# User Manual

# APAX-5580

## High Performance DIN-Rail PC Controller w/ 2xGbE, 2 x mPCIe, 4 x USB, VGA

**ADVANTECH**

*Enabling an Intelligent Planet*

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# Product Warranty (2 years)

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

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

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

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

1.  Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.

2.  Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.

3.  If your product is diagnosed as defective, obtain an RMA (return merchandize authorization) number from your dealer. This allows us to process your return more quickly.

4.  Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.

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

# Declaration of Conformity

### CE

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. This kind of cable is available from Advantech. Please contact your local supplier for ordering information.

### FCC Class A

Note: This equipment has been tested and found to comply with the limits for a Class A 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.

# Technical Support and Assistance

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

# 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.

# 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:
15. The power cord or plug is damaged.
16. Liquid has penetrated into the equipment.
17. The equipment has been exposed to moisture.
18. The equipment does not work well, or you cannot get it to work according to the user's manual.
19. The equipment has been dropped and damaged.
20. The equipment has obvious signs of breakage.
21. 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.
22. 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.
23. ATTENTION: Danger d'explosion si la batterie est mal REMPLACE. REMPLACER UNIQUEMENT PAR LE MEME TYPE OU EQUIVALENT RECOMMANDÉ PAR LE FABRICANT, jeter les piles usagées SELON LES INSTRUCTIONS DU FABRICANT.
24. 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.

# Contents

# Chapter 1

## Overview

This chapter provides an overview of APAX-5580 specifications.
Sections include:

- Introduction
- Hardware specification
- Safety precautions
- Chassis dimensions

## 1.1 Introduction

The APAX-5580 is an embedded Application Ready Platform (ARP) that can shorten your development time and offers a wide array of networking interfaces to fulfill the extensive needs of different projects. APAX-5580 includes Intel's latest Core i7/i3/Celeron technology and provide rich interfaces including 1 x serial port, 2 x GbE LAN, 4 x USB ports and Audio. APAX-5580 supports VGA for various high resolution requirements and also Advantech latest iDoor technology.

The APAX-5580 can operate in wide temperatures (from -20 to 60°C). The APAX-5580 also uses Intel Core i7/i3/Celeron CPUs with great computing power and built-in up to 8G DDR3 RAM for heavy programs.

The APAX-5580 provides great expansion including 2 x Mini-PCIe and SIM card support. With these expansions APAX-5580 has great expandability from Wi-Fi, 3G, I/O expansion and industrial protocols with iDoor technology.

With multiple OS and driver support, such as Windows 7/8, WES7, and embedded Linux, users can integrate applications easily in an application ready platform that can provide versatile functions to fulfill diverse requirements.

## 1.2 Safety Precautions

The following sections tell how to make each connection. In most cases, you will simply need to connect a standard cable.

*Warning!*  Always disconnect the power cord from your chassis whenever you are working on it. Do not connect while the power is on. A sudden rush of power can damage sensitive electronic components. Only experienced electronics personnel should open the chassis.

*Warning!*  Toujours à la terre pour éliminer toute charge d'électricité statique avant toucher APAX-5580. Appareils électroniques modernes sont très sensibles à charges d'électricité statique. Utilisez un bracelet antistatique à tout moment. Placez tous composants électroniques sur une surface antistatique ou dans un statique-sac blindé.

*Caution!*  Always ground yourself to remove any static electric charge before touching APAX-5580. Modern electronic devices are very sensitive to static electric charges. Use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag.

*Caution!*  Toujours débrancher le cordon d'alimentation de votre boîtier lorsque vous êtes travailler. Ne branchez pas lorsque l'appareil est allumé. Un afflux soudain de puissance peut endommager les composants électroniques sensibles. Seulement connu personnel de l'électronique devraient ouvrir le châssis.

## 1.3 Accessories

Please refer below for the accessory list:

- mPCIe screws (Advantech P/N: 1935020300)
- 2 x PCS jumpers (Advantech P/N: 1653302122)
- Driver DVD
- Warranty card

If anything is missing or damaged, contact your distributor or sales representative immediately.

## 1.4 Product Specifications

### 1.4.1 APAX-5580 System Specifications

| CPU | APAX-5580-473AE: Intel Core i7 4650U 1.7GHz<br>APAX-5580-433AE: Intel Core i3 4010U 1.7GHz<br>APAX-5580-4C3AE: Intel Celeron 2980U 1.6GHz |
|---|---|
| Memory | 1 slot<br>4GB DDR3 SO-DIMM (Maximum to 8GB) |
| BIOS | AMI(UEFI) |
| Graphics | Intel HD Graphics 5000/4400 |
| Storage | 1x mSATA (for operation system)<br>1x SD slot (for data storage)<br>1x SD slot (for OS backup) |
| LAN | 1x Intel i210-IT GbE<br>1x Intel i218-LM GbE, support Intel AMT |
| USB | 2x USB2.0<br>2x USB3.0<br>1x USB2.0(internal) |
| Audio | Line Out |
| Display | 1x VGA (1920X1080@60Hz) |
| Serial Ports | 1x RS-232/422/485, DB9, 50~115.2kbps |
| LED Indicators | PWR, RUN, SATA, UPS, ERR, Over Temp.,Abnormal Volt, SYS Recovery |
| Watchdog Timer | Programmable 256 levels time internal for 1 to 255secs |
| Expansion Slot | 1x Full-size mPCIe slot<br>1x Half-size mPCIe slot |
| OS Support | Microsoft Windows 7/8, Linux Kernel 3.X |

## 1.4.2 Hardware Specifications

| | |
|---|---|
| Dimensions (W x D x H) | 128 x106 x110mm |
| Enclosure | Aluminum Housing |
| Mounting | DIN-Rail, Wall mount |
| Weight (Net) | 1.8kg (4.0lbs) |
| Power Requirement | $24V_{DC}\pm20\%$ |
| Power Consumption | 28W(Typical), 72W(Max) |
| Operation Temperature | -10~60°C |
| Storage Temperature | -40~85°C |
| Relative Humidity | 10~95%@40°C (non-condensing) |

# Chapter 2

## Hardware Functionality

This chapter shows how to setup the APAX-5580's hardware functions, including connecting peripherals, setting switches and indicators.

Sections include:

- Peripherals
- RS-232 Interface
- RS-422/485 Interface
- LAN / Ethernet Connector
- Power Connector
- Audio Connector
- USB Connector
- Reset Button

