

User Manual



EPC-R4710

Rockchip Arm® Cortex®-A72 BOX Computer



Copyright

The documentation and the software included with this product are copyrighted 2020 by Advantech Co., Ltd. All rights are reserved. Advantech Co., Ltd. reserves the right to make improvements in the products described in this manual at any time without notice. No part of this manual may be reproduced, copied, translated or transmitted in any form or by any means without the prior written permission of Advantech Co., Ltd. Information provided in this manual is intended to be accurate and reliable. However, Advantech Co., Ltd. assumes no responsibility for its use, nor for any infringements of the rights of third parties, which may result from its use.

Acknowledgments

ARM is trademarks of ARM Corporation.

Rockchip is trademarks of Rockchip Corporation.

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

Product Warranty (2 years)

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

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

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

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

- 1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
- 2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
- 3. If your product is diagnosed as defective, obtain a return merchandise authorization (RMA) number from your dealer. This allows us to process your return more quickly.
- 4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. Products 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. 2006R47100 Printed in China Edition 1 January 2021

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 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 which case the user will be required to correct the interference at his own expense.

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 the equipment.
 - The equipment has been exposed to moisture.
 - The equipment is malfunctioning or does not operate according to the user manual.
 - The equipment has been dropped and damaged.
 - The equipment shows obvious signs of breakage.

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

Safety Precaution – Static Electricity

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

To avoid electrical shock, always disconnect the power from your PC chassis before you work on it. Don't touch any components on the CPU card or other cards while the PC is on.

Packing List

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

- 1 x EPC-R4710 Box computer
- 1 x China rohs
- 2 x wall mount
- 4 x screw for wall mount

Optional Accessories

Part No.	Description
96PSA-A36W12R1-3	ADP A/D 100-240V 36W 12V C6 DC PLUG 90°
1700001524	Power cord 3P UL 10A 125 V 180 cm (70.8 in)
170203180A	Power Code 3P UK 2.5A/3A 250V 183 cm (72 in)
170203183C	Power Code 3P Europe 183 cm (72 in)
1700019146	Power Cord CCC 3P 10A 250V 183 cm (72 in)
SQF-MSDM1-8G-21C	SQF MICRO SD C10 MLC 8G (-25 ~ 85 °C/-4 ~ 185 °F)
968AD00479*	EC20CEFAG-MINIPCIE R2.1 LTE Cat 4
EWM-C117FL06E*	LTE 4G, 3G WCDMA/DC-HSPA+, 2G module, MPCI-L280H
1750006264	Antenna cable SMA(F)/MHF 15 cm (5.9 in)
1750007990-01	Antenna 4G/LTE full band L= 11 cm (4.33 in) 50 Ohm
EWM-W188M201E	Wi-Fi 802.11ac/abgn 2T2R and BT4.2
1750008800-01	Antenna Cable R/P SMA (M) to MHF4, 100 mm (3.93 in)
1750008671-01	Dipole Ant.SMA/M-R 2.4/5G 2.5/4dBi BLK 109 mm (4.29 in)

* Please contact us to find a suitable cellular module for your region.

Ordering Information

Part No.	Description
EPC-R4710NO-XAA1E	EPC-R4710 RK3399 2GDDR16Gemc system, 0 ~ 50 °C (32 ~ 122 °F)
EPC-R4710IO-XAA1E	EPC-R4710 RK3399 2GDDR16Gemc system, -20 ~ 70 °C (-4 ~ 158 °F)

