



**User Manual**

# **EPC-R3710**

**Rockchip Arm<sup>®</sup> Cortex<sup>®</sup>-A72  
BOX Computer**

**ADVANTECH**

*Enabling an Intelligent Planet*

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## Product Warranty (2 years)

Advantech warrants 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 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.

Because of Advantech's high quality-control standards and rigorous testing, most customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced free of charge during the warranty period. For out-of-warranty repairs, customers will be billed according to the cost of replacement materials, service time, and freight. Please consult your dealer for more details.

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 onscreen 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 in a residential installation. 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. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for assistance.

## Safety Precautions - 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 the PC chassis before manual handling. Do not touch any components on the CPU card or other cards while the PC is powered on.
- Disconnect the power before making any configuration changes. A sudden rush of power after connecting a jumper or installing a card may damage sensitive electronic components.

## Packing List

Before system installation, check that the items listed below are included and in good condition. If any item does not accord with the list, contact your dealer immediately.

- 1 x EPC-R3710 Box computer
- 1 x China RoHS
- 2 x Wall mount bracket

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## Safety Instructions

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

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

## Technical Support and Assistance

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

## 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 cm)
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-ISDS1-8G-82E	SQF SDHC C10 SLC 8G, 1CH (-40 ~ 85 °C/-40 ~ 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 (4.3 in) 50 Ohm
EWM-W188M201E	WiFi 802.11ac/abgn 2T2R and BT4.2
EXM-CMPF1-M2E01E	M.2(NGFF) to MiniPCle KEY-E Adapter
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 get suitable cellular module for your region.

## Ordering Information

Part No.	Description
EPC-R3710NO-XAA100	EPC-R3710 system with UIO-4030, 0 ~ 50 °C (32 ~ 122 °F)
EPC-R3710NO-XAA120	EPC-R3710 system with UIO-4032, 0 ~ 50 °C (32 ~ 122 °F)
EPC-R3710NO-XAA140	EPC-R3710 system with UIO-4034, 0 ~ 50 °C (32 ~ 122 °F)
EPC-R3710NO-XAA160	EPC-R3710 system with UIO-4036, 0 ~ 50 °C (32 ~ 122 °F)



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# Chapter 1

## General Introduction

This chapter details background information on the EPC-R3710.

Sections include:

- Introduction
- Specifications

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## 1.1 Introduction

EPC-R3710 is an Arm based box computer powered by a high-performance Rockchip RK3399 ARM dual Cortex-A72 or quad Cortex-A53 high performance processor which supports 4K displays via HDMI. It offers diverse display interfaces — including dual HDMI/LVDS/eDP and diverse I/O — including dual GbE/2 x serials/3 x USB/12 x GPIO. EPC-R3710 also features a Mini-PCIe slot for integrating Wi-Fi, Bluetooth, and 3G/4G modules. It is an ideal solution for HMI, IoT gateway, and healthcare applications.

