USER MANUAL

REVISION 0.02 **DATE 2016/03/02**

FWA-3260

1U MIDDLE-RANGE NETWORK APPLIANCE

BASED ON INTEL® XEON® D PROCESSORS

SYSTEM ON CHIP

Revision History

Date [mm/dd/yyyy]	Revision	Modifications
02/25/2016	0.1	Initial version –draft-
03/02/2016	0.2	Update BIOS setup menu based on BIOS ver. 1.04

About this manual

Thank you for purchasing and using the Advantech FWA-3260.

The target audience of this manual includes users, administrators and technicians. This publication is a useful reference when installing, configuring, operating and managing the FWA-3260.

This manual is organized as follows:

- Section 1: Getting Started helps you with the first steps with the FWA-3260.
- Section 2: Product Specification provides a detailed description of the FWA-3260 and its features.
- Section 3: Configuration and Service describes how to change the FWA-3260's configuration or how to install and service replaceable items.
- Section 4: Tips, Tricks and Troubleshooting provides best practices and other information that may be helpful for operation and troubleshooting of the FWA-3260
- Appendices provide supplemental information referenced in the other sections of this document.

Useful documents

If you cannot find the information you're looking for or need more detailed information on a specific topic, please refer to the list of additional documents and other sources of information below. Please contact your Advantech representative if you need help on obtaining these documents or still can't find what you're looking for.

- Advanced LAN Bypass User Manual
- Advantech IPMI User Manual
- Information on intel CPUs, Chipsets and NIC silicon can be found at www.intel.com
- FWA-3260 Reference Platform Software User's Guide (for samples only)

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.*

Note! *Notes provide additional information.*

We appreciate your input

Please let us know of any aspect of this product, including the manual, which could use improvement or correction. We appreciate your valuable input in helping make our products and documentation better.

Please send all such - in writing to: ncg@advantech.com

Acknowledgements

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Glossary

ACPI	Advanced Configuration and Power Interface
AHCI	Advanced Host Controller Interface
APIC	Advanced Programmable Interrupt Controller
BIOS	Basic Input Output System
BMC	Baseboard Management Controller
CPU	Central Processing Unit
EHCI	Enhanced Host Controller Interface
FRU	Field Replaceable Unit
FW	Firmware
GbE	Gigabit Ethernet
HPM	Hardware Platform Management
HWM	Hardware Monitor (chip)
IPMC	Intelligent Platform Management Controller
IPMI	Intelligent Platform Management Interface
LOM	Lights Out Management
MAC	Media Access Control
MTBF	Mean Time Between Failures
NIC	Network Interface Controller
NMC	Network Mezzanine Card
NVRAM	Non-volatile Random Access Memory
OOS	Out Of Service
PCH	Platform Controllers Hub
PCIe	PCI Express
PECI	Platform Environment Control Interface
PCI SIG	PCI Special Interest Group
PICMG	PCI Industrial Computer Manufacturers Group
POST	Power On Self Test
PSU	Power Supply Unit
PXE	Pre-boot Execution Environment
QAT	QuickAssist Technology
QPI	QuickPath Interconnect
RASUM	Reliability, Availability, Serviceability, Usability, Maintainability
RDIMM	Registered DIMM
RMCP	Remote Management Control Protocol
RX	Receive

SAS	Serial Attached SCSI
SATA	Serial Advanced Technology Attachment
SCSI	Small Computer System Interface
SDR	Sensor Data Record
SerDes	Serializer/Deserializer
SOL	Serial Over LAN
SSD	Solid State Disk
SW	Software
TPM	Trusted Platform Module
TX	Transmit
UDIMM	Unbuffered DIMM
UHCI	Universal Host Controller Interface
USB	Universal Serial Bus

1. GETTING STARTED

1.1 Safety Instructions

This section provides warnings that precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed during all phases of operation, service, and repair of this equipment. You should also employ all other safety precautions necessary for the operation of the equipment in your operating environment. If you are not sure about the precautions applicable to your operating environment, please contact your company's safety administrator. For basic information you may also refer to the safety precautions per IEC704-1 listed below although Advantech disclaims all responsibility for the accuracy of any statements contained therein and its applicability for your specific environment.

Failure to comply with these precautions or with specific warnings elsewhere in this manual could result in personal injury or damage to the equipment.

Advantech intends to provide all necessary information to install and handle the FWA-3260 in this manual. Because of the complexity of this product and its various uses, we do not guarantee that the given information is complete. If you need additional information, contact your Advantech representative.

The product has been designed to meet the standard industrial safety requirements. It must not be used except in its specific area as specified in section 2.3.

Only personnel trained by Advantech or persons qualified in electronics or electrical engineering are authorized to install, service or maintain the product. The information given in this manual is meant to complete the knowledge of a specialist and must not be used as replacement for qualified personnel. Operating personnel must not remove equipment covers. Only factory authorized service personnel or other qualified service personnel may remove equipment covers for internal subassembly or component replacement or any internal adjustment.

Do not install substitute parts or perform any unauthorized modification of the equipment or the warranty may be voided. Contact your local Advantech representative for service and repair to make sure that all safety features are maintained.

1.1.1 Safety Precautions per IEC704-1

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Keep this equipment away from humidity.
4. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
5. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
6. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
7. All cautions and warnings on the equipment should be noted.
8. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient over-voltage.
9. Never pour any liquid into an opening. This may cause fire or electrical shock.
10. For safety reasons, the equipment should be opened only by qualified service personnel.
11. If one of the following situations arises, get the equipment checked by service personnel:
12. The power cord or plug is damaged.
13. Liquid has penetrated into the equipment.
14. The equipment has been exposed to moisture.

15. The equipment does not work well, or you cannot get it to work according
16. The equipment has been dropped and damaged.
17. The equipment has obvious signs of breakage.
18. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BEYOND THE RANGE SPECIFIED IN Technical Specifications. THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.
19. 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.
20. The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70 dB (A).

DISCLAIMER: The set of instructions is given according to IEC704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

1.1.2 Safety Precautions - Static Electricity

Follow instructions below to protect yourself from harm and the products from damage:

1. Be sure you are at an ESD workstation, or grounded with an ESD strap before opening the top cover or installing/removing any unit accessible from the outside. Doing so will discharge any static electricity that might have built up in your body.
2. Don't touch any components inside the system while the system is on.
3. 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.
4. When unpacking a static-sensitive component from its shipping carton, do not remove the component's antistatic packing material until you are ready to install the component in the unit.
5. When transporting any electrical component, first place it in an antistatic container or packaging.

1.2 Unpacking

Please check the delivery for completeness as you open the carton carefully. If any of the items listed in Table 1 is missing or damaged, please contact your Advantech representative.

When opening the box, you will find the FWA-3260 embedded in protective foam and the accessory box embedded to the foam. Remove the accessory box first and then pull out the unit including the protective foam using both hands. Now, remove the foam and the plastic sleeve on the unit.

After unpacking the unit, please check for any visible damage of the unit and contact your Advantech representative in case of any issue.

Please note that unless agreed otherwise power cords need to be ordered separately. Please refer to section 2.6 for ordering information.

Item	Qty.	Image	Description
Network Appliance FWA-3260	1		1U Middle-Range Network Appliance based on Intel® Xeon™ D processors System On Chip
Console cable	1		Adapter cable RJ45 to DB9 2m for RS232.
HDD Carrier plate	1		Carrier Plate for 2.5” HDD
HDD Carrier Screw Set	1		Screws (4pcs) for mounting the HDD carrier plate inside the chassis
m.2 Screw	2		Screw for m.2 SSD mounting
SATA Cable	1		SATA Cable for HDD connection
Mounting Ears	2		Mounting Ears for Rack mounting
Mounting Ear Screw Set	1		Screws (6pcs) for mounting the ears on the chassis

Table 1: Packaging List

1.3 Installation and Configuration

The FWA-3260 comes as a pre-configured system with CPUs, memory and peripherals installed in the unit. In the rare case that you procured a barebone system or need to install components in the FWA-3260 for any other reason, please refer to section 3.

1.3.1 Rack Mounting

The FWA-3260 appliance is designed to be installed in a standard 19-inch rack. Please follow the basic guidelines below for rack mounting:

1. Mount the mounting ears on the each side of the unit using the screws included.
   1) Locate the threaded mount holes on the chassis on the side, close to the front panel

Figure 1 : Mounting ear thread holes

   2) Place the mounting ear over the holes and insert the three screws. Do not tighten the screws immediately.

Figure 2: Mounting ear screws inserted but not fastened yet

   3) After all screws have been inserted, hand tightened them using a PH2 screw driver to ensure secure installation.

2. Ensure the rack is adequate for the unit (weight) and the application.
3. Use the mounting hardware recommended by the rack manufacturer to mount the unit in the rack. Four mounting screws, compatible with the rack design, must be used and hand tightened to ensure secure installation
4. While Advantech does not supply support brackets, slide rails are available for separate order. Please refer to section 2.6 for options.
5. Choose a mounting location where all four mounting holes line up with those of the mounting bars of the 19-inch cabinet.
6. Choose a mounting location that does not block any air inlet and air outlet areas of the unit, It is also recommended to factor in heat generated by adjacent equipment and to avoid exposure to direct sunlight when mounting the unit. If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum recommended ambient temperature per section 2.3.
7. Route cables away from power lines, fluorescent lighting fixtures and sources of noise.

Make sure that cables do not block air inlet and outlet areas.

8. Reliable grounding of rack-mounted equipment must be maintained.

1.3.2 Powering On

Before connecting the FWA-3260 to the power outlet, please make sure that the power rating of the outlet and the FWA-3260's PSU match. Please also make sure that the primary circuit and all power distribution in not overloaded. Inrush current and steady state power specifications for the FWA-3260 can be found in appendix C as well as the type label on the bottom of the unit.

Connect the power cord to the PSU module and then to the power outlet. The System has a DC on/off button next to the power connector.

The unit will automatically power on after power is supplied and push the DC on/off button to on position one times. The green LED on the front panel should be lit as the unit is under power.

Please refer to section 2.4 for the location of front and rear panel elements.

1.3.3 Connecting to the Console

FWA-3260 does not provide an interface for an external monitor in the standard configuration. BIOS output as well as OS output are provided via a serial terminal connection by default.

The remainder of this section describes how to configure PuTTY on a Windows platform for connection with the FWA-3260 serial console as a reference. Other terminal programs may be used in a similar way as well.

Open up PuTTY and begin the configuration as shown below. Please use the actual COM port's number on the client machine instead of "COM1".

- Specify "COM1" under serial line and "115200" for speed, no parity, no flow control.
- Check Serial for connection type.
- Check "VT100+" for keypad in the keyboard submenu
- Check "Colour" or "Both" for "Indicate bolded text" in the colours submenu
- Click the "Open" button and a PuTTY terminal screen will appear.

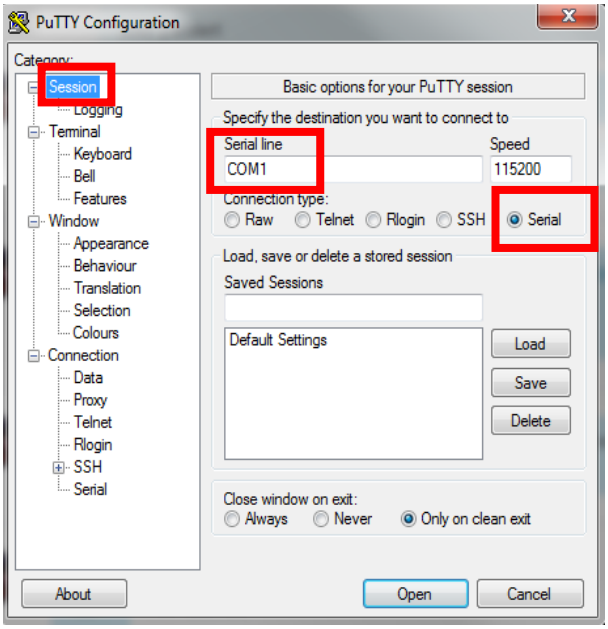


Figure 3: PuTTY Session Configuration

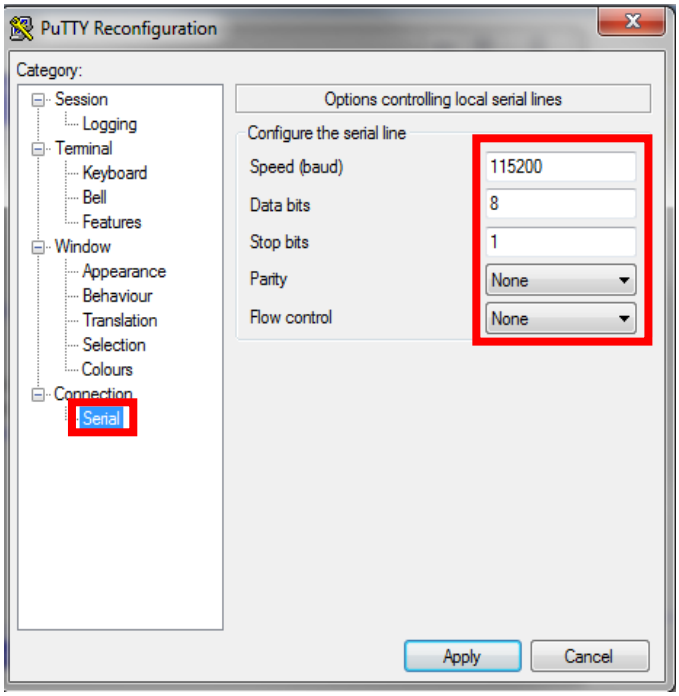


Figure 4: PuTTY Serial Configuration

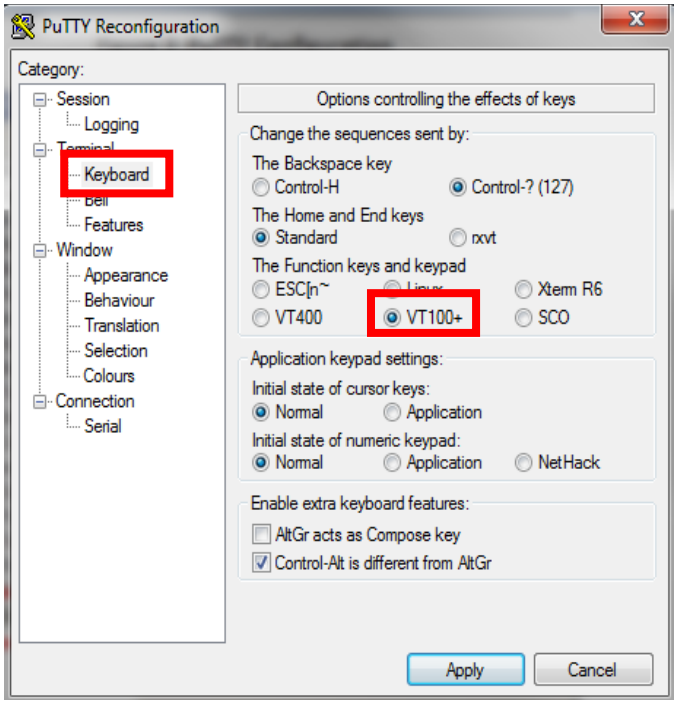


Figure 5: PuTTY Keyboard Settings

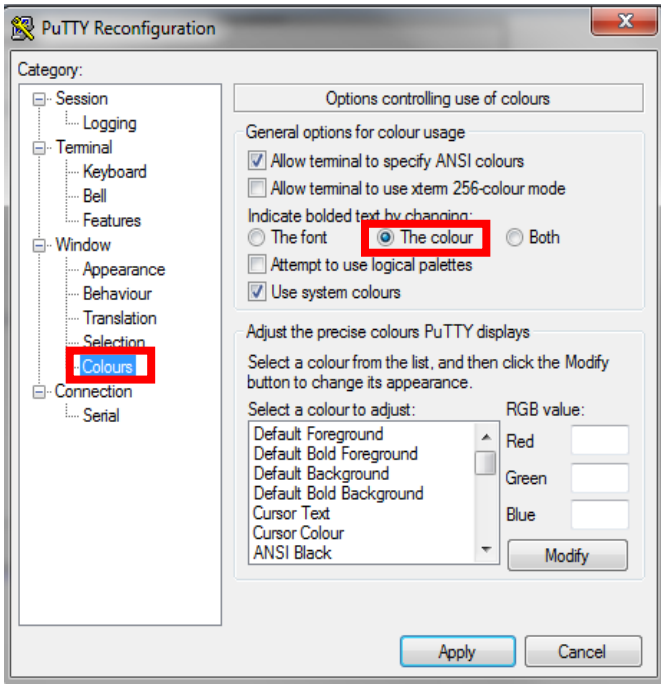


Figure 6: PuTTY Colour Settings

If the connection is successful you should be able to see the BIOS Power On (POST) screen after powering the unit:

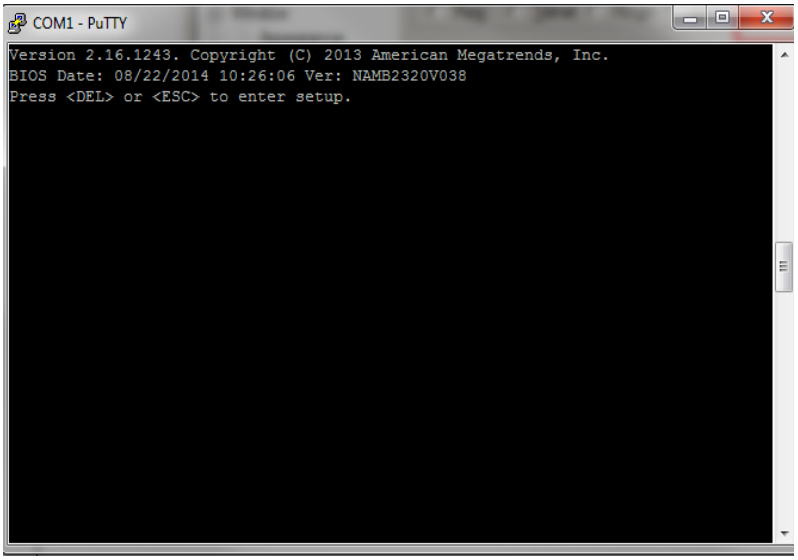


Figure 7: BIOS POST screen (example)

Please note that the BISO is doing some initial start up work while the console is still not active. It may take a while until the BIOS POST screen appears. On the other hand, the BIOS has been optimized for minimum boot time. The BIOS will move through POST quickly and immediately try to boot an OS according to the selected boot options in the BIOS:

In case you would extend the time the BIOS displays the POST screen and waits for a key press to enter the setup menu, you can do so via the BIOS setup menu. Please refer to section 3.2 for details.

