

Set GPIO value 0/1 if GPIO pin define is output.

```
$ echo 1 > /sys/class/gpio/gpio96/value
```

Used as IRQ signal.

```
$ echo "rising" > /sys/class/gpio/gpio96/edge
```


NOTE:

You have to configure GPIO to input
rising: Trigger on rising edge
falling: Trigger on falling edge
both: Trigger on both edges
none: Disable interrupt on both edges

Unexport GPIO.

```
$ echo 96 > /sys/class/gpio/unexport
```

GPIO1 and GPIO2 are taken as an example:

Connect GPIO1 and GPIO2.

Export GPIO1 and GPIO2.

```
$ echo 96 > /sys/class/gpio/export  
$ echo 98 > /sys/class/gpio/export
```

Set GPIO1 to output and GPIO2 to input.

```
echo "out" > /sys/class/gpio/gpio96/direction  
echo "in" > /sys/class/gpio/gpio98/direction
```

Change GPIO1 to 1 and read GPIO2 value.

```
echo 1 > /sys/class/gpio/gpio96/value  
cat /sys/class/gpio/gpio98/value  
1
```

Change GPIO1 to 0 and read GPIO2 value.

```
echo 0 > /sys/class/gpio/gpio96/value  
cat /sys/class/gpio/gpio98/value  
0
```

3.4 UART

The Android/Linux UART/serial port access is via the tty-devices. The tty-devices have different names depending on the UART driver on different boards.

RS-485 uses half-duplex communication, which means that one medium is shared for transmitting and receiving data. Therefore the system needs to control the RS-485 transceiver transmit mode. Usually the UART RTS signal is used to switch the transmitter on and off.

3.4.1 RSB-4810 UART

COM Name	Device Node	Remark
COM1	/dev/ttyS4	Supports RS-232, no flow control
COM2	/dev/ttyS7	Supports RS-232, no flow control
COM3	/dev/ttyUSB2	RS232 4-wire or RS485
COM4	/dev/ttyUSB3	RS232 4-wire or RS485
COM5	/dev/ttyUSB0	RS232 4-wire
COM6	/dev/ttyUSB1	RS232 4-wire

3.4.2 How to Configure RS-232/485 Mode

Enter U-boot interrupt mode.

Connect the device to the debug port and open the debug console.

Press “ctrl + c” before powering on the device. The following information should be displayed on the debug console:

```
Hit any key to stop autoboot: 0
=> <INTERRUPT>
=>
```

Then input the following command to configure the UART mode.

RS-485 Mode:

```
setenv uart_mode 0x0c
saveenv
reset
```

RS-232 Mode:

```
setenv uart_mode 0x00
saveenv
reset
```

Note:

The default value is RS-232.

Cp210x supports four ports, but for RSB-4810 only ttyUSB2 and ttyUSB3 support RS-485 mode.

In the above command “setenv uart_mode 0x0c”, 0x0c means set bit2(ttyUSB2) and bit3(ttyUSB3) to 1 (0 means to RS-232; 1 means to RS-485).

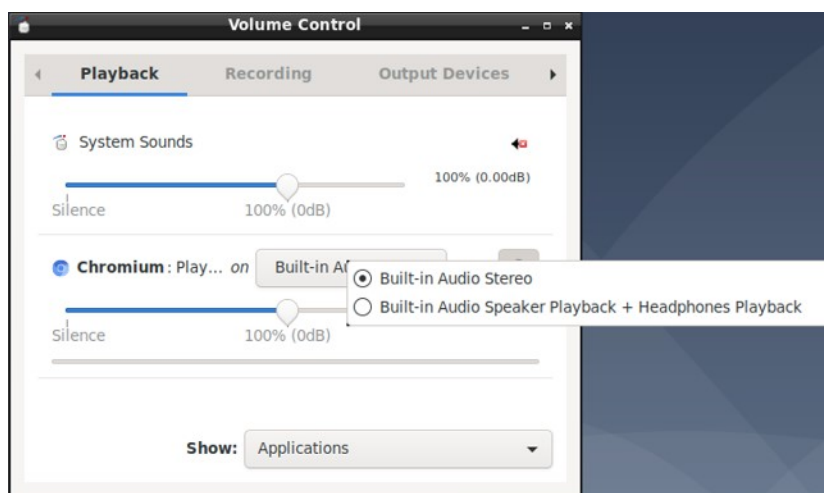
To configure just ttyUSB2 (or ttyUSB3) to RS-485 mode, change 0x0c to 0x04 (or 0x08).

