

User Manual

UBC-222

The Gateway Solution for IoT

ADVANTECH

Enabling an Intelligent Planet

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5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Declaration of Conformity

FCC Class B

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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- 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.
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 - Description of your software (operating system, version, application software, etc.)
 - A complete description of the problem
 - The exact wording of any error messages

Warnings, Cautions and Notes

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



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



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

Note! Notes provide optional additional information.



Packing List

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

- 1x UBC-222 unit with Wall mount bracket

Ordering Information

Model Number	Description
UBC-222NS-GLA1E	Intel Quark x1000 400MHz

Optional Accessories

Model Number	Description
XRISC-ADP-10HW-AG	USB power adapter 100-240V +5.35V 2A
1700025431-01	USB to DC-in cable
1700021565-01	Debug cable (DB-9 type)
SQF-ISDS1-2G-86E	SQFlash SD card SLC 2G (-40 ~ 85° C)

Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. **DO NOT COVER THE OPENINGS.**
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel:
 - The power cord or plug is damaged.
 - Liquid has penetrated into the equipment.
 - The equipment has been exposed to moisture.
 - The equipment does not work well, or you cannot get it to work according to the user's manual.
 - The equipment has been dropped and damaged.
 - The equipment has obvious signs of breakage.
15. **DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -20° C (-4° F) OR ABOVE 60° C (140° F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.**
16. **CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER, DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.**

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

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

Safety Precaution - Static Electricity

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

- To avoid electrical shock, always disconnect the power from your PC chassis before you work on it. Don't touch any components on the CPU card or other cards while the PC is on.
- Disconnect power before making any configuration changes. The sudden rush of power as you connect a jumper or install a card may damage sensitive electronic components.

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Chapter 1

General Introduction

This chapter gives background information on UBC-222 series.

1.1 Introduction

UBC-222 is a new generation embedded computing system based on Intel Quark X1000 processor technology. With fanless and optimized power design, wired/wireless connectivity, and highly integrated I/O for industrial automation, it's the most reliable and economical solution for your intelligent factory. UBC-222 comes equipped with a specially designed mounting bracket and optionally you can purchase a DIN rail or VESA mount. The palm-size box computer offers you a simple solution that can be easily installed in different applications. Supported with WISE-Agent, Yocto Linux and remote management tools for device control and monitoring, UBC-222 can help you create an innovative and smart automatic production line environment connected to the cloud.

1.2 Product Features

1.2.1 Key Features

- Intel® Quark x1000 400MHz processor
- Onboard DDR3-800 512MB memory
- Supports 1x RS-232/ 422/ 485 ports
- Supports 2 10/100 Ethernet ports
- Supports wallmount bracket for flexible mounting methods
- Low power and fanless design

1.2.2 General

- **CPU:** Onboard Intel Quark x1000 400MHz
- **OS:** Yocto Linux
- **System Memory:** Onboard 512MB DDR3 memory
- **COM Port:** 1 x RS-232/ 422/ 485
- **USB:** 1 x USB 2.0 Host
- 1 Green LED for the system power and 1 amber for user programming
- **SD slot:** 1 x SD Slot
- **Power input:** +5V DC

1.2.3 Ethernet

- 2 x 10/100 Ethernet ports
- **Speed:** 10/100 Mbps
- **Interface:** 2 x RJ-45 jack with LED

1.2.4 Power Consumption

- **Typical:** 1.90 Watts.
- **Max:** 1.97 Watts.

Test Condition:

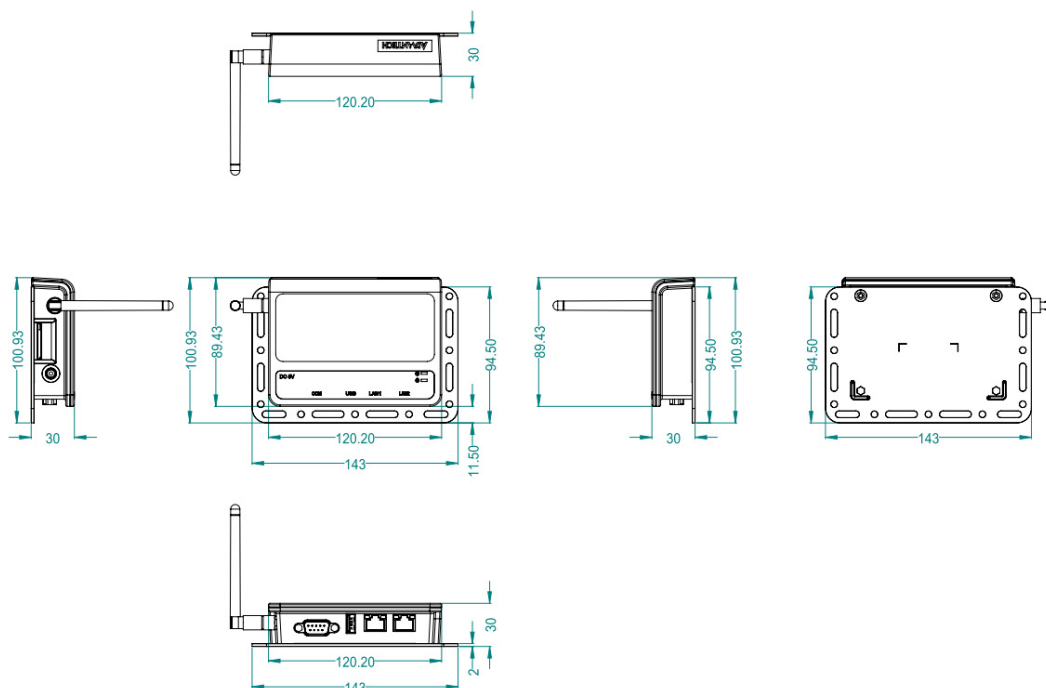
1. Test temperature: room temperature 25° C
2. Test voltage: rated voltage DC +5.0 V
3. Test loading:
Maximum load mode: running programs.
Idle mode: DUT power management off and no running any program.
4. OS: Linux kernel 3.8.7
5. Test software: QuarkPTU_Rev1.0