1.3.4 Installing an OS

Several options are available for OS installation:

- System comes with a preinstalled OS
- Install an image from a USB key
- Install an OS via network boot.

If you use Advantech's services to pre-install an OS, you can skip the following section.

1.3.4.1 Pre-Installed reference OS

If you receive this manual along with a sample unit, the system will have a reference OS installed by default. The unit will be ready to boot the reference OS from the mass storage option selected.

1.3.4.2 Installing and/or boot an OS from a USB key

To install an OS via USB and/or boot the appliance from an USB stick, please make sure the following BIOS options are configured properly:

Advanced Setup: USB Configuration: Mass Storage Driver = Enabled

To boot from a USB stick:

1) Create a Live USB stick using LiLi (available via http://www.linuxliveusb.com/) or a similar tool. Please make sure to configure the Linux for the operation with a serial console (115200bd, 8N1, no handshake). Enabling serial support in the Linux bootloader (grub or similar) as well as kernel debug messages via serial console may be valuable for potential troubleshooting.

2) Install the USB stick in one of the front ports. Make sure you have a serial console connection established via tools such as PuTTY as described earlier.

3) Power on the appliance.

4) The boot priority in the FWA-3260's BIOS is giving SATA devices higher priority than USB devices. This is a safety measure to avoid that any end user can tamper the unit when installed in the field with a bootable USB stick. So, in order to boot from the USB stick, you need to enter BIOS setup.

   In BIOS setup menu, move to the "Boot" menu. You can either give the USB stick higher boot priority over SATA devices. Alternatively, you can select the USB stick in the "Boot Override" Menu. Boot Override will modify the boot order for a single boot process only and will automatically revert back to the original boot priority. After making these changes leave the Setup Menu via "Save&Exit".

   This will restart the appliance and it will boot from the USB stick.

1.3.4.3 Installing an OS via network boot

To install an OS via network, basically works the same way as booting an OS via USB stick described above.

The main difference is that instead of a Linux live image you need to install a network installer / a network installable image on the USB key. Network Installers or network installable iso images are available for most Linux distributions such as RedHat, Debian, Ubuntu and CentOS. For detailed information, please refer to the documentation of the related network installer and / or Linux distribution.

Please make sure you configure the network installer image properly for the Ethernet port / device of the FWA-3260 that you plan to sue for the installation.

1.3.4.4 Booting an OS via network boot

The FWA-3260 supports booting over network via PXE.

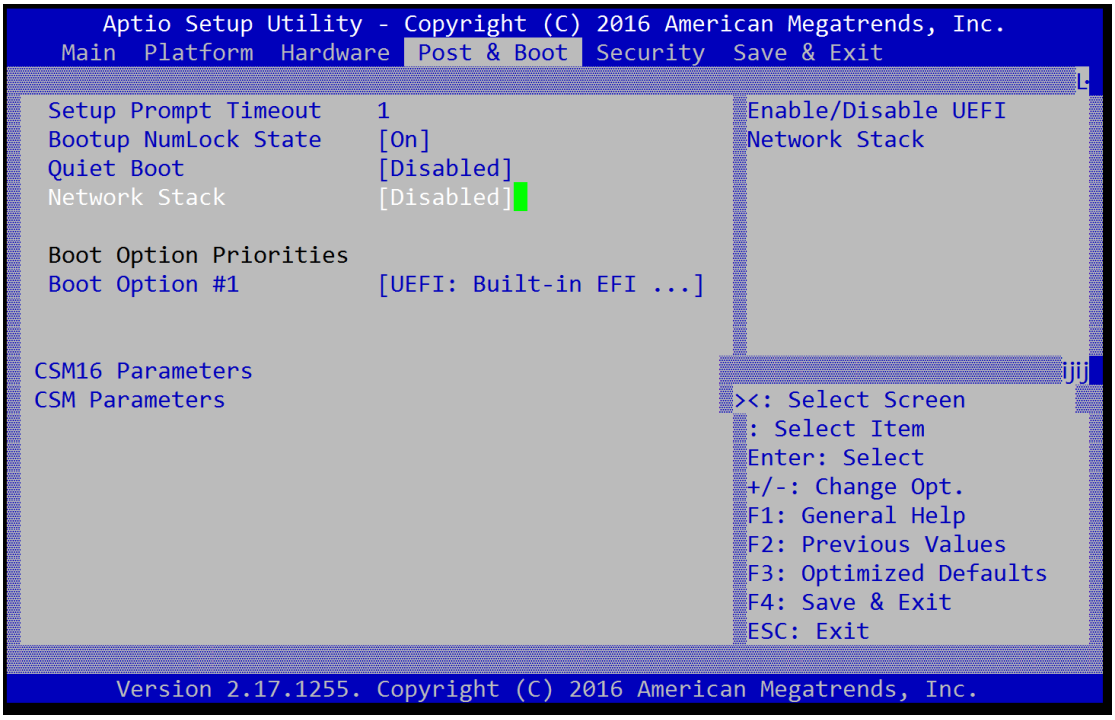
To boot an OS via network, please make sure the following BIOS options In the Advanced: Network Stack Configuration Menu are configured properly:

Network Stack	Enabled	Enables the UEFI Network Stack.
IPv4 PXE Support	Enabled Disabled	Enabled if PXE booting in an IPv4 network; disabled otherwise

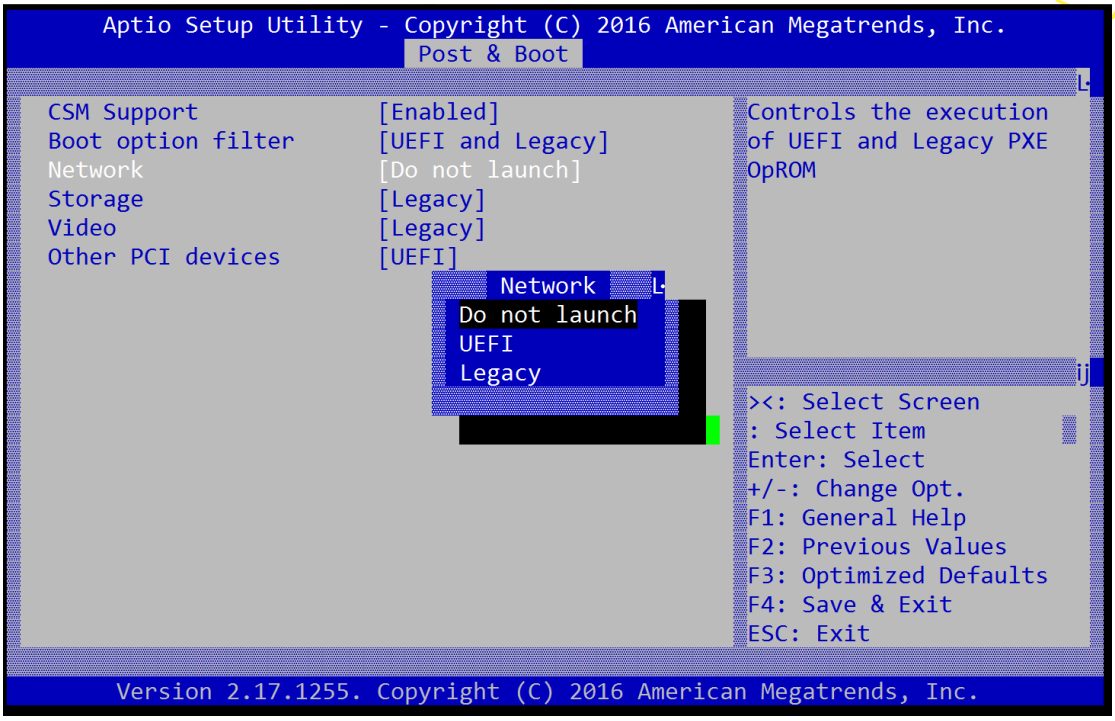
Table 2: PXE BIOS Options

Below are the steps to enable PXE boot.

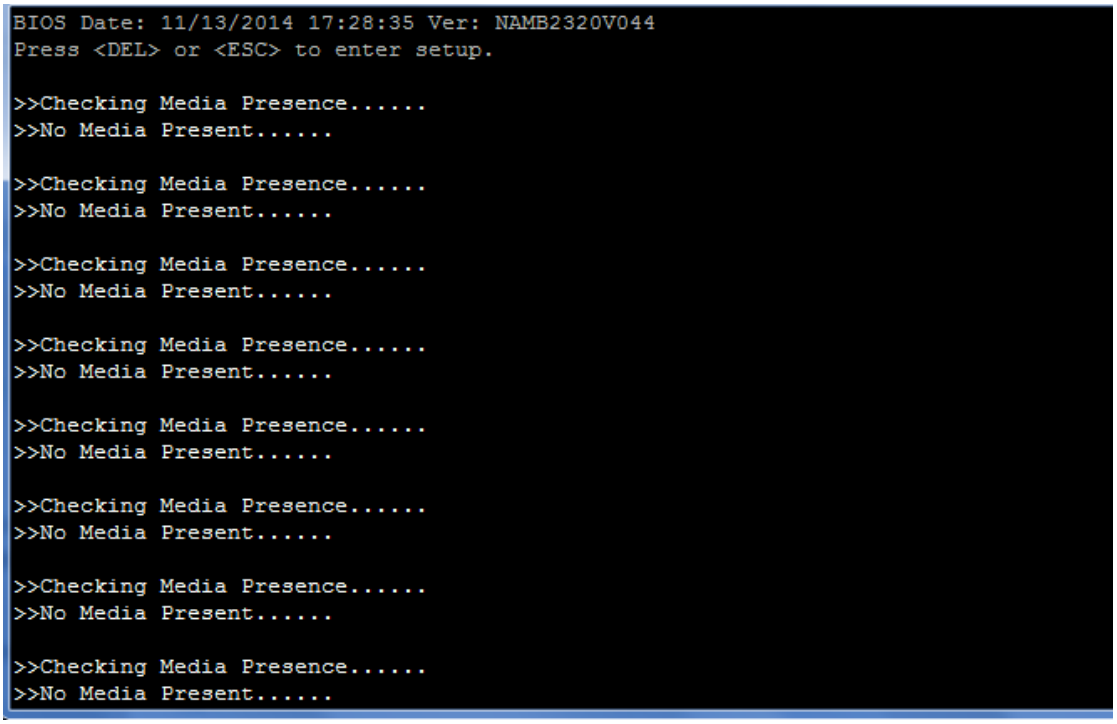
1. It needs to set BIOS/ Advanced-> Network Stack Configuration-> Network Stack as enabled (default setting is disabled)



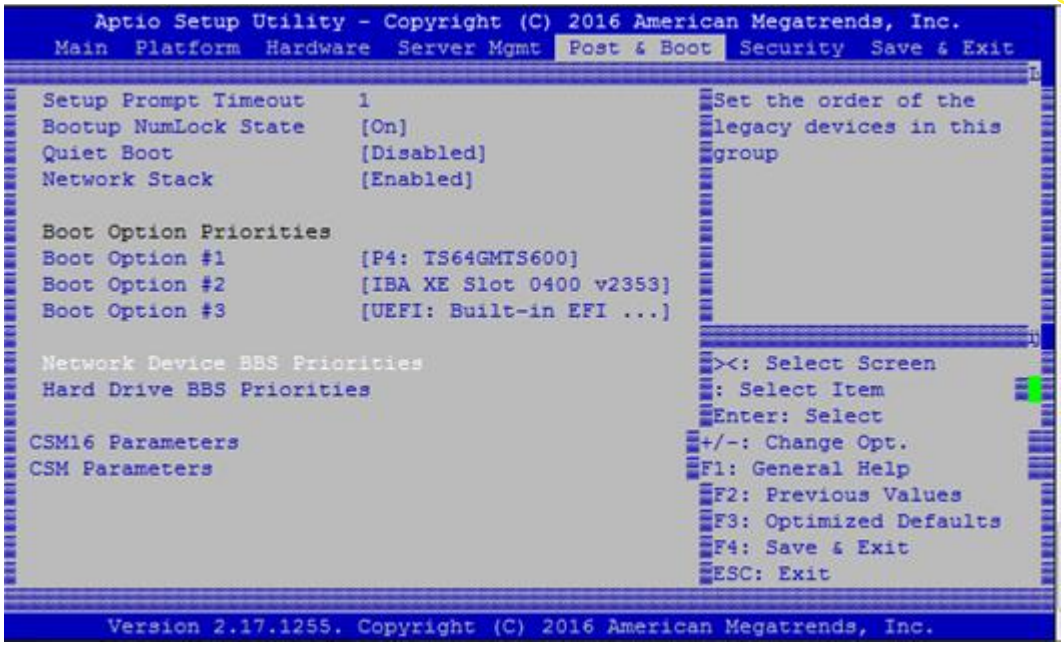
2. When set Network Stack is enabled, and then go to item of " BIOS/ Advanced-> CSM Parameters -> Network" to enable PXE ROM function, set it as "Legacy" (IPV4 PXE) function .



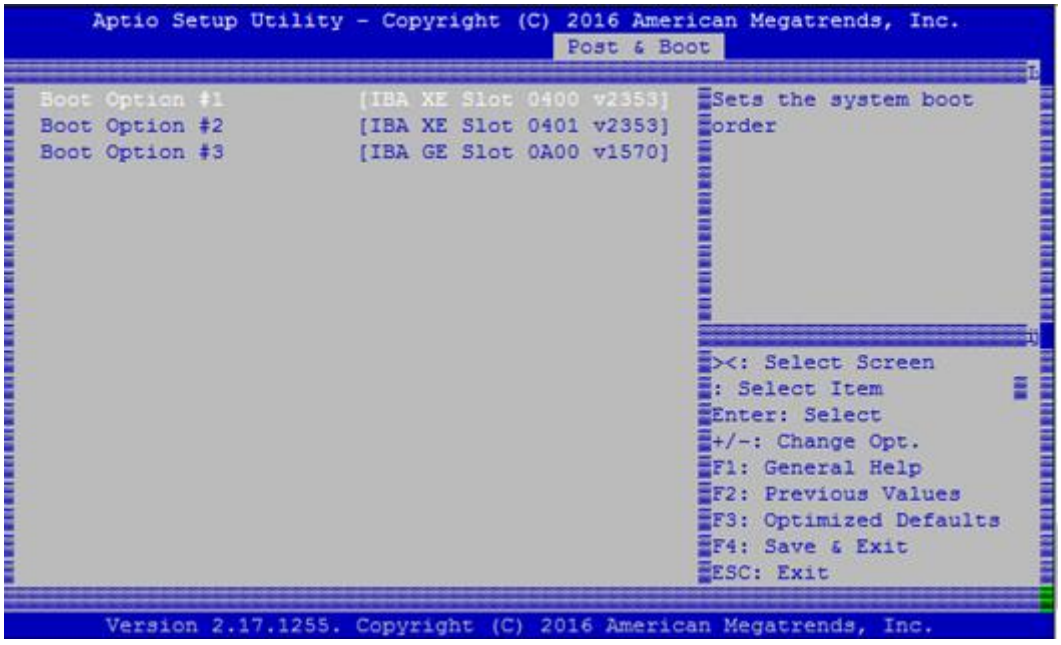
3. Save BIOS and reboot system. The BIOS will show “Checking Media Presence……”, if system is not connected PXE server, it will show “No Media Present……”



4. User may re-login in BIOS, choose BIOS/ boot item, it will has “Network Device BBS Priorities” item and set UEFI PXE LAN boot sequence priority.