# 2.1 Introduction

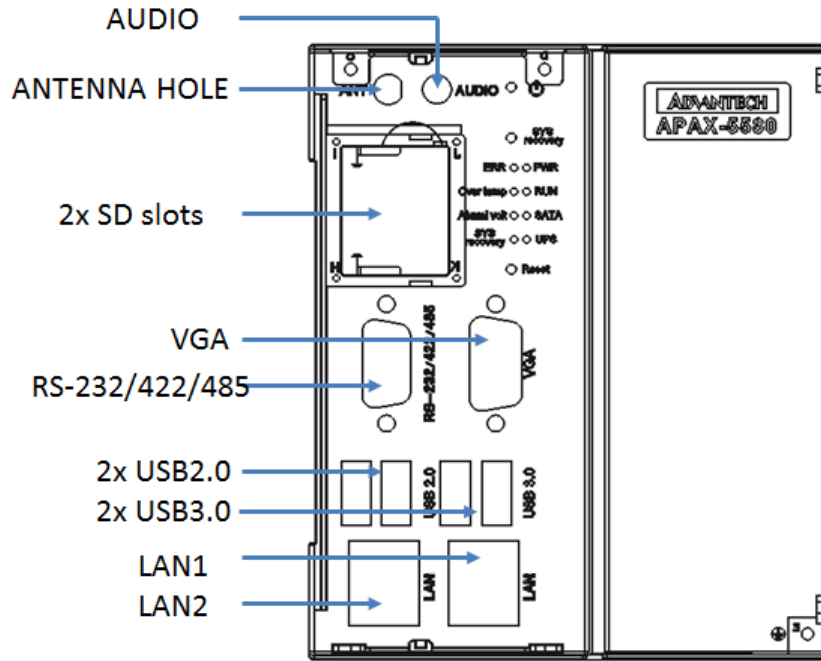The following figures show the connectors on APAX-5580. The following sections give you information about each peripheral.
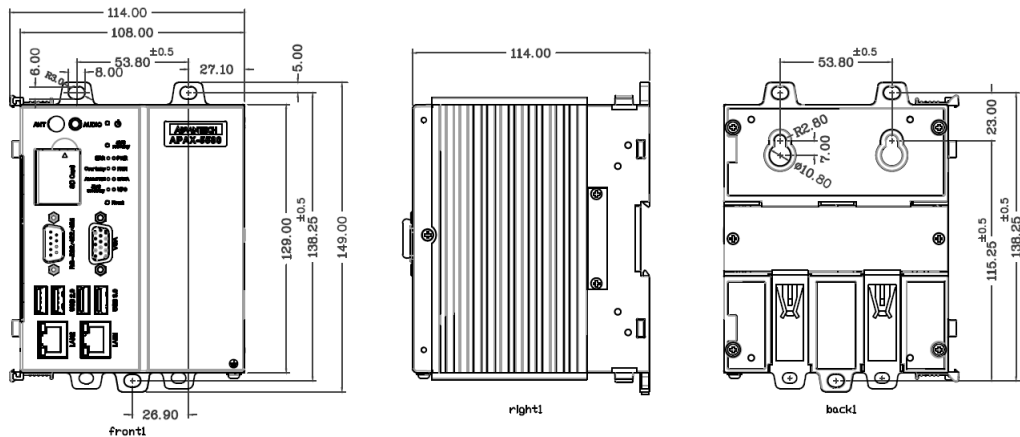


**Figure 2.1 Front Panel of APAX-5580**



**Figure 2.2 APAX-5580 Dimensions**

## 2.2 APAX-5580 Interface (COM1)

APAX-5580 offers one standard RS-232/422/485 serial communication interface ports: COM1.

The setting can be adjusted in the bios page, the driver will be installed automatically during OS installation

### 2.2.1 RS-232 Interface (COM 1)

The APAX-5580 offers one RS-232 serial communication interface port: COM1. Please refer to Appendix A.3 for its pin assignments.

### 2.2.2 Automatic Data Flow Control Function for RS-485

In RS-485 mode, the APAX-5580 automatically detects the direction of incoming data and switches its transmission direction accordingly. So no handshaking signal (e.g. RTS signal) is necessary. This lets you conveniently build an RS-485 network with just two wires. More importantly, application software previously written for half duplex RS-232 environments can be maintained without modification.

## 2.3 LAN: Ethernet Connector

The APAX-5580 is equipped with two Gigabit LAN controllers. The controller chip used in both model are Intel 1 x i218 and 1 x i210 Ethernet controller that is fully compliant with IEEE 802.3u 10/100Base-T CSMA/CD standards and IEEE 802.3ab specification for 1000Mbps Ethernet. The Ethernet port provides a standard RJ-45 jack on board, and LED indicators on the front side to show its Link (Green LED) and Active (Yellow LED) status.

*Note!* *APAX-5580 with i218 LAN chip can support AMT7.0.*

## 2.4 Power Connector

The APAX-5580 comes with a Phoenix connector that carries 24 $V_{DC}$ external power input, and features reversed wiring protection. Therefore, it will not cause any damage to the system by reversed wiring of ground line and power line. Please refer to Appendix A.4

## 2.5 USB Connector

The USB interface supports Plug and Play, which enables you to connect or disconnect a device whenever you want, without turning off the computer. The APAX-5580 provides four connectors of USB interfaces, which gives complete Plug & Play and hot swapping for up to 127 external devices. Two of the four connectors are USB 3.0 standard. The USB interface complies with USB EHCI, Rev. 2.0 compliant. The USB interface can be disabled in the system BIOS setup. Please refer to Appendix A.6 for its pin assignments.

## 2.6 RTC Battery Specification

The APAX-5580 has an RTC Battery to ensure the setting in bios and system clock can be kept, even with power disconnected for a short time.

■ **Type:** Panasonic BR-1/2AAC2P (LITH Battery)

■ **Output Voltage:** 3 $V_{DC}$

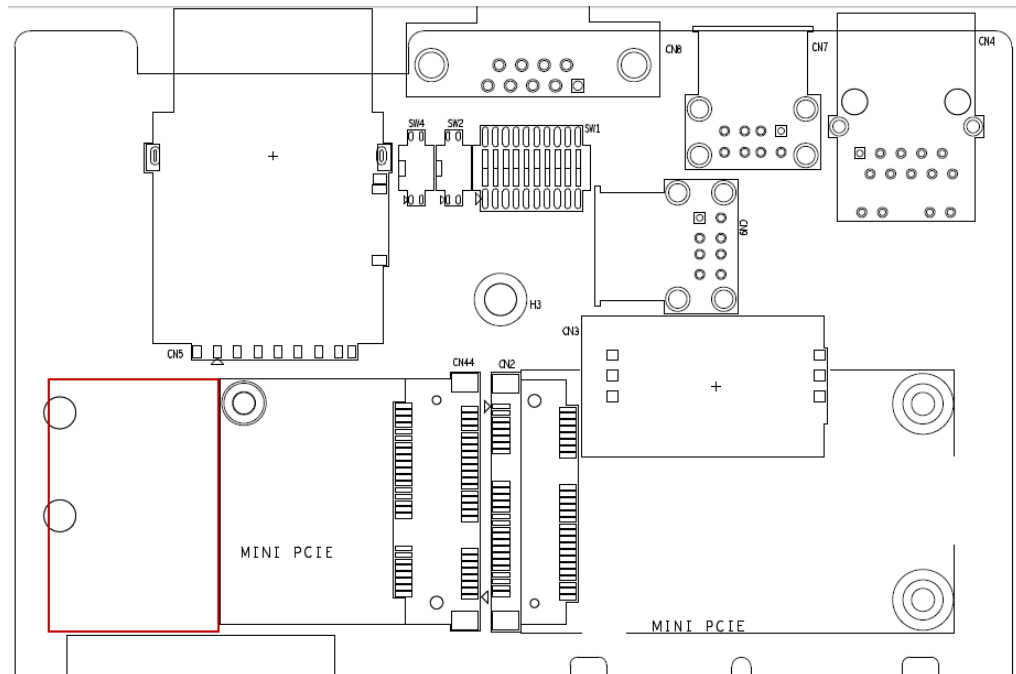■ **Location:** refer to the figure below



**Figure 2.3 RTC Battery Location**

## 2.7 Power Button/Power Management

Press the "PWR" button to power on or power off the APAX-5580 (ATX type). The APAX-5580 supports the ACPI (Advanced Configuration and Power Interface). Besides power on/off, it support multiple suspend modes, such as Power on Suspend (S1), Suspend to RAM (S3), Suspend to Disk (S4). In S3 and S4 suspend mode, the power consumption can be less than 2W which meet criteria of Energy Star.

## 2.8 Reset Button

Press the "Reset" button to activate the hardware reset function.

## 2.9 HD Audio

The APAX-5580 provides 1 phone jack connector for audio output. Please configure the function through provided software utility.