Input power		Measurement						Measure Point
		Max. load			Idle mode			
		V	A	W	V	A	W	
DCIN1	5.0V	4.987	0.395	1.970	4.988	0.382	1.905	DCJACK_2

1.3 Mechanical Specification

1.3.1 Dimensions

- 143 x 101 x 30 mm (L x W x H) with the metal plate
- 120 x 89 x 30 mm without metal plate



1.3.2 Weight

- 200 g (Net weight)

1.4 Power Requirements

1.4.1 System Power

- Power input: DC +5V

1.4.2 RTC Battery

- 3 V/240 mAh

1.5 Environment Specifications

1.5.1 Operating Temperature

- 0 ~ 60° C (32 ~ 140° F)

1.5.2 Relative Humidity

- 95% @ 40° C (non-condensing)

1.5.3 Storage Temperature

- -40 ~ 85° C (-40 ~ 185° F)

1.5.4 Vibration Loading during Operation

1 Gms, IEC 60068-2-64, random, 5 ~ 500 Hz, 1 Oct/min, 1 hr/axis.

1.5.5 EMC

- CE, FCC Class B

Chapter 2

Hardware Functionality

This chapter introduces external I/O and explains the setup procedures of the UBC-222 hardware.

2.1 Introduction

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

2.2 UBC-222 I/O Indication

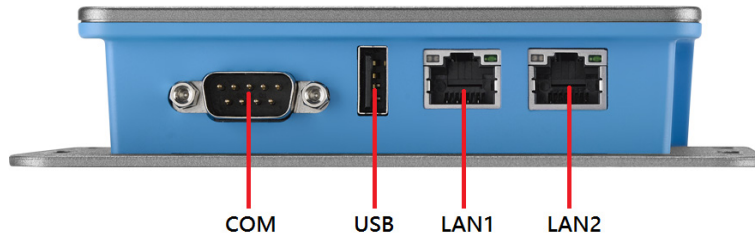


Figure 2.1 UBC-222 front view



Figure 2.2 UBC-222 LED indication



Figure 2.3 UBC-222 left side view

2.3 UBC-222 I/O Connectors

2.3.1 Power Input Connector

The UBC-222 comes with a DC-Jack header that carries +5V DC external power input. The power connector can be fixed by a fastener which is an optional accessory. The fastener avoids power cables falling off.



Figure 2.4 Power input connector

2.3.2 COM Connector

The UBC-222 provides one DB-9 connector for serial communication. The port can support RS-232/422/485 modes by jumper selection.

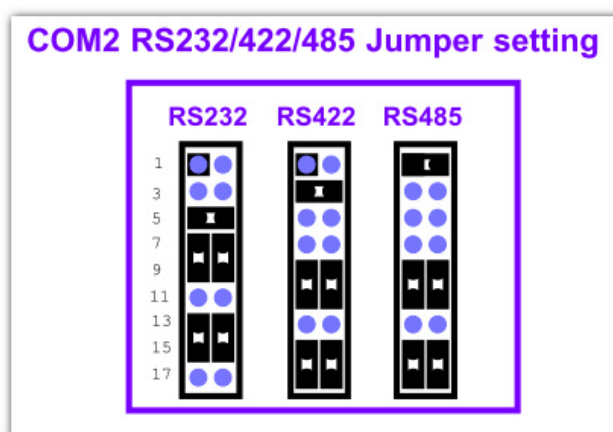


Figure 2.5 COM connector

Table 2.1: COM Connector Pin Assignment

RS-232			
Pin	Description	Pin	Description
1	DCD	2	SIN
3	SOU	4	DTR
5	GND	6	DSR
7	RIS	8	CTS
9	RI		
RS-422			
Pin	Description	Pin	Description
1	RS422_TX-	2	RS422_TX+
3	RS422_RX+	4	RS422_RX-
5	N/A	6	N/A
7	N/A	8	N/A
9	N/A		

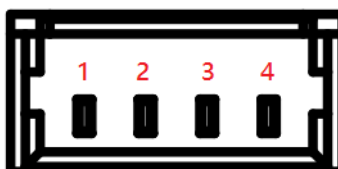
RS-485			
Pin	Description	Pin	Description
1	RS485-	2	RS485+
3	N/A	4	N/A
5	N/A	6	N/A
7	N/A	8	N/A
9	N/A		



2.3.3 Debug Console

Table 2.2: Debug Console Pin Assignment

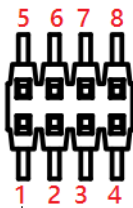
Pin	Description	Pin	Description
1	+3V3	2	Debug_TXD
3	Debug_RXD	4	GND



2.3.4 SPI

Table 2.3: SPI Pin Assignment

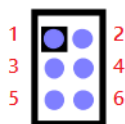
Pin	Description	Pin	Description
1	+3V3	2	+3V3
3	GND	4	LSPI_CS#
5	GND	6	LSPI_MISO
7	LSPI_SCK	8	LSPI_MOSI



2.3.5 GPIO

Table 2.4: GPIO Pin Assignment

Pin	Description	Pin	Description
1	GPI_0	2	GPO_0
3	GPI_1	4	GPO_1
5	GND	6	GND



2.3.6 Ethernet Connectors (LAN1 and LAN2)

The UBC-222 provides two RJ45 interface connectors. The Ethernet ports are fully compliant with IEEE 802.3x 10/100 and CSMA/CD protocol support. The Ethernet ports provides standard RJ-45 connector with LED indicators on the front side to show Speed/Active status.