And please choose PXE Boot priority as “IBA GE Slot 0A00 v1570” it is on board Mgmt GbE port.



PXE boot usually does not allow for OS installation over network as the PXE client will only load a single file from the boot server. Similarly, booting Linux over network is usually a two stage process. In the first step, a boot loader such a grub or mini OS such as SysLinux are loaded via PXE from the boot server. The boot loader or miniOS then load the actual target OS which usually consists of multiple files which decompressed and installed into a RAM disk. The detailed process and required configuration of such network install will heavily depend on the target OS and boot loader / miniOS used. Please refer to the related documentation available.

PXE boot requires a DHCP server and a TFTP server in the network to complete. DHCP Server and TFTP server are commonly run on the same machine and collectively referred to as "boot server". Setting up such a boot server implies a couple of steps. How-to guides for setting up Linux as PXE boot server are available on the internet, e.g. https://www.debian-administration.org/article/478/Setting_up_a_server_for_PXE_network_booting.

Please note that it is recommended to setup a separate network / subnet for network booting as the DHCP required for PXE booting may conflict with existing DHCP servers in your network.

The PXE client in the FWA-3260 sends the system's GUID as part of the DHCP Request. Some boot servers have mechanisms to automatically configure the target OS image based on the client system's GUID. Using this mechanism allows to use the same boot server for network booting of different devices / appliances.

1.4 Getting Help: Technical Support and Assistance

In case the unit you received is a sample for evaluation, please contact your Advantech representative. For production units, please follow the process below:

1. Visit the Advantech web site at www.advantech.com/support to find the latest information about the FWA-3260 and related products.

2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Worldwide contact information can be found on www.advantech.com.
   -
3. Please have the following information ready before you call / be sure to include this information in your email:
   - Product name and serial number
   - Description of your peripheral attachments
   - Description of firmware and software versions installed on the product
   - A complete description of the problem
   - The exact wording of any error messages

4. In case the unit needs to be send back for repair, please refer to appendix E for instructions.

2. PRODUCT SPECIFICATION

2.1 Overview

The FWA-3260 1U network appliance features Intel's® Xeon® Processor D System On Chip to meet the need for higher core count, larger and faster memory as well as increased IO performance without sacrificing cost efficiency in a compact footprint.With up to 16 Xeon class cores and 1.5MB last level cache per core tightly integrated with DDR4 memory controllers and a rich IO subsystem, the Xeon® D SoC performs extremely well in applications tailored for multicore designs. Besides supporting memory capacities up to 128GB, Xeon® D also brings enhanced reliability and availability features previously only available on high end Xeon® E5 series processors into a midrange appliance footprint. Two integrated 10GE controllers with 128TX/RX queues per port, support for SR-IOV and optimizations for network overlays such as VxLAN and NVGRE as well as high performance PCIe gen.3 interfaces complement the processor subsystem of the SoC.

With an optimized system design the FWA-3260 adds four server class copper ports based on the Intel i350-AM4 Ethernet controller, Advanced LAN bypass capabilities as well as flexible, scalable and high performance port expansion via two PCIe gen.3 Network Mezzanine bays. Support for a PCIex8 gen.3 full height / half length card provides additional flexibility to integrate special purpose IO cards or QuickAssist™ offload adapters such as Advantech's PCIE-3215.

In the base configuration, the system comes with support for two 2.5" SATA HDDs/SSDs, two M.2 sockets, LCM, RJ45 console, two USB ports and two additional GbE management ports. While the FWA-3260A SKU is optimized for highest performance and system reliability supporting redundant, hot swap power supplies, the FWA-3260B is tailored for best cost in entry level applications.

Featuring an optional server BMC in accordance with IPMI2.0, the FWA-3260 supports state-of-the-art remote and lights-out management for increased reliability, serviceability and improved total cost of ownership. Advanced features such as power supply monitoring via PMBus allow the whole platform to be remotely managed. All management firmware can be remotely upgraded using the industry standard HPM.1 protocol, same as the motherboard system BIOS. All upgrades are fail safe and support instant rollback allowing for full system recovery without the necessity for onsite service staff.

The system is FCC,CE,CB,UL,CCC and RoHS compliant.

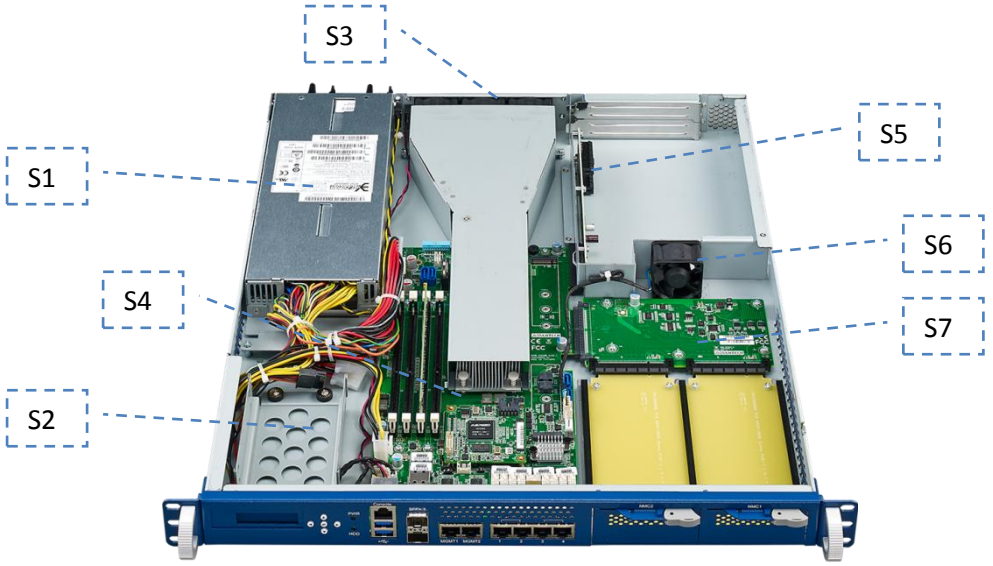


Figure 8: System Overview

Component	Qty.	Description
S1	1	PSU module
S2	1	2x 2.5” HDD bracket
S3	3	Rear system cooling fan
S4	1	NAMB-3260 Motherboard
S5	1	PCIe expansion card mounting area
S6	1	Inner fan
S7	1	Middle board for NMCs

Table 3: System components

2.2 Product Versions

The FWA-3260 is available in the following standard configurations. Contact your Advantech representative for availability of other configuration options.

Model Name	Configurations
FWA-3260A-00E	Intel Xeon D-1528(6C), 6GbE + 2 10GE ports, red. AC PSU, 2 NMC bays, 4 DDR4 RDIMM sockets, up to 2400 MHz 1 PCIEx8 riser card, 1 LOM (IPMI)
FWA-3260A-01E	Intel Xeon D-1548(8C), 6GbE + 2 10GE ports, red. AC PSU, 2 NMC bays, 4 DDR4 RDIMM sockets, up to 2400 MHz 1 PCIEx8 riser card, 1 LOM (IPMI)
FWA-3260B-00E	Intel Xeon D-1508(2C), 6GbE + 2 10GE ports, single AC PSU, 2 NMC bays, 4 DDR4 RDIMM sockets, up to 2400 MHz
FWA-3260B-01E	Intel Xeon D-1527(4C), 6GbE + 2 10GE ports, single AC PSU, 2 NMC bays, 4 DDR4 RDIMM sockets, up to 2400 MHz

Table 4: Available Product Versions

2.3 Technical Specifications

		FWA-3260A	FWA-3260B
Processor System	**CPU** **L2 Cache**	Intel® Xeon D up to 16 cores 1.5MB per core	Intel® Xeon D up to 4 cores 1.5MB per core
Memory	**DIMM socket**	4	
	Technology	Dual channel DDR4-2400MHz ECC	
	Capacity	64GB(UDIMM)/128GB(RDIMM)	
PCIe	**Expansion Slot**	1 x PCIe x8 riser cards Supports full-height/half-length cards	Without PCIe riser card
Ethernet	**LAN on board**	4 x Intel I350-AM4 10/100/1000 Mbps Ethernet with optional 2 segment advanced bypass 2 x Intel I210-AT 10/100/1000 Mbps Ethernet for Management 2 x 10GbE SFP+ (integrated in Xeon® D)	
	NMC modules	2 x NMC modules with PCIex8 gen.3 interfaces Maximum 8 GbE ports, 4 10GE ports or 2 40GE ports Please refer to the "Recommended NMC Module List" section for a list of currently available NMCs	
Storage	**SATA3.0**	2 x 2.5" Internal HDD/SSD	
	Flash	2 x M.2 sockets (1x 2280 or 2x 2240)	
System management & Peripherals	**USB**	2 x USB3.0 ports in the front 1 x USB2.0 ports on board	
	Serial	1 x RS232 Console port (RJ-45 connector)	
	LCD Module	16 x 2 graphic display, 5 buttons	
	IPMI	LOM Module (optional) with Aspeed AST1250 chip	Without LOM module

		Supports IPMI 2.0, redundant BIOS and remote, failsafe BIOS update	
	TPM	Trust Platform Module (Optional)	
Power supply	**Watt**	300W redundant AC PSU (redundant DC PSUs on request)	250W non-redundant AC PSU
	Input	AC 100 ~ 240 V @ 50 ~ 60 Hz, full range PMBus support	AC 100 ~ 240 V @ 50 ~ 60 Hz, full range
Environment	**Temperature**	Operating	Non-operating
	Humidity	0 ~ 40 °C (32 ~ 104 °F) 5 ~ 85 %@40 °C (104 °F)	-20 ~ 80 °C (-4 ~ 167 °F) 5 ~ 95 %
Physical	**Dimensions**	430x500x44 mm (W x L x H), 17”x19.7”x 1.7”	
	Weight(N.W)	10 Kg (22lb)	

The "Recommended NMC Module List" section for a list of currently available NMCs

Recommended NMC Module List

Part Number	NMC-0120	NMC-0121	NMC-0806	NMC-1008	NMC-4005	NMC-4006
						
Description	4-port GbE card	4-port GbE card	8-port GbE card	2-port 10 GbE card	4-port 10 GbE card	2-port 40 GbE card
LAN Controller	1 x Intel® I350-AM4	1 x Intel® I350-AM4	2 x Intel® I350-AM4	1 x Intel® 82599	1 x Intel® XL710	1 x Intel® XL710
Ports	4 x SFP	4 x RJ45	8 x RJ45	2 x SFP+	4 x SFP+	2 x QSFP
Other	With LAN bypass	With LAN bypass	With LAN bypass	With LAN bypass	Without LAN bypass	Without LAN bypass

For a full list of available / recommended NMC modules, please contact your Advantech representative.

Table 5: Specifications

2.3.1 System dimensions

The system dimensions (in mm) are shown below:

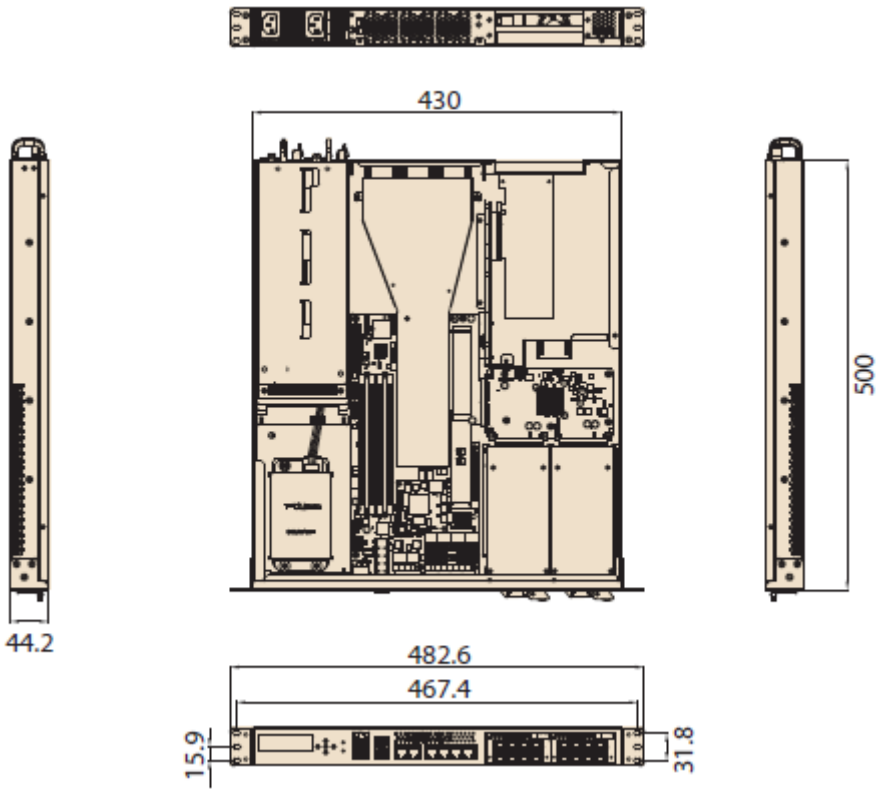


Figure 9: System Dimensions

2.3.2 Regulatory Compliance

The Advantech FWA-3260 meets the specifications and regulations for safety and EMC defined in this chapter. Please contact your Advantech representative for a copy of the declaration of conformity or detailed test reports.

2.3.2.1 Safety

USA/Canada	UL 60950-1 2nd Edition//CSA C22.2 No. 60950-1-07 2nd Edition
Europe	EN 60950-1:2006/A11:2009/A1:2010/A12:2011 EN 60950-1: A2:2013
International	CB Certificate and Report to IEC60950-1, 2nd Edition and all international deviations

Table 6: Applicable Safety Regulations

2.3.2.2 Electromagnetic Compatibility

USA	FCC 47 CFR Parts 15, Verified Class A Limit
Canada	ICES-003 Class A Limit

Europe	EMC Directive, 2004/108/EC EN55022, Class A Limit, Radiated & Conducted Emissions EN55024 Immunity Characteristics for ITE EN61000-4-2 ESD Immunity EN61000-4-3 Radiated Immunity EN61000-4-4 Electrical Fast Transient EN61000- 4-5 Surge EN61000-4-6 Conducted RF EN61000-4-8 Power Frequency Magnetic Fields EN61000-4-11 Voltage Fluctuations
International	CISPR 22, Class A Limit, CISPR 24 Immunity

Table 7: Applicable EMC Regulations

2.3.2.3 CE Mark

The CE marking on this product indicates that it is in compliance with the European Union EMC Directive 2004/108/EC, Safety Directive 2001/95/EC, Low Voltage Directive 2006/95/EC, and RoHS (recast) Directive 2011/65/EU.

2.4 Detailed Description

2.4.1 Front elements

Please refer to appendix A for a description of connector pin definitions.