## 2.10 PCI Express Mini Card Socket

The APAX-5580 supports two sockets for one full size and one half size PCI Express mini cards. The first interface(CN2) is with SIM card slot. The second inter-face(CN44) is the half size PCI Express mini card. User can install WLAN, GPRS, 3G, GPS and other communication card easily by using those interface.
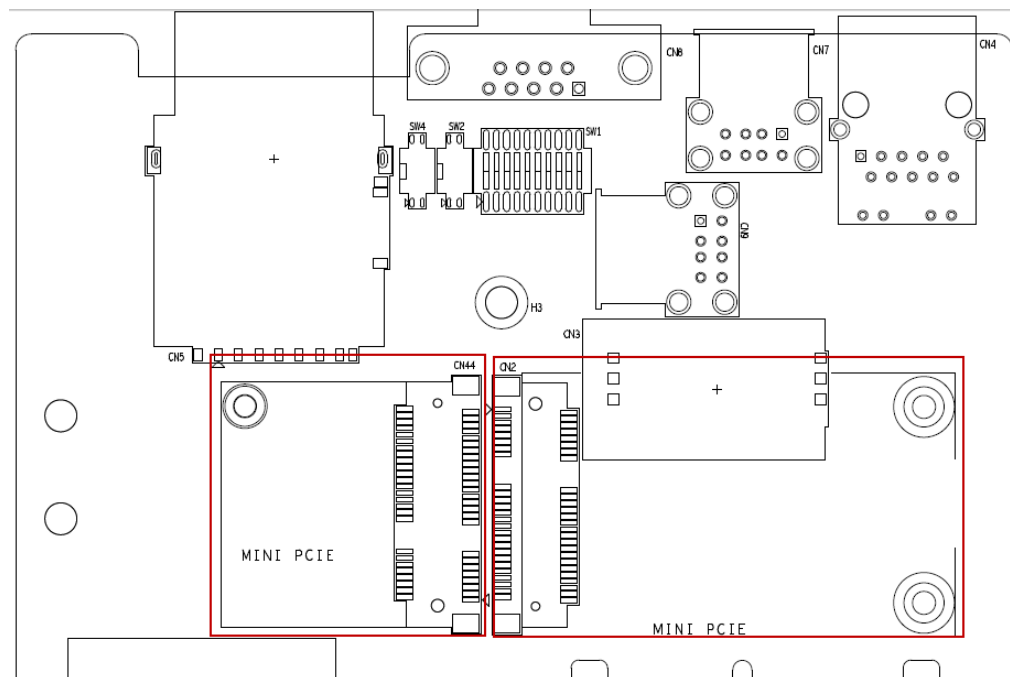


Unscrew the six screws first to remove the slide cover to configure comport setting and insert the mini card.

## 2.11 Expansion Module (APAX-5402 Series)

To add the PCI express module or APAX I/O module, you need purchase APAX-5402 series to expansion I/O capacity.

| Model Name | Description |
|---|---|
| APAX-5402-E2A0AE | It has two peripheral slots to extend the number of comports using iDoor and so on. |
| APAX-5402-E2A1AE | It has two peripheral slots and one APAX I/O slot to extend the module as required. |
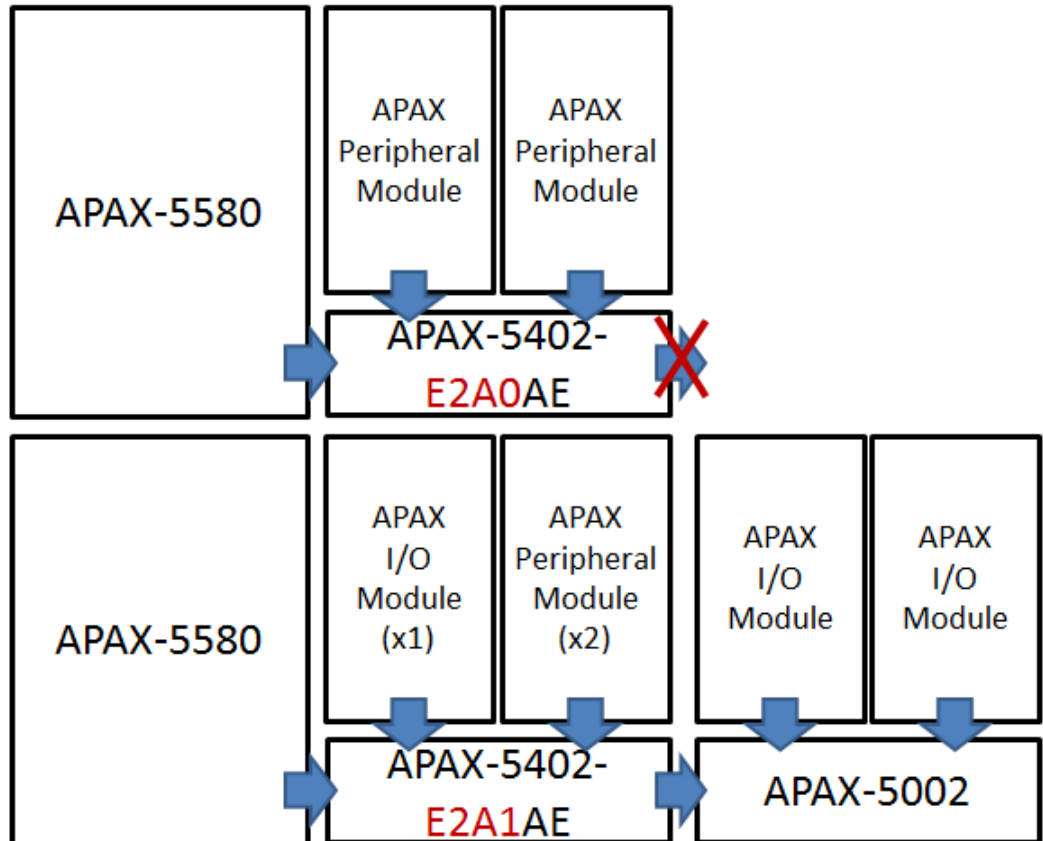
1. First, you will need to add one plastic plate at the right hand site of APAX-5580. Screw four screws (PN: 1930002141) to fix it on the right hand site of APAX-5580:



2. Then please mount APAX-5402 from the right hand site, APAX-5402 provides two screws to add connected mechanism between 5580 and 5402.
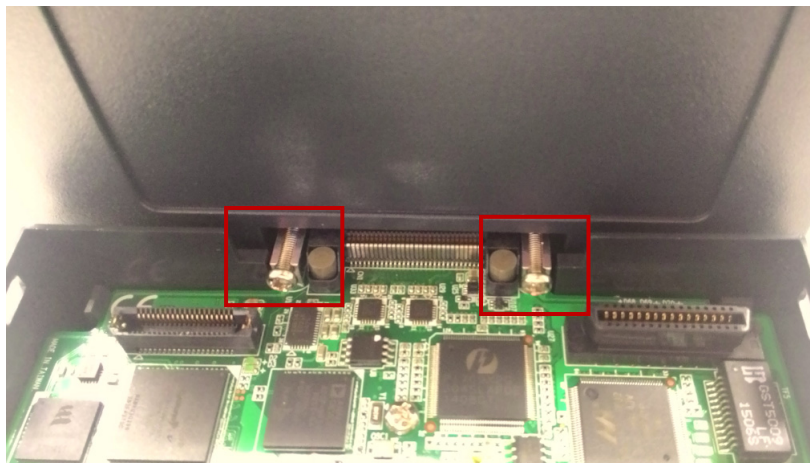
3.    Final, the system will become as the following configuration:
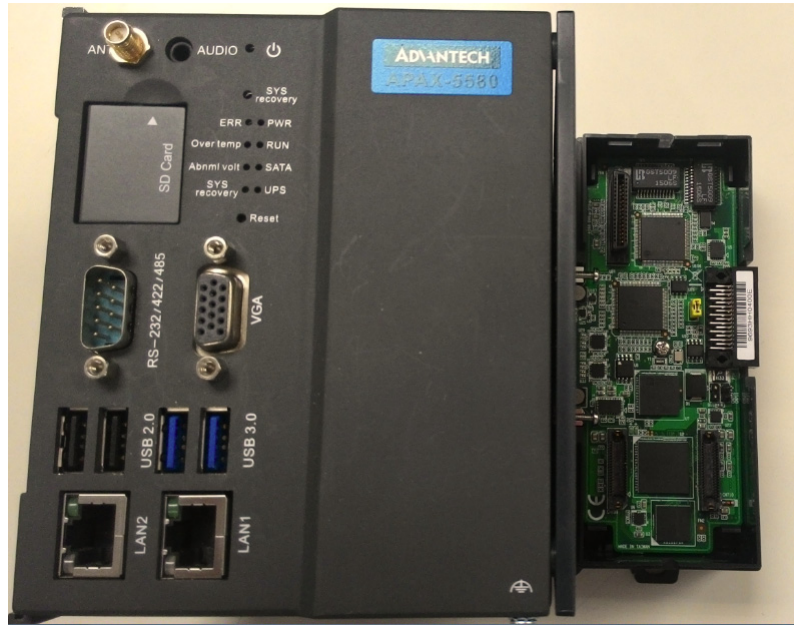
# Chapter 3

## Initial Setup

This chapter introduces how to initialize the APAX-5580/.