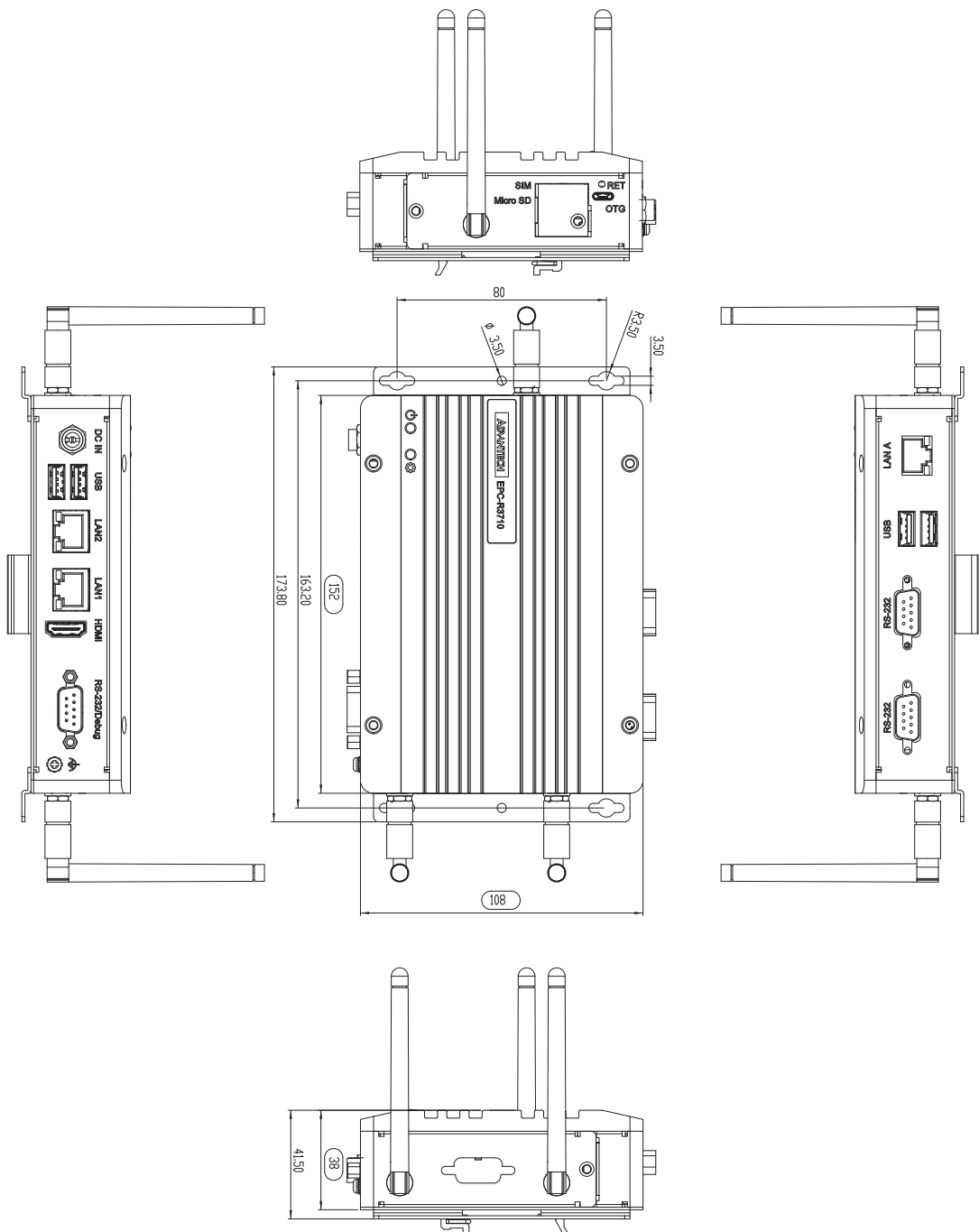
## 1.2 Product Features

### 1.2.1 Specifications

Model		EPC-R3710NO-XAA100	EPC-R3710NO-XAA120	EPC-R3710NO-XAA140	EPC-R3710NO-XAA160
Processor System	CPU	Rockchip RK3399 ARM dual Cortex-A72 and quad Cortex-A53 1.8 GHz			
Memory	Technology	LPDDR4			
	Capacity	2 GB On-board			
	Flash	16GB of eMMC NAND Flash for OS and Advantech's boot loader			
Graphics	HDMI	1 HDMI 2.0, 1920 x 1080 at 60Hz			
	Graphics Engine	OpenGL ES 1.1/2.0/3.1, OpenCL 1.1, DirectX 11			
	H/W Video Codec	Decoder: MPEG-1, MPEG-2, MPEG-4, H.263, H.264, AVS, VC-1, VP8, MVC, HEVC/H.265 decoder, 4k@60FPS Encoder: H.264 (BP@level4.0, MP, HP@level4.0), MVC and VP8			
Ethernet	Chipset	RTL8211FSI			
	Speed	2 10/100/1000 Mbps			
Watchdog Timer	Watchdog Timer	Yes			
Front I/O	USB	1 x USB 3.0 Type A, 1 x USB 2.0 Type A			
	GbE	2 x RJ45 for GbE			
Rear I/O		1 x RS-485, 1 x 2 wires RS-232 4 x DIs, 4 x DOs	2 x 2 wires RS-232 1 x GbE, 2 x USB 2.0	2 x 2 wires RS-232	4 X GbE (Hub)
Expansion	Full-Size Mini PCIe	1 Full Size Mini PCIe Slot (with PCIE/USB)			
	M.2 Micro	-			
	SD Socket	1 Micro SD Socket			
	SIM	1 Nano SIM Slot			
	Antenna Holes	3			
Power	Power Supply Voltage	+12V			
	Power Type	Lockable DC-Jack			
	Power Consumption	11.5W (burning)			
Environment	Operating Temperature	0 ~ 50 °C/-20 ~ 70 °C (32 ~ 122/-4 ~ 158 °F)			
	Operating Humidity	5 ~ 95% relative humidity, non-condensing			
Mechanical	Dimensions	174 x 108 x 25 mm (6.85 x 4.25 x.98 in)			
	Mounting	Wall mount/Din Rail			
	Weight	TBD			
Operating System	Linux	Debian			
	Android	Android			
Certifications		CCC/CE/FCC/BSMI Class B			

## 1.3 Mechanical Specifications

- **Dimension:** 174 x 108 x 25 mm (6.85 x 4.25 x .98 in)
- **Reference Weight:** 1.26 kg (2.77 lb) (including whole package)



## 1.4 Electrical Specifications

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

## 1.5 Environmental Specifications

- **Operating Temperature:** 0 ~ 50 °C/-20 ~ 70 °C (32 ~ 122/-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



# Chapter 2

## H/W Installation

This chapter details mechanical and connector information on the EPC-R3710.

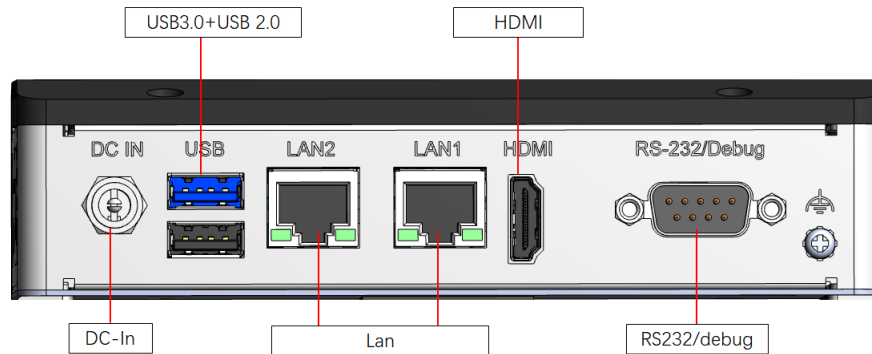
- Sections include:
- Connector Information
- Mechanical Drawing
- Quick Start Guide

## 2.1 Introduction

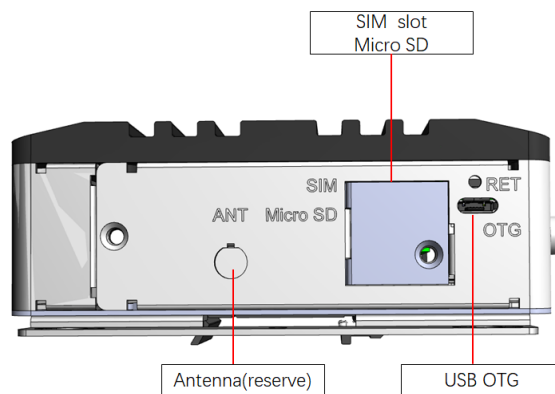
The following sections show the external connectors and pin assignments for applications.

## 2.2 EPC-R3710 I/O Overview

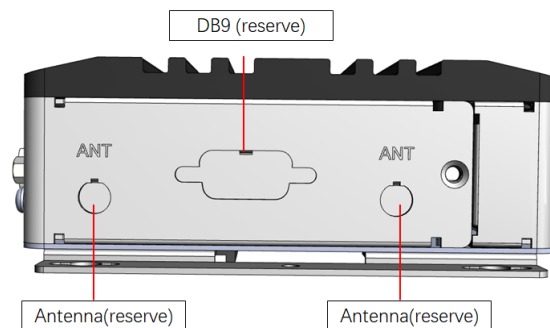
Front I/O



Left-Side



Right-Side





Rear I/O by UIO express card  
EPC-R3710NO-XAA100 with UIO-4030



EPC-R3710NO-XAA120 with UIO-4032



EPC-R3710NO-XAA140 with UIO-4034 but no CAN function



EPC-R3710NO-XAA160 with UIO-4036



## 2.3 ECP-R3710 Connectors Outside

### 2.3.1 DC in

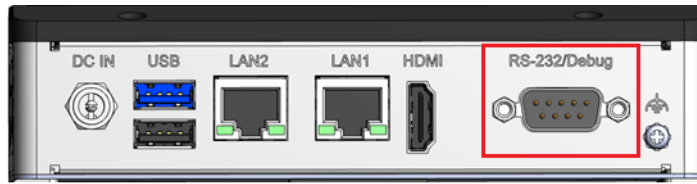
EPC-R3710 supports a DC-Jack header that can be connected 12V<sub>DC</sub> external power input.



Pin	Description
1	+12V
2	GND
3	GND

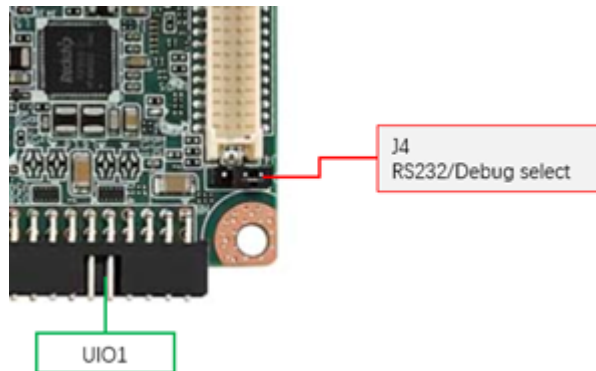
## 2.3.2 COM2

The COM2 can be used as a RS232 port or debug port. It is set, by default, as a Debug port. Select the desired mode using jumper J4.



Pin	Description	Pin	Description
1	NC	5	GND
2	COM2_RXD	6	NC
3	COM2_TXD	7	NC
4	NC	8	NC
9	NC		

<b>J4</b>		<b>Uart2 use for com port and debug mode select</b>
Part number	1653003101	
Footprint	HD_3x1P_79_D	
Description	PIN HEADER 3x1P 2.0mm 180D(M) DIP 2000-13 WS	
Setting	Function	
(1-2)	Debug port (default)	
(2-3)	RS232	



## 2.4 Quick Start Guide

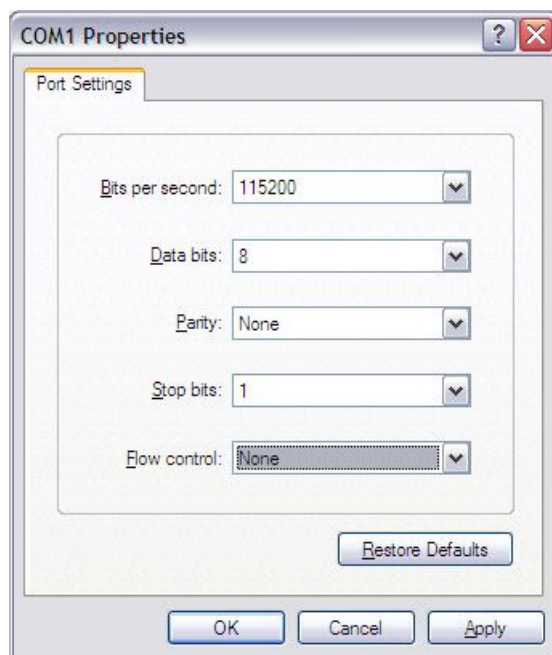
### 2.4.1 Debug Port Connection

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

### 2.4.2 Debug Port Setting

EPC-R3710 can communicate with a host server using serial cables. Common serial communication programs such as HyperTerminal, Tera Term, or PuTTY can be used in this case. The example below demonstrates the serial terminal setup using HyperTerminal on a Windows host:

1. Connect EPC-R3710 to your PC 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 SD card, insert power adapter connector to DC jack on EPC-R3710 to power up the board. The bootloader prompt is displayed on the terminal screen.