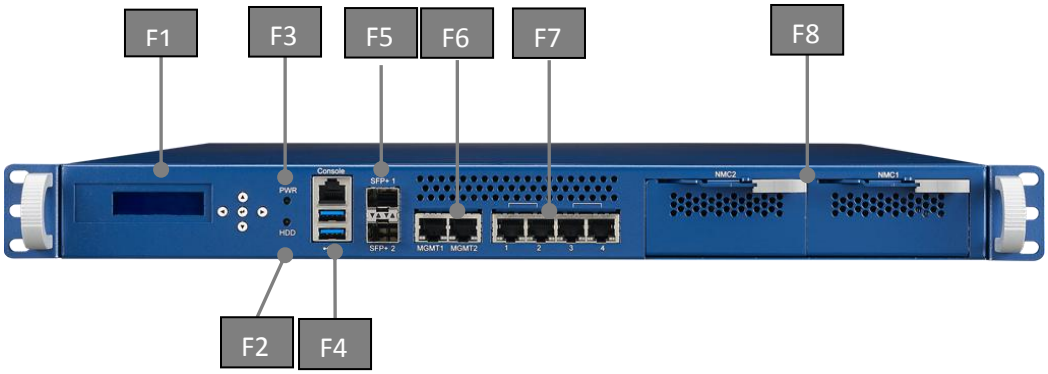


Figure 10: System Front View

Item	Element	Description
F1	LCM	Graphical LCD Module with 5 buttons
F2	HDD LED	Hard disk activity LED (all SATA devices)
F3	PWR LED	Power LED
F4	Console + USB Connector	RS232 Console + Stacked Type A USB connector providing 2 USB2.0/3.0 ports
F5	SFP+ Connector	2 10G SFP+
F6	Management Port 0/1	Management LAN Port 0/1
F7	Traffic Port 1~4	Traffic LAN Port 1~4
F8	NMC slots	2 NMCs slot for NICs expansion

Table 8: Front elements

2.4.1.1 LED details

Two LEDs are provided at the front for signalling important system status at location F2 and F3.

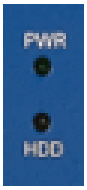


Figure 11: Front LEDs

The PWR LED is a green indicator which is lit when the unit is powered. The HDD activity LED is amber and indicates hard disk and M.2 activity.

2.4.2 Rear Elements

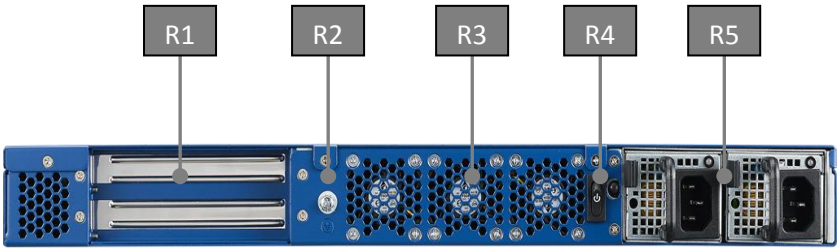


Figure 12: System Rear View

Item	Element	Description
R1	PCIE slots	1 PCIEx8 for Add on card as default option
R2	Grounding screws	Grounding connection
R3	System fan	3 Rear system fan exhaust
R4	On/Off Button	Power DC on/off button
R5	AC Power inlet	AC Power connector (2 skus with single and redundant PSU options)

Table 9: Rear elements

2.4.3 System block diagram

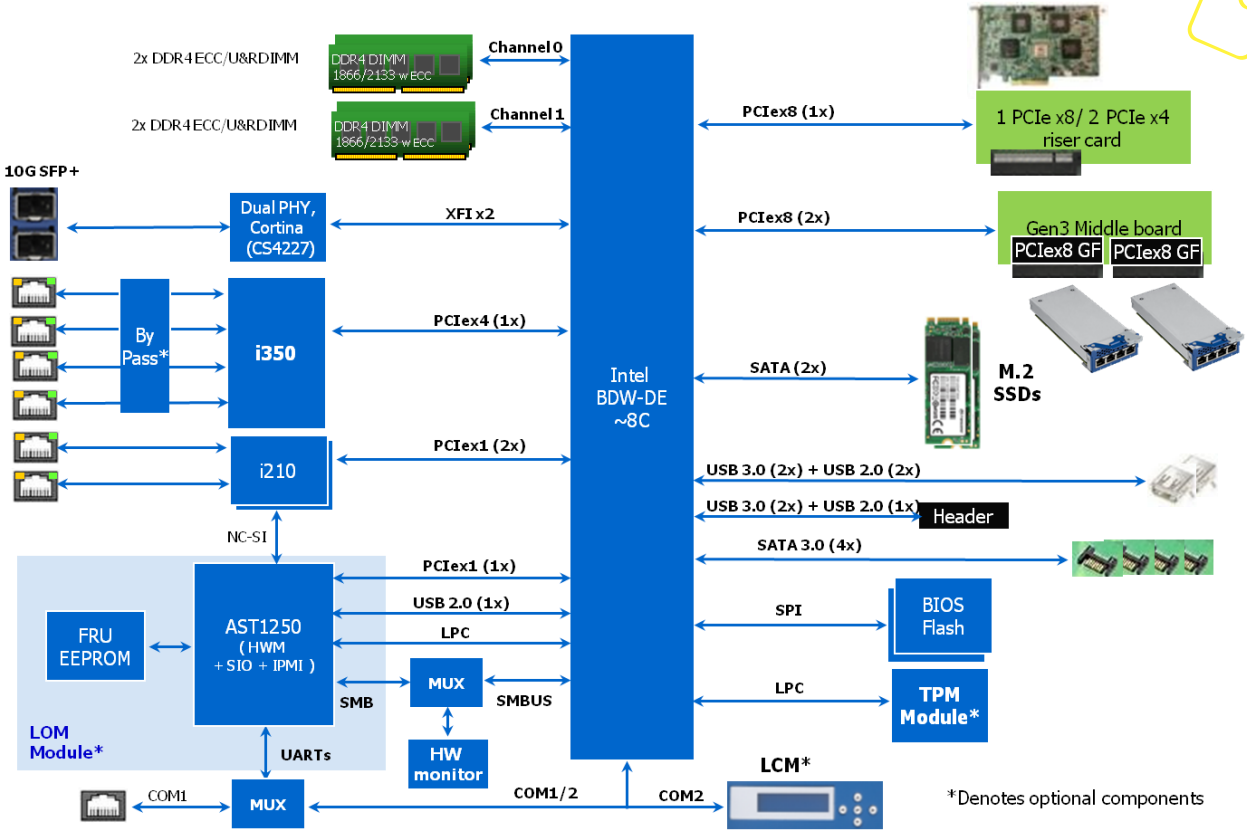


Figure 13: Block diagram

2.4.4 Processor(s)

The FWA-3260 supports one Xeon D processor. The table below gives an overview of the processor SKUs for Network and Storage infrastructure which can be supported on the FWA-3260:

Prod. Avail.	LCC Standard Production (LCC)								HCC Standard Production (SKU definition in planning)			
SKU #	Pentium D1507	Pentium D1508	Pentium D1517	Xeon D-1518	Xeon D-1527	Xeon D-1528	Xeon D-1537	Xeon D-1548	Xeon D-1557	Xeon D-1567	Xeon D-1577	Xeon D-1587
Core #	2	2	4	4	4	6	8	8	12	12	16	16
TDP	20W	25W	25W	35W	35W	35W	35W	45W	45W	65W	45W	65W
Core Freq.	~1.2GHz	~2.2GHz	~1.6GHz	2.2GHz	~2.2GHz	~1.9GHz	~1.7GHz	~2.0GHz	tbd	tbd	tbd	tbd
Max Turbo Freq.	-	~2.5GHz	~1.9GHz	-	~2.5GHz	~2.2GHz	~2.0GHz	~2.3GHz	tbd	tbd	tbd	tbd
Turbo	No	Yes		No	Yes							
HT	No	Yes										
I/O	24x PCIe3, 6x SATA3, 4x USB3.0, 4x USB2.0											
PSE	Yes (NTB, ADR, CBDMA)											
Ethernet	2x 10G (BaseT, iXFI only)	2x 10G (full POR interfaces)		2x 10G (BaseT, iXFI only)	2x 10G (full POR interfaces)				2x 10G (BaseT, iXFI only)	2x 10G (full POR interfaces)		
Memory Type												
Memory Speed	Up to DDR4-1600 DDR3L-1333	Up to DDR4-2133, DDR3L-1600						Up to DDR4-2400, DDR3L-1600	tbd	tbd	tbd	tbd
eTEMP	No											
Life/ Reliability	7yr / 10yr											

Table 10: Xeon D SKUs for Network and Enterprise Storage Infrastructure

Please note that the Xeon D is soldered on the motherboard and cannot be installed later. The standard product configurations available including CPU options are listed in section 2.2. If you're interested in the support of other CPU SKUs, please contact your Advantech representative.

For details on the features of the Xeon D processor, please refer to documentation available from Intel.

2.4.5 Memory

Four DDR4 RDIMMs or UDIMMs are supported on the FWA-3260. Both DIMMs reside on the CPU's memory channel A/B and can support operation up 2400MT/s (CPU SKU dependent).

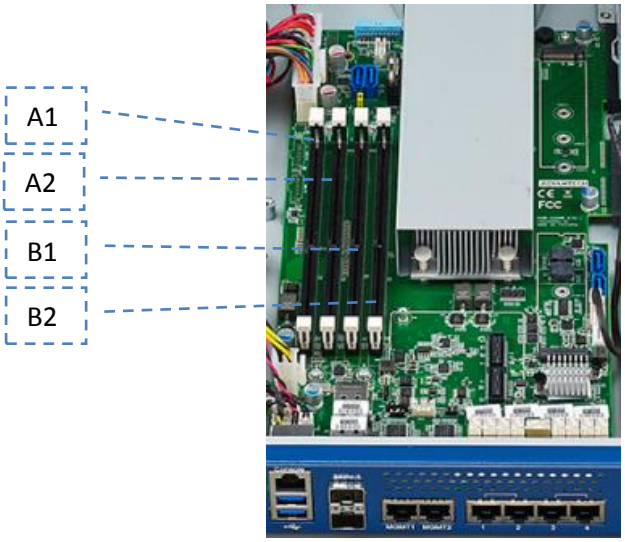


Figure 14: DIMM Location

Location	DIMM	Channel	Color	SMBus Adr.
A0	CN1	A	Black	0xA0
A1	CN2	A	Black	0xA2
B0	CN3	B	Black	0xA4
B1	CN4	B	Black	0xA6

Table 11: DIMM mapping

DIMM modules need to be populated in A1 or B1 as first priority. DDR4 modules will be recognized automatically. No manual adjustment is required.

It is recommended to use identical DIMMs on both sockets for best performance and reliability.

The following list summarizes the modules validated on the FWA-3260:

Vendor	Frequency	Capacity	Advantech PN
Advantech	DDR4-2133	4G	AQD-D4U4GR21-SG
	DDR4-2133	8G	AQD-D4U8GR21-SG
	DDR4-2133	16G	AQD-D4U16R21-SE

Table 12: Validated DIMMs

Please contact you Advantech representative for the most recent list of validated peripherals or if you would like to use modules not listed.

2.4.6 Chipset

The chipset / PCH functionality is integrated into the Xeon D SoC.

2.4.6.1 USB

The FWA-3260 supports two external USB2.0/3.0 ports which can be used to connect low, full and high speed devices. The 5V supply rail supplied to external devices is current limited by a self resetting, electronic fuse to 500mA.

USB Port	USB Type	Implementation
0/1	2.0/3.0	Type A front panel connector
1/2	2.0/3.0	Type A front panel connector
3	2.0	USB header (reserved)
5/6	3.0	USB header (reserved)

Table 13: USB Ports

2.4.6.2 SATA

The PCH has two integrated SATA host controllers that support independent DMA operation and supports data transfer rates of up to 6.0 Gb/s (600 MB/s) on up to six ports while all ports support rates up to 3.0 Gb/s (300 MB/s) and up to 1.5 Gb/s (150 MB/s). The SATA controller contains two modes of operation—a legacy mode using I/O space, and an AHCI mode using memory space. Software that uses legacy mode will not have AHCI capabilities. Four SATA connectors and two M.2 connectors are implemented on motherboard design The SATA ports are implemented per below table on the FWA-3260.

System SATA Port	Implementation	Controller	Controller Port
1	SATA header 1	SATA3	Port 0
2	SATA header 2	SATA3	Port 1
3	SATA header 3	SATA3	Port 2
4	SATA header 4	SATA3	Port 3
5	m.2 socket (location CN17)	SATA3	Port 4
6	m.2 socket (location CN18)	SATA3	Port 5

Table 14: SATA Ports

Figure 15: m.2 SSD

The following list summarizes the drives validated on the FWA-3260:

Please contact you Advantech representative for the most recent list of validated peripherals or if you would like to use modules not listed.

Vendor	Vendor PN (Capacity)	Advantech PN
HDD Drive		
WD	WD5000LUCT-63Y8HY0 500GB	
Intel	Intel SSD DC S3500 Series SSDSC2BB160G4	
ADVANTECH	820 Series 2.5” SATA III SSD 640G	SQF-25M5-60G-S8C
WD	SATA 2.5” HDD 1T (24x7)	96ND1T-ST-WD5KE

m.2 SSD		
ADATA	ADATA IM2S3138E-128GM-B	
Transcend	TS64GMTS400 TS64ZBTMM0000A	
Transcend	TS64GMTS800 TS64XBTMM0000A	
PLEXTOR	PLEXTOR PX-64G7Ge 64GB	96FD42-N064-PLG
PLEXTOR	PLEXTOR PX-128G7Ge 128GB	96FD42-N128-PLG
PLEXTOR	PLEXTOR PX-256G7Ne 256GB	96FD80-N256-PLG
PLEXTOR	PLEXTOR PX-512G7Ne 512GB	96FD80-N512-PLG

Table 15: Validated SATA drives

2.4.6.3 Legacy Functions and IO

2.4.6.3.1 Serial Ports

The SoC integrates two 16C550 compliant UARTs which are mapped to the default resources:

UART	Port	Resources	Implementation
0	COM1	IO Range 0x3f8 -0x3ff, IRQ4	Console port
1	COM2	IO Range 0x2f7 – 0x2ff, IRQ3	Interface to LCM

Table 16: COM Ports

The SoC provide two high-speed serial communication ports (UARTs)with Tx/Rx only. The UARTs support legacy speeds up to 115.2K bps. Not support hardware flow control (CTS/RTS)

COM1 is used for console display, baud rate setting need consistent with external terminal. 115.2K is set in BIOS as default value.

2.4.6.3.2 SMBus

The PCH integrates two SMBus controllers. The first one is used as interface to external devices such as EEPROMs, the hardware monitor; the second controller is not used on the FWA-3260.

SMBus	Adr,	Device	Function
0	0x5A/5C	NCT7904D	Hardware monitor chip
0	0xA0	DIMM A0 SPD	SPD EEPROM
0	0xA2	DIMM A1 SPD	SPD EEPROM
0	0xA4	DIMM B0 SPD	SPD EEPROM
0	0xA6	DIMM B1 SPD	SPD EEPROM
0	0xAC	24C02	System FRU EEPROM

Table 17: SMBus Devices

Most of the SMBus devices are only accessed by BIOS at system start up to determine and set system configuration. Tampering with these devices may lead to system instability and malfunction.

Information on the hardware monitor and how to access it is provided in section 2.4.13.

Information reg. the FRU EEPROM can be found in section 2.4.14.2.

2.4.7 Network interfaces (onboard)

The FWA-3260 supports a total of 6 network ports copper and 2 10G SFP+ port fiber on board.

There are 2 i210 GbE LAN device for management(locations F6), and 1 i350 for “traffic” ports(locations F7), the i210 is a single LAN chip and i350 GbE LAN device is a four port LAN chip, compact, low power components that offer a fully integrated Gigabit Ethernet Media Access Control (MAC) and Physical Layer (PHY) port.

The i210 LAN chip and i350 LAN chip are connected from integrated PCH PCIe port. The LAN chip can support PCIe Gen1 and 10/100/1000 Mb/s.

The X552 10G MAC integrated in Broadwell-DE SoC package, and it connect with external PHY CS4227 (10GbE SFP+ PHY) to support 2 SFP+ connector on board in front IO(locations F5).

2.4.8 PCIe Expansion

A std PCIex8 slot as add on card expansion module in rear pane(locations R1) . The expansion slot supports 1 PCIex8 gen.3 connectivity. (2 PCIex4 on request)

2.4.9 TPM Module

Infineon SLB9665TT2.0 FW5.00 TPM module is used in this design. The Infineon SLB SLB9665TT2.0 FW5.00 Trusted Platform Module (TPM) is an integrated circuit and software platform that provides computer manufacturers with the core components of a subsystem used to assure authenticity, integrity and confidentiality in e-commerce transactions and Internet communications. The SLB9665TT2.0 FW5.00 is a complete solution implementing version 2.0 of the Trusted Computing Group specifications (TCG), which is an industry group founded in 2003 by AMD, HP, IBM, Intel, Microsoft and now including more than 50 companies.

The board dimension of module is 20mmX20mm. A screw to secure the board in MB. Avoid system vibrations to cause module off.