Contents

Chapter	1	General Introduction	1
	1.1 1.2	Introduction Product Features	2 2
		1.2.1 Specification	2
	1.3	Mechanical Specifications	3
	1.4	Electrical Specifications	3
	1.5	Environmental Specifications	3
Chapter	2	H/W Installation	5
	2.1	Introduction	6
	2.2	EPC-R4710 I/O Overview	6
	2.3	ECP-R4710 Outside Connectors	7
		2.3.1 GPIOs	7
		2.3.2 COM2	8
		2.3.3 COM 1, COM 3/4, and COM 5/6	9
		2.3.4 DC Power Jack (DCIN1)	13
	• •	2.3.5 Power button	14
	2.4	Quick Start Guide	15
		2.4.1 Debug Port Connection	15
		2.4.2 Debug Port Setting.	15
Chapter	3	Software Functionality	.17
	3.1	Introduction	18
	3.2	Set up Build Environment	18
		3.2.1 Install Docker	18
		3.2.2 Get Base Image	18
		3.2.3 Getting Android Source Codes	18
		3.2.4 Building Android 7.1.2 Image	19
	3.3	GPIO	20
	3.4	UART	22
		3.4.1 EPC-R4710 UART	22
	0 5	3.4.2 How to Configure RS232 or RS485 Mode	22
	3.5	AUGIO	23
	3.0	3.6.1 Browso the SD	ZS
	37		23 24
	0.7	371 HDMI Resolution	24
		372 HDMI Audio	24
	3.8	Multi-display	
		3.8.1 Enter U-boot Interrupt Mode	25
		3.8.2 eDP and HDMI	25
		3.8.3 HDMI and LVDS	25
		3.8.4 LVDS and eDP	25
		3.8.5 HDMI and DP (HDMI2)	26
		3.8.6 eDP and DP (HDMI2)	26
		3.8.7 LVDS and DP (HDMI2)	26
	3.9	Network Setup	27
		3.9.1 Wi-Fi	27
		3.9.2 BT	29
		3.9.3 3G/4G	30

	3.10	3.9.4 Ethernet I2C	
Chapter	4	Advantech Services	33
	4.1	RISC Design-in Services	
	4.2	Contact Information	
	4.3	Global Service Policy	
		4.3.1 Warranty Policy	
		4.3.2 Repair Process	



General Introduction

This chapter details background information on the EPC-R4710.
Sections include:
■ Introduction
■ Specifications

1.1 Introduction

EPC-R4710 is an Arm based box computer powered by a high-performance Rockchip RK3399 ARM dual Cortex-A72 and quad Cortex-A53 processors. This solution supports 4K displays via HDMI. It delivers both dual HDMI/LVDS/eDP and diverse I/ O — including GbE, 6 x serials, 6 x USB, and 5 x GPIO. EPC-R4710 also features Mini-PCIe, M.2, and SIM card slots for integrating Wi-Fi, Bluetooth, and 3G/4G modules. It is an ideal solution for kiosk, POS, and vending machine applications.

1.2 Product Features

1.2.1 Specification

Module Name	9	EPC-R4710	
SOC		Rockchip RK3399 ARM	
Processor	Spec.	Dual Cortex-A72 and quad Cortex-A53 1.8 GHz	
	Technology	LPDDR4 1333MHz	
Memory	Capacity	Onboard 2G	
	Flash	16GB eMMC NAND Flas	
Ethornot	Chipset	RTL8211FSI	
Ethernet	Speed	2 x 10/100/1000Mbit	
Watch Dog T	imer	Yes	
RTC		Yes	
	GPIO	5 x GPIO via D-SUB 9 (3.3V TTL level)	
	Serial Port	1 x RS232/debug 3 x RS232 w/2wire 2 x RS232/485 w/4wier	
	USB host/OTG	5 x USB Type A, 1 x USB OTG	
	SPI	1 x SPI by pin header	
	I2C	1 x I2C by pin header	
	Mini-PCIE	1 x Full size mini PCIe slot (USB signal only)	
Expansion	M.2	1 x M.2 2230 Key E slot, w/SIDO*UART*PCIe*USB	
Expansion	SIM slot	1 x SIM slot	
	SD socket	1 x Micro SD slot	
LED system i	indicators	1 x Green LED for system power 1 x Orange LED for WLAN	
Button		1 x Power button, 1 x Reset button	
	Power supply	12V	
Power	Power Type	DC-in	
	Consumption	Boost 15W@12V	
SW	OS	Android/Debian	
Mounting		Wall mount	

Module Name		EPC-R4710	
	Operating Temp.	0 ~ 50 °C/-20 ~ 70 °C (32 ~ 122 °F/-4 ~ 158 °F)	
Environment	Storage Temp.	-40 ~ 85 °C (-40 ~ 185 °F)	
	Operating Humidity	5 ~ 95% Relative Humidity, non-condensing	
Certification		CE/FCC/CCC/BSMI Class B	

1.3 Mechanical Specifications

- Dimension: 190 x 150 x 43 mm (7.4 x 5.9 x 1.69 in)
- Reference Weight: 1.26 kg/2.77 lb (including whole package)







1.4 Electrical Specifications

Power supply type: DC-in 12 V.