# Chapter 3

## Software Functionality

This chapter details the software programs on the EPC-R3710 platform.

## 3.1 Introduction

The purpose of this chapter is to introduce software development of EPC-R3710. This will enable you to develop your own application(s) efficiently.

EPC-R3710 is designed for Linux host exclusively. Your development may fail on Windows/Android host PCs. The present officially supported host version is Ubuntu 16.04 LTS 64bit. Host PCs with any other version may have compatibility issues. We strongly recommend having Ubuntu 16.04 LTS 64bit installed on your host PC before starting EPC-R3710 evaluation/development.

## 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, login to installed system and perform the steps detailed in the following sections:

### 3.2.1 Install Docker

You have to install Docker on your platform before using it for development. Please refer to the Docker Installation Guide. You are able to install Docker on Linux, Cloud, Windows, and OS X. We generally recommend installation on Ubuntu.

### 3.2.2 Get Base Image

Use docker pull to get the images we provide <IMAGE REPOSITORY> to acquire the images on the image list.

```
# docker pull advrisc/u16.04-imx6abv5:20170523
```

### 3.2.3 Getting Android Source Code

Related version information:

Android 7.1.2

Kernel 4.4.126

U-Boot 2014-10

Use the following to access the Android source tree for your working directory from the repositories as specified in the default manifest:

```
$ cd ~/code
$ 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 are 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 your device is EPC-R3710, you will be send command “lunch rk3399\_rsb3710-userdebug.

```
$ lunch rk3399_rsb3710-userdebug
```

**To build boot loader**

Perform the following command in the terminal console:

```
$ cd u-boot
$ make rk3399_rsb3710a2_2G_defconfig
$ make ARCH=aarch64
```

**To build kernel image**

Perform the following command in the terminal console:

```
$ cd kernel
$ make ARCH=arm64 rk3399_adv_defconfig -j8
$ make ARCH=arm64 rk3399-rsb3710-a2.img -j12
```

## To build system image

Perform the following command in the terminal console:

```
$ source build/envsetup.sh
$ lunch rk3399_rsb3710-userdebug
$ make -j4 2>&1 | tee build-log.txt
$ ./mkimage.sh
```

All Android images will be generated in rockdev/Image- rk3399\_rsb3710/ 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	: Misc partition image, to switch boot mode and pass parameter in recovery mode.
# 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	: File about sleep
# MiniLoaderAll.bin	: Loader

## 3.3 GPIO

GPIO Number	GPIO formed	Numeric Representation
# GPIO1	EXP1_0	504
# GPIO2	EXP1_1	505
# GPIO3	EXP1_2	506
# GPIO4	EXP1_3	507
# GPIO5	EXP2_0	496
# GPIO6	EXP2_1	497
# GPIO7	EXP2_2	498
# GPIO8	EXP2_3	499
# GPIO9	EXP2_4	500
# GPIO10	EXP2_5	501
# GPIO11	EXP2_6	502
# GPIO12	EXP2_7	503

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

Export GPIO1.

```
$ echo 504 > /sys/class/gpio/export
```

Set GPIO direction to in/out.

```
$ echo "out" > /sys/class/gpio/gpio504/direction
```



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

```
$ echo 1 > /sys/class/gpio/gpio504/value
```

Unexport GPIO1.

```
$ echo 504 > /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 504 > /sys/class/gpio/export
$ echo 505 > /sys/class/gpio/export
```

Set GPIO 1 to output.

```
$ echo "out" > /sys/class/gpio/gpio504/direction
```

Set GPIO 2 to input.

```
$ echo "in" > /sys/class/gpio/gpio505/direction
```

Change GPIO 1 to 1 and read GPIO 2 value.

```
$ echo 1 > /sys/class/gpio/gpio504/value
$ cat /sys/class/gpio/gpio505/value
1
```

Change GPIO 1 to 0 and read GPIO 2 value.

```
echo 0 > /sys/class/gpio/gpio504/value
$ cat /sys/class/gpio/gpio505/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 boards.

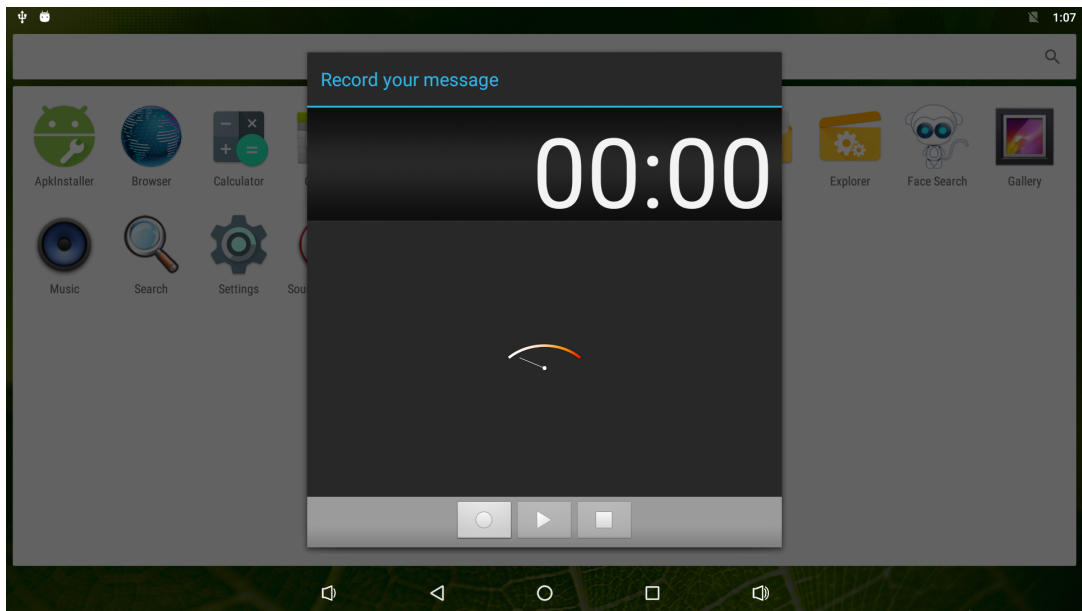
RS-485 uses half-duplex communication, which means that one medium is shared for transmitting and receiving data. Therefore the system needs to control the RS-485 transceiver's transmit mode. Usually the UART RTS signal is used to switch the transmitter on and off.

### 3.4.1 EPC-R3710 UART

COM Name	Device Node	Remark
COM0	/dev/ttyS0	support RS232, no flow control
COM2	/dev/ttyS2	Debug Port
COM4	/dev/ttyS4	support RS232, no flow control

## 3.5 Audio

Launch “Sound Recorder” for MIC.