LED: Left is speed (ON-100, OFF-10), Right is Active



Figure 2.6 Ethernet connector

2.3.7 USB Connector

The UBC-222 uses one USB interface connector that supports high-speed (480 Mbps), full-speed (12 Mbps), and low-speed (1.5 Mbps) operation.



Figure 2.7 USB connector

2.3.8 SD Connector

UBC-222 provides an SD slot. The SD card is essential for booting up the system and for storage as UBC-222 has no onboard storage.



Figure 2.8 SD connector

Note! It is recommended to use only "Transcend and Sandisk" SD Cards which Advantech has verified.



2.4 UBC-222 Hardware Installation

2.4.1 SD Card Installation

1. Remove the power cord.
2. Insert the SD Card directly into UBC-222 from the left side SD slot.

2.4.2 Mini-PCle Card Installation

1. Unscrew the two screws on the bottom of the case.

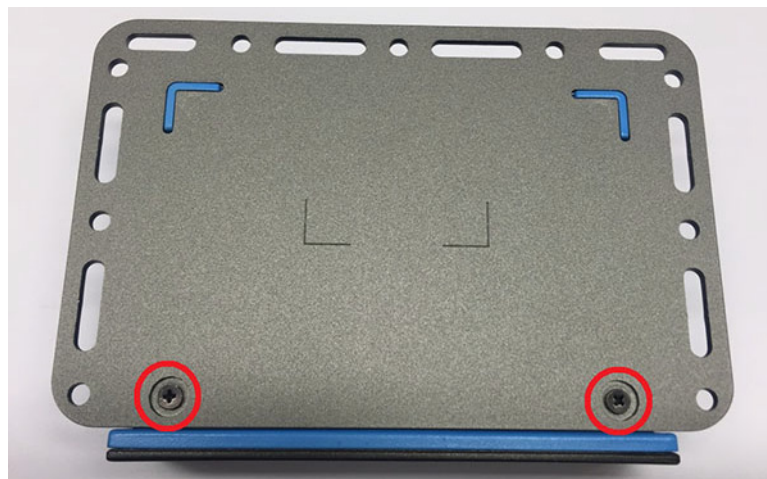


Figure 2.9 Unscrew the two screws

2. Open the top cover.



Figure 2.10 Open the top cover

3. Install your mini-PCIe card, close the top cover and put back the two screws on the bottom of the case.

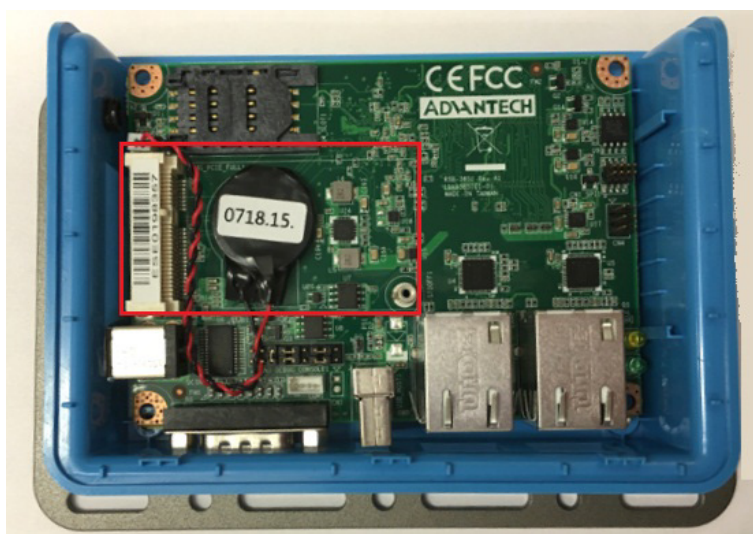


Figure 2.11 Install mini-PCIe card

2.4.3 Console Installation

To install the console cable you must:

1. Unscrew the two screws on the bottom of the case.
2. Open the top cover.
3. Install the console cable, close the top cover and put back the two screws on the bottom of the case as shown in Figure 2.12.

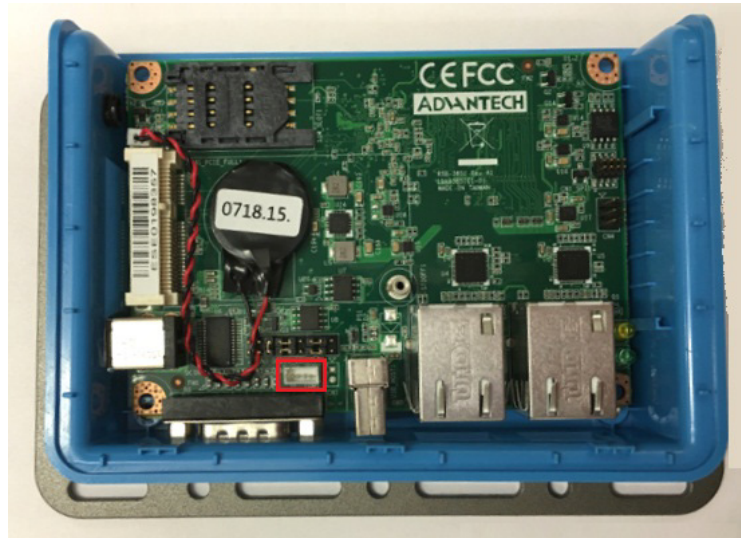


Figure 2.12 Console Installation

2.4.4 Mounting Assembly method

The UBC-222 supports flexible wall mounting holes so you can easily fix UBC-222 onto the wall. It also supports a DIN-rail kit (optional) for users who need to mount UBC-222 onto a 35mm DIN-rail.