Sections include:

- Inserting a mSATA Card
- Chassis Grounding
- Connecting Power
- BIOS Setup and System Assignments

## 3.1 Inserting a mSATA

1. Remove the power cord.
2. Unscrew the two screws in the bottom cover.
3. Plug a mSATA card with your OS and application program into the mPCIe slot CN703.
4. Screw the two screws on board to fix mSATA.
5. Screw back the bottom cover.

## 3.2 Chassis Grounding

APAX-5580 provides good EMI protection and a stable grounding base. There is an easy-to-connect chassis grounding point to use.
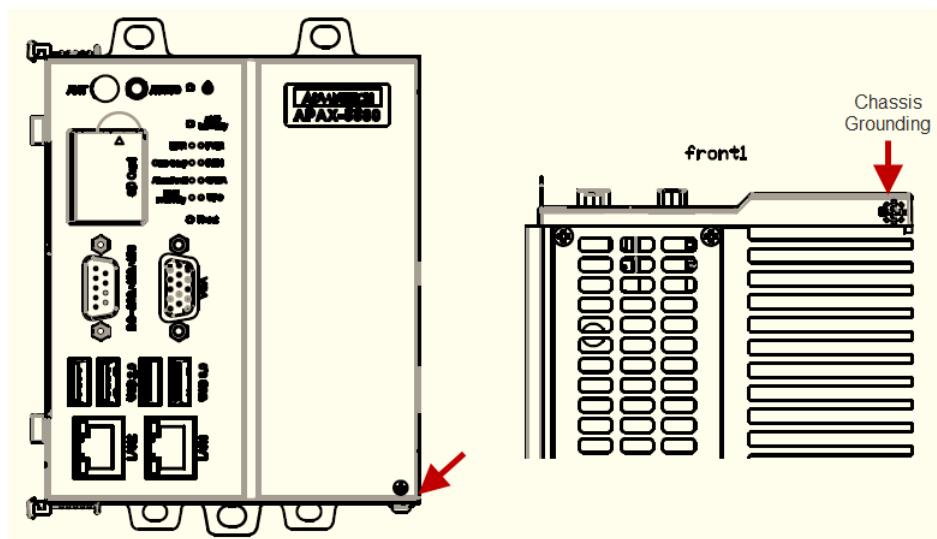


**Figure 3.1 Chassis Grounding Connection**

Please also note that system ground and chassis ground are separated in the APAX-5580.

## 3.3 Connecting Power

Connect the APAX-5580 to a 24 $V_{DC}$ power source. The power source can either be from a power adapter or an in-house power source.

## 3.4    Installing a Wireless LAN Card and Antenna

Please contact Advantech to prepare the following optional kit:

**Antenna**
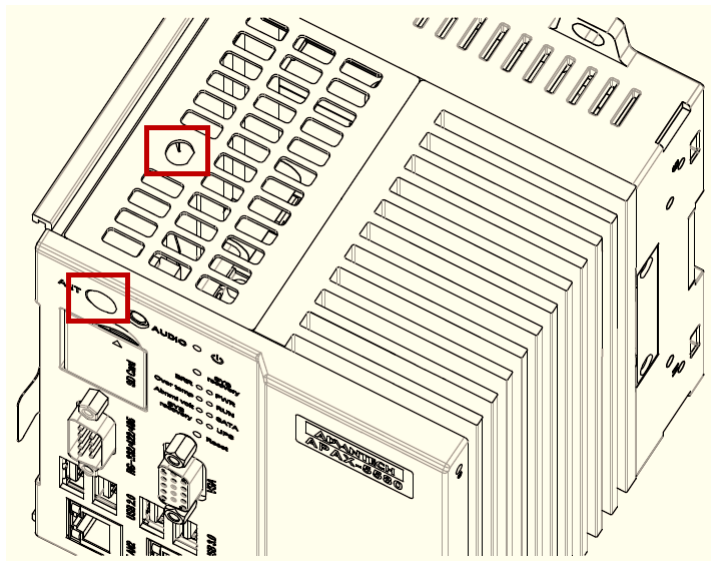


■    The internal cable: 1750006043 (15cm)



**Wireless Module (PCI Express mini card)**

■    One of the suggested module is EWM-W151H01E which is a verified Wireless IEEE 802.11b/g/n module

**Antenna**

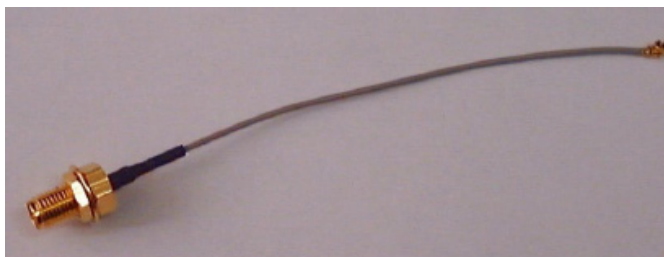■ Please select the necessary specification according to your application.
■ One of the suggested antenna is 1750002842.



Then follow the below steps for the installation:

1. Unscrew the bottom panel and open it.
2. Remove the hole(s) on the panel for antenna installation.
3. Install the internal cable 1750006043 (15cm) on the panel.
4. Plug the Wireless module with bracket kit (9656EWMG00E) onto the PCI Express mini card socket (CN2 and CN44).
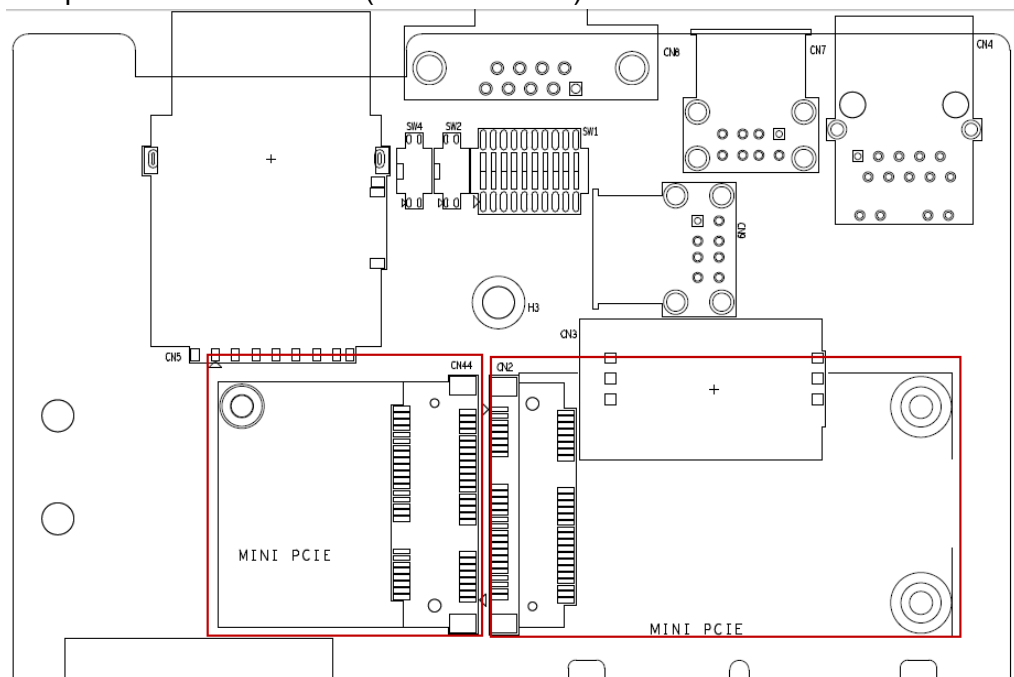