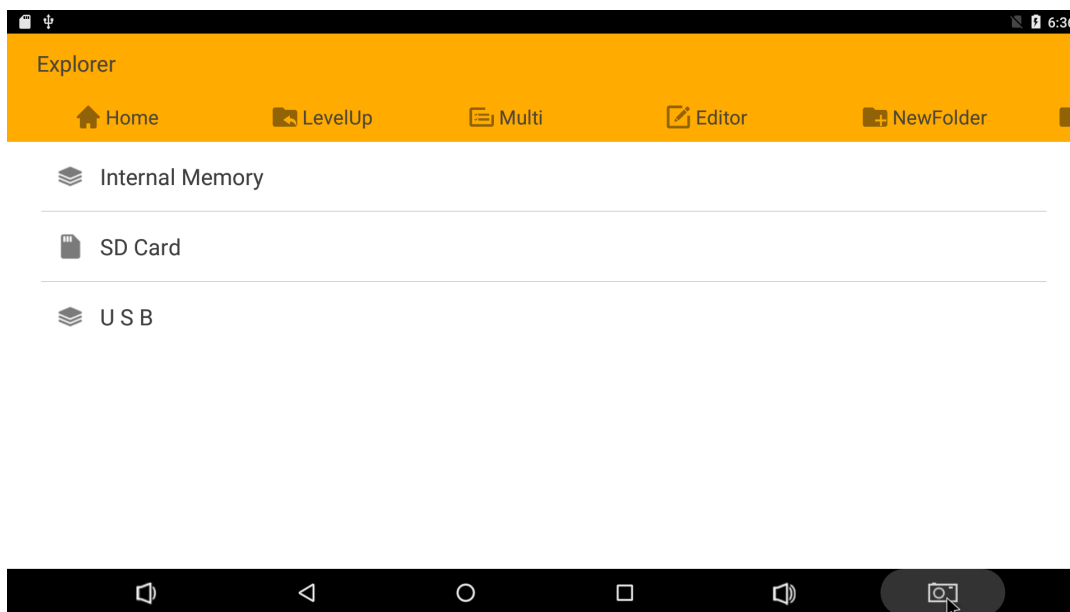
Launch “Video” for Audio.



## 3.6 SD/MMC Card/USB Disk

### 3.6.1 Browse the SD

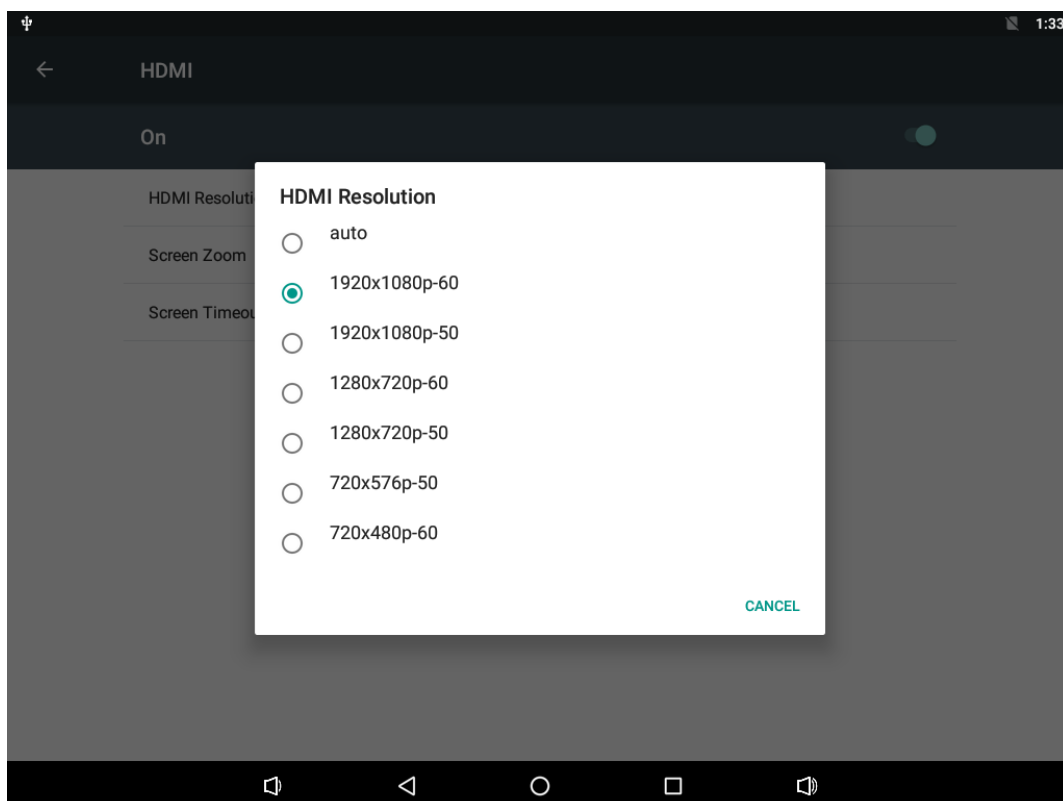
Launch “Explorer” to browse the SD card or USB Disk.



## 3.7 HDMI

### 3.7.1 HDMI Resolution

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



### 3.7.2 HDMI Audio

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

## 3.8 Multi-display

EPC-R3710 supports 3 x display ports: eDP, LVDS (mipi to LVDS), HDMI. Only two ports work at the same time.

Default Support Display:

Port	RSB3710
edp	edp-1920x1080 edp-1366x768
lvds	lvds-g070vw01 lvds-g150xgel05 lvds-g215hvn01
hdmi	hdmi-default

NOTE:

1. The name of the panel must begin with "edp-", "lvds-" or "hdmi-". And it can be found in "kernel/include/dt-bindings/display/screen-timing/{LCD-NAME}.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  
... prmary\_screen=hdmi-default extend\_screen=edp-1920x1080