RTC Battery:

- Typical voltage: 3 V
- Normal discharge capacity: 210 mAhC

1.5 Environmental Specifications

- Operating temperature: 0 ~ 50 °C/-20 ~ 70 °C (32 ~ 122 °F/-4 ~ 158 °F)
- **Operating humidity:** 0 ~ 90% relative humidity, non-condensing
- Storage temperature: -40 ~ 85 °C (-40 ~ 185 °F)
- Storage humidity: 60 °C/140 °F @ 95% RH Non-condensing

EPC-R4710 User Manual



H/W Installation

This chapter details mechanical and connector information for the EPC-R4710.

- Sections include:
- Connector Information
- Mechanical Diagrams
- Quick Start Guide

2.1 Introduction

The following sections show the external connectors and pin assignments.

2.2 EPC-R4710 I/O Overview

Front I/O



Rear I/O



Left-Side



2.3 ECP-R4710 Outside Connectors

2.3.1 GPIOs

EPC-R4710 supports 5 x GPIOs via a DB9 connector.



Pin	Description	Pin	Description
1	GPIO1	6	GPIO2
2	NC	7	GPIO4
3	GPIO5	8	GPIO6
4	NC	9	NC
5	GND		

2.3.2 COM2

COM2 can be used as RS232 port or debug port by J4 select.



Pin	Description	Pin	Description	
1	NC	5	GND	
2	COM4_RXD	6	NC	
3	COM4_TXD	7	NC	
4	NC	8	NC	
9	NC			



J4	Uart2 is used for com port and debug mode selection
Part number	1653003101
Footprint	HD_3x1P_79_D
Description	PIN HEADER 3x1P 2.0 mm 180D(M) DIP 2000-13 WS
Setting	Function
(1-2)	Debug Port (Default)
(2-3)	RS232



2.3.3 COM 1, COM 3/4, and COM 5/6

COM1 can only be used as RS232 with 2 wires.



Pin	Description	Pin	Description
1	NC	5	GND
2	COM4_RXD	7	NC
3	COM4_TXD	8	NC
4	NC	9	NC
9	NC		

COM 3 and COM 4 can only be used as RS232 with 4 wires.



COM3:

Pin	Description	Pin	Description
1	NC	5	GND
2	COM3_RXD	6	NC
3	COM3_TXD	7	COM3_RTS
4	NC	8	COM3_CTS
9	NC		

COM4:

Pin	Description	Pin	Description
1	NC	5	GND
2	COM4_RXD	6	NC
3	COM4_TXD	7	COM4_RTS
4	NC	8	COM4_CTS
9	NC		

COM 5 and COM 6 can be used as RS232 or RS485 by sw config, and when users set it as RS485, they can select the impedance on/off using J1. Otherwise EPC-R4710 supports 12/5V @0.5A power supply via COM 5 and COM 6. Power levels can be selected using J3.



COM5:

Pin	Description	Pin	Description
1	COM5_DCD	5	GND
2	COM5_RXD	6	NC
3	COM5_TXD	7	COM5_RTS
4	NC	8	COM5_CTS
9	NC		

COM6:

Pin	Description	Pin	Description
1	COM6_DCD	5	GND
2	COM6_RXD	6	NC
3	COM6_TXD	7	COM6_RTS
4	NC	8	COM6_CTS
9	NC		



J1	COM5 and COM6 RS485 impedance ON/OFF
Part number	1653003201-01
Footprint	HD_3x2P_79_D_PRX
Description	PIN HEADER 2X3P 2.00mm 180D(M) DIP 1140-010-06SN
Setting	Function
(1-3)	COM5 RS485 impedance OFF
(3-5)	COM5 RS485 impedance ON
(2-4)	COM6 RS485 impedance OFF
(4-6)	COM6 RS485 impedance ON





J3	COM5 and COM6 power 12 and 5V level select
Part number	1653003101
Footprint	HD_3x1P_79_D
Description	PIN HEADER 3x1P 2.0 mm (.078 in) 180D(M) DIP 2000-13 WS
Setting	Function
(1-2)	5V
(2-3)	12V



2.3.4 DC Power Jack (DCIN1)

EPC-R4710 supports a DC-jack header that can be connected 12V DC external power input.



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

2.3.5 Power Button

EPC-R4710 utilizes ATX mode by default. You can configure AT mode using SW1.