2.4.10 LCD Module

Features

21 columns × 4 lines text display

128 × 32 dots graphic display

Text wrap, scroll and inverse capability

Built in characters plus 16 user defined characters

Communicate over RS232 interface

Baud rate speed selection between 9600 and 19200 bps

Programmable on/off and brightness of the LED backlight

Horizontal and vertical bar charts

32 bytes reserved non-volatile memory spaces for user settings

5 buttons keypad

Fit in a standard 3.5" floppy

2.4.11 Mass Storage

Up to four SATA devices and two m.2 SSD are supported by the FWA-3260. In the default configuration, two SATA 2.5”HDD devices are supported (location M1): an onboard m.2 socket with 22x42 or 60 or 80 type support (location M2) and another on board m.2 socket with 22x42 type support only(location M3).

The HDD power cable and SATA cable are supplied with the unit.

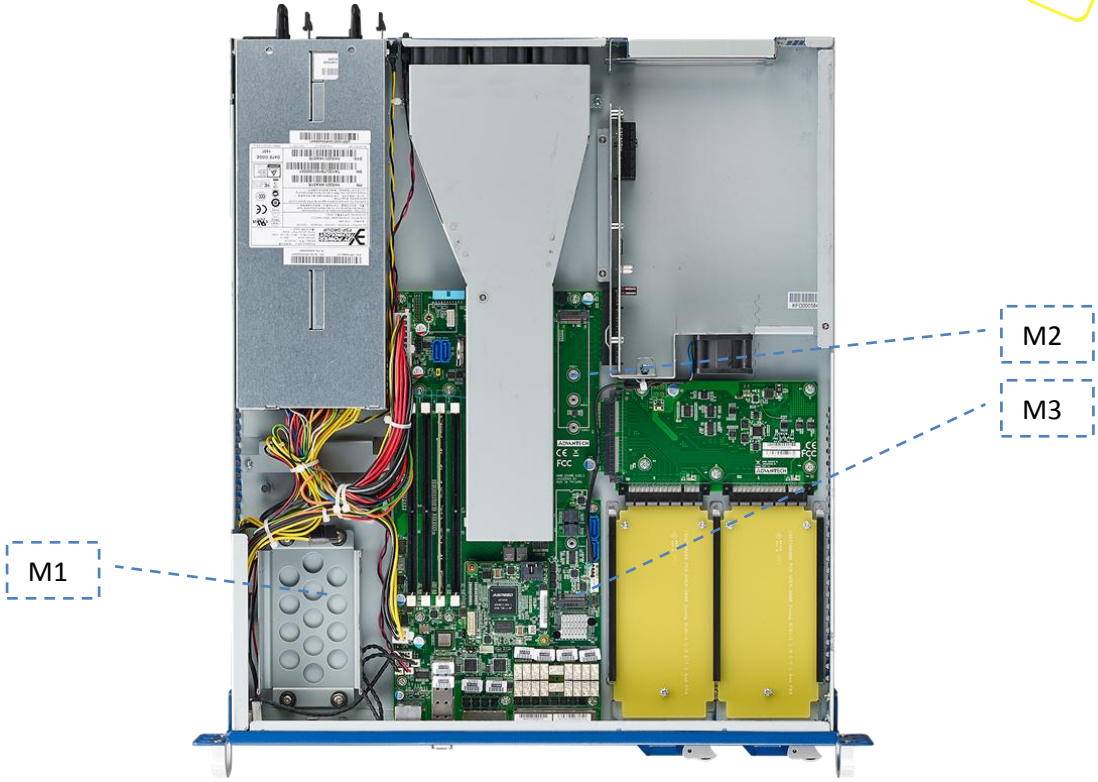


Figure 16: Mass storage components

2.4.12 BIOS

The FWA-3260's BIOS is based on AMI's APTIO BIOS and compliant to the UEFI, SMBIOS and ACPI specifications.

The BIOS performs probing, initialization and configuration of the FWA-3260 and initializes the OS boot process at the end of POST (Power On Self Test).

Regular BIOS output as well as the setup menu are displayed via the console port. Please refer to section 1.3.3 reg. the console connection process.

The BIOS Setup Menu is described in detail in section 3.2. BIOS Error Codes used during POST are described in appendix B.

Please note that the FWA-3260 does not have any onboard POST Code LEDs onboard. A special POST code adapter is required to retrieve BIOS error codes.

All BIOS configuration parameters bare stored in NVRAM, a dedicated section of the BIOS flash chip. Parameters are no longer stored in legacy CMOS RAM by the platform BIOS. I.e. BIOS configuration parameters will not be lost due to an empty battery.

2.4.12.1 Password protection

The BIOS supports and administrator password to restrict access to the BIOS setup menu to qualified and trusted personal, only.

2.4.12.2 BIOS defaults

The BIOS comes with a set of configuration parameters when shipped by Advantech referred to as “Optimized Defaults” or “factory defaults”. The user can change BIOS settings via the setup menu either temporarily or permanently by saving the changes as “User defaults”.

The BIOS loads Optimized Defaults by the option “Restore Defaults; and loads User defaults by the option “Restore User Defaults”. If no User defaults have been defined, the BIOS will do nothing.

2.4.12.3 PCIe Tree

The BIOS also performs an enumeration of all PCIe resources, builds a bus/device map and assigns resources to the PCIe devices. Most OSs performs a reallocation of resources during start up. However, the PCIe bus/device map will not be changed by the OS. The table below gives an overview of the PCIe devices and their corresponding system function:

PCIe bus:dev:fun	PCIe VenID : DevID	Device	Description
00:00:00	8086:6F00	Host bridge	DMI2 x4 Link from Processor to PCH
00:01:00 - 01	8086:6F02-6F03	PCI Express Root Port 1	Intel PCIe Root Port 1
00:02:00 - 03	8086:6F04-6F07	PCI Express Root Port 2	Intel PCIe Root Port 2
00:03:00 - 03	8086:6F08-6F0B	PCI Express Root Port 3	Intel PCIe Root Port 3
00:14:00	8086:8C31	Intel USB xHCI	Intel USB3.0 Controller
00:16:00	8086:8C3A	Intel® ME Interface #1	Intel ME
00:16:01	8086:8C3B	Intel® ME Interface #2	Intel ME
00:1C:00	8086:8C10	Intel PCH PCI Express* Port 1	Intel PCH Root port1
00:1C:04	8086:8C18	Intel PCH PCI Express* Port 5	Intel PCH Root port5
00:1C:05	8086:8C1A	Intel PCH PCI Express* Port 6	Intel PCH Root port6
00:1C:06	8086:8C1C	Intel PCH PCI Express* Port 7	Intel PCH Root port7
00:1D:00	8086::8C26	Intel USB EHCI #1	Intel EHCI controller

00:1F:00	8086:8C54	Intel LPC device	Intel LPC device
00:1F:03	8086:8C22	Intel SMBus	Intel SMBus controller
00:1F:02	8086:8C06	Intel SATA1	Intel SATA controller
00:1F:05	8086:8C08	Intel SATA	Intel SATA controller
02:00:00 - 03	8086:6F51-6F53	Intel QuickData Technology	DMA Channel 0 to Channel 3
03:00:00	8086:15AC	Intel Lan controller	Intel BoradWell-DE LAN Controller
05:00:00	8086:1521	Intel I350 LAN	Onboard I350 LAN device #1
05:00:01	8086:1521	Intel I350 LAN	Onboard I350 LAN device #2
05:00:02	8086:1521	Intel I350 LAN	Onboard I350 LAN device #3
05:00:03	8086:1521	Intel I350 LAN	Onboard I350 LAN device #4
06:00:00	8086:1533	Intel I210 LAN	Onboard I350 LAN device #1
07:00:00	8086:1533	Intel I210 LAN	Onboard I350 LAN device #2
08:00:00	1A03:1150	Aspeed PCI Express Root Port	Aspeed PCIe Root Port
09:00:00	1A03:2000	Aspeed VGA	Onboard VGC

Table 18: PCIe devices

2.4.13 Platform Management

A Nuvoton NCT7904 Hardware Monitor Chip (HWM) provides hardware monitoring capabilities on the FWA-3260. The HWM chip is connector to the PCH's SMBus. Standard software packages such as "lmsensors" can be used on the host to provide sensor information under Linux. Advantech provides the required patch that adds support for the HWM chip and a system specific configuration file.

Please contact your Advantech representative if you wish to receive the lmsensors patch or, in case you want to implement your own hardware monitoring solution, to obtain more details regarding the hardware implementation.

The HWM monitors all critical voltages on the FWA-3260:

Pin No.	Pin Name	Function
6	HWM_VSEN6	Monitor PSU +12V Power
7	HWM_VSEN7	Monitor PSU 5V Power
8	HWM_VSEN8	Monitor PSU 5V standby power
9	+VCORE	Monitor CPU Vcore Power
11	+VDDQ	Monitor DIMM Power
13	+1V05_PCH	Monitor PCH 1.05V power
48	VBAT	Monitor coin-battery Power

Moreover, the following temperatures are supervised:

Pin No.	Pin Name	Function
2, 3	HWM_DP1/2	Monitor inlet Temperature
5, 6	HWM_DN1/2	Monitor outlet Temperature

The HWM also monitors the rear fans:

Pin No.	Pin Name	Function
29	HWM_FANIN1	Monitor FAN1 Speed
31	HWM_FANIN2	Monitor FAN2 Speed
33	HWM_FANIN3	Monitor FAN3 Speed
35	HWM_FANIN4	Monitor FAN4 Speed

In addition to the HWM, the Xeon D CPU features integrated temperature sensors (1 per core) that are supported by the module of lmsensors:


```
[root@localhost ae]# sensors
coretemp-isa-0000
Adapter: ISA adapter
Physical id 0:  +38.0°C  (high = +82.0°C, crit = +104.0°C)
Core 0:         +38.0°C  (high = +82.0°C, crit = +104.0°C)
Core 1:         +38.0°C  (high = +82.0°C, crit = +104.0°C)
Core 2:         +38.0°C  (high = +82.0°C, crit = +104.0°C)
Core 3:         +38.0°C  (high = +82.0°C, crit = +104.0°C)
Core 4:         +38.0°C  (high = +82.0°C, crit = +104.0°C)
Core 5:         +38.0°C  (high = +82.0°C, crit = +104.0°C)
Core 6:         +38.0°C  (high = +82.0°C, crit = +104.0°C)
Core 7:         +38.0°C  (high = +82.0°C, crit = +104.0°C)
Core 8:         +38.0°C  (high = +82.0°C, crit = +104.0°C)
Core 9:         +38.0°C  (high = +82.0°C, crit = +104.0°C)
Core 10:        +38.0°C  (high = +82.0°C, crit = +104.0°C)
Core 11:        +38.0°C  (high = +82.0°C, crit = +104.0°C)
Core 12:        +38.0°C  (high = +82.0°C, crit = +104.0°C)
Core 13:        +38.0°C  (high = +82.0°C, crit = +104.0°C)
Core 14:        +38.0°C  (high = +82.0°C, crit = +104.0°C)
Core 15:        +38.0°C  (high = +82.0°C, crit = +104.0°C)
```

Figure 19: Display of CPU temperature

The diagram below shows the location of the various temperature sensors:

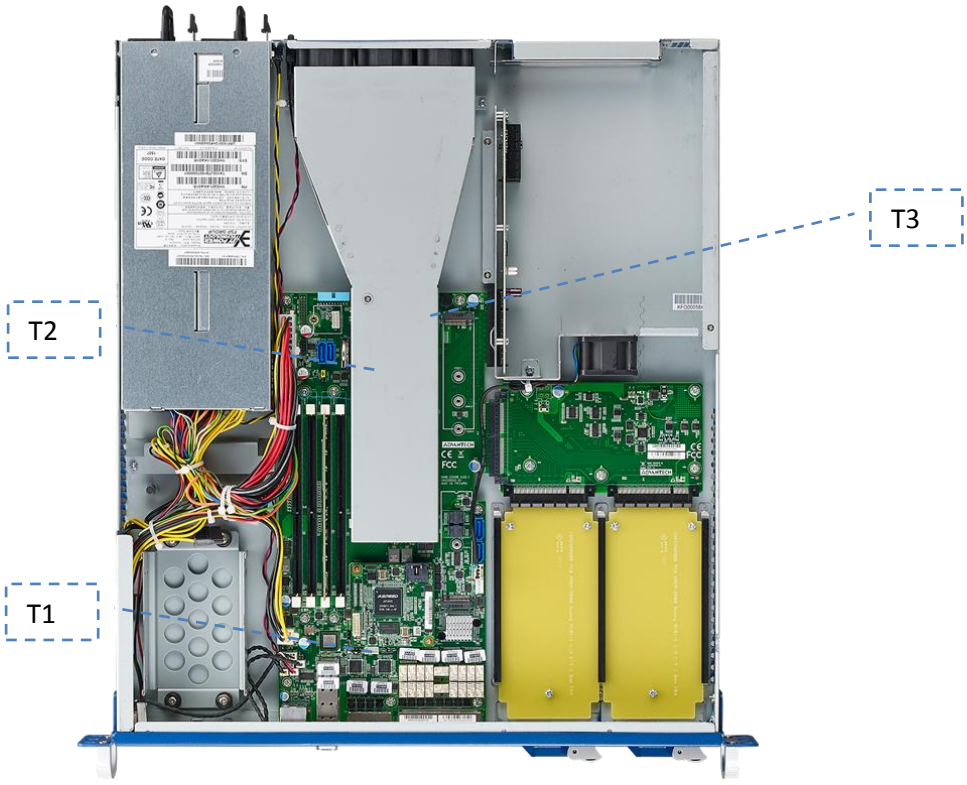


Figure 17: Thermal Sensor Locations

Sensor	Description
T1	Air Inlet Sensor
T2	CPU Temperature Sensors (integrated into SoC)
T3	Air Outlet Sensor

Table 20: Thermal Sensors

2.4.14 Power Supplies

The FWA-3260 supports a single AC and redundant PSU wide range PSU located at position Rx. Technical specification for the power supply can be found in appendix C.

2.4.14.1 Product Labelling

The FWA-3260 contains a number of labels that help to identify the product as well as the MAC addresses used by the system. The type label is placed on the bottom side of the unit and other labels can be found inside the unit.

Figure 18: Type Label (bottom)

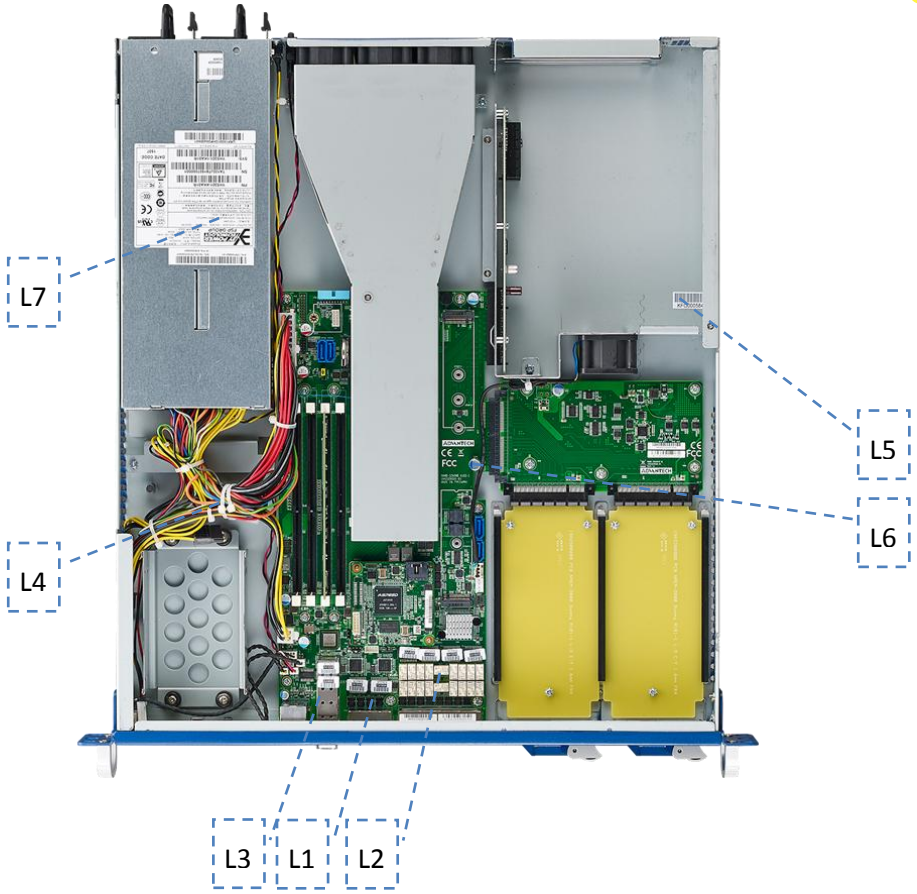


Figure 19: Product Labels (internal)

Label	Description
L1	MAC Address for Management Port 0/1
L2	MAC Address for Traffic Port 1~4
L3	MAC Address for Traffic Port 5/6
L4	Motherboard Serial Number
L5	System Serial Number
L6	CE/FCC/RoHS/WEEE labels (on PCB)
L7	PSU labels (PSU specific)

Table 21: Product Labels

2.4.14.2 Electronic label: FRU EEPROM

The FWA-3260 supports an onboard FRU EEPROM which can be accessed via SMBus 0 using afru. The table below shows the FRU EEPROM format:

DMI Table	Field in DMI Table	Field in System FRU	Parameter in afru_mfg
Type 1 **System Information**	Manufacturer	Product Manufacturer	PM
	Product Name	Product Name	PN
	Version	Product Version	PV
	Serial Number	Product Serial	PS
	SKU Number	Product Part Number	PPN
Type 2 **Base Board Information**	Manufacturer	Board Mfg	BM
	Product Name	Board Product	BP
	Version	Product Version	PV
	Serial Number	Board Serial	BS
Type 3 **Chassis Information**	Version	Chassis Part Number	CPN
	Serial Number	Chassis Serial	CS

Table 22: FRU Data Synced to the DMI Tables

Alternatively, FRU information is also embedded in DMI Tables 1/2/3 and can be displayed with DMI parsing tools like dmidecode.