3.5 Audio

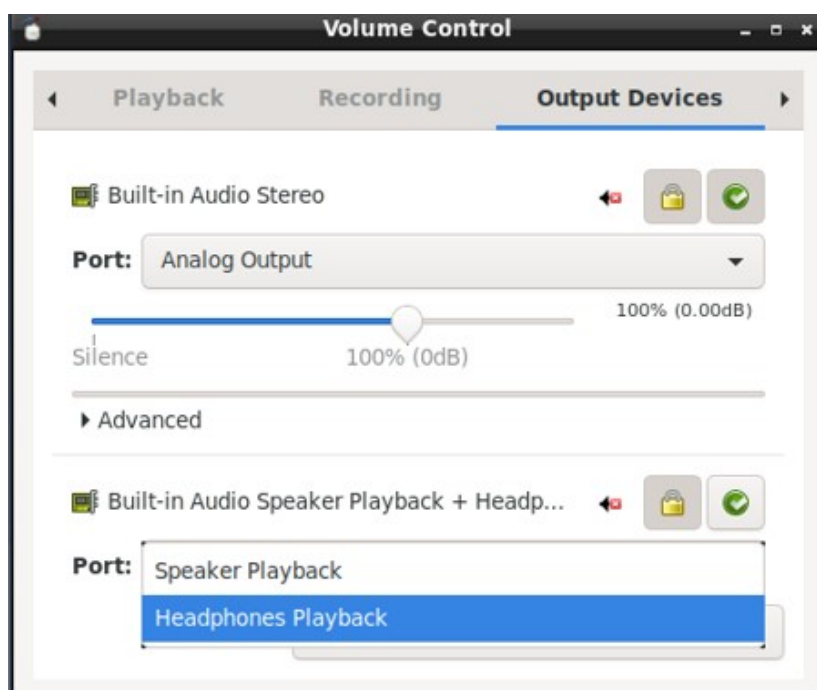
3.5.1 Audio Settings

RSB-4810 supports 2 sound cards: 0 hdmi, 1 rk809-codec. Set the default audio output when playing media files, if it supports audio.

1. Entry start->Sound & Video->PulseAudio Volume Control.
2. Select “Built-in Audio stereo” for HDMI output
Or select “Built-in Audio Speaker ...” for rk809-codec output.



3. Select “Speaker” or “Headphone” for rk809-codec output.



3.5.2 Audio Test

1. Record.

```
arecord -Dplughw:1,0 -f S16_LE -r 16000 -d 10 -t wav test.wav
```

2. Playback.

```
aplay -Dplughw:1,0 -t wav test.wav
```

3.6 RTC

Set the system to the current time then set the RTC.

```
root@linaro-alip:~# date 021710452016 && hwclock -w && date
Wed Feb 17 10:45:00 UTC 2016
Wed Feb 17 10:45:01 UTC 2016
```

Set one incorrect time, then read RTC to verify.

```
root@linaro-alip:~# date 010100002000 && hwclock -r && date
Sat Jan 1 00:00:00 UTC 2000
2016-02-17 10:49:08.417688+00:00
Sat Jan 1 00:00:00 UTC 2000
```

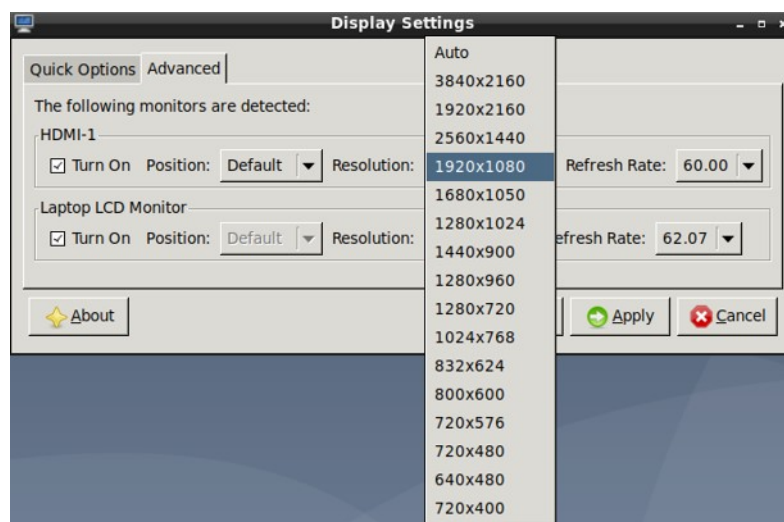
Restore the RTC time to system time.

```
root@linaro-alip:~# hwclock -s && date
Wed Feb 17 10:46:58 UTC 2016
```

3.7 HDMI

3.7.1 HDMI Resolution

1. Entry start->Preferences->Monitor Settings.
2. Turn on HDMI and select resolution.



3.8 Multiple Display

RSB-4810 supports four kinds of the display ports — HDMI, eDP, LVDS and MIPI-DSI. Only two ports can be used simultaneously.

HDMI, eDP, MIPI-DSI can only set to display0 or display1.

LVDS can only set to display1 or display2.

LVDS and MIPI are alternative.

Default Display Support:

Port	RSB-4810
EDP	EDP-1920x1080 EDP-1366x768
LVDS	LVDS-g070vw01 LVDS-g150xgel05 LVDS-800x480 LVDS-1024x768 LVDS-1280x800 LVDS-1366x768
HDMI	HDMI-default
MIPI-DSI	MIPI-gl0uan

Notes:

1. The name of the panel must begin with “edp-”, “lvds-”, “hdmi-” or “dp-”. They can be found in “kernel/include/dt-bindings/display/screen-timing/{LCDNAME}.dtsi”
For example,
lvds_g070vw01: lvds-g070vw01
2. If there is no configuration, you will get default setting: hdmi-default and edp-1366x768 as default setting.
3. Check the configuration via the terminal or debug console.

```
fw_printenv | grep display
...
display0=hdmi-default
display1=edp-1366x768
...
```

3.8.1 Enter U-Boot Interrupt Mode

Connect the device to the debug port and open the debug console.