### 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 configure Multi-Display.

### 3.8.2 eDP and HDMI

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

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

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

```
setenv prmary_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 demonstrated below:

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

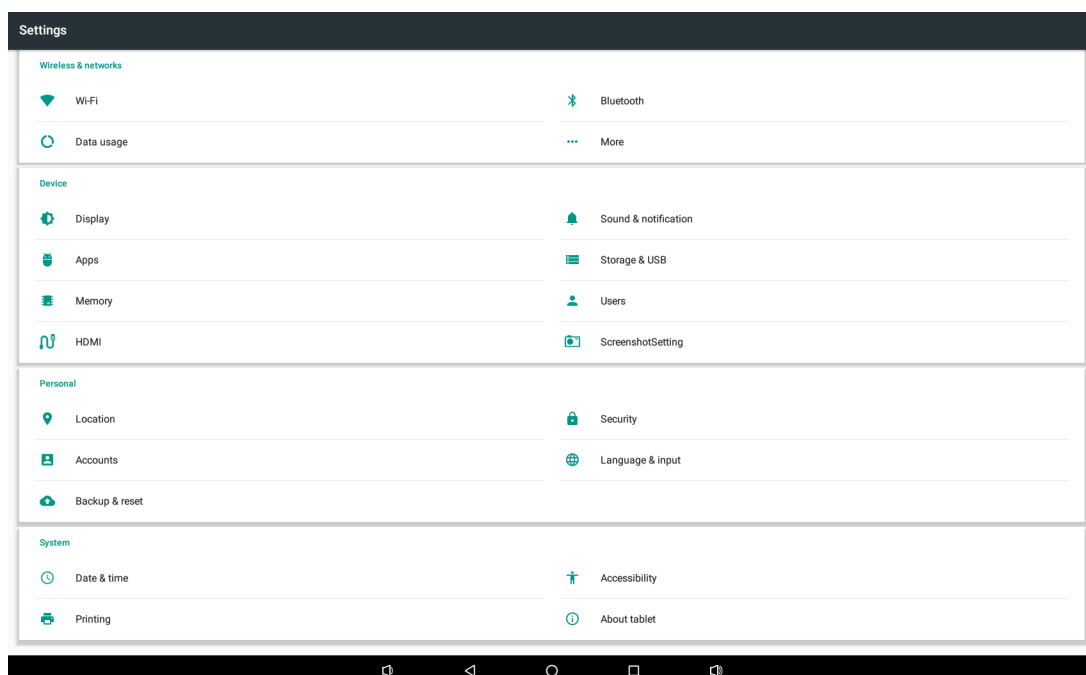
2. LVDS is main display, please set in u-boot as demonstrated below:

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

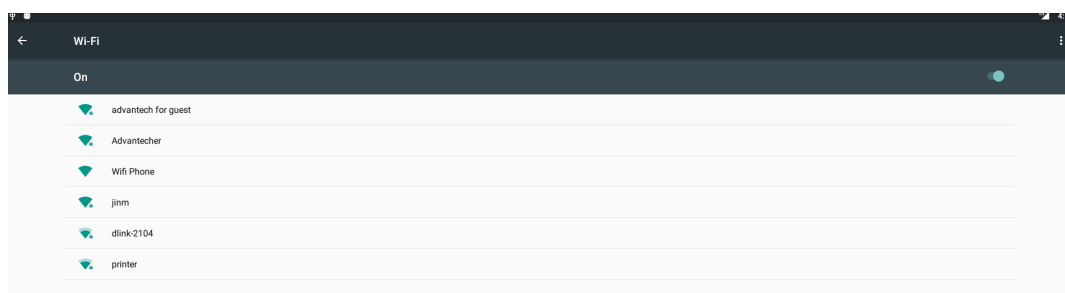
## 3.9 Network Setup

### 3.9.1 Wi-Fi

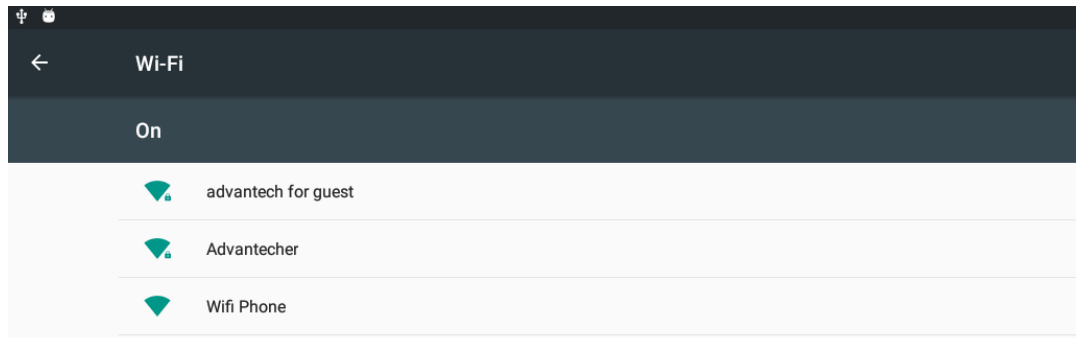
1. Click Settings.



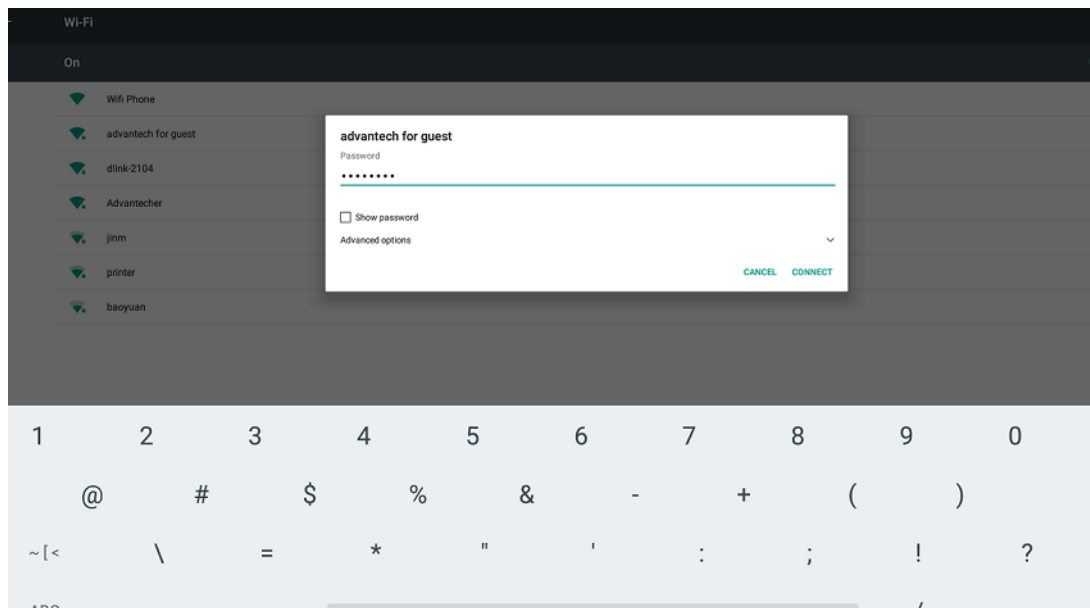
2. Turn on the Wi-Fi.



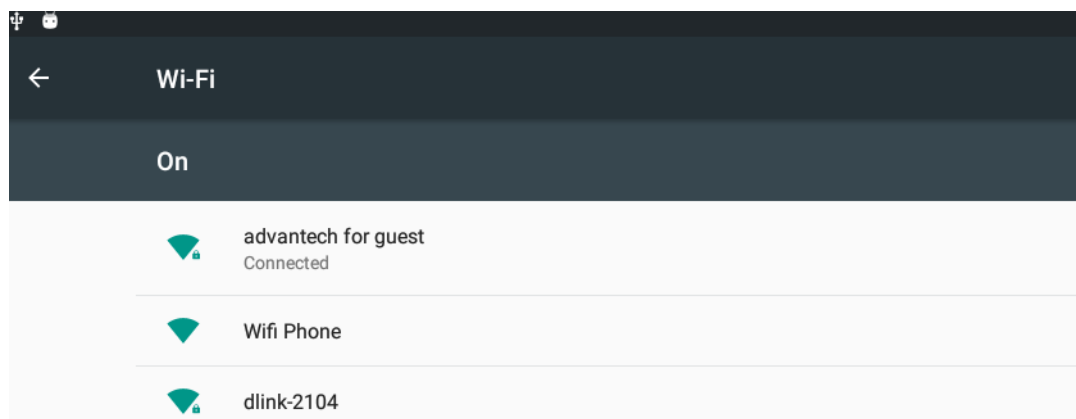
3. Choose the ESSID (for example, Advantech for guest).



4. Input the correct password.

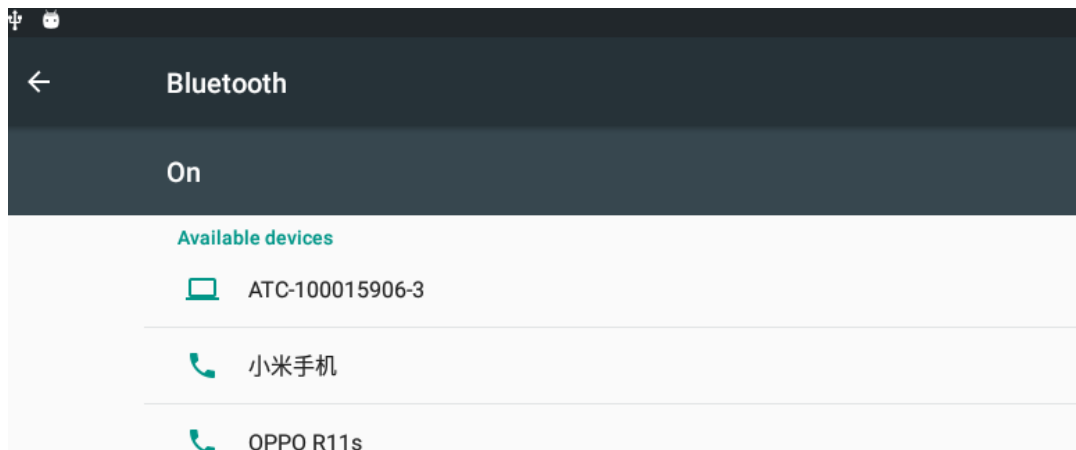


5. Connect to Wi-Fi.



### 3.9.2 Bluetooth

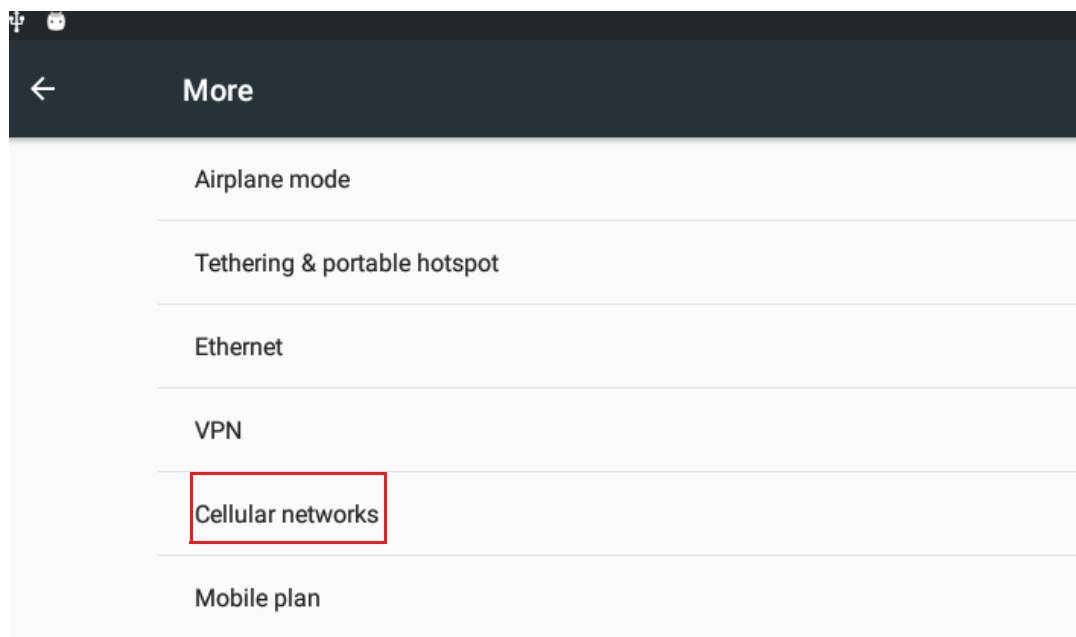
1. Click Settings, switch the Bluetooth switch to ON to turn on Bluetooth:

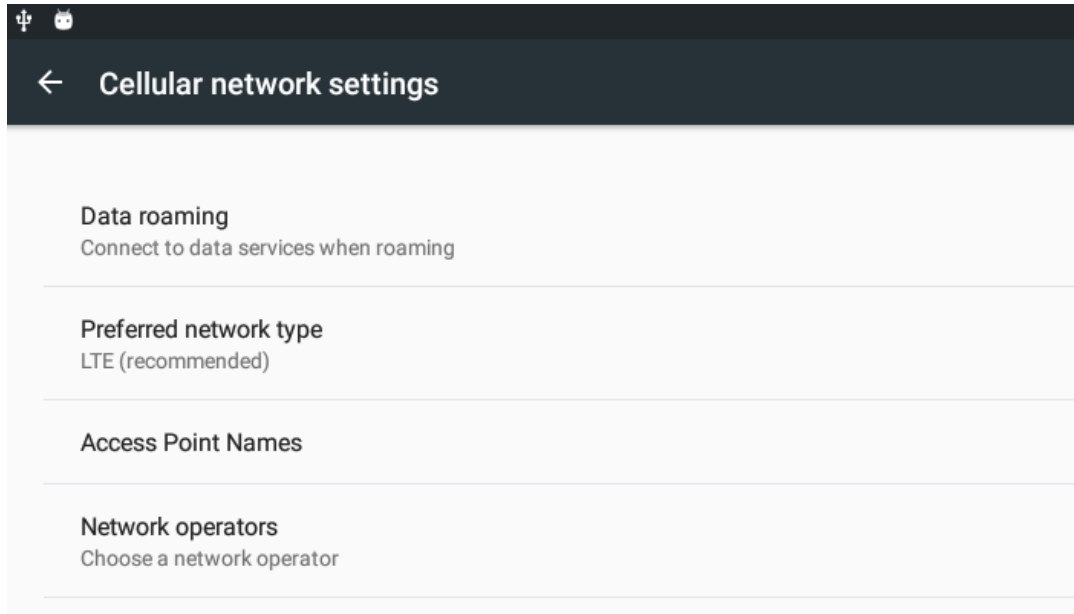


2. Click any available devices to pair with.
3. After pairing successfully you can communicate with that device.

### 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.





### 3.9.4 Ethernet

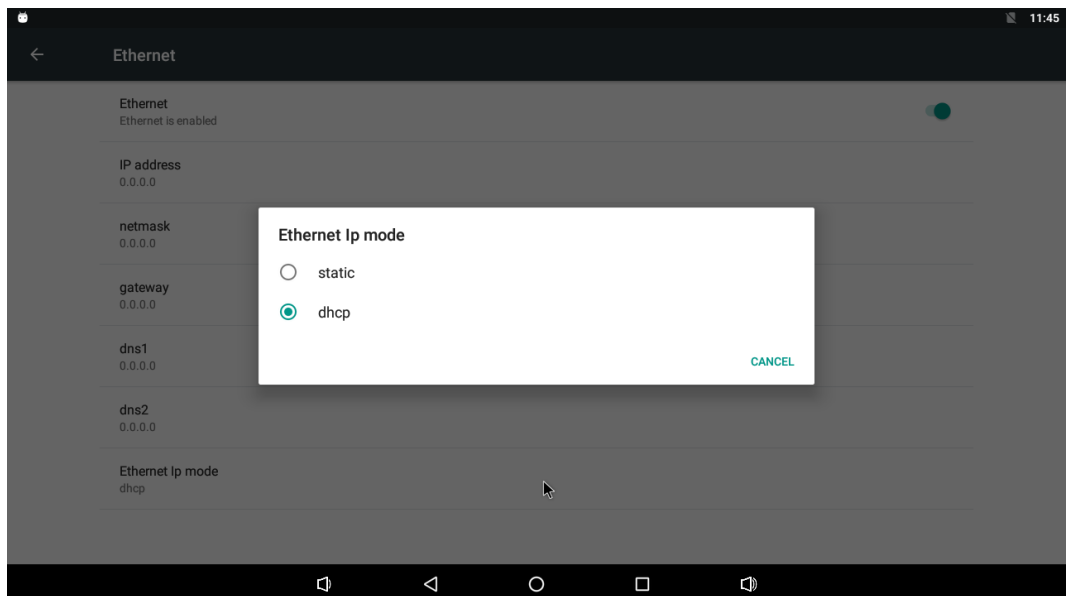
EPC-R3710 supports two Ethernet (eth0 and eth1), but Android only supports to config eth0 as follows:

#### Config eth0:

Click Settings Settings->More->Ethernet Configure Ethernet

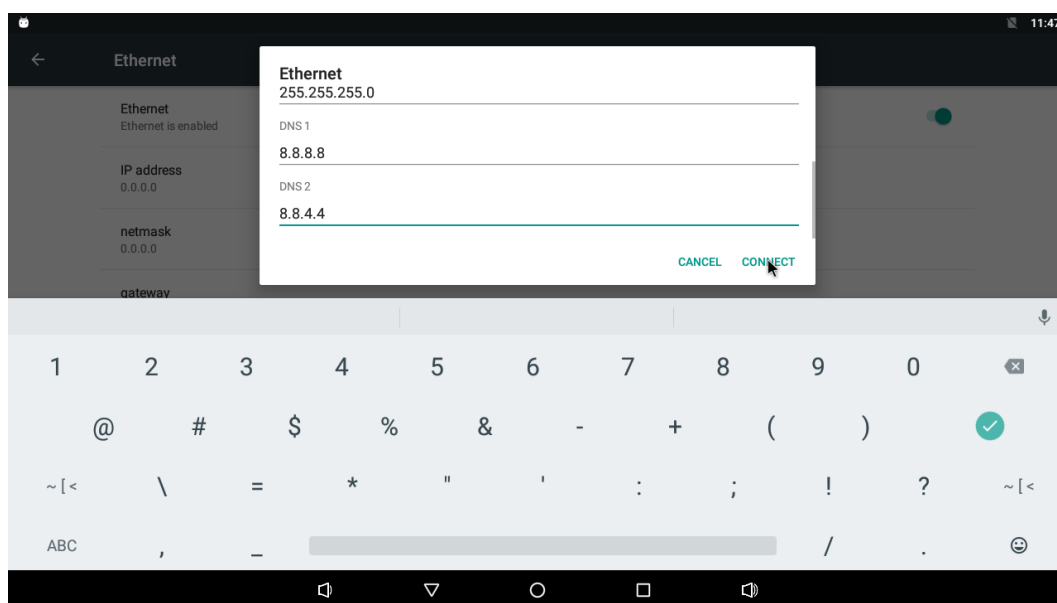
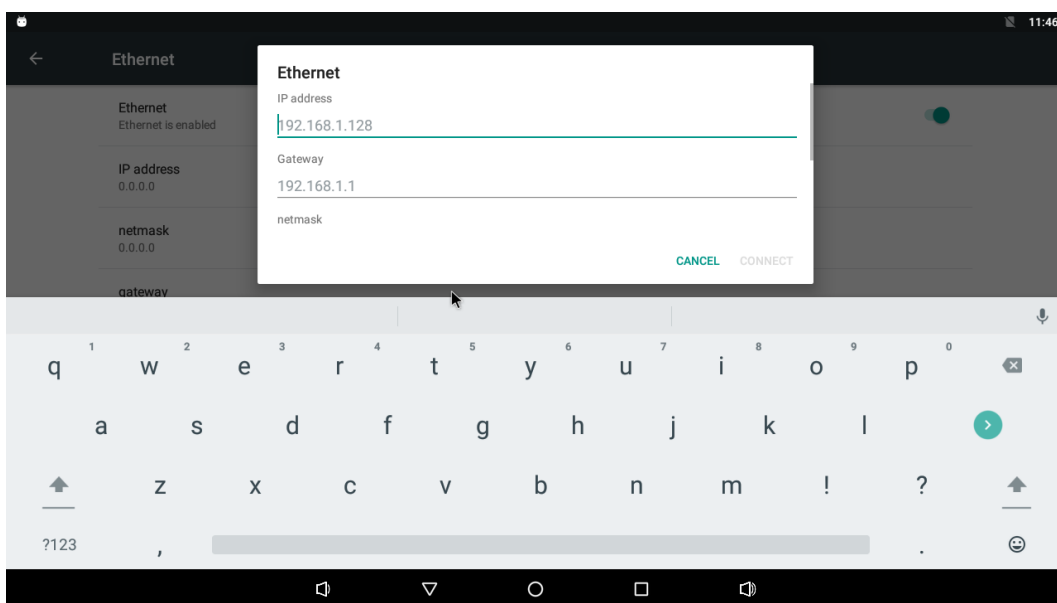
There are two of IP setting: DHCP IP and static IP.

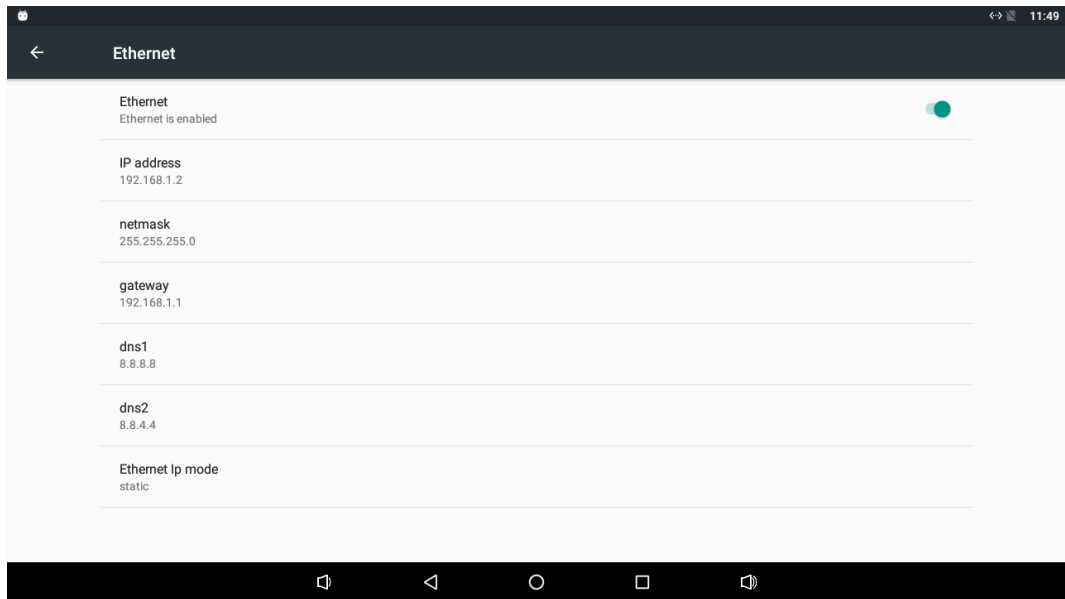
**DHCP IP** - The configuration is controlled by system.





**Static IP** - There are five fields that need to be filled in — the IP Address, netmask, gateway, dns1, and dns2.





### Config eth1:

Eth1 setting static ip example

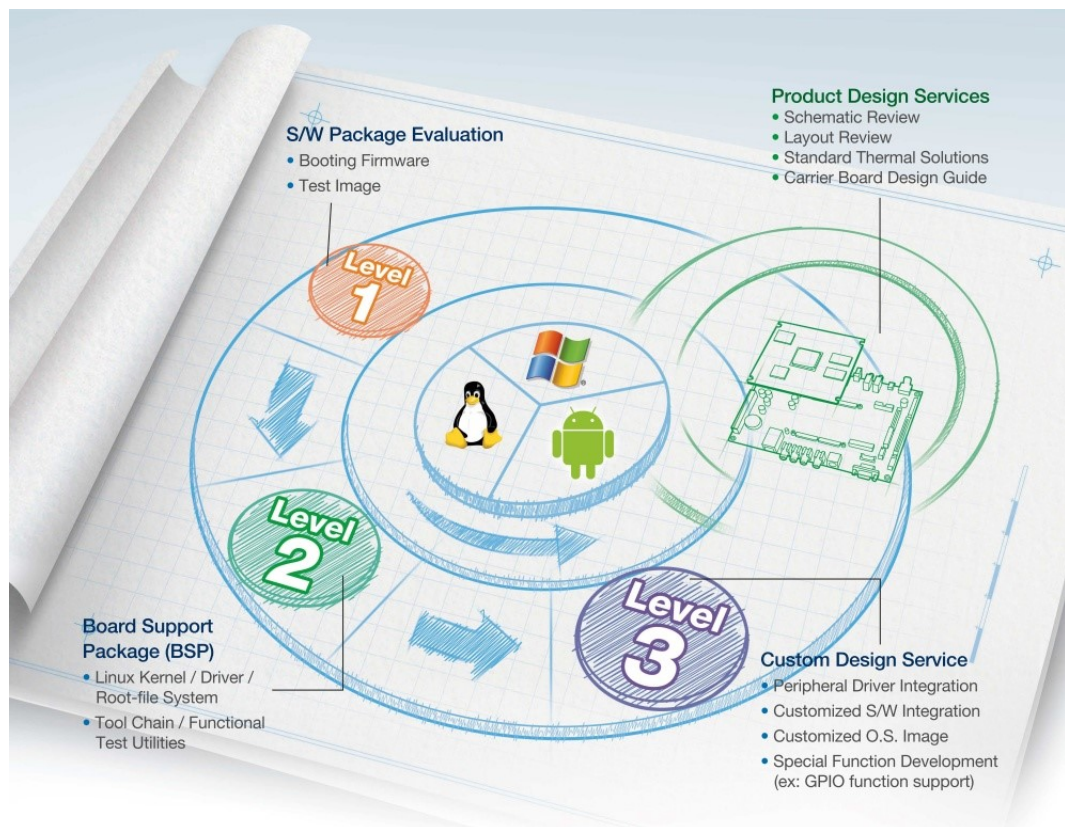
```
$ su  
# ip rule add from all lookup main pref 9999  
# ifconfig eth1 172.12.1.2 netmask 255.255.0.0
```

# Chapter 4

## Advantech Services

This chapter introduces Advantech design in services, technical support, and the warranty policy for the EPC-R3710 evaluation kit.

## 4.1 RISC Design-in Services



The following section details Advantech RISC Design-in Services.

### Easy Development

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

- Full Range of RISC Product Offerings
- Comprehensive Document Support

### Design Assistance Service

Advantech provides engineers with a schematic checklist and review services based on customer carrier board specifications. These services prevent design errors before they occur. This saves time and reduces the costs associated with 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 and/or customized thermal solutions — that quickly accommodate customers' designs.