J1	COM 5 and COM 6 RS485 impedance ON/OFF
SW1	AT & ATX Mode Switch
Part number	160000071
Footprint	SW_3P_CJS-1201TA1
Description	SLIDE SW CJS-1201TA1 SMD 3P SPDT P=6.0mm W=2.5mm
Setting Function	Setting Function
(1-2) ATX	(1-2) ATX
(2-3) AT	(2-3) AT (default)



2.4 Quick Start Guide

2.4.1 Debug Port Connection

- 1. Connect debug cable to COM2 debug port.
- 2. Connect the other side of debug adapter to USB-to-RS-232 cable then connect to your PC.

2.4.2 Debug Port Setting

EPC-R4710 can communicate with a host servers using serial cables. Common serial communication programs such as HyperTerminal, Tera Term, or PuTTY can be used in these cases. The following example describes the serial terminal setup using HyperTerminal on a Windows host:

- 1. Connect EPC-R4710 with your PC by using a serial cable.
- 2. Open HyperTerminal on your Windows PC, and select the settings as shown in Figure 2-7.
- 3. After the bootloader is programmed on the SD card, insert the power adapter connector to the DC jack on EPC-R4710 to power up the board. The bootloader prompt is displayed on the terminal screen.

OM1 Properties		?
Port Settings		
Bits per second:	115200	~
<u>D</u> ata bits:	8	~
<u>P</u> arity:	None	~
Stop bits:	1	~
Bow control:	None	~
	Res	tore Defaults
0	K Cancel	Apply

Figure 2.1 HyperTerminal Settings for Terminal Setup

EPC-R4710 User Manual



Software Functionality

This chapter details the software programs on the EPC-R4710 plat-form.

3.1 Introduction

The purpose of this chapter is to introduce EPC-R4710's software. This will enable users to develop their own application(s) efficiently.

EPC-R4710 is designed to support Linux host only. Therefore, users may fail to develop their app if they use a Windows/Android host PC. At present, the officially supported host version is Ubuntu 16.04 LTS 64 bit. Host PCs in any other version may have compatibility issues. In these cases, we strongly recommend using Ubuntu 16.04 LTS 64bit installed to the host PC before starting evaluation/development for EPC-R4710.

3.2 Set up Build Environment

All instructions in this guide are based on Ubuntu 16.04 LTS 64bit only. Please install Ubuntu 16.04 LTS 64bit with minimum 4GB DRAM in advance. After that, log in to installed system and perform the tasks detailed in the following sections:

3.2.1 Install Docker

Users must install Docker on their platform before using it in development. Please refer to the Docker Installation Guide for further details. Docker can be installed on Linux, Cloud, Windows, and OS X; but is generally used with Ubuntu.

3.2.2 Get Base Image

Use docker pull <IMAGE REPOSITORY> to get files from our provided image list.

docker pull advrisc/u16.04-imx6abv5:20170523

3.2.3 Getting Android Source Codes

Related version information:

- Android 7.1.2
- Kernel 4.4.126
- U-Boot 2014-10

Download the Android source tree to your working directory from the repositories as specified in the default manifest.

\$ cd ~/BSP

\$ sudo git clone https://github.com/rockchip-linux/repo.git

\$ mkdir rk3399_android_n7

\$ cd rk3399_android_n7

\$ git config --global user.name "Your Name"

\$ git config --global user.email you@example.com

\$../repo/repo init -u https://gitlab.wise-paas.com/RISC/android-manifest.git -b android-7.1.2 -m default.xml

\$../repo/repo sync

\$../repo/repo forall -c git checkout -b local --track origin/android-7.1.2

Some folders described below:

android/u-boot/

U-Boot source code

android/device/rockchip/

Android device related settings

hardware/rockchip/

HAL (Hardware Abstraction Layer)

android/kernel/ Linux kernel source code

3.2.4 Building Android 7.1.2 Image

Start Docker Container

docker run -it --name android_n7 -v /home/bsp/myandroid:/home/adv/BSP:rw advrisc/ u16.04-imx6abv5:20170523 /bin/bash

Build instructions

Set the \$JAVA_HOME environment variable.

\$ export JAVA_HOME=/usr/lib/jvm/java-8-openjdk-amd64
\$ export PATH=\$JAVA_HOME/bin:\$PATH
\$ export CLASSPATH=.:\$JAVA_HOME/lib:\$JAVA_HOME/lib/tools.jar

Set up the environment for building. This only configures the current terminal.

\$ source build/envsetup.sh

Execute the Android launch command. In this example, the setup is for the production image of Advantech RISC platform device with user debug type. If you devices is RSB4710, you will be send command "lunch rk3399_rsb4710-userdebug.