Press “ctrl + c” before powering on the device. The following information will be displayed on the debug console:

```
Hit any key to stop autoboot: 0
=> <INTERRUPT>
=>
```

Then input the commands below to configure multi-display function.

3.8.2 Single Display

1. HDMI, please set in u-boot as follows:

```
setenv display0 hdmi-default
setenv display1
setenv display2
saveenv
reset
```

2. eDP, please set in u-boot as follows:

```
setenv display0 edp-1366x768
setenv display1
setenv display2
saveenv
reset
```

3. MIPI, please set in u-boot as follows:

```
setenv display0 mipi-gl0uan
setenv display1
setenv display2
saveenv
reset
```

4. LVDS, please set in u-boot as follows:

```
setenv display0
setenv display1 lvds-g070vw01
setenv display2
saveenv
reset
```

3.8.3 Dual Display

1. HDMI and eDP, please set in the u-boot as demonstrated below:

```
setenv display0 hdmi-default
setenv display1 edp-1366x768
setenv display2
saveenv
reset
```

2. HDMI and MIPI is the main display, please set in u-boot as demonstrated below:

```
setenv display0 hdmi-default
setenv display1 mipi-gl0uan
setenv display2
saveenv
reset
```

3. HDMI and LVDS is the main display, please set in u-boot as demonstrated below:

```
setenv display0 hdmi-default
setenv display1 lvds-g070vw01
setenv display2
saveenv
reset
```

4. eDP and MIPI is the main display, please set in u-boot as demonstrated below:

```
setenv display0 edp-1366x768
setenv display1 mipi-gl0uan
setenv display2
saveenv
reset
```

5. eDP and LVDS is the main display, please set in u-boot as demonstrated below:

```
setenv display0 edp-1366x768
setenv display1 lvds-g070vw01
setenv display2
saveenv
reset
```

Note:

LVDS panel support 4 bus format: rgb666_vesa, rgb888_vesa, rgb666_jeida, rgb888_jeida.

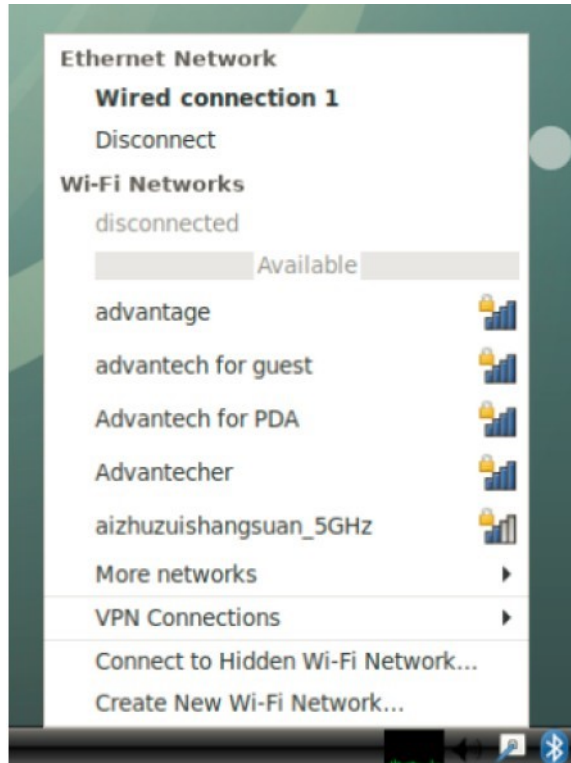
If lvds panel is not the default format of rgb888_vesa, Must set lvds format:

```
fw_setenv lvds_format rgb666_vesa
or
fw_setenv lvds_format rgb666_jeida
or
fw_setenv lvds_format rgb888_jeida
```

3.9 Network Setup

3.9.1 Wi-Fi

1. Click the Wi-Fi icon in the bottom right corner of the screen and select a Wi-Fi connection (for example, Advantech for guest).