- Standard thermal solutions
- Customized thermal solutions

### Embedded Software Services

This service provides support drivers, software integration/customized firmware, root file-system, and Linux image — enabling users to save time and focus on their core development.

- Embedded Linux/Android OS
- Advantech boot loader customization

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

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

### General I/O Design Capability

Users can typically perform vertical integration. However, lack of expertise and experience in general power and I/O design can cause challenges; especially when integrating CPU modules into carrier boards

### The Acquisition of Information

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

### Software Development and Modification

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

Addressing this, Advantech introduced Streamlined Design-in Support Services for RISC-based Computer on Modules (COM). With a dedicated professional design-in services team, Advantech actively participates in carrier board design and problem

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solving. Advantech's services not only enable customers to effectively distribute their resources, but also reduce R&D costs and hardware investment.

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

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

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

### **Planning Stage**

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

### **Design Stage**

Advantech will supply a reference carrier board design guide when a product moves into the design stage. The carrier board design guide provides pin definitions for the COM connectors with limitations and recommendations for carrier board design. This design guide gives customers clear guidelines during their carrier board development. Advantech offers a complete pin-out check list for different form factors such as Q7, ULP and RTX 2.0, enabling carrier board signals and layout design examination. Advantech's team helps customers review the placement/layout and schematics. This helps carrier board designs fulfill customers' requirements. Advantech's RISC software team assists in establishing an environment for software development while evaluating the time and resources needed. Advantech can also cooperate with third parties to provide proficient consulting services in software development. With Advantech's professional support, the design process is eased and product quality is improved; thus meeting customer targets.