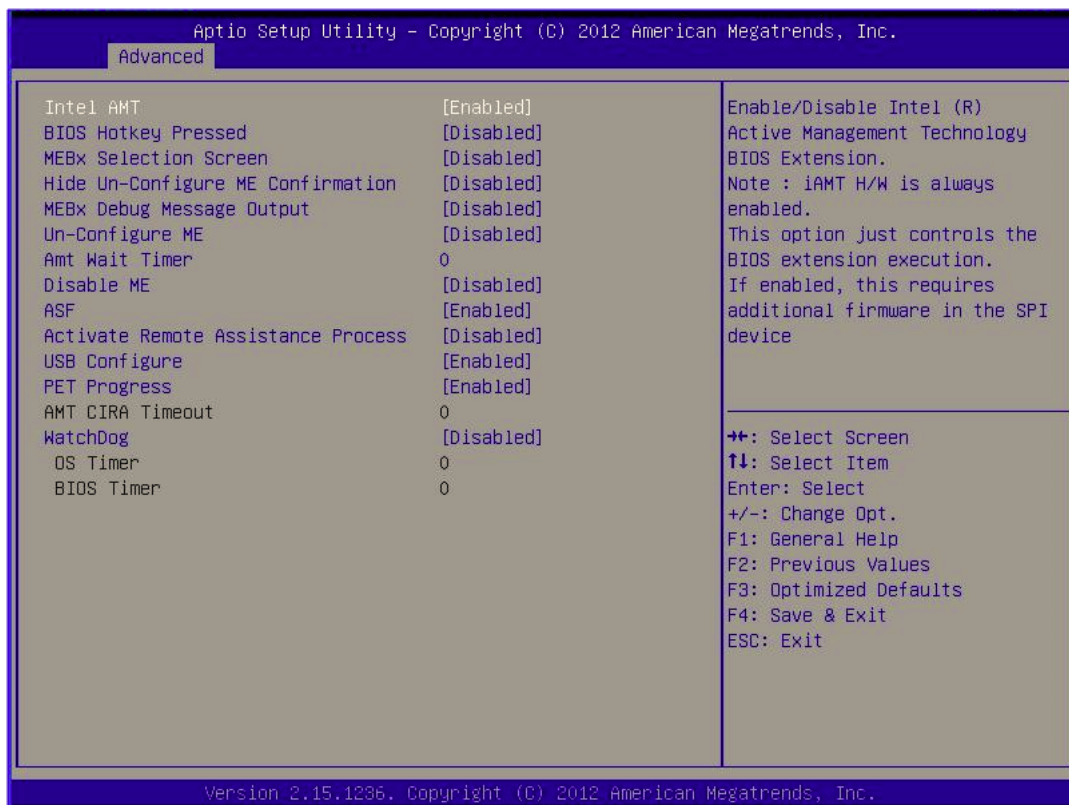5. Connect the internal cable with the module.
6. Secure the bottom panel.
7. Assemble the antenna on the SMA connector.

## 3.5 BIOS Setup

Press "F2" in the boot-up screen to enter the BIOS setup utility. Please follow the instruction on the screen to do the necessary settings.
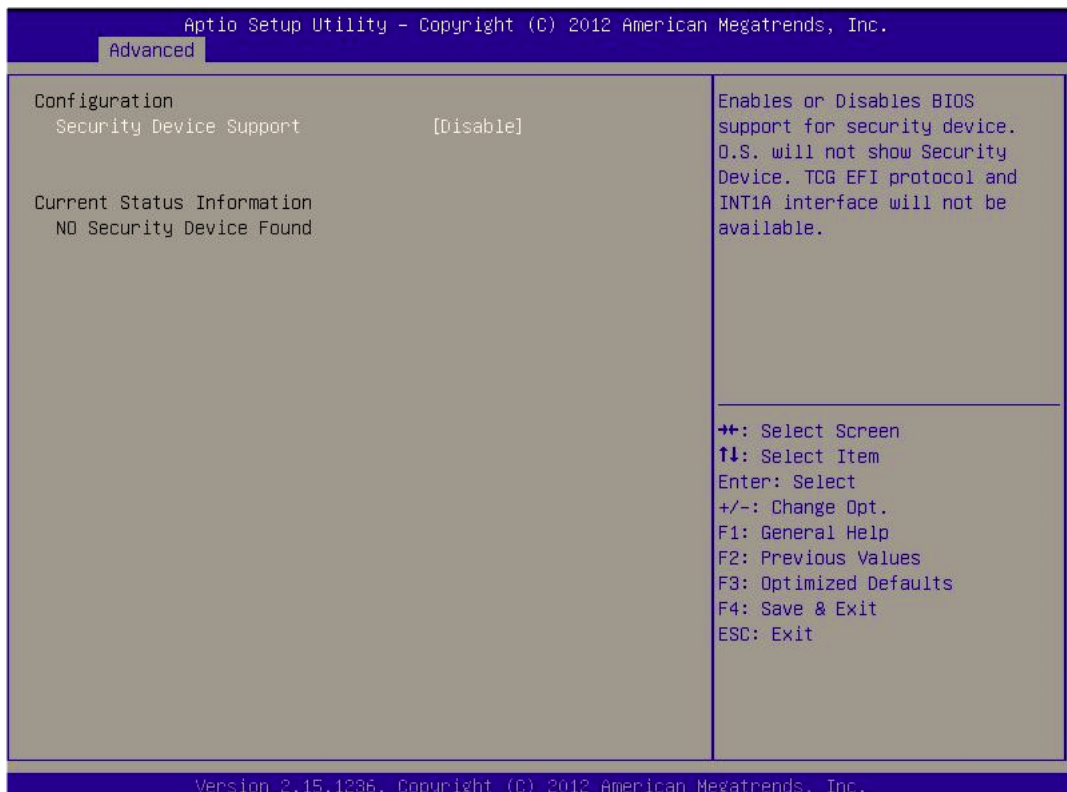
Please note that you can try to "Load Optimized Defaults" from the BIOS Setup manual if the APAX-5580 does not work properly.

# 3.6 AMT Configuration

```
              Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
       Advanced

  Intel AMT                          [Enabled]            Enable/Disable Intel (R)
  BIOS Hotkey Pressed                [Disabled]           Active Management Technology
  MEBx Selection Screen              [Disabled]           BIOS Extension.
  Hide Un-Configure ME Confirmation  [Disabled]           Note : iAMT H/W is always
  MEBx Debug Message Output          [Disabled]           enabled.
  Un-Configure ME                    [Disabled]           This option just controls the
  Amt Wait Timer                     0                     BIOS extension execution.
  Disable ME                         [Disabled]           If enabled, this requires
  ASF                                [Enabled]             additional firmware in the SPI
  Activate Remote Assistance Process [Disabled]           device
  USB Configure                      [Enabled]
  PET Progress                       [Enabled]
  AMT CIRA Timeout                   0
  WatchDog                           [Disabled]           ↔: Select Screen
   OS Timer                          0                     ↑↓: Select Item
   BIOS Timer                        0                     Enter: Select
                                                          +/-: Change Opt.
                                                          F1: General Help
                                                          F2: Previous Values
                                                          F3: Optimized Defaults
                                                          F4: Save & Exit
                                                          ESC: Exit

              Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

■ **Intel AMT**

This item allows users to enable or disable Intel AMT BIOS extension.

■ **BIOS Hotkey Pressed**

This item allows users to enable or disable BIOS hotkey pressed.

■ **MEBx Selection Screen**

This item allows users to enable or disable MEBx selection screen.

■ **Hide Un-configuration ME confirmation**

This item allows users to hide un-configured ME without password confirmation prompt.

■ **MEBx Debug Message Output**

This item allows users to enable or disable MEBx debug message.

■ **Un-Configured ME**

This item allows users to Un-configure ME without password.

■ **Amt Wait Timer**

Set timer to wait before sending ASF_GET_BOOT_OPTIONS.

■ **Disable ME**

This item allows users to enable or disable ME.

■ **ASF**

This item allows users to enable or disable ASF Configure Function.

■ **Activate Remote Assistance Process**

This item allows users to enable or disable PET event progress to receive PET events or not.

■ **USB Configure**

This item allows users to enable or disable USB Configure Function.

- ■ **PET Progress**

  This item allows to enable or disable PET event progress to receive PET events or not.
- ■ **AMT CIRA Timeout**

  OEM defined time out for MPS connection to be established.
- ■ **Watchdog**

  This item allows users to enable or disable WatchDog Timer.
- ■ **OS Timer**

  Sets OS Watchdog Timer.
- ■ **BIOS Timer**

  Sets BIOS Watchdog timer.