For a detailed description of the FRUs functionality and the related software API, please refer to the Advantech_Afru_Utility_User_Guide_Rev0_1. (Please contact your Advantech representative to get the doc)

2.5 Advanced Platform features

2.5.1 Intrusion detection

The FWA-3260 does not support intrusion detection by default. This feature has been reserved in the motherboard design, though, and can be enabled at system level via customization. Please contact your Advantech representative should you be interested in this option.

2.5.2 Watchdog

The FWA-3260 provides a programmable watchdog that may be used to reset the system in case it bites due to malfunctioning application software to restore the unit to a known good state. The watchdog is based on H/W monitor 7904D timer. The watchdog timer is supported under Linux via a kernel driver. Please refer to Linux documentation in details.

2.5.3 LAN Bypass

For a detailed description of the LAN Bypass functionality and the related software API, please refer to the Advanced LAN Bypass User's Manual.

LAN bypass allows automated or manual control of the connectivity between two LAN ports grouped into a bypass segment and the host:

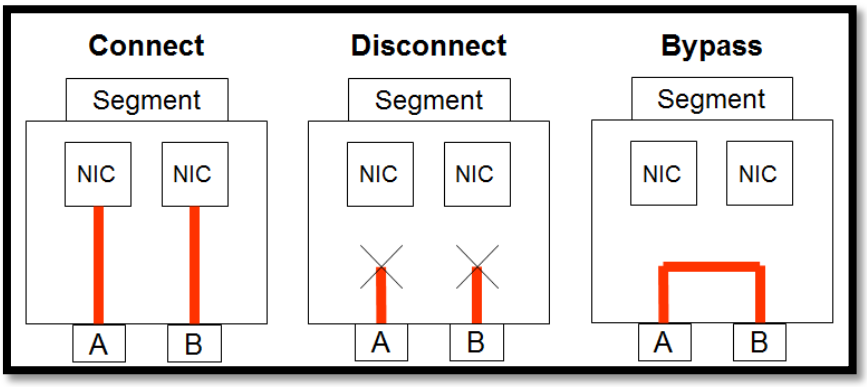


Figure 20: Connectivity options of LAN ports in a bypass segment

In "connect" mode, the ports on a segment are connected to the host via NICs. Traffic will enter and leave the ports just like on a regular NIC.

In "disconnect" mode, the ports are disconnected from the host and from each other. No traffic can flow through the ports

In "bypass" mode, the two ports are disconnected from the host, but connected to each other. Traffic entering the system on one port will be sent out on the other port and vice versa.

"Bypass mode" is used to allow traffic to flow through the system when the system is in a non operational state such as loss of power or in case the application is unresponsive. Application health is monitored by a configurable watchdog.

"Disconnect" mode is typically used to block any traffic until the system has fully started up and the application SW is in a well defined state allowing to handle traffic properly.

Connectivity can be auto controlled by a number of system events:

- **Power Up**
  Host system is turned on / powers up (DC on)
- **Power Down**
  Host system is turned off / powers down (DC off)
- **Power Reset**
  Host system is reset or rebooted
- **Watchdog Start**
  LAN bypass watchdog is started or strobed for the first time
- **Watchdog Timeout**
  LAN bypass watchdog timed out
- **External Trigger**
  Global Watchdog Trigger input (dedicated GPIO pin)

In addition to the event driven model, it is also possible to set the connectivity for a bypass segment via the SW API.

2.5.3.1 LAN Bypass Segments

The FWA-3260 supports four onboard traffic ports which are grouped into 2 bypass segments as shown below:

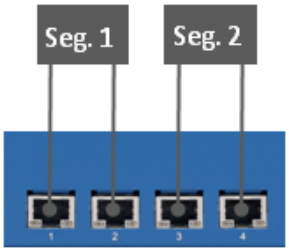


Figure 21: Onboard LAN ports and bypass segments

2.5.3.2 Bypass Watchdog Support

Each bypass segment is support by an independent watchdog timer. The timer basis is set to 100ms. Watchdog timeout periods can be set between 100ms and 6553.5 seconds (about 109 minutes).

The FWA-3260 also supports a global watchdog trigger which allows multiple bypass segments to be controlled at the same time. The global watchdog signal is connected between the two onboard bypass segments and also to the PCIe extension connector (for future use).

2.5.3.3 LED Behaviour

Advantech Advanced LAN bypass uses a LED to show the state of a bypass segment. Usually the bypass LED is implemented as a dual colour LED combined with a regular LAN port LED. The table below shows the status of the bypass LED, only. For a complete description of port LEDs please refer to appendix A.3.2).

State	LED Status
CONNECT	Off
BYPASS	Solid Amber
DISCONNECT	Blinking Amber (1Hz)

Table 23: Bypass States and LED behaviour

2.6 Available Accessories and Related Products

2.6.1 Accessories

The following accessories are available for ordering. Please contact your Advantech representative for a list of available and supported peripherals such as memory modules, hard disks and solid state drives

Model Name	Configurations
1702002600	Power cable 3P 180 cm, USA
1702002605	Power cable 3P 180 cm, Europe
1702031801	Power cable 3P 180 cm, UK
1700000237	Power cable 3P 180 cm, JP
9680006903	Repon 20" traditional slide rail screws type
9680016887	Repon 20" slide rail tool-less type
9680016903	Repon 22" traditional slide rail screws type
9680016888	Repon 22" slide rail tool-less type

Table 24: Accessories

3. CONFIGURATION AND SERVICE

3.1 Jumper Settings

There are no jumpers on the FWA-3260 intended for customer use.

3.2 BIOS Setup Menu

This section describes the FWA-3260's UEFI BIOS based on AMI's APTIO BIOS.

Users can modify BIOS settings and control the special features of the FWA-3260 using the BIOS setup menu.

Please note that Advantech supports shipping the FWA-3260 with custom BIOS defaults to simplify the deployment and integration for our customers. Please contact your Advantech representative if you want to receive more information regarding this service.

The BIOS Setup Menu can be entered via the BIOS POST screen displayed on the console interface:

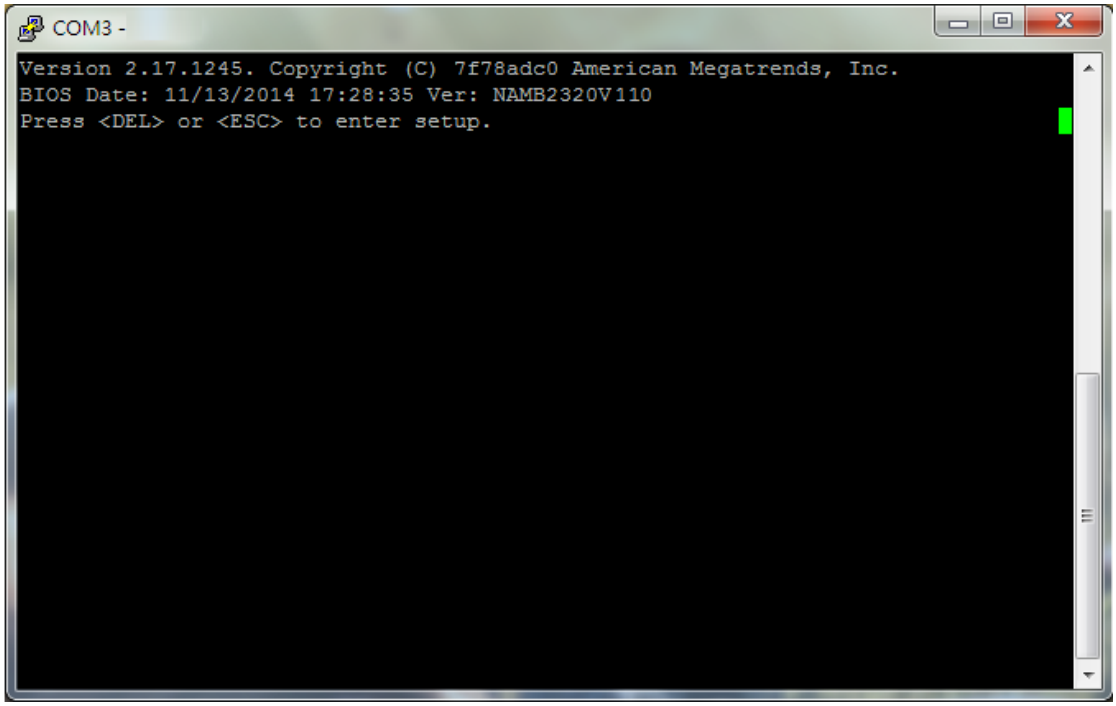


Figure22: BIOS POST screen (example)

BIOS Setup can be entered by hitting <DEL> or <F2> keys during POST.

The BIOS setup menu screens have a few main elements as shown below. The menu bar displays the selectable menu pages as tabs. The parameter window displays and allows configuration of the settings available in a given menu page or a submenu thereof. Auxiliary text providing information about the selected setup item is displayed in the top right corner.

Figure 23: BIOS Setup Screen Organization

3.2.1 Main Setup Menu

If security protection has been enabled previously (see chapter 3.2.4), you will be prompted for the BIOS password upon entering the BIOS Setup. After a successful check or if password protection has not been enabled, users will see the Main Setup screen shown below. Users can always return to the Main setup screen by selecting the Main tab.

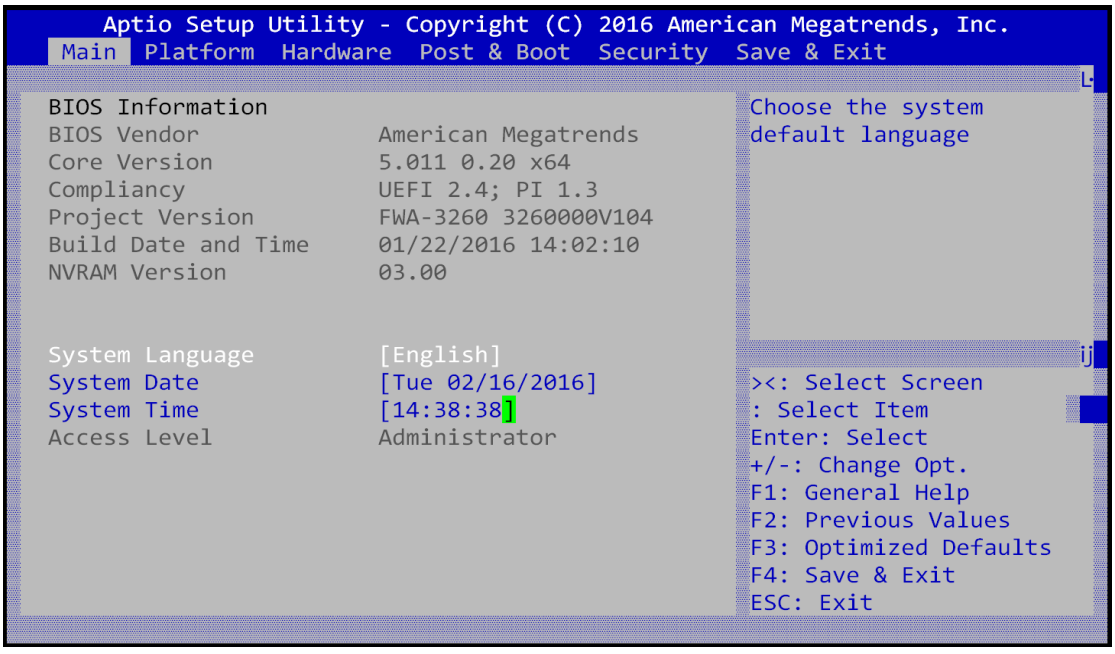


Figure 24: BIOS Setup Main screen

The main setup page displays system a summary of system and BIOS configuration and status information. The fields on this page are read-only except for the System Date and Time setting.

Group	Setup item	Access / Options	Description
BIOS Information	BIOS Vendor	Display only	American Megatrends
	Core Version	Display only	Current AMI BIOS core version in use
	Compliancy	Display only	UEFI Spec revision that the BIOS complies to
	Project Version	Display only	Advantech BIOS Version info EX: mmmm Vx.yz mmmm : model name X : major version Yz: minor version
	Build Date & Time	Display only	Shows BIOS build date and time
	NVRAM Version	Display only	Shows current NVRAM ver.
System Language		Display only	Selects the Setup Menu Language. Only English is supported on the FWA-3260.
System Date		MM/DD/YY	Displays and sets the system date as used by the BIOS
System Time		HH:MM:SS	Displays and sets the system time as used by the BIOS
Access Level		Display only	Shows the user privilege level according to the security settings. If password protection has not been enabled, this will default to "Administrator"

Table 25: BIOS Setup: Main Menu

3.2.1.1 Setting System Time and Date

Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

Please not that system time and date are set during manufacturing process according to factory's local time zone. You may need to update system time to reflect the desired time zone when you receive the unit.

3.2.2 Platform Setup Menu

Select the Platform tab from the FWA-3260 setup screen to enter the Platform Setup screen. Users can select any of the items in the left frame of the screen, such as the Trusted Computing Configuration, to go to the sub menu for that item. Users can display an Platform BIOS Setup option by highlighting it using the <Arrow> keys.

The Platform BIOS Setup screen is shown below. The sub menus are described on the following pages.

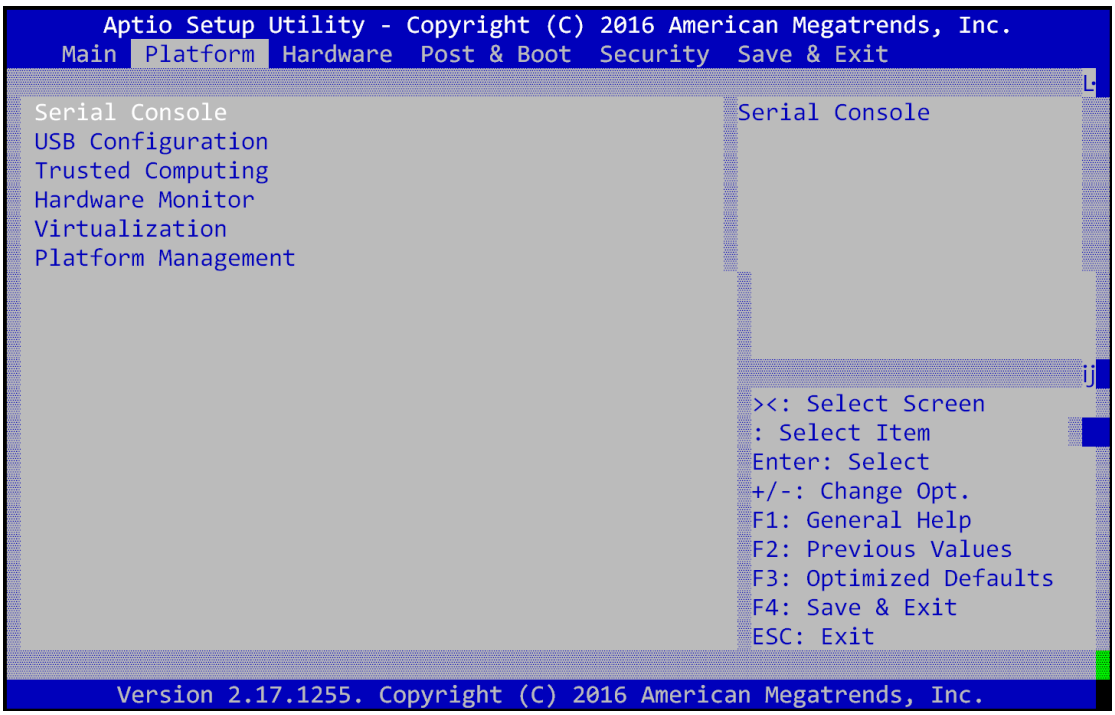


Figure25: Platform Setup Main screen

3.2.2.1 Serial Port Console Redirection

This sub menu allows you to change the settings used for the serial console.