\$ lunch rk3399_rsb4710-userdebug

To build boot loader

Perform the following command in terminal console.

\$ cd u-boot
\$ make rk3399_rsb4710a2_2G_defconfig
\$ make ARCHV=aarch64

To build kernel image

Perform the following command in terminal console.

\$ cd kernel

\$ make ARCH=arm64 rk3399_adv_defconfig -j8

\$ make ARCH=arm64 rk3399-rsb4710-a2.img -j12

To build system image

Perform the following command in terminal console.

\$ source build/envsetup.sh
\$ lunch rk3399_rsb4710-userdebug
\$ make -j4 2>&1 | tee build-log.txt
\$./mkimage.sh

All android image will be generated in rockdev/Image- rk3399_rsb4710/ folder. The common image files are listed below:

# boot.img	: Android's initramfs, to initialize and mount system partition.			
# kernel.img	: Kernel image.			
# misc.img mode.	: Misc partition image, to switch boot mode and pass parameter in recovery			
# recovery.img	: Recovery mode image.			
# resource.img	: Resource image, containing boot logo and kernel's device tree info.			
# system.img	: System partition image with ext4 filesystem format.			
# uboot.img	:uboot			
#trust.img : tru	trust.img :trust zome image			
# MiniLoaderAll	.bin :Loader			

3.3 **GPIO**

The RK3399 bank/bit notation for GPIOs must be formed as "GPIO<GPI-O_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. GPIO2_B0 becomes 72

GPIO Number	GPIO formed	Numeric Representation
GPIO1	GPIO2_B0	72
GPIO2	GPIO1_C2	50
GPIO4	GPIO3_D4	124
GPIO5	GPIO4_A4	132
GPIO6	GPIO0_B0	8

Export GPIO then you can use control GPIO from user space through sysfs.

Export GPIO1.

\$ echo 72 > /sys/class/gpio/export

Set GPIO direction to in/out.

\$ echo "out" > /sys/class/gpio/gpio72/direction

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

\$ echo 1 > /sys/class/gpio/gpio72/value

Used as IRQ signal.

Note: You have to configure GPIO to input.

\$ echo "rising" > /sys/class/gpio/gpio72/edge NOTE: rising: Trigger on rising edge falling: Trigger on falling edge both: Trigger on both edges none: Disable interrupt on both edges

Unexport GPIO1.

\$ echo 72 > /sys/class/gpio/unexport

GPIO 1 and GPIO 2 are taken as an example: Connect GPIO 1 and GPIO 2. Export GPIO 1 and GPIO 2.

\$ echo 72 > /sys/class/gpio/export
\$ echo 50 > /sys/class/gpio/export

Set GPIO 1 to output.

\$ echo "out" > /sys/class/gpio/gpio72/direction

Set GPIO 2 to input.

\$ echo "in" > /sys/class/gpio/gpio50/direction

Change GPIO 1 to 1 and read GPIO 2 value.

\$ echo 1 > /sys/class/gpio/gpio72/value
\$ cat /sys/class/gpio/gpio50/value
1

Change GPIO 1 to 0 and read GPIO 2 value.

echo 0 > /sys/class/gpio/gpio72/value \$ cat /sys/class/gpio/gpio50/value 0

3.4 **UART**

The Android/Linux UART/serial port access from user is through the tty-devices. The tty-devices have different names depending on UART driver on different board.

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's transmit mode. Usually the UART RTS signal is used to switch the transmitter on and off.

3.4.1 EPC-R4710 UART

COM Name	Device Node	Remark
COM1	/dev/ttyS4	Support RS232, no flow control
COM2	/dev/ttyS2	Debug Port
COM3	/dev/ttyUSB0	Support RS232
COM4	/dev/ttyUSB1	Support RS232
COM5	/dev/ttyUSB2	Support RS232 and RS485
COM6	/dev/ttyUSB3	Support RS232 and RS485

3.4.2 How to Configure RS232 or RS485 Mode

Enter U-boot interrupt mode.

Connect device to debug port, and open debug console.

Press "ctrl + c" key before power up the device, until get the following information on debug console:

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

Then you can input the following command to config UART mode. RS485 Mode:

setenv uart_mode 0x0c saveenv reset

RS232 Mode:

setenv uart_mode 0x00 saveenv reset

Note:

The default value is RS232.

Cp210x support four port, but RSB4710 Only ttyUSB2 and ttyUSB3 support RS485 mode.