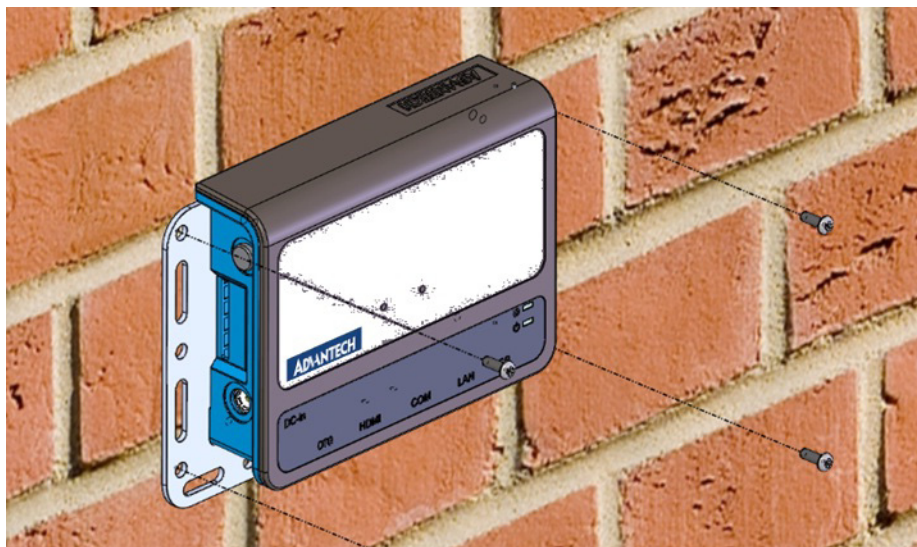


Figure 2.13 Wall mount installation

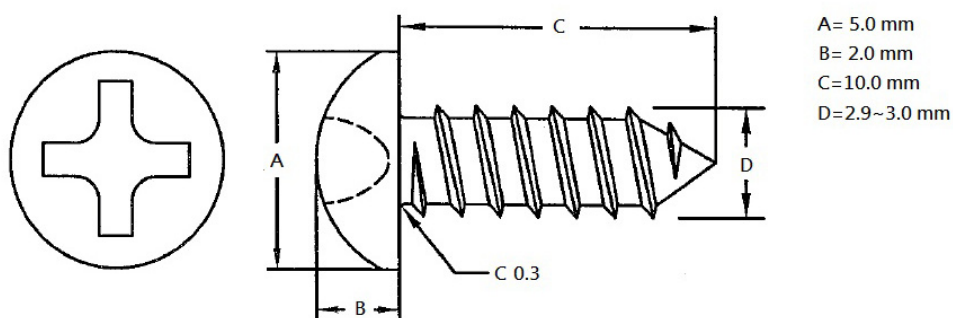


Figure 2.14 Drawing of mating screw

Part Number	Description	Quantity
1930000721	1/4R/S D=5.5 H=2.0 + T3*10 ST Zn	4

Figure 2.15 Mating screws for wall mounting

Chapter 3

Software Functionality

This chapter details the software operating on UBC-222.

3.1 Getting Started and Customization

3.1.1 Getting Started

3.1.1.1 Prerequisites

To install Docker Engine on your platform

Please refer to Docker Installation Guide for details:

<https://docs.docker.com/engine/installation/>

To pull ubuntu 12.04 image from Docker Hub & run the image

```
$ docker pull advrisc/u12.04-quarklbv2
$ docker run --name quarkLBV2011 -it advrisc/u12.04-
quarklbv2 /bin/bash
```

To copy BSP from local filesystem to the container

```
$ docker cp ${BSP_PACK} quarkLBV2011:/home/adv/
```

To copy files from the container's filesystem to local machine

```
$ docker cp quarkLBV2011:/home/adv/${BSP_HOME}/${BDIR}/tmp/
deploy/images/quark ~
```

3.1.1.2 Conventions

`${BOARD_ID}`: board ID

e.g. ubc222 or ubc221

`${IMAGE_PACK}`: prebuilt image pack

e.g. ubc222 or ubc221

`${IMAGE_DIR}`: the directory prebuilt image pack extracted to

e.g. ~/U222LIV2011_quark_2016-01-29

`${BSP_PACK}`: BSP pack

e.g. U222LIV2011_quark_2016-01-29.zip

`${BSP_HOME}`: the directory BSP pack extracted to

e.g. ~/LBV2011/meta-clanton_v1.2.0

`${BDIR}`: build directory

e.g. yocto_build

`${SD_MOUNT}`: mount point of SD card in Ubuntu

e.g. /media/sdf1

`${POKY}`: Yocto poky version

e.g. 1.7.2

debug console / serial console

serial terminal program (e.g. minicom, putty, teraterm ...) that serial port is configured to 115200 8N1 terminal console

terminal console

terminal program (e.g. gnome-terminal, xfce4-terminal ...)

3.1.1.3 Introducing the BSP

The BSP is based on Yocto Project with Intel enhanced features for Quark, plus specific target board features from Advantech Inc.

Naming Rule

The BSP/prebuilt image pack name is consist of the model name followed by "LB" or "LI" plus version number and released date.