Note that the serial console is always using COM1 which is connected to the front panel.

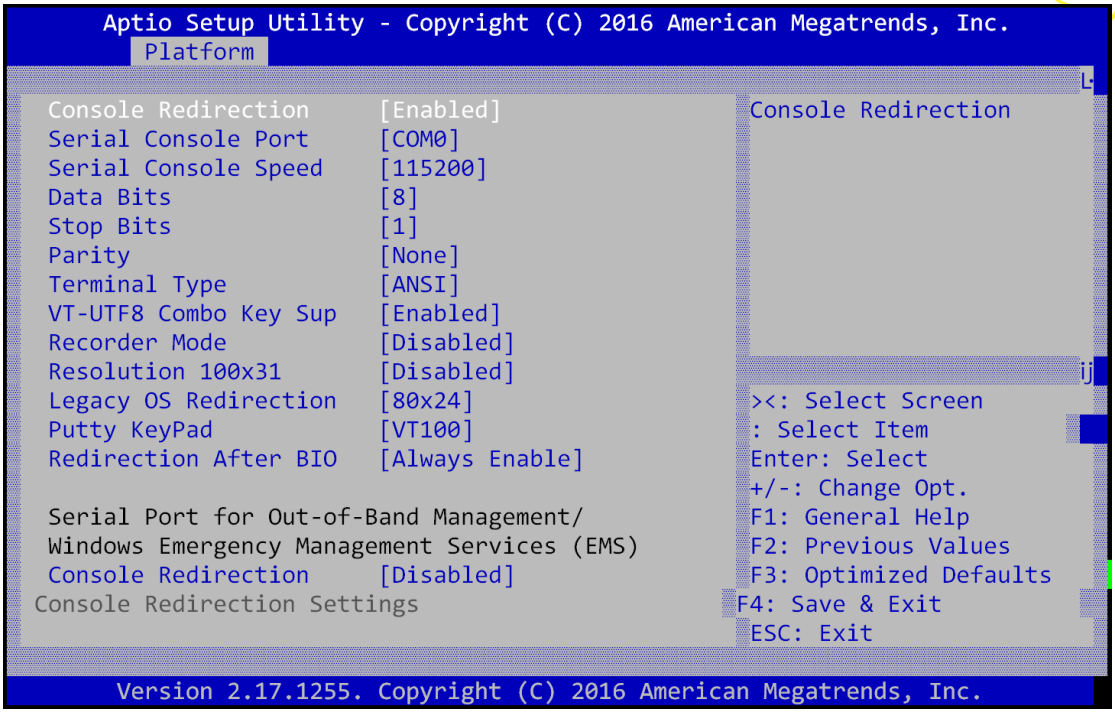


Figure 26: Platform Setup: Console Redirection Menu

3.2.2.1.1 COM1 Console Redirection Settings

The settings for COM1 console can be accessed in this menu.

This sub menu allows you to change the settings used for the serial console. For example, users can define the terminal type, bits per second, data bits, parity, stop bits and others.

Setup item	Access / Options	Description
Terminal Type	ANSI / VT100 / VT100+ / VT-UTF8	Select the target terminal emulation type: - ANSI to use the Extended ASCII Character Set. - VT100 to use the ASCII Character set. - VT100+ to add color and function key support. - VT-UTF8 to use UTF8 encoding to map Unicode characters into one or more bytes.
Serial Console Speed	9600 / 19200 / 38400 / 57600 / 115200	Defines the baud rate.
Data Bits	7 / 8	Defines number of data bits in a character.
Parity	None / Even / Odd / Mark / Space	Defines the parity scheme used.

Stop Bits	1 / 2	Defines number of stop bits in a character.
Flow Control	None / Xon/Xoff	Defines the flow control scheme.
VT-UF8 Combo Key	Disabled / Enabled	Enables VT-UTF8 Combination Key Support for ANSI / VT100 terminals
Recorder Mode	Disabled / Enabled	When Enabled the data displayed on a terminal will be captured and sent as text messages to a remote server.
Resolution 100x31	Disabled / Enabled	Enables or disables extended terminal resolution
Legacy OS redirection	80x24 / 80x 25	When using Legacy OS, this item specifies the Number of Rows and Columns supported
PuTTY Keypad	VT100 /. LINUX / XTERMR6 / SCO / ESCN / VT400	Select Function Key and Key Pad Emulation on PuTTY.
Redirection after BIOS	Always Enable / BootLoader	This defines how long console redirection will be active: "BootLoader" means that legacy console redirection is disabled before booting into a Legacy OS. "Always Enable" means Legacy console Redirection is enabled permanently.

Table 26: Platform Setup: COM1 Console Redirection Menu Items

3.2.2.2 USB Configuration

This sub menu allows you to change the settings used for USB and to get an overview of the USB devices detected by the BIOS.

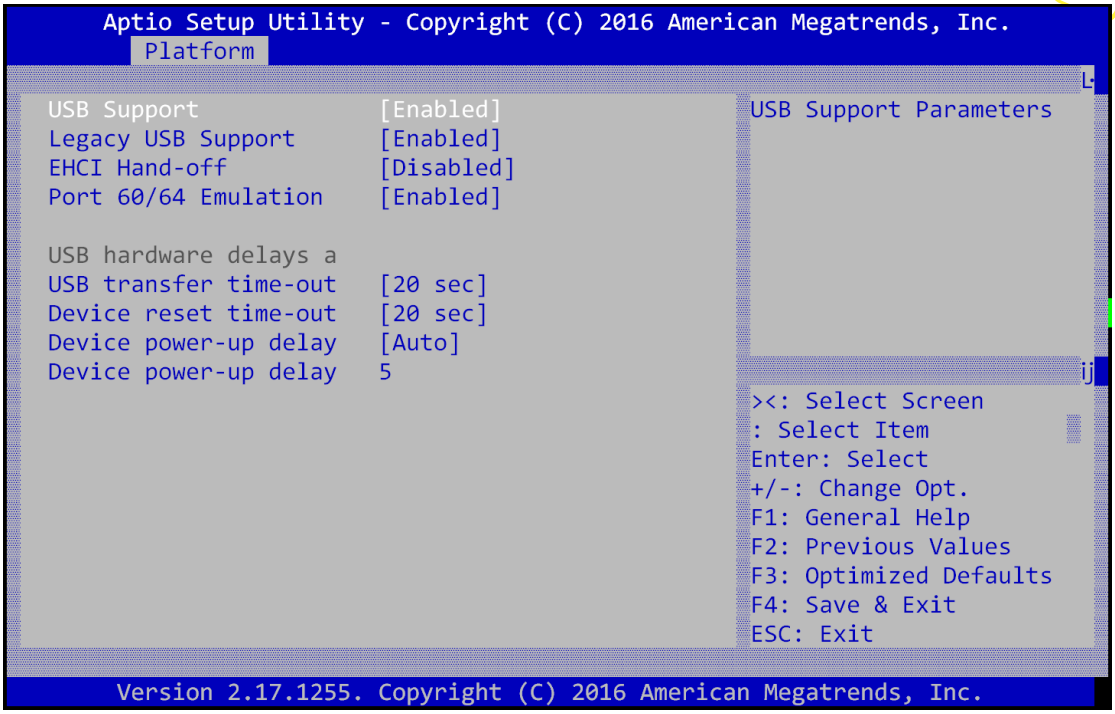


Figure 27: Platform Setup: USB Configuration Menu

Group	Setup item	Access / Options	Description
None	USB Support	Enabled Disabled	Enables or disables the support for USB. If disabled, the USB EHCI controller will not be initialized by the BIOS.
	Legacy USB Support	Auto Enabled Disabled	Enables legacy support over USB to support Keyboard and Mouse
	EHCI Hand-Off	Enabled Disabled	Controls the hand off of EHCI ownership from BIOS to OS at boot time.
USB hardware delay	USB transfer time-out	1sec / 5sec / 10sec / 20sec	The time-out value for Control, Bulk, and Interrupt transfers.
	Device Reset time-out	10sec / 20sec / 30sec / 40sec	Time Out for a device to Reset
	Device power-up delay	Auto Manual	Maximum time the device will take before it properly reports itself to the Host Controller.
	Device power-up delay	5	

Table 27: USB Configuration Menu

3.2.2.3 Trusted Computing

Please note that Trusted Computing support is disabled by default in the factory defaults to save system boot time. If disabled, the Trusted Computing Menu will not display any status information.

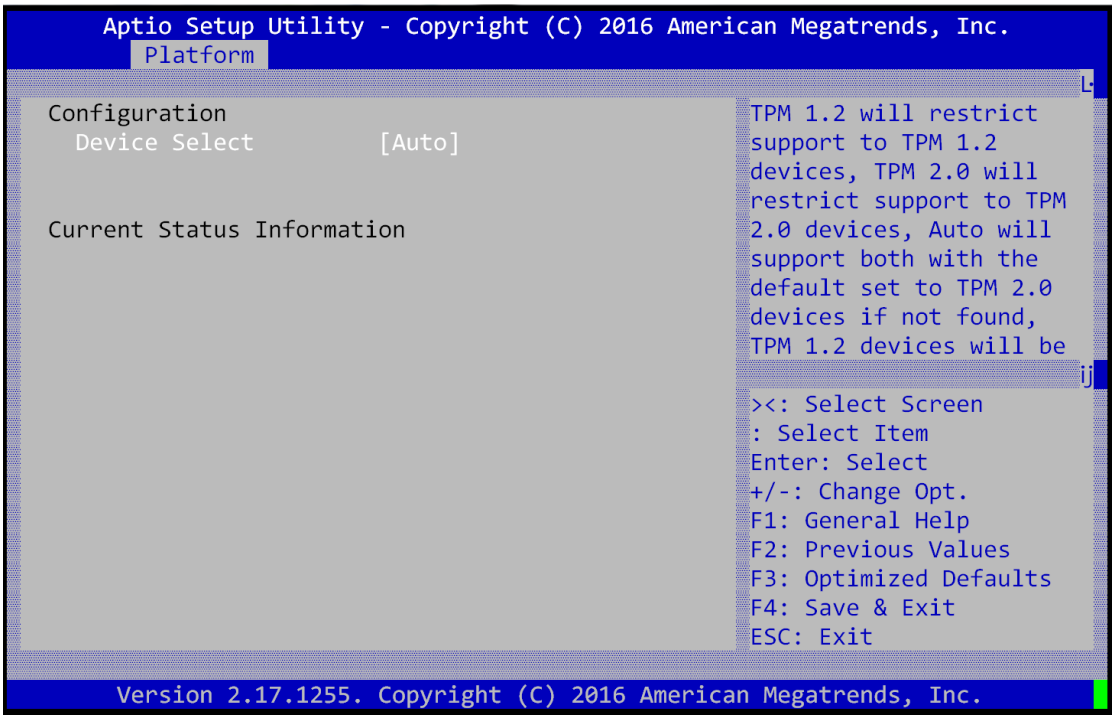


Figure 28: Platform Setup: Trusted Computing

Group	Setup item	Access / Options	Description
Configuration	Security Device Sup	Auto TPM1.2 TPM2.0	Auto will support both or set the support for the TPM 1.2 or TPM2.0.
Current Status information	Support Turned Off	Display Only	Is displayed when TPM support is disabled
	TPM State	Display Only	Shows TPM Enablement Status
	TPM Active State	Display Only	Shows TPM Activation Status
	TPM Owner	Display Only	Shows Current TPM Owner

Table 28: Trusted Computing Menu

3.2.2.3.1 *Trusted Computing with TPM module installed*

When system with TPM2.0 module installed, and the BIOS will auto detect it and the related setting will be shown in the BIOS setup menu as below.

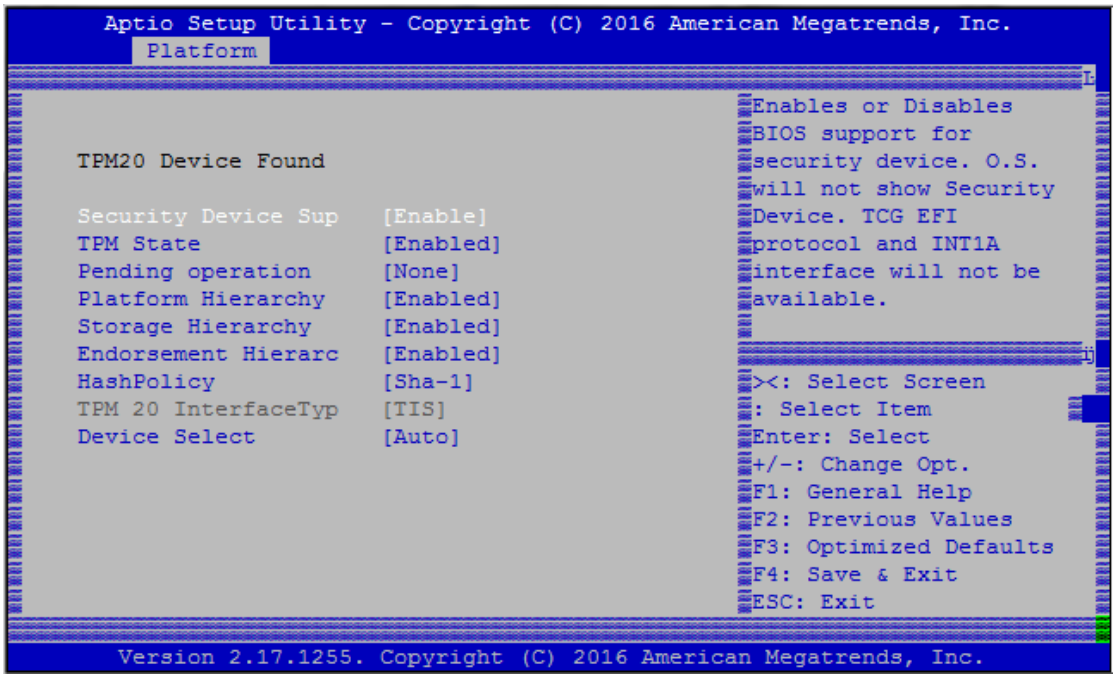


Figure 29: Platform Setup: Trusted Computing with TPM2.0

Group	Setup item	Access / Options	Description
TPM20 Device Found	Security Device Sup	Enable Disable	BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
	TPM State	Enable Disable	Enable/Disable Security Device. NOTE: Your Computer will reboot during restart in order to change State of the Device.
	Pending operation	None	Schedule an Operation for the Security Device. NOTE: Your Computer will reboot during restart in order to change State of Security Device.
	Platform Hierarchy	Enable Disable	Enable or Disable Platform Hierarchy
	Storage Hierarchy	Enable Disable	Enable or Disable Storage Hierarchy
	Endorsement Hierarchy	Enable	Enable or Disable Endorsement Hierarchy

		Disable	
	Hashpolicy	Sha-1	Select the Hash policyto use. SHA-2 is most secure but might not be supported by all Operating Systems
	TPM 20 InterfaceTyp	Display only (TIS)	
	Device Select	Auto	Auto will support both or set the support for the TPM 1.2 or TPM2.0.

Table 29: Trusted Computing Menu with TPM2.0

3.2.2.4 H/W Monitor

This sub menu allows you to see all the H/W monitor items detected by the BIOS, for well know the current system health status.