Above command "setenv uart_mode 0x0c", 0x0c means set bit2(ttyUSB2) and bit3(ttyUSB3) to 1 (0 means to RS232; 1 means to RS485).

If you just want ttyUSB2 (or ttyUSB3) to be RSB485 mode, please change 0x0c to 0x04 (or 0x08).

3.5 Audio

Launch "Sound Recorder" for MIC.



Launch "Video" for Audio.



d)

3.6 SD/MMC Card/USB Disk

3.6.1 Browse the SD

Launch "Explorer" to browse the SD card or USB Disk.

0

😭 Home	LevelUp	🖽 Multi	C Editor	NewFolder
Internal Me	mory			
SD Card				
🕏 USB				

3.7 HDMI

3.7.1 HDMI Resolution

Starting Android, Entry Settings->Display->HDMI->HDMI Resolution.



3.7.2 HDMI Audio

When the HDMI monitor supports audio, the default output is from both HDMI and onboard audio codec.

3.8 Multi-Display

EPC-R4710 supports 4 display ports: eDP, LVDS (mipi to LVDS), HDMI, and DP (DP to HDMI). Only two ports work at the same time. Default Support Display:

Port	RSB4710	
edp	edp-1920x1080 edp-1366x768	
lvds	lvds-g070vw01 lvds-g150xgel05 lvds-g215hvn01	
hdmi	hdmi-default	
dp	dp-default	
NOTE		

NOTE:

1. The name of the panel must begin with "edp-", "lvds-", "hdmi-" or "dp-". And it can be found in "kernel/include/dt-bindings/display/screen-timing/{LCDNAME}.dtsi" like:

lvds_g070vw01: lvds-g070vw01

2. If there is no configuration, you will get default setting:

hdmi-default and dp-default as default setting.

3. Check your configuration in Terminal or debug console.

cat /proc/cmdline

... prmry_screen=hdmi-default extend_screen=dp-default

3.8.1 Enter U-boot Interrupt Mode

Connect device to debug port, and open debug console.

Press "ctrl + c" key before power up the device, until get the following information on debug console:

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

Then you can input the following command to config Multi-Display.

3.8.2 eDP and HDMI

1. eDP is main display, please set in u-boot as below:

```
setenv prmry_screen edp-1920x1080
setenv extend_screen hdmi-default
saveenv
reset
```

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

```
setenv prmry_screen hdmi-default
setenv extend_screen edp-1920x1080
saveenv
reset
```

3.8.3 HDMI and LVDS

1. HDMI is main display, please set in u-boot as below:

```
setenv prmry_screen hdmi-default
setenv extend_screen lvds-g070vw01
saveenv
reset
```

2. LVDS is main display, please set in u-boot as below:

```
setenv prmry_screen lvds-g070vw01
setenv extend_screen hdmi-default
saveenv
reset
```

3.8.4 LVDS and eDP

1. LVDS is main display, please set in u-boot as below:

```
setenv prmry_screen lvds-g070vw01
setenv extend_screen edp-1920x1080
saveenv
reset
```

2. eDP is main display, please set in u-boot as below:

```
setenv prmry_screen edp-1920x1080
setenv extend_screen lvds-g070vw01
saveenv
reset
```

3.8.5 HDMI and DP (HDMI2)

1. HDMI is main display, please set in u-boot as below:

```
setenv prmry_screen hdmi-default
setenv extend_screen dp-default
saveenv
reset
```

2. DP(HDMI2) is main display, please set in u-boot as below:

```
setenv prmry_screen dp-fefault
setenv extend_screen hdmi-default
saveenv
reset
```

3.8.6 eDP and DP (HDMI2)

1. eDP is main display, please set in u-boot as below:

```
setenv prmry_screen edp-1920x1080
setenv extend_screen dp-default
saveenv
reset
```

2. DP(HDMI2) is main display, please set in u-boot as below:

```
setenv prmry_screen dp-default
setenv extend_screen edp-1920x1080
saveenv
reset
```

3.8.7 LVDS and DP (HDMI2)

1. LVDS is main display, please set in u-boot as below:

```
setenv prmry_screen dp-default
setenv extend_screen lvds-g070vw01
saveenv
reset
```

2. DP(HDMI2) is main display, please set in u-boot as below:

```
setenv prmry_screen dp-default
setenv extend_screen edp-1920x1080
saveenv
reset
```