```
            Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
     Advanced

  Configuration                                         Enables or Disables BIOS
    Security Device Support         [Disable]           support for security device.
                                                        O.S. will not show Security
                                                        Device. TCG EFI protocol and
  Current Status Information                            INT1A interface will not be
    NO Security Device Found                            available.



                                                        ↦←: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F4: Save & Exit
                                                        ESC: Exit

            Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

# 3.7 Teaming Configuration

1.  Please install the OS and LAN driver first.
2.  After entering the OS, please right click the mouse on Network adaptors to configure the Network Connection properties in the device manager.
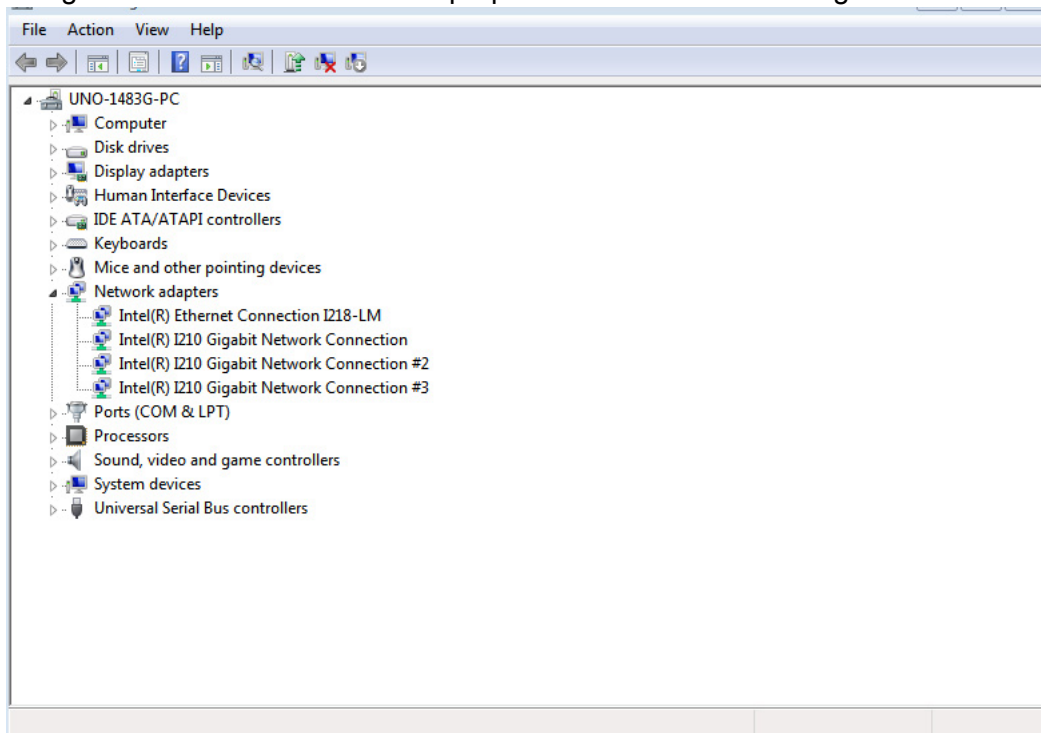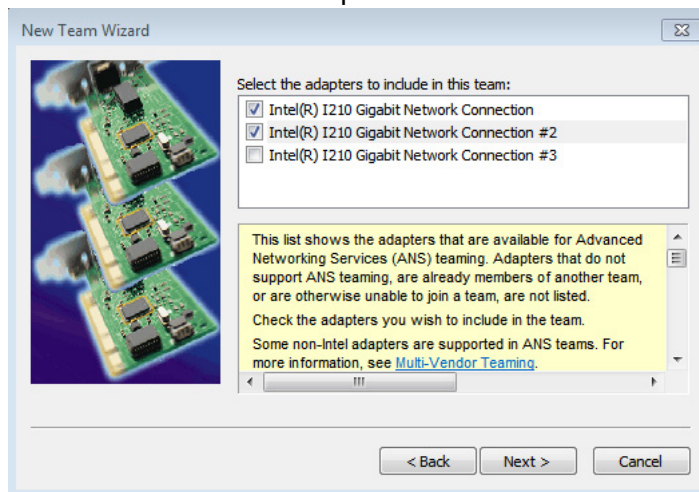
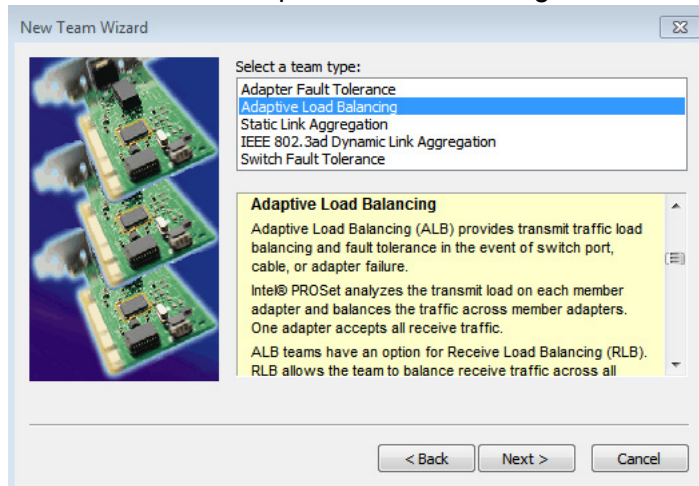3.  Set Teaming with other adapters in Teaming and then press New Team.
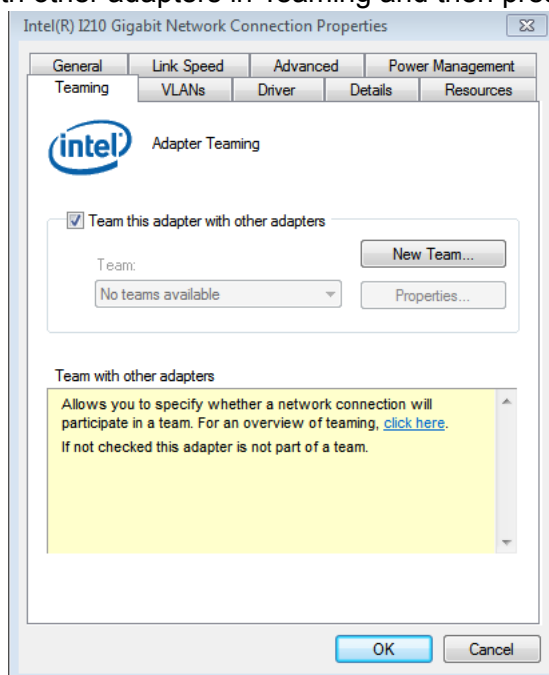
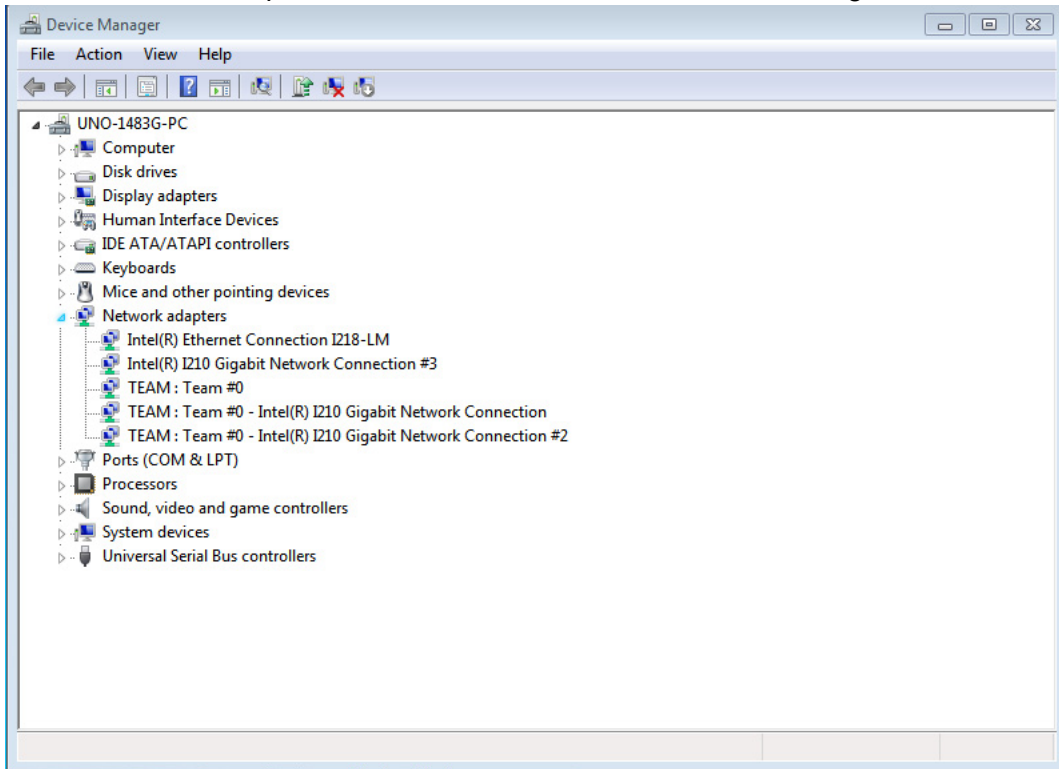4.    Select the adapters to include in this team then press Next.
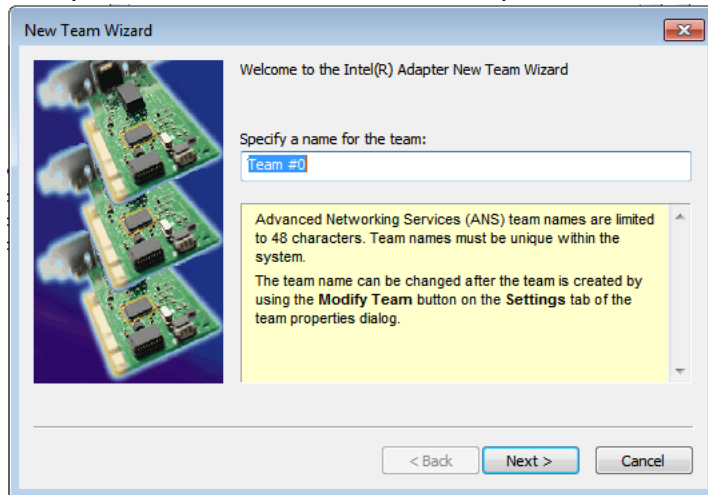