For example, U222LIV2011_quark_2016-01-29.zip which "U221" stands for UBC-222, "LB" is acronym of Yocto Linux BSP, "V2011" stands for Version 2.011.

For example, U222LIV2011_quark_2016-01-29.zip which "LI" is acronym for prebuilt Linux Image.

BSP pack

Unpack BSP pack to home directory by performing the following command:

```
$ unzip ${BSP_PACK} -d ~/
```

The description of some important folders list below:

sources/

meta-advantech/: meta layer by Advantech

meta-intel/: meta layer by Intel

meta-clanton-*/: meta layer by Intel

setup.sh: to create one new build environment

Prebuilt image pack

Perform the following command to unpack prebuilt-image-pack to home directory.

```
$ unzip ${PREBUILT_IMAGE_PACK} -d ~/
```

Prepare one FAT32 formatted SD card, and mount it to mount point.

```
$ cp -a ${PREBUILT_IMAGE_DIR}/sdcard/* ${SD_MOUNT}/
```

3.1.1.4 Build Instructions

To create a new build environment

Perform the following commands in terminal console

```
$ cd ${BSP_HOME}
```

```
$ ./setup.sh
```

```
$ BOARD=${BOARD_ID} source ./oe-init-build-env ${BDIR}
```

To continue an existing build environment

Perform the following commands in terminal console

```
$ cd ${BSP_HOME}
$ BOARD=${BOARD_ID} source ./oe-init-build-env
```

To build all image files

1. To create/continue a build environment
2. Perform the following commands in the terminal console

```
$ bitbake image-full
```
3. The following files will be located in directory `"/tmp/ deploy/ images/ quark"` while building process finished successfully.

```
boot/grub/grub.conf
bzImage
core-image-minimal-initramfs-quark.cpio.gz
grub.efi
image-full-quark.ext3
```

To build a toolchain installer

1. To create/continue a build environment
2. Perform the following command in the terminal console

```
$ bitbake image-full -c populate_sdk
```
3. The installer, `iot-devkit-glibc-x86_64-image-full-i586-toolchain-${POKY}.sh`, will be located in the directory `"/tmp/ deploy/ sdk"`.

To build grub individually

1. To create/continue a build environment
2. Perform the following command in the terminal console

```
$ bitbake grub
```
3. The file, `grub.efi`, will be located in directory, `./tmp/ deploy/ images/ quark`.

To build linux kernel individually

1. To create/continue a build environment
2. Perform the following command in the terminal console
 - A.to show up menuconfig

```
$ bitbake linux-yocto-quark -c menuconfig
```
 - B.to do build

```
$ bitbake linux-yocto-quark
```
3. The file, `bzImage`, will be located in directory, `./tmp/ deploy/ images/ quark`.

To build initramfs individually

1. To create/continue a build environment
2. Perform the following command in terminal console

```
$ bitbake core-image-minimal-initramfs
```
3. The file, `core-image-minimal-initramfs-quark.cpio.gz`, will be located in directory, `./tmp/ deploy/ images/ quark`.

3.1.2 Debug Port Setting

UBC-222 can communicate with a host server (Windows or Linux) by using serial cables. Common serial communication programs such as HyperTerminal, Tera Term or PuTTY can be used in this case. The example as below describes the serial terminal setup using HyperTerminal on a Windows host:

1. Connect UBC-222 with your Windows PC by using a debug cable. (optional accessory, 1700021565-01)
2. Open HyperTerminal on your Windows PC, and select the settings as shown in Figure 3.1.

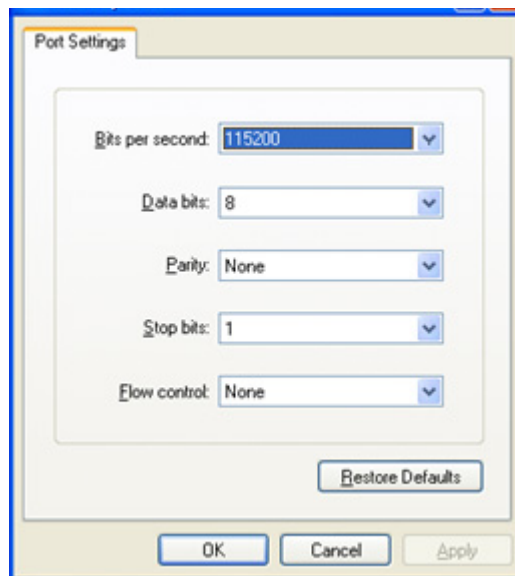


Figure 3.1 Debug port setting

3. After the bootloader is programmed into the SD card, power on UBC-222 by inserting the power adapter cord. The bootloader prompt will be displayed on the terminal screen.

3.1.3 Customization

3.1.3.1 Setting up SDK

1. Please follow the steps below to build a toolchain installer.
2. Perform the following command in the terminal console:


```
$ cd ${BSP_HOME}/${BDIR}/tmp/deploy/sdk
$ sudo ./clanton-tiny-uclibc-x86_64-i586-toolchain-${POKY}.sh
```
3. Enter directory or press Enter when the following question appears:

```
Enter target directory for SDK (default: /opt/clanton-tiny/1.4.2):
```

4. Just press Enter when the following question shows up:

```
You are about to install the SDK to "/opt/clanton-tiny/1.4.2". Proceed[Y/n]?
```

5. When the following message shows up it means the SDK is ready.

```
Extracting SDK...done  
Setting it up...done  
SDK has been successfully set up and is ready to be used.
```

3.1.3.2 Setting up a cross compiling environment

1. SDK has been set up. (ref. 2.2)
2. Perform the following command in the terminal console

```
$ source /opt/clanton-tiny/${POKY}/environment-setup-i586-poky-linux-uclibc
```

3.2 Test tools

All test tools must be verified on UBC-222, please prepare the required test fixtures before verifying each specified I/O. If you have any problems getting the test fixture, please contact your Advantech contact window for help.