3.9 Network Setup

3.9.1 Wi-Fi

1. Click Settings.

Manines & networks				
• m/i		8	Bluetooth	
O Data unap	•		More	
C Display			Sound & notification	
Apps		-	Storage & USB	
Memory		1	Users	
NJ HOME		E 3	ScreenahotSetting	
Personal				
Cocation		ê	Security	
Accounts		0	Language & input	
A Backup & r	vesat.			
System.				
 Date & tim 	2	*	Accessibility	
Printing		0	About tables	

2. Turn on Wi-Fi.

÷	WHE		
	On		•
	۰.	advantech for guest	
		Advantachar	
		W6 Pone	
	۰.	jon .	
	Ψ.	divis 2104	
	Ψ.	printer	

3. Choose ESSID (for example, Advantech for guest).

4 🖷		
÷	Wi-Fi	
	On	
	▼.	advantech for guest
	▼.	Advantecher
	•	Wifi Phone

4. Input correct password.

Wi	<u>n</u>																
09																	
	e w	Phone :												-			
	1	which for s	and a		advantech for guest												
	📽 dina 2104			Passed													
4	6 AA	artiches			D Show pa	bread											
	6. M	1			Advanced op	none								* :			
	6. 20	-										CANCE	n. cowner	n -			
	5. H	-															
I		2		3	4		5		6		7		8		9		0
	@		#		\$	%		&		-		+		()	
[<		١		=	*		"		1		:		;		!		?
20														_	1		

5. Wi-Fi connected.

4	? O							
	÷	Wi-Fi						
		On						
		₹.	advantech for guest Connected					
		•	Wifi Phone					
		•	dlink-2104					

3.9.2 **BT**

1. Click Settings, switch the Bluetooth switch to ON to turn on Bluetooth:

Ψ 🛎							
÷	Bluetooth						
	On						
	Available devices						
	ATC-100015906-3						
	↓ 小米手机						
	COPPO R11s						

- 2. Click any available devices to pair with.
- 3. After pairing successfully you can now communicate with the device.

3.9.3 3G/4G

- 1. Insert SIM card, restart.
- 2. If you can't connect to the network, please check the following settings: Settings/More/Cellular networks/ Access Point Names, then correct accordingly.

ł 🛛	
÷	More
	Airplane mode
	Tethering & portable hotspot
	Ethernet
	VPN
	Cellular networks
	Ψ ø ← Cellular network settings
	Data roaming Connect to data services when roaming
	Preferred network type LTE (recommended)
	Access Point Names

Network operators Choose a network operator

Chapter 3 Software Functionality

3.9.4 Ethernet

EPC-R4710 supports two Ethernet (eth0 and eth1), but Android only supports config eth0 as follows:

Config eth0:

Click Settings->More->Ethernet Configure Ethernet. There are two of IP settings: DHCP IP and static IP.

DHCP IP - Configuration is controlled by the system.

•							臣 11:45
÷	Ethernet						
	Ethernet Ethernet is enabled					۰	
	IP address 0.0.0.0						
	netmask 0.0.0.0	Ethernet Ip mo	de				
	gateway 0.0.0.0	 static dhcp 					
	dns1 0.0.0.0				CANCEL		
	dns2 0.0.0.0						
	Ethernet lp mode dhcp			Þ.			
		0	\triangleleft	0	0		

Static IP - There are five fields that need to be filled: IP Address, netmask, getway dns1, and dns2.





٠							0 E	11:49
÷	Ethernet							
	Ethernet Ethernet is enabled					۰		
	IP address 192.168.1.2							
	netmask 255.255.255.0							
	gateway 192.168.1.1							
	dns1 8.8.8.8							
	dns2 8.8.4.4							
	Ethemet Ip mode static							
		0	\bigtriangledown	0	0			

Config eth1:

Eth1 setting static ip example.

\$ su

ip rule add from all lookup main pref 9999 # ifconfig eth1 172.12.1.2 netmask 255.255.0.0

3.10 I2C

Use i2cdetect cmd to detect iic device,eg:i2cdetect -y 4.



Advantech Services

This chapter introduces Advantech design in services, technical support, and warranty policy for the RSB-6410 evaluation kit.

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

- Full Range of RISC Product Offerings
- Comprehensive Document Support

Design Assistance Service

Advantech provides check lists to help engineers check their schematics and review services based on customer carrier board schematics. These services are preventative, and identify design errors before they occur. They help save time and money when developing carrier boards.