2. Enter the Wi-Fi password to connect to the device.

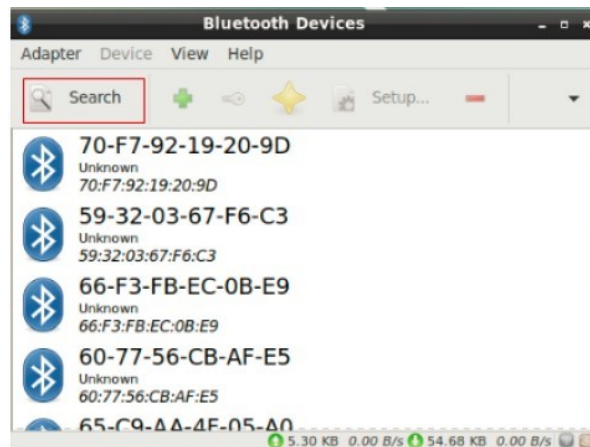


3. If the password is correct the device will connect quickly.



3.9.2 Bluetooth

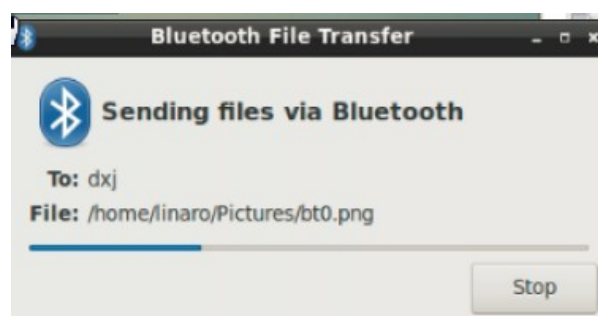
1. Entry start->Preferences-> Bluetooth manager. Click the Search button to search for Bluetooth devices.



2. Right-click to select a device, such as DXJ, and send a file.



3. RSB-4810 will start sending files when the receiver device, such as DXJ, confirms Bluetooth reception.



3.9.3 4G Test

1. Power off the device, then insert 4G module and SIM card.

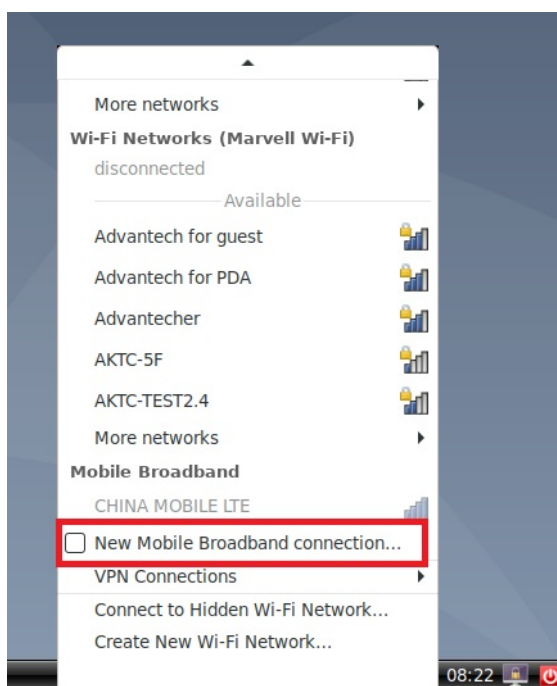
Note! *Make sure the device is power off before insert 4G module and SIM card, otherwise the device 4G module and/or SIM card may be damaged.*



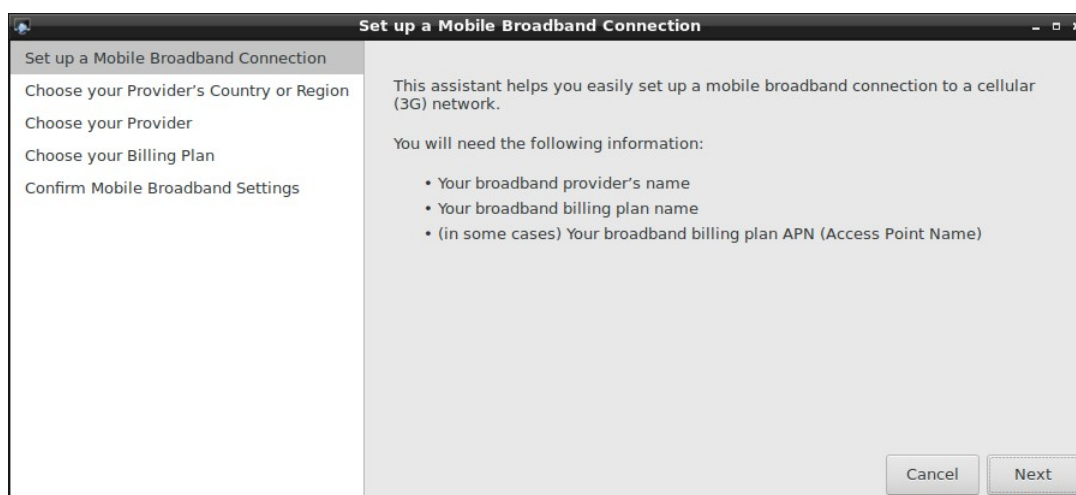
2. Power on the device, click network connection icon.