3.2.1 GPIO

```
# cat /sys/kernel/debug/gpio  
# for N in 0 1 2 3; do echo $N > /sys/class/gpio/export 2>/dev/  
null; done  
# for N in 0 1; do echo out>/sys/class/gpio/gpio${N}/direction;  
done  
# for N in 2 3; do echo in > /sys/class/gpio/gpio${N}/direc-  
tion; done  
# grep "" /sys/class/gpio/gpio{0..3}/direction  
# cat /sys/kernel/debug/gpio
```

```

root@quark:~# cat /sys/kernel/debug/gpio
GPIOs 0-7, platform/sch_gpio.2398, sch_gpio.2398:
gpio-0 (sysfs) out hi
gpio-1 (sysfs) out lo
gpio-2 (sysfs) in lo
gpio-3 (sysfs) in hi

GPIOs 8-15, intel_qrk_gip_gpio:
gpio-8 (SPI_CS) out hi
root@quark:~# for N in 0 1 2 3; do echo $N > /sys/class/gpio/export 2>/dev/null; done
root@quark:~# for N in 0 1; do echo out>/sys/class/gpio/gpio${N}/direction; done
root@quark:~# for N in 2 3; do echo in > /sys/class/gpio/gpio${N}/direction; done
root@quark:~# grep "" /sys/class/gpio/gpio{0..3}/direction
/sys/class/gpio/gpio0/direction:out
/sys/class/gpio/gpio1/direction:out
/sys/class/gpio/gpio2/direction:in
/sys/class/gpio/gpio3/direction:in
root@quark:~# cat /sys/kernel/debug/gpio
GPIOs 0-7, platform/sch_gpio.2398, sch_gpio.2398:
gpio-0 (sysfs) out lo
gpio-1 (sysfs) out lo
gpio-2 (sysfs) in lo
gpio-3 (sysfs) in lo

GPIOs 8-15, intel_qrk_gip_gpio:
gpio-8 (SPI_CS) out hi

```

3.2.1.1 Connecting #0 and #3

```

cd /sys/class/gpio; \
echo 0 > gpio0/value; grep "" gpio{0,3}/value; \
echo 1 > gpio0/value; grep "" gpio{0,3}/value; cd -

```

```

root@quark:~# cd /sys/class/gpio; \
> echo 0 > gpio0/value; grep "" gpio{0,3}/value; \
> echo 1 > gpio0/value; grep "" gpio{0,3}/value; cd -
gpio0/value:0
gpio3/value:0
gpio0/value:1
gpio3/value:1

```

3.2.1.2 Connecting #1 and #2

```

cd /sys/class/gpio; \
echo 0 > gpio1/value; grep "" gpio{1,2}/value; \
echo 1 > gpio1/value; grep "" gpio{1,2}/value; cd -

```

```

root@quark:~# cd /sys/class/gpio; \
> echo 0 > gpio1/value; grep "" gpio{1,2}/value; \
> echo 1 > gpio1/value; grep "" gpio{1,2}/value; cd -
gpio1/value:0
gpio2/value:0
gpio1/value:1
gpio2/value:1
/home/root

```

3.2.2 UART

3.2.2.1 RS-232 Loop-back (Pin 2 to Pin 3)

```
# stty -F /dev/ttyS0 -echo; cat /dev/ttyS0 &
# echo "1234567890" > /dev/ttyS0; killall cat
```

```
1016_1103 $ stty -F /dev/ttyS0 -echo; cat /dev/ttyS0 &
[1] 295
1016_1103 $ echo "1234567890" > /dev/ttyS0; killall cat
1234567890

[1]+  Terminated                  cat /dev/ttyS0
```

3.2.2.2 RS-422 Loop-back (Pin1 to Pin4; Pin 2 to Pin 3)

```
# stty -F /dev/ttyS0 -echo; cat /dev/ttyS0 &
# echo "1234567890" > /dev/ttyS0; killall cat
```

3.2.2.3 RS-485 connected with PC/USB-to-Serial/ADAM 4520 RS232-to-RS485 UBC-222 to PC (Ubuntu 12.04)

```
$ sudo stty -F /dev/ttyUSB1 speed 115200 raw -crtcts -echo
$ sudo cat /dev/ttyUSB1
```

UBC-222

```
# stty -F /dev/ttyS0 speed 115200 raw -crtcts -echo
# for I in `seq 0 9`; do echo $I:1234567890 > /dev/ttyS0; done
```

PC to UBC-222

```
# stty -F /dev/ttyS0 speed 115200 raw -crtcts -echo
# cat /dev/ttyS0
```

PC (Ubuntu 12.04)

```
$ sudo stty -F /dev/ttyUSB1 speed 115200 raw -crtcts -echo
$ sudo sh -c 'for I in `seq 0 9`; do sudo echo $I:1234567890 > /dev/ttyUSB1; done'
```

3.2.3 LED

```
# D=/sys/class/gpio; echo 15 > $D/export
# D=/sys/class/gpio/gpio15; echo "out" > $D/direction
```

3.2.3.1 LED on

```
# echo 1 > $D/value
```

3.2.3.2 LED off

```
# echo 0 > $D/value
```

3.2.3.3 Blink

```
# while :;do N=$((N+1)%2); echo $N > $D/value; usleep 100000; done
```


3.2.4 Wifi

Using Intel wifi card for example:

Intel Centrino Wireless-N 135

Model:135BNHMW

Set wifi ssid to environment variable, SSID.