- Schematic Review
- Placement and Layout Review
- Debugging Assistance Services
- General/Special Reference Design Database

Thermal Solution Services

Advantech provides thermal solution services — including modularized thermal solutions and customized thermal solutions — for quicker and more flexible thermal design integration.

- Standard Thermal Solutions
- Customized Thermal Solutions

Embedded Software Services

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

- 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. Now, the situation has improved. 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. ARM-based CPU modules came 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

Despite having the ability and knowledge to vertically integrate in professional application fields, a lack of general expertise and experience in power and I/O design causes challenges. This is especially true when integrating CPU modules into carrier boards.

The acquisition of information

Even if an individual client is able to obtain enough information to make the right decision for the specialized vertical application, some customers encounter difficulties when dealing with platform design and communication with CPU/chipset manufacturers. This increases carrier board design difficulties and risk. It can also result in increased time-to-market and lost market opportunities.

Software development and modification

Compared to x86 architectures, RISC architectures use simpler instruction sets. As such, 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. Even though driver support is provided, SIs still have to work to integrate these platforms into their system core. Moreover, the BSP provided by CPU manufacturers are usually for carrier board designs — therefore 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 professional design-in services team, Advantech actively participates in carrier board design and problem solving. Our services enable customers to effectively distribute their resources while reducing R&D, HR, and hardware costs.

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. Our services reduce product development uncertainties. Advantech's professional software team also focuses on providing a complete Board Support Package and assists customers in creating software development environments for their RISC platforms.

Advantech RISC design-in services helps customers overcome their problems to reduce 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 through the following phases:

Planning stage

Before deciding to adopt Advantech RISC COM, customers must go through a complete survey process, including product features, specification, and compatibility testing with software. Advantech offers a RISC Customer Solution Board (CSB) as an evaluation tool for carrier boards which are simultaneously designed when developing RISC COMs. In the planning stage, customers can use this evaluation board to assess RISC modules and test peripheral hardware. Advantech provides standard software Board Support Package (BSP) for RISC COM, enabling customers to define their product's specifications while simultaneously verifying I/O and performance. We not only offer hardware planning and technology consulting, but also software evaluation and peripheral module recommendations (such as Wi-Fi, 3G, and BT). Resolving customer concerns is Advantech's main goal at this stage. As product evaluation is the key task in the planning period, especially for performance and specification, 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 carrier board design guide for reference. The carrier board design guide provides COM connector pin definitions with limitations and recommendations for carrier board design, so customers can have a clear guideline to follow during development. Regarding different form factors, Advantech offers a complete pin-out check list for different form factors — such as Q7, ULP and RTX 2.0. These checklists enable customers to examine their carrier board signals and layout design accordingly. In addition, our team assists customers with reviewing the placement/layout and schematics to ensure the carrier board design meets their full requirements. For software development, Advantech RISC software team can help customers 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 easier and product quality is improved.

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 time analyzing integration problems. In addition,

peripheral module implementation is related to 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 to get the best solution with the least effort. Advantech's team has years of experience in customer support and HW/SW development. Consequently, we support customers with professional advice and information. We also shorten development time and enable effective product integration.

Validation stage

After customer's ES sample is completed, next up 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.

Advantech primarily helps customers solve their problems in the testing process and will give suggestions and tips. 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.

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

Below is the contact information for Advantech customer service.

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.

4.3 Global Service Policy

4.3.1 Warranty Policy

Below is the warranty policy for Advantech products:

4.3.1.1 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 work-manship, 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 the 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.

4.3.1.2 Repairs Under Warranty

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

For 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.

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 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 suffered a failure for 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, or earthquake, etc.
- Product updates/upgrades and tests upon the request of customers who are 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. 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.

4.3.2.2 Returning the Product for Repair

It's possible customers can save time and meet end-user requirements by returning defective products to any authorized Advantech repair facility without an extra cross-regional charges. Users are required to contact the local repair center before pursuing global repair services.

We recommend returning products without accessories (manuals, cables, etc.). Remove any unnecessary components from the product, 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 Union 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 unrepaired items at the customer's cost if inappropriately packed. In addition, "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 during the warranty period, 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 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 a detailed 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.

4.3.2.4 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 USD \$60 or USD \$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 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.

4.3.2.6 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 and 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.



www.Advantech.com

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

All product specifications are subject to change without notice.

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

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

© Advantech Co., Ltd. 2021