3. Then choose "New Mobile Broadband connection".



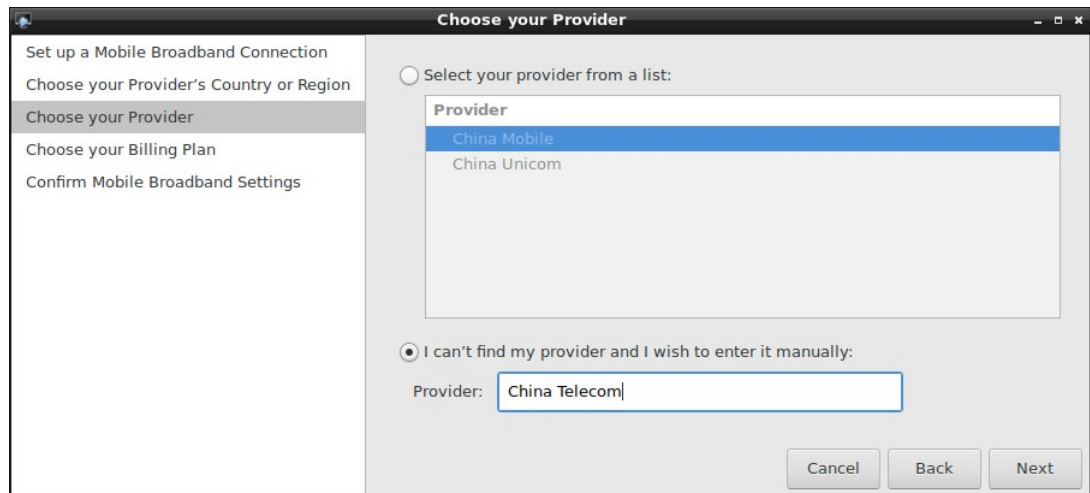
4. Then you will see the following window, click "Next" button to the next step.



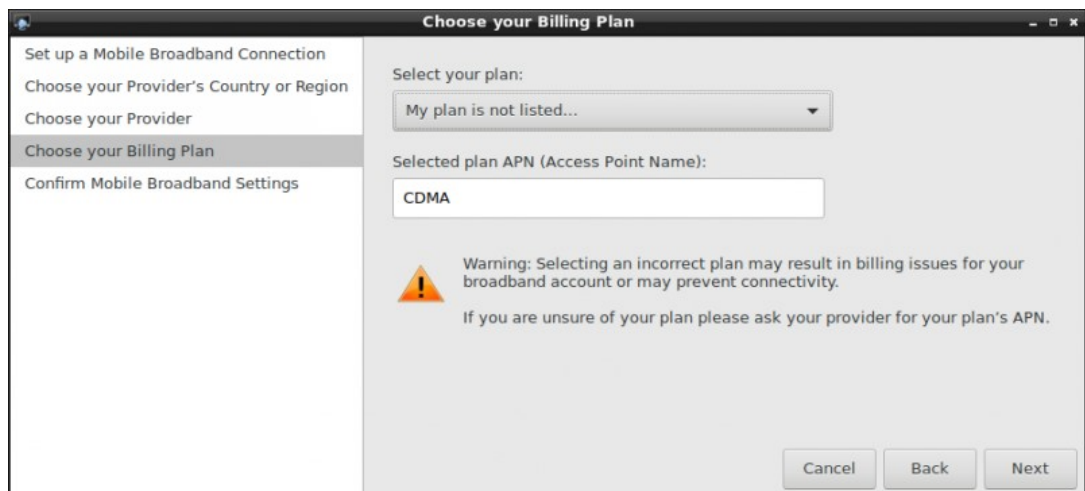
5. Choose your provider's country or region of the SIM card you insert.



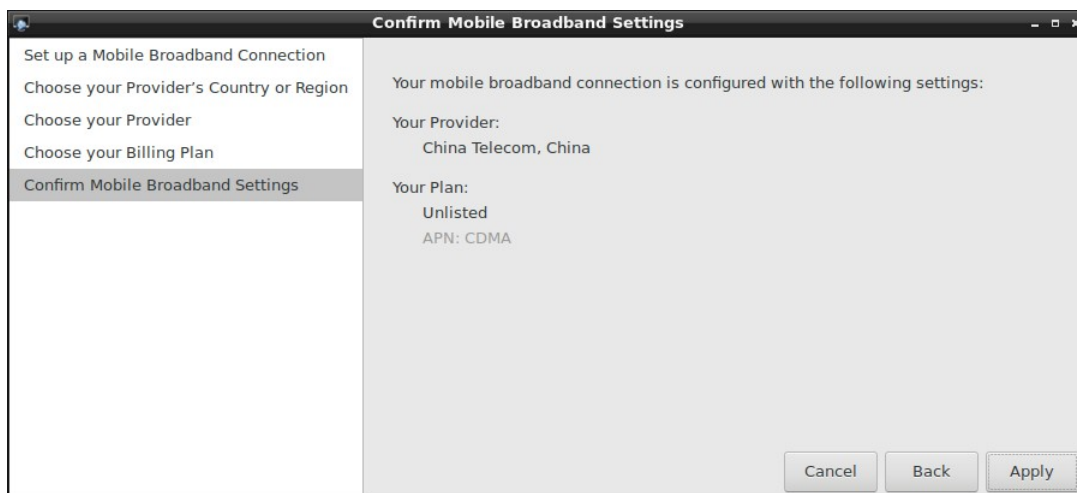
6. Choose or set the provider's name.