Set wifi password to environment variable, PSWD.

```
# SSID={ssid here}
# PSWD= {password here}
# wifi_connect.sh "${SSID}" "${PSWD}"
# DEV=wlan0
# SVC=$(P=`connmanctl services | grep "$SSID"` && echo -n
  wifi_${P#*wifi_})
# set - `connmanctl services $SVC | grep "Nameservers ="`
# DNS=${4/,/}
# ping -c5 $DNS -I $DEV
```

```
root@quark:~# SSID="ESSD Testing"
root@quark:~# PSWD=adv27927818
root@quark:~# wifi_connect.sh "${SSID}" "${PSWD}"
** space char detected **
Scanning WiFi...done
Checking available service...found
[ 52.747137] wlan0: authenticate with 78:44:76:d8:11:a8
[ 52.767891] wlan0: send auth to 78:44:76:d8:11:a8 (try 1/3)
[ 52.780522] wlan0: authenticated
[ 52.791289] wlan0: associate with 78:44:76:d8:11:a8 (try 1/3)
[ 52.807852] wlan0: RX AssocResp from 78:44:76:d8:11:a8 (capab=0xc11 status=0 aid=4)
[ 52.824917] wlan0: associated
[ 52.828233] IPv6: ADDRCONF(NETDEV_CHANGE): wlan0: link becomes ready

Connected wifi_0cd29257bc19_455353442054657374696e67_managed_psk
root@quark:~#
root@quark:~# DEV=wlan0
root@quark:~# SVC=$(P=`connmanctl services | grep "$SSID"` && echo -n wifi_${P#*wifi_})
root@quark:~# set - `connmanctl services $SVC | grep "Nameservers ="`
root@quark:~# DNS=${4/,/}
root@quark:~# ping -c5 $DNS -I $DEV
PING 168.95.1.1 (168.95.1.1): 56 data bytes
64 bytes from 168.95.1.1: seq=0 ttl=246 time=29.138 ms
64 bytes from 168.95.1.1: seq=1 ttl=246 time=25.114 ms
64 bytes from 168.95.1.1: seq=2 ttl=246 time=32.899 ms
64 bytes from 168.95.1.1: seq=3 ttl=246 time=67.309 ms
64 bytes from 168.95.1.1: seq=4 ttl=246 time=7.968 ms

--- 168.95.1.1 ping statistics ---
5 packets transmitted, 5 packets received, 0% packet loss
round-trip min/avg/max = 7.968/32.485/67.309 ms
```

3.2.5 LAN

Make sure the DHCP service works in the connected LAN.

Remove network connection from both of the two LAN ports.

```
# DEV=eth0 # or eth1
# MAC=$(set - `ifconfig $DEV | grep HWaddr`; echo ${5~~} | sed
"s://g")
# set - $(connmanctl services | grep $MAC)
# SVC=$3
# set - `connmanctl services $SVC | grep "Nameservers ="`
# DNS=${4/,/}
# ping -c5 $DNS -I $DEV
```

```
root@quark:~# DEV=eth0 # or eth1
root@quark:~# MAC=$(set - `ifconfig $DEV | grep HWaddr`; echo ${5~~} | sed "s://g")
root@quark:~# set - $(connmanctl services | grep $MAC)
root@quark:~# SVC=$3
root@quark:~# set - `connmanctl services $SVC | grep "Nameservers ="`
root@quark:~# DNS=${4/,/}
root@quark:~# ping -c5 $DNS -I $DEV
PING 172.22.2.100 (172.22.2.100): 56 data bytes
64 bytes from 172.22.2.100: seq=0 ttl=127 time=400.794 ms
64 bytes from 172.22.2.100: seq=1 ttl=127 time=1159.124 ms
64 bytes from 172.22.2.100: seq=2 ttl=127 time=159.002 ms
64 bytes from 172.22.2.100: seq=3 ttl=127 time=801.840 ms
64 bytes from 172.22.2.100: seq=4 ttl=127 time=1500.059 ms

--- 172.22.2.100 ping statistics ---
5 packets transmitted, 5 packets received, 0% packet loss
round-trip min/avg/max = 159.002/804.163/1500.059 ms
```

3.2.6 USB

```
# dd if=/dev/urandom of=/PTN bs=1024 count=1
# dd if=/PTN of=/dev/sda bs=1024 count=1 seek=4
# dd if=/dev/sda of=/READ bs=1024 count=1 skip=4
# diff /READ /PTN && echo "correct" || echo "incorrect"
```

```
root@quark:~# dd if=/dev/urandom of=/PTN bs=1024 count=1
1+0 records in
1+0 records out
root@quark:~# dd if=/PTN of=/dev/sda bs=1024 count=1 seek=4
[ 3937.003122] sd 1:0:0:0: [sda] No Caching mode page found
[ 3937.008568] sd 1:0:0:0: [sda] Assuming drive cache: write through
[ 3937.023594] sda: sda1
1+0 records in
1+0 records out
root@quark:~# dd if=/dev/sda of=/READ bs=1024 count=1 skip=4
1+0 records in
1+0 records out
root@quark:~# diff /READ /PTN && echo "correct" || echo "incorrect"
correct
```