5.    Specify the name for the team then press Next.



6.    Select a team mode. Here Adaptive Load Balancing is chosen.

7. Finally, the wizard has the settings needed to create the team, and you'll find out the Network adapters will show as a team in the device manager.

# Appendix A

## System Settings and Pin Assignments

# A.1 Board Connectors and Jumpers

There are several connectors and jumpers on the APAX-5580 board. The  following sections tell you how to configure the APAX-5580 hardware setting.

Figure A.1 shows the locations of the APAX-5580's connectors and jumpers.
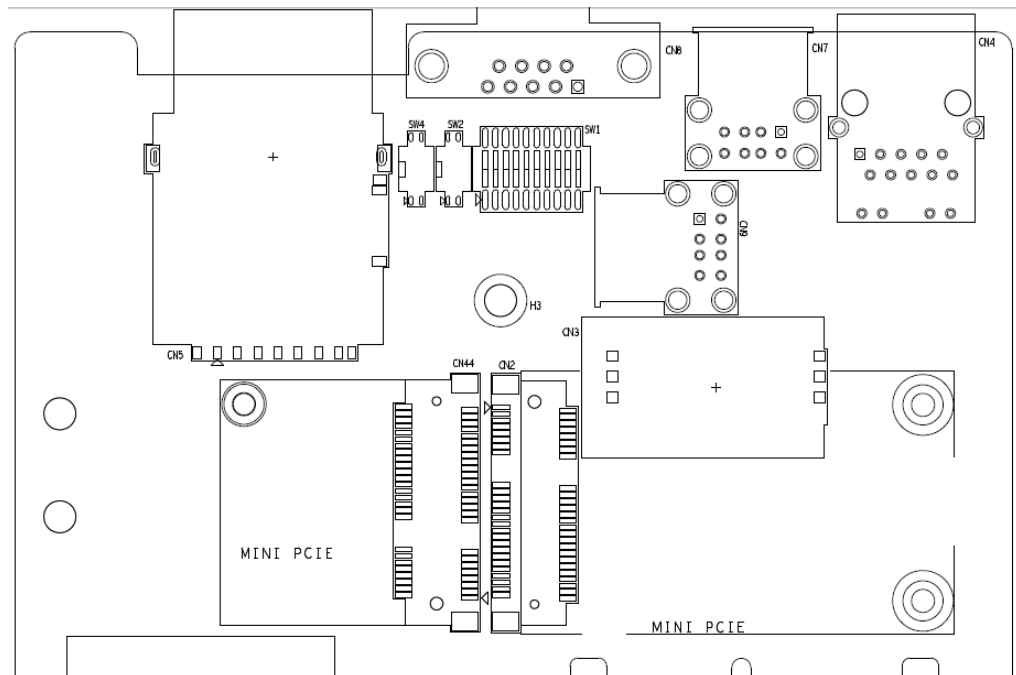


**Figure A.1 Connector & Jumper Locations (front)**

| Table A.1: Connectors and Jumpers | |
|---|---|
| **Label** | **Function** |
| CN2, CN44 | PCI Express mini card socket |
| CN3 | SIM card slot |
| CN5 | SD card slot |
| SW1 | RS232/422/485 mode setting |
| SW2 | Termination Resistor Select |
| SW4 | RS232/422/485 mode setting |

| Table A.2: COM 1 Mode Setting | | | |
|---|---|---|---|
| SW1/SW4 | COM1 RS232/422/485 mode setting | | |
| Description | This switch is used to select comport mode | | |
| Default | RS-232 Mode | SW1 | SW4 |
| **RS-232 Mode** | SW1: Bit 6,7,8,9,10 OFF<br>Bit 1,2,3,4,5 ON | | N/A |
| **RS422 Master Mode** | SW1: Bit 6,7,8,9,10 ON<br>Bit 1,2,3,4,5 OFF<br>SW4: Bit 1,2 ON | | |
| **RS422 Slave Mode** | SW1: Bit 6,7,8,9,10 ON<br>Bit 1,2,3,4,5 OFF<br>SW4: Bit 1,2 OFF | | |
| **RS485 Auto Direction Mode** | SW1: Bit 1,2,3,4,5,8,9 OFF<br>Bit 6,7,10 ON<br>SW4: Bit 1,2 OFF | | |

| Table A.3: SW2 Selection | |
|---|---|
| SW2 | **Termination Resistor Select** |
| Description | This switch is used to select Termination Resistor (120 ohm) for long distance transmission or device matching. |
| RS422 OFF<br>RS485 OFF | |
| RS422 OFF<br>RS485 ON | |
| RS422 ON<br>RS485 OFF | |
| RS422 ON<br>RS485 ON | |