### **Integration Stage**

This phase comprises HW/SW integration, application development, and peripheral module implementation. Due to the lack of knowledge and experience using platforms, customers need to spend time analyzing integration problems. In addition, peripheral module implementation is relevant to driver designs on carrier boards. RISC platforms usually have less support for ready-made drivers on carrier boards, therefore users need to learn by trial and error to get the best solution with the least

effort. Advantech's team has years of experience in customer support and HW/SW development. Advantech supports customers with professional advice and information — shortening development time and enabling effective product integration.

### Validation Stage

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

## 4.2 Contact Information

Below is the contact information for Advantech customer service.

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

Our service team is also reachable through this website and our technical support engineers provide quick responses once the forms are filled out:

[http://www.advantech.com.tw/contact/default.aspx?page=contact\\_form2&subject=Technical+Support](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 of 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

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and prompt global warranty service. Product defect in design, materials, and workmanship, are covered from the date of shipment.

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

All 3rd party products purchased separately will be covered by the original manufacturer's warranty and time period, and shall not exceed one year of coverage through Advantech.

#### **4.3.1.2 Repairs Under Warranty**

It is possible to obtain a replacement (Cross-Shipment) during the first 30 days of the purchase. Contact your original Advantech supplier to organize returns for Dead on Arrival (DOA) products (if the products were purchased directly from Advantech). The DOA cross-shipment excludes any damage incurred during shipping as well as customized and/or built-to-order products.

The return fee to an authorized Advantech repair facility for products found to be not DOA will be covered by the customer. The shipping fee for refurbished products from Advantech back to customers' sites will be covered by Advantech.

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

### **4.3.2 Repair Process**

#### **4.3.2.1 Obtaining an RMA Number**

All returns from customers must be authorized with an Advantech RMA (Return Merchandise Authorization) number. Any returns of defective units or parts without valid RMA numbers will not be accepted; they will be returned to the customer at the customer's expense 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 Advant-