7. Choose or Set APN.

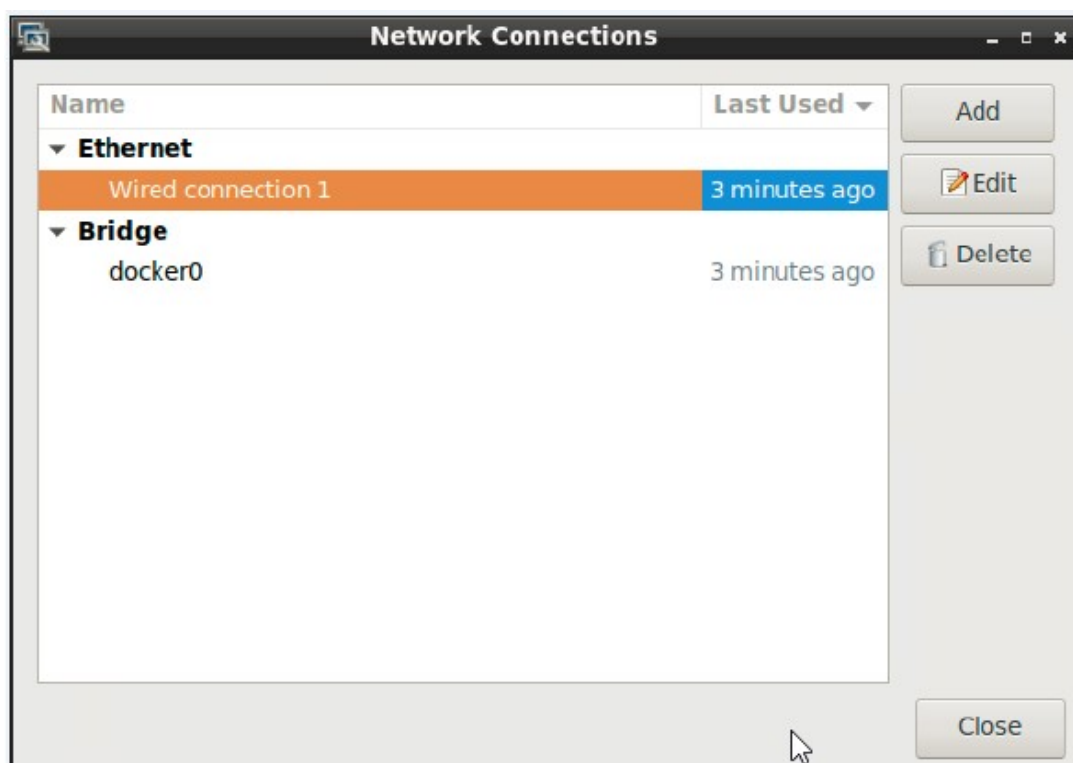


8. Confirm your configuration and finish.

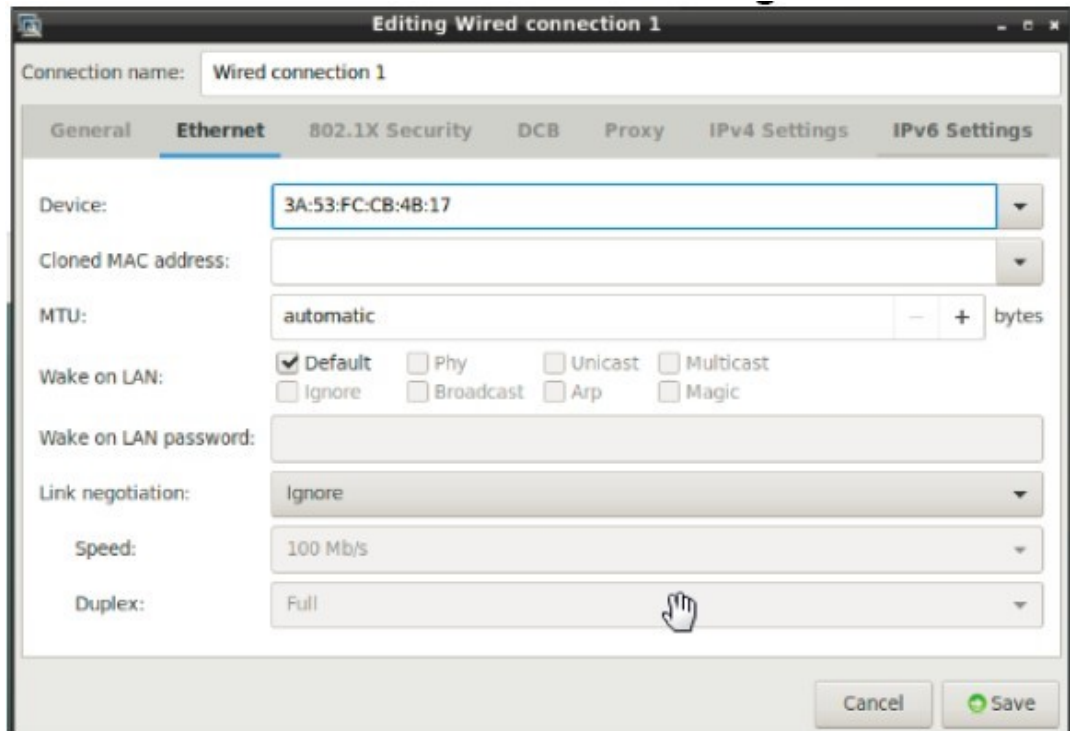


3.9.4 Ethernet

1. Entry Start-> Preferences-> Network Connections.



2. Double-click “Wired Connection 1” to configure it.



Or set it in the terminal using ifconfig, such as setting its IP address to 192.168.1.1.

```
root@linaro-alip:~# ifconfig eth0 192.168.1.1
root@linaro-alip:~# ifconfig eth0 192.168.1.1
eth0: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
    inet 192.168.1.1 netmask 255.255.255.0 broadcast 192.168.1.255
    ether c6:df:8b:79:17:3f txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
    device interrupt 35
```