## A.1.1 SW102 Function Switch
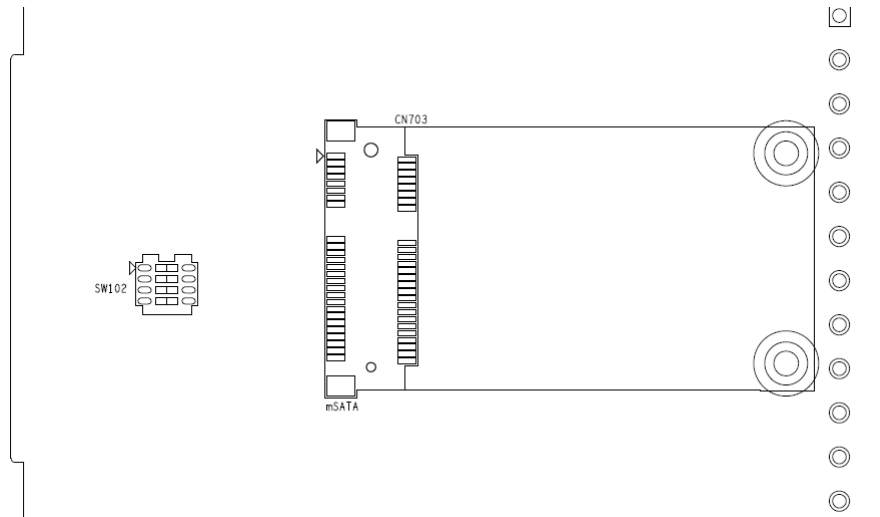


The bottom of APAX-5580 provides one PCI express mini card for mSATA HDD. You can install your system disk from this interface.

SW102 is the function switch for the following functions; refer to this table for each DIP switch and its function:

**Table A.4: SW102 Selection**

| SW102 | Function Select | |
|---|---|---|
| Default | |  |
| PIN1 | APAX-Bus Power by DC |  |
| | APAX-Bus power by Battery |  |
| PIN2* | V1 and V2 failure Alert |  |
| | Standby and Power ON Detection |  |
| PIN3 | ATX mode |  |
| | AT mode |  |
| PIN4 | Reserved | |

*PIN2 is for the setting of the relay on the pin5(RL+) and pin6(RL-) of the power connector.

CN703 is the PCI express mini card slot to support mSATA as the system disk of APAX-5580.
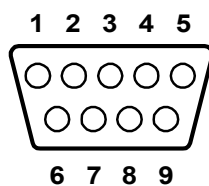
## A.2  RS-232 Standard Serial Port



| Table A.5: RS-232 Serial Port Pin Assignments | |
| --- | --- |
| **Pin** | **Pin Name** |
| 1 | DCD |
| 2 | RxD |
| 3 | TxD |
| 4 | DTR |
| 5 | GND |
| 6 | DSR |
| 7 | RTS |
| 8 | CTS |
| 9 | RI |

## A.3  RS-422/485 Serial Port
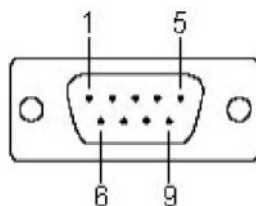


| Table A.6: RS-422/485 Serial Port Pin Assignments | | |
| --- | --- | --- |
| **Pin** | **RS-422** | **RS-485** |
| 1 | TX- | Data- |
| 2 | TX+ | Data+ |
| 3 | RX+ | NC |
| 4 | RX- | NC |
| 5 | GND | GND |
| 6 | NC | NC |
| 7 | NC | NC |
| 8 | NC | NC |
| 9 | NC | NC |

# A.4 Power Connector (PWR)
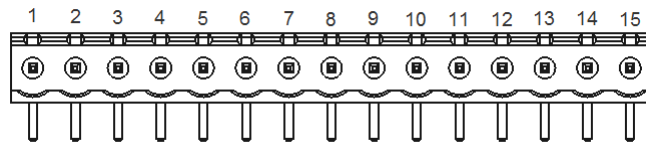


## Table A.7: Power connector pin assignments

| Pin | | Pin | |
|---|---|---|---|
| 1 | V1+ (24V$_{DC}$) | 8 | +V_CHG BATT |
| 2 | V1- | 9 | +V BATT |
| 3 | V2- | 10 | GND |
| 4 | V2+ | 11 | BATT CHG PRENT# |
| 5 | RL+ | 12 | BATT SMB CLK |
| 6 | RL- | 13 | BATT SMB DAT |
| 7 | GND (Earth) | 14 | BATT CHG SMBALERT |
| | | 15 | BATT CHG EN |

## A.5  USB Connector
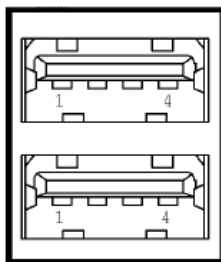


### Table A.8: USB 2.0 Connector Pin Assignments

| Pin | Signal Name | Cable Color |
|-----|-------------|-------------|
| 1 | VCC | Red |
| 2 | DATA- | White |
| 3 | DATA+ | Green |
| 4 | GND | Black |



USB A TYPE
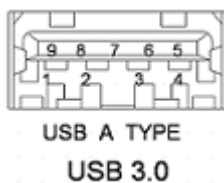
USB 3.0

### Table A.9: USB 3.0 Connector Pin Assignments

| Pin | Signal Name | Description |
|-----|-------------|-------------|
| 1 | VBUS | Power |
| 2 | D- | USB2.0 differential pair |
| 3 | D+ | |
| 4 | GND | Ground for power return |
| 5 | StdA_SSRX- | SuperSpeed receiver differential pair |
| 6 | StdA_SSRX+ | |
| 7 | GND_DRIAN | Ground for signal return |
| 8 | StdA_SSTX- | SuperSpeed transmitter differential pair |
| 9 | StdA_SSTX+ | |

# A.6  LED Indicators

### Table A.10: PWR LED

| Description | | ACPI Status |
|---|---|---|
| LED Status | OFF | Shutdown |
| | Green | S0 |
| | Flashing Green | S3 |
| | Orange | S5 |

### Table A.11: RUN LED

| Description | | User Defined |
|---|---|---|
| LED Status | OFF | User Defined |
| | Green | User Defined |

### Table A.12: SATA LED

| Description | | SATA Read and Write |
|---|---|---|
| LED Status | OFF | Not working |
| | Orange | Read and Write |

### Table A.13: ERR LED

| Description | | User Defined |
|---|---|---|
| LED Status | OFF | User Defined |
| | Red | User Defined |
| | Green | OS Recovery |

### Table A.14: Over Temp LED

| Description | | User Defined |
|---|---|---|
| Setting | | BIOS |
| LED Status | OFF | Normal |
| | Red | Over temp |
| | Green | OS Recovery |

### Table A.15: Abnormal Voltage LED

| Description | | Detect AC1 and AC2 power high and low limit voltage |
|---|---|---|
| Setting | | BIOS |
| LED Status | OFF | Safety |
| | Red | Abnormal* |
| | Green | OS Recovery |

*Due to the resolution of the chipset, the real lower limitation will be around 19.3V (2LSB)

| Table A.16: SYS Recovery LED | | |
|---|---|---|
| **Description** | OS Recovery status | |
| LED Status | OFF | Not working |
| | Flashing Red | OS Recovery |

When the system starts the OS recovery processes, ERR LED. The Over temp LED, Abnormal voltage LED will flash one-by-one in green and follow this sequence: ERR LED→Over temp LED→Abnml voltage LED→ERR LED→Over temp LED→Abnml voltage LED...

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