3.2.7 3G

The compatible 3G module is EWM-C106FT01E, please use this module to do below verification.

```
# ll /dev/ttyU*
```

```
root@quark:/tools# ll /dev/ttyUSB*
crw-rw----  1 root    dialout  188,  0 Jan 26 05:40 /dev/ttyUSB0
crw-rw----  1 root    dialout  188,  1 Jan 26 05:40 /dev/ttyUSB1
crw-rw----  1 root    dialout  188,  2 Jan 26 05:40 /dev/ttyUSB2
```

```
# ifconfig eth0 down; ifconfig eth1 down
# pppd connect 'chat -v -s -t 10 "" "AT" "" "ATDT*99#" "CONNECT" ""' \
user username password password /dev/ttyUSB2 460800 nodetach
crtscrts \
debug usepeerdns defaultroute &
# ifconfig
```

```
sent [IPCP ConfReq id=0x24 <addr 111.70.126.19> <ms-dns1 168.95.1.1> <ms-dns2 168.95.192.1>]
rcvd [IPCP ConfAck id=0x24 <addr 111.70.126.19> <ms-dns1 168.95.1.1> <ms-dns2 168.95.192.1>]
Could not determine remote IP address: defaulting to 10.64.64.64
local IP address 111.70.126.19
remote IP address 10.64.64.64
primary DNS address 168.95.1.1
secondary DNS address 168.95.192.1
Script /etc/ppp/ip-up started (pid 327)
Script /etc/ppp/ip-up finished (pid 327), status = 0x0

root@quark:/tools# ifconfig
lo          Link encap:Local Loopback
            inet addr:127.0.0.1  Mask:255.0.0.0
            inet6 addr: ::1/128 Scope:Host
            UP LOOPBACK RUNNING MTU:65536 Metric:1
            RX packets:168 errors:0 dropped:0 overruns:0 frame:0
            TX packets:168 errors:0 dropped:0 overruns:0 carrier:0
            collisions:0 txqueuelen:0
            RX bytes:12856 (12.5 KiB)  TX bytes:12856 (12.5 KiB)

ppp0       Link encap:Point-to-Point Protocol
            inet addr:111.70.126.19 P-t-P:10.64.64.64  Mask:255.255.255.255
            UP POINTOPOINT RUNNING NOARP MULTICAST MTU:1500 Metric:1
            RX packets:39 errors:0 dropped:0 overruns:0 frame:0
            TX packets:42 errors:0 dropped:0 overruns:0 carrier:0
            collisions:0 txqueuelen:3
            RX bytes:1074 (1.0 KiB)  TX bytes:2055 (2.0 KiB)
```

```
# cat /etc/resolv.conf
# ping -c5 8.8.8.8
```

```
root@quark:~# cat /etc/resolv.conf
# This file is managed by systemd-resolved(8). Do not edit.
#
# Third party programs must not access this file directly, but
# only through the symlink at /etc/resolv.conf. To manage
# resolv.conf(5) in a different way, replace the symlink by a
# static file or a different symlink.

nameserver 8.8.8.8
nameserver 8.8.4.4
nameserver 2001:4860:4860::8888
# Too many DNS servers configured, the following entries may be ignored.
nameserver 2001:4860:4860::8844
root@quark:~# ping -c5 8.8.8.8
PING 8.8.8.8 (8.8.8.8): 56 data bytes
64 bytes from 8.8.8.8: seq=0 ttl=47 time=1678.253 ms
64 bytes from 8.8.8.8: seq=1 ttl=47 time=997.772 ms
64 bytes from 8.8.8.8: seq=2 ttl=47 time=457.302 ms
64 bytes from 8.8.8.8: seq=3 ttl=47 time=386.656 ms
64 bytes from 8.8.8.8: seq=4 ttl=47 time=376.381 ms

--- 8.8.8.8 ping statistics ---
5 packets transmitted, 5 packets received, 0% packet loss
round-trip min/avg/max = 376.381/779.272/1678.253 ms
```

Chapter 4

Advantech Services

This chapter introduces Advantech design in serviceability, technical support and warranty policy.

4.1 Contact Information

Below is the contact information for Advantech customer service.

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

You can also reach our service team through the 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

4.2 Technical Support and Assistance

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

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

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

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

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

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

4.3 Global Service Policy

4.3.1 Warranty Policy

Below is the warranty policy of Advantech products:

4.3.2 Warranty Period

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

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

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

4.3.3 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 to arrange DOA replacement if the products were purchased directly from ADVANTECH and the product is DOA (Dead-on-Arrival). The DOA Cross-Shipment excludes any shipping damage, customized and/or build-to-order products.

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

4.3.4 Exclusions from Warranty

The product is excluded from warranty if:

- The product has been found to be defective after expiry of the warranty period.
- Warranty has been voided by removal or alternation of product or part identification labels.
- The product has been misused, abused, or subjected to unauthorized disassembly/modification; placed in an unsuitable physical or operating environment; improperly maintained by the customer; or failure caused which ADVANTECH is not responsible for, 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/upgrades and tests upon the request of customers who are without warranty.

4.4 Repair Process

4.4.1 Obtaining an RMA Number

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

An RMA number is only an authorization for returning a product; it is not an approval for repair or replacement. When requesting an RMA number, please access ADVANTECH's RMA web site: <http://erma.ADVANTECH.com.tw> with an authorized user ID and password.

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

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.

4.4.2 Returning the Product for Repair

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

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

European Customers that are located outside European Community are requested to use UPS as the forwarding company. We strongly recommend adding a packing list to all shipments. Please prepare a shipment invoice according to the following guidelines to decrease goods clearance time:

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

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

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

Door-to-Door transportation such as speed post is recommended for delivery, otherwise, the sender should bear additional charges such as clearance fees if Air-Cargo is adopted.

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

4.4.3 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 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) 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.

4.4.4 Repair Report

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

4.4.5 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.

4.4.6 Shipping Back 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, 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.

ADVANTECH

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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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