ech's RMA website: <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 for customers to save time and meet end-user requirements by returning defective products to an authorized Advantech repair facility without an extra cross-region charge. Customers are required to contact their local repair center before seeking global repair services.

We recommend sending cards without accessories (manuals, cables, etc.). Remove any unnecessary components from the card, such as CPU, DRAM, and CF Card. If you return these parts (because you believe they may be part of the problem), please note their inclusion clearly. Otherwise, Advantech will not be responsible for any items not listed. Make sure the "Problem Description" is enclosed.

European Customers that are located outside European Union should 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 it to 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 expense if inappropriately packed.

We suggest the use of "Door-to-Door" transportation — such as Speed Post — otherwise, the sender will bear any additional charges incurred — such as clearance fees if air-cargo is adopted.

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

#### 4.3.2.3 Service Charges

The product will be 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 found.
- 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 lightning strike, flood, earthquake, etc.
- Product updates and tests upon the request of customers who are without warranty.

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

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

Before we start out-of-warranty repairs, we will send you a pro forma invoice (P/I) that lists 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. 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 details the result of the repair. A "Repair Analysis Report" is also provided to customers upon request. If the defect is not caused by Advantech design or manufacturing, customers will be charged US\$60 or US\$120 for in-warranty or out-of-warranty repair analysis reports respectively.

#### 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 awaiting 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 stay in proper contact with the customers 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. Per customer requirement, other express services can be adopted, such as UPS or FedEx. The customer must bear the extra costs accrued by alternative shipment. If you require any special arrangements, please indicate this when shipping the product to us.



**ADVANTECH**

*Enabling an Intelligent Planet*

**[www.advantech.com](http://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.

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