3.10 Watchdog

System will reboot after 60 seconds if cat/dev/watchdog.

```
cat /dev/watchdog
```

3.11 CAN

Connect CAN0 and CAN1.

```
ip link set can0 down
ip link set can0 type can bitrate 1000000 dbitrates 8000000 fd on
ip link set can0 up
ip -details link show can0
candump can0 &

ip link set can1 down
ip link set can1 type can bitrate 1000000 dbitrates 8000000 fd on
ip link set can1 up
ip -details link show can1

cansend can1 123##155
cansend can1 123##155
cansend can1 123##155
cansend can1 123##155
cansend can1 123##155
cansend can1 123##155
cansend can1 123##155
... ..
```

3.12 I2C

RSB-4810 supports one I2C pin header on I2C bus 2.

Detect device address:

```
i2cdetect -y 2
```

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

Dump I2C device (For example i2c flash, address 0x50) register:

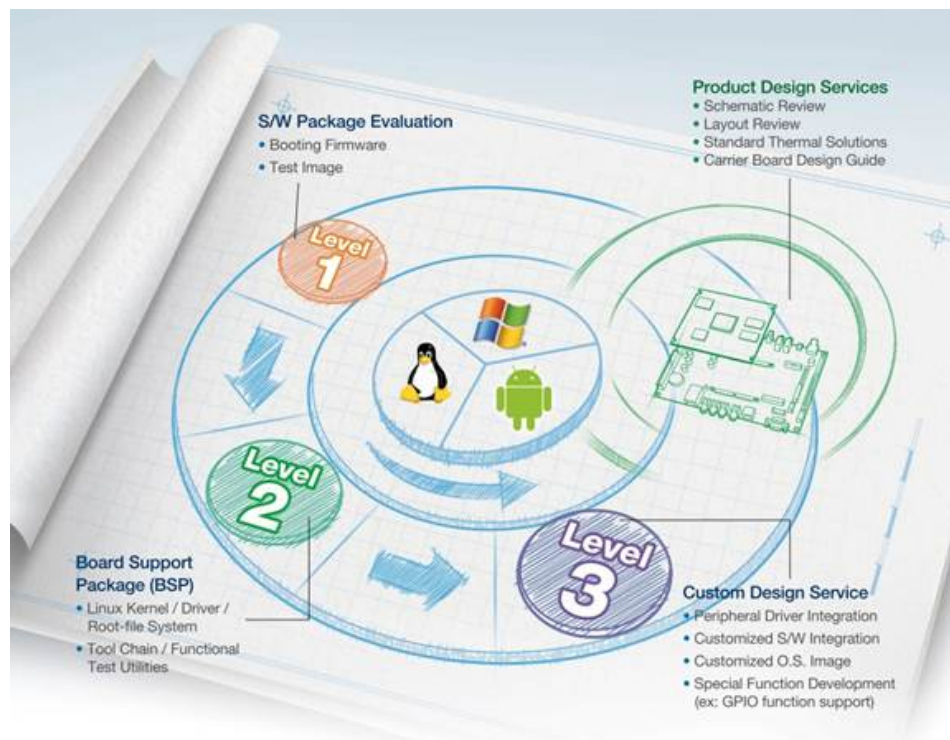
```
i2cdump -f -y 2 0x50
```


Chapter 4

Advantech Services

This chapter outlines Advantech's Design-In services, technical support, and warranty policy for RSB-4810.

4.1 RISC Design-In Services



Advantech's RISC Design-In Services help customers reduce the time and work required to design new carrier boards. We handle the complexities of technical research, greatly minimizing the development risks associated with carrier boards.

Easy Development

Advantech offers support firmware, root file systems, board support packages, and other development tools that help customers easily develop unique carrier boards and differentiate their embedded products and applications.

- Full range of RISC-based product offerings
- Comprehensive document support

Design Assistance Service

Advantech provides a checklist for engineers to easily check their schematics as well as several services for reviewing customer carrier board schematics. These services aim to help identify design errors before implementation, which saves substantial development time and costs.

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

Thermal Solution Services

To provide customers with more flexible thermal solutions and designs, Advantech offers thermal solution services that include consultations and customizations.

- 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 have now changed. Due to diverse market demands and intense competition, cooperation for (both upstream and downstream) vertical integration has become a more effective way to create competitive advantages. ARM-based CPU modules were born out of this trend. Concentrating all the components on the CPU module and placing other parts on the carrier board in response to market requirements for specialization, provides greater flexibility and retains low power consumption credentials.

Advantech has been involved in the industrial computer industry for many years and has 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 possess sufficient knowledge and professional competence in the specific application field, a lack of expertise and experience in general power and I/O design can cause challenges, especially when integrating CPU modules with a carrier board.

Data Acquisition

Even if customers can obtain sufficient information to make the right decision for specialized vertical applications, some customers encounter difficulties with platform design in general and communicating with CPU or chipset manufacturers. This can increase the challenge and risks of designing carrier boards and impact time-to-market.

Software Development and Modification

When compared to x86 architectures, RISC architectures use simpler instruction sets; therefore, the software for x86 platforms cannot be used on RISC platforms. System integrators (SIs) must develop unique software for their system and integrate the hardware and software themselves. Unlike x86 platforms, RISC platforms have less support for board support packages (BSPs) and drivers. Although driver support is provided, SIs are still required to integrate them into the system core. Moreover, the BSPs provided by CPU manufacturers are typically aimed at carrier board design. Thus, they may not be an appropriate environment for software development.

Advantech proposed the concept of streamlined Design-In support services for RISC-based computer-on modules (COMs) to remedy the issue. With a dedicated design-in services team, Advantech participates in carrier board design and problem solving. Our services enable customers to effectively distribute their resources and reduce R&D costs/hardware investment.

Because of our close relationship with leading CPU and chipset manufacturers — such as ARM, TI, and Freescale — we are able to solve communication and technical support difficulties. Doing so reduces the uncertainties of product development. Advantech's software team focuses on providing comprehensive BSPs and assists customers with establishing a software development environment for RISC platforms.

Advantech's RISC Design-In services help customers overcome challenges and achieve a faster time-to-market. Along with our multi-stage development process, which includes planning, design, integration, and validation, Advantech's RISC Design-In services provide comprehensive support during the following phases:

The 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 during the development of RISC COMs. During the planning stage, customers can use the CSB evaluation board to assess RISC modules and test peripheral hardware. Moreover, Advantech provides standard software BSPs for RISC COMs to allow customers to define the product specifications and verify I/O and performance. We not only offer hardware planning and technology consultations, but also software evaluations and recommendations regarding peripheral modules (such as Wi-Fi, 3G, and Bluetooth modules). Resolving customer concerns is Advantech's primary target at this stage. Because product evaluation is the key task in the planning stage, especially regarding performance and specifications, we try to help our customers conduct all the necessary tests for their RISC COM.

The Design Stage

When a product moves into the design stage, Advantech will supply a carrier board design guide for reference. The carrier board design guide provides pin definitions of the COM connector with limitations and recommendations for carrier board design. This gives customers a clear guideline to follow during carrier board development. Regarding different form factors, Advantech offers a complete pin-out checklist for different form factors, such as Q7, ULP, and RTX2.0, to enable customers to examine the carrier board signals and layout design accordingly. In addition, our team is able to assist customers with reviewing the placement/layout and schematics to ensure the carrier board design meets all their requirements. For software development, Advantech's RISC software team can assist customers with establishing an environment for software development and evaluating the time and resources required. If customers outsource software development to a third party, Advantech can also cooperate with the third party and provide consultation services. With Advantech's expert support, the design process becomes much easier and the product quality is enhanced to meet all customer criteria.

The Integration Stage

This phase comprises hardware and software integration, application development, and peripheral module implementation. Because they may lack the knowledge and experience of certain platforms, customers may need to spend some time analyzing integration problems. Additionally, the implementation of peripheral module depends a lot on the driver designs on carrier boards, and RISC platforms typically have less support for ready-made drivers on the carrier board. Thus, customers may have to figure out the best solution through trial and error. Advantech's team has years of support experience and extensive hardware/software development knowledge. Consequently, we can support customers by providing expert advice and information, which will shorten the development time and enable more effective product integration.

The Validation Stage

After the customer's ES sample is completed, the next step is a series of verification steps. In addition to verifying the product's functionality, the product's efficiency must also be tested at this stage, particularly with RISC platforms.

Advantech plays a supportive role in helping customers solve problems during the testing and verification process and will provide suggestions and tips as well. Through an efficient verification process backed by our technical support team, customers are able to optimize their applications with less hassle. Furthermore, Advantech's team can provide professional consultation services about further testing and equipment usage. This allows customers to find the appropriate tools to efficiently identify and solve problems and further enhance the quality and performance of their products.

4.2 Contact Information

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

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

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

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

4.3 Global Service Policy

4.3.1 Warranty Policy

The warranty policy for Advantech products is provided below.

4.3.1.1 Warranty Period

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

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

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

4.3.1.2 Repairs Under Warranty

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

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

4.3.1.3 Exclusions from Warranty

The product is excluded from warranty if

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

4.3.2 Repair Process

4.3.2.1 Obtaining an RMA Number

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

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

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

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

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

4.3.2.2 Returning the Product for Repair

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

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

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

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

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

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

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

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

4.3.2.3 Service Charges

The product is excluded from warranty if:

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

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

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

4.3.2.4 Repair Report

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

4.3.2.5 Custody of Products Submitted for Repair

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

4.3.2.6 Return Shipping to the Customer

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



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