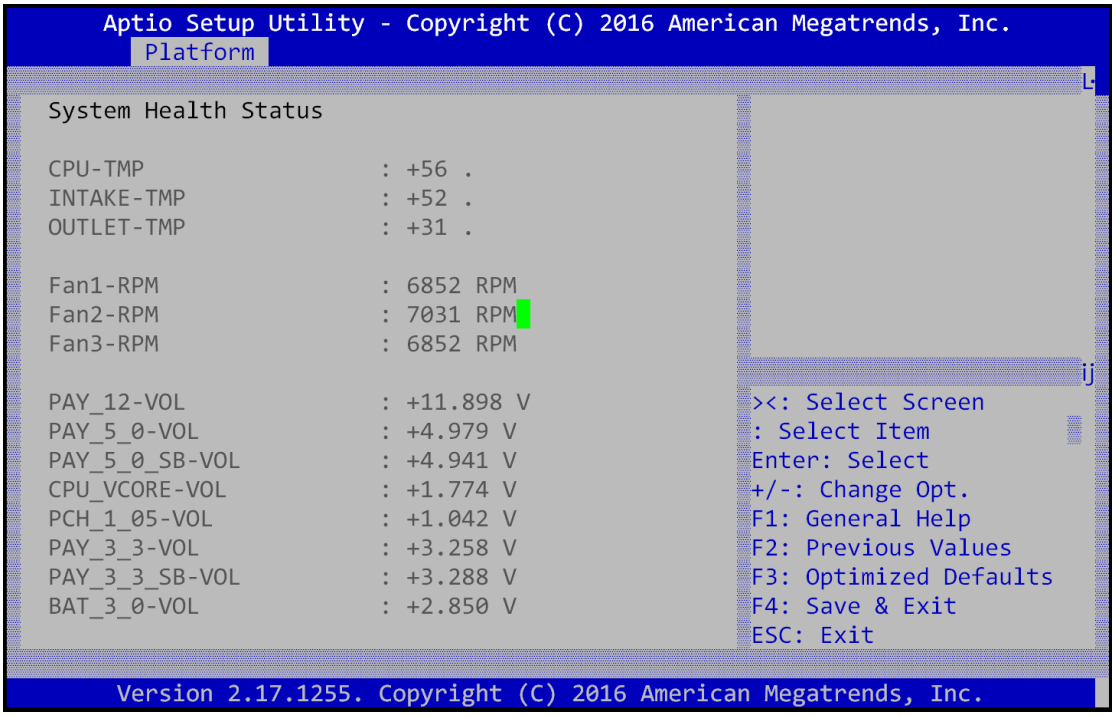


Figure 30: Platform Setup: H/W monitor

3.2.2.5 Virtualization

This sub menu allows you to change the settings used for Virtualization function.

Intel® Virtualization Technology for Directed I/O (VT-d). Thus, BIOS handle virtual functions exposed by PCIe devices in case SR-IOV is supported, otherwise PCIe devices will be assigned to virtual machines in pass-through mode. This applies for all PCIe devices.

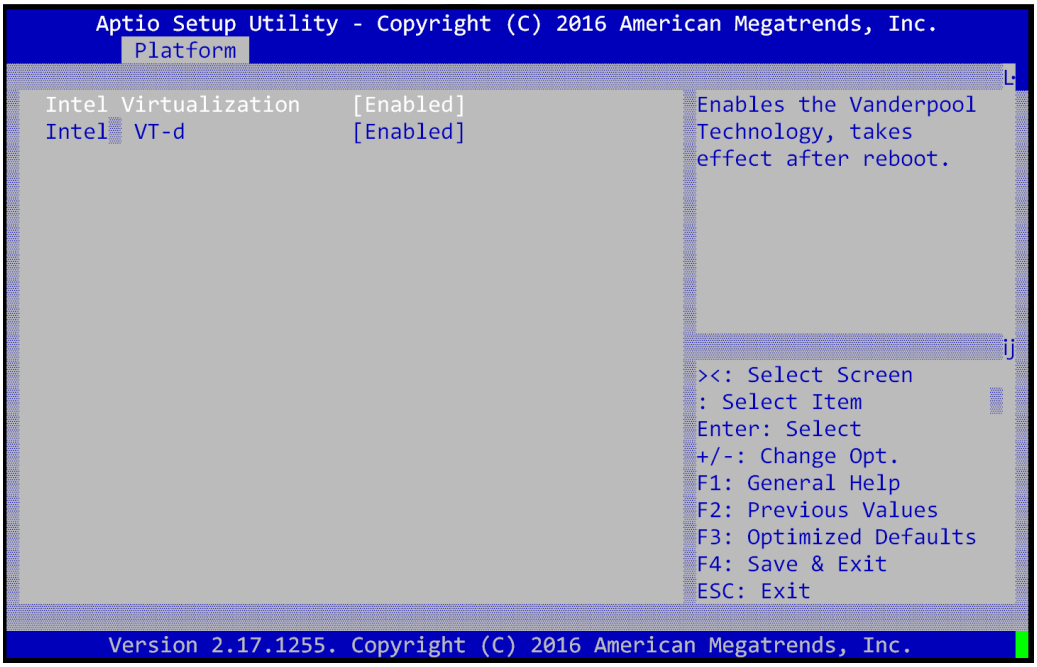


Figure 31: Platform Setup: Virtualization

Group	Setup item	Access / Options	Description
None	Intel Virtualization	Enable Disable	Enable/Disable Intel Virtualization Technology , take effect after reboot
	Intel VT-d	Enable Disable	Enable/disable Intel Virtualization Technology for Directed I/O (VT-d) by reporting the I/O device
	IOAT	Hidden (Enable)	This item will be hidden and enable it by default setting for get better performance

Table 30: Virtualization Menu

3.2.2.6 Platform Management

This sub menu allows you to change the settings used for related CPU utilization setting.

The default configuration for CPU was optimized setting for getting better performance for networking, so it is not recommend to change it.

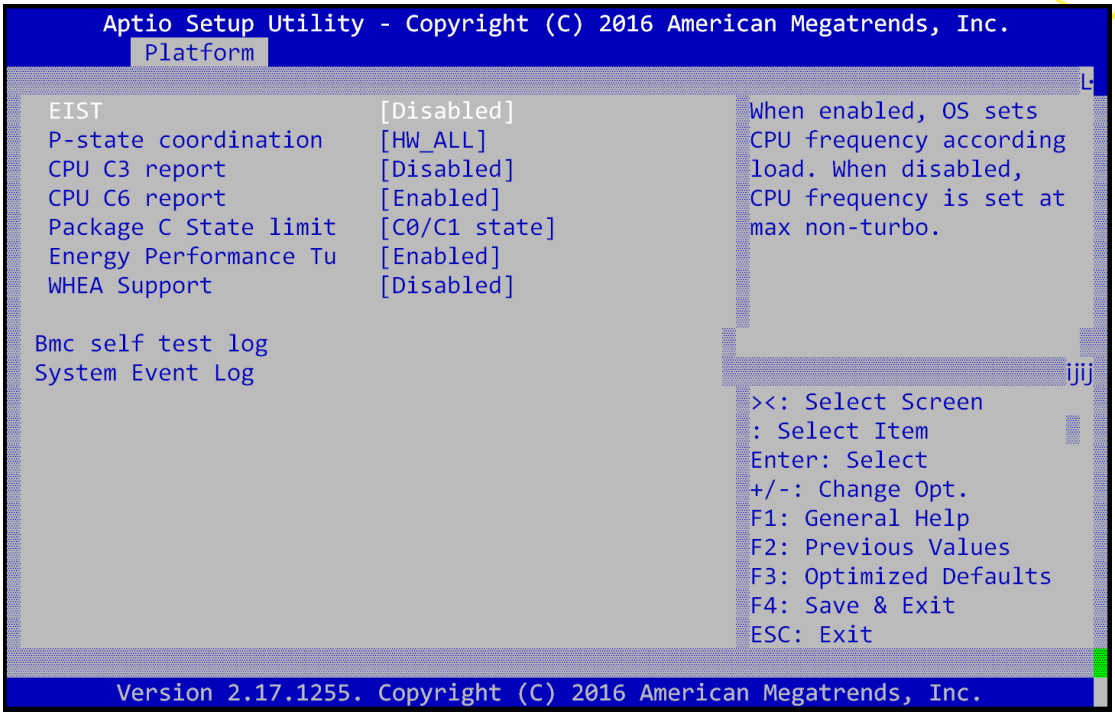


Figure 32: Platform Setup: Platform Management

Group	Setup item	Access / Options	Description
None	EIST	Enable Disable	Enable or disable BIOS support for Enhanced Intel SpeedStep Technology, When enabled, OS sets CPU frequency according load. When disabled, CPU frequency is set at max non-turbo.
	P-state coordination	HW_ALL	HW_ALL (hardware) coordination is recommended over SW_ALL and SW_ANY (software coordination).
	CPU C3 report	Enable Disable	Enable/Disable CPU C3(ACPI C2) report to OS. Recommended to be disabled.
	CPU C6 report	Enable Disable	Enable/Disable CPU C6(ACPI C2) report to OS Recommended to be enabled.
	Package C State limit	C0/C1 state C2 state C6(non Retention) state C6(Retention) state	Package C State limit. The "waking-up time" will be longer if Package C state limit setting is deep C state support.
	Energy	Enable	Selects whether BIOS or Operating System

	Performance Tu	Disable	chooses energy performance bias tuning.
	WHEA Support	Enable Disable	Enable or disable the WHEA support
BMC Self test log	Erase Log	Yes, On every reset	Erase Log Options
	When log is full	Clear Log	Select the action to be taken when log is full
System event log	SEL Components	Enable Disable	Change this to enable or disable all features of System Event Logging during boot.
	Erase SEL	No	Choose options for erasing SEL.
	When SEL is Full	Do Nothing	Choose options for reactions to a full SEL.
	Log EFI Status Codes	Error code	Disable the logging of EFI Status Codes or log only error code or only progress code or both

Table 31: Platform Management Menu

3.2.3 Hardware

This sub menu allows you to change the settings of the Intel chipset. Please note that "chipset" is a legacy term and the related functionality is split over the CPU and PCH portions of the SoC. Similarly, the terms "South Bridge" and "North Bridge" are legacy terms and do not represent the silicon implementation any more. However, those terms are kept consistent with previous products to allow users to navigate more easily.

The sub menus are described on the following pages.

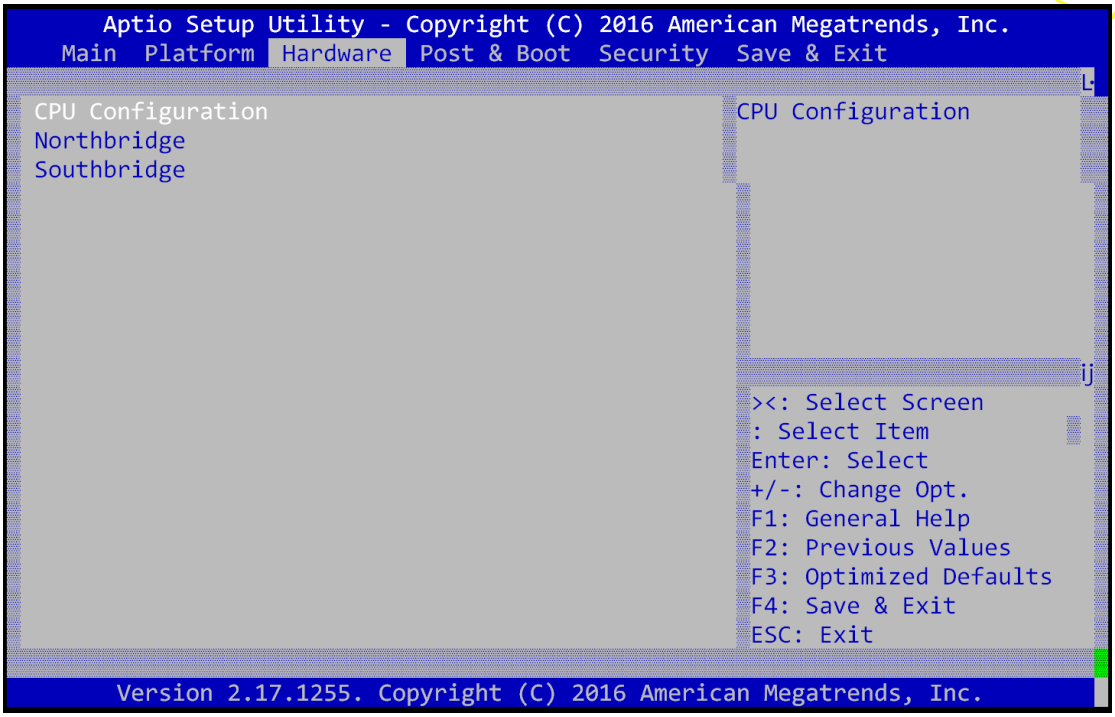


Figure 33: Hardware Configuration Menu

3.2.3.1 Hardware Setup: CPU Configuration

This menu supports configuration of the Xeon D CPU.

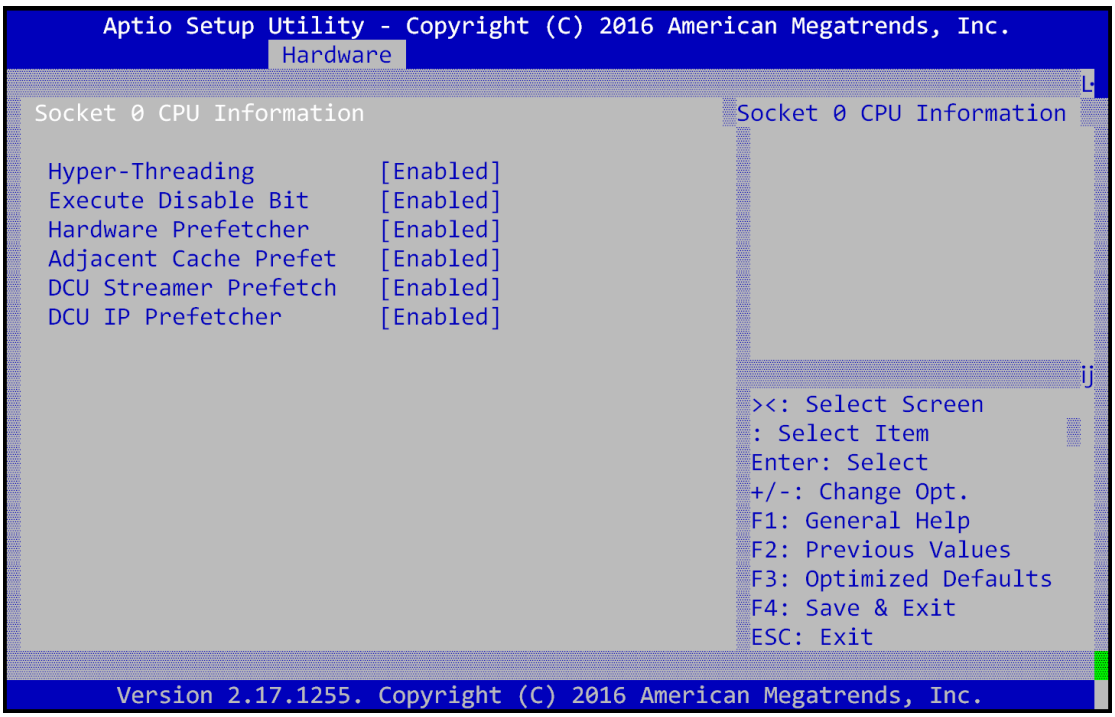


Figure 34: Chipset: Processor Configuration Menu

Group	Setup item	Access / Options	Description
Socket0 CPU information	CPU signature	Display only	Displays information on the processor installed
	Microcode Patch		
	CPU Frequency		
	Processor Cores		
	Intel VT-x Technology		
	L1 code Cache		
	L2 Cache		
	L3 Cache		
None	Hyper-threading	Enable Disable	Enables Hyper Threading (Software Method to enable/disable logical processor threads.
	Execute Disable Bit	Enable Disable	Execute Disable Bit allows the processor to classify areas in memory where application code can be executed and cannot preventing certain classes of malicious buffer overflow attacks when combined with a supporting operating system.
	Hardware Prefetcher	Enable Disable	Enable or disable Hardware Prefetcher feature. = MLC Streamer Prefetcher (MSR 1A4h Bit[0])
	Adjacent Cache Line Prefetch	Enable Disable	Enable or disable Adjacent Cache Prefetch feature. = MLC Spatial Prefetcher (MSR 1A4h Bit[1])
	DCU Streamer Prefetch	Enable Disable	Enable or disable DCU Streamer Prefetcher feature. DCU streamer prefetcher is an L1 data cache prefetcher (MSR 1A4h [2]).
	DCU IP Prefetcher	Enable Disable	Enable or disable DCU IP Prefetcher feature. DCU IP prefetcher is an L1 data cache prefetcher (MSR 1A4h [3]).

Table 32: Processor Configuration Menu

3.2.3.2 Hardware Setup: North Bridge Configuration

This menu allows the configuration of the memory controller and related features of the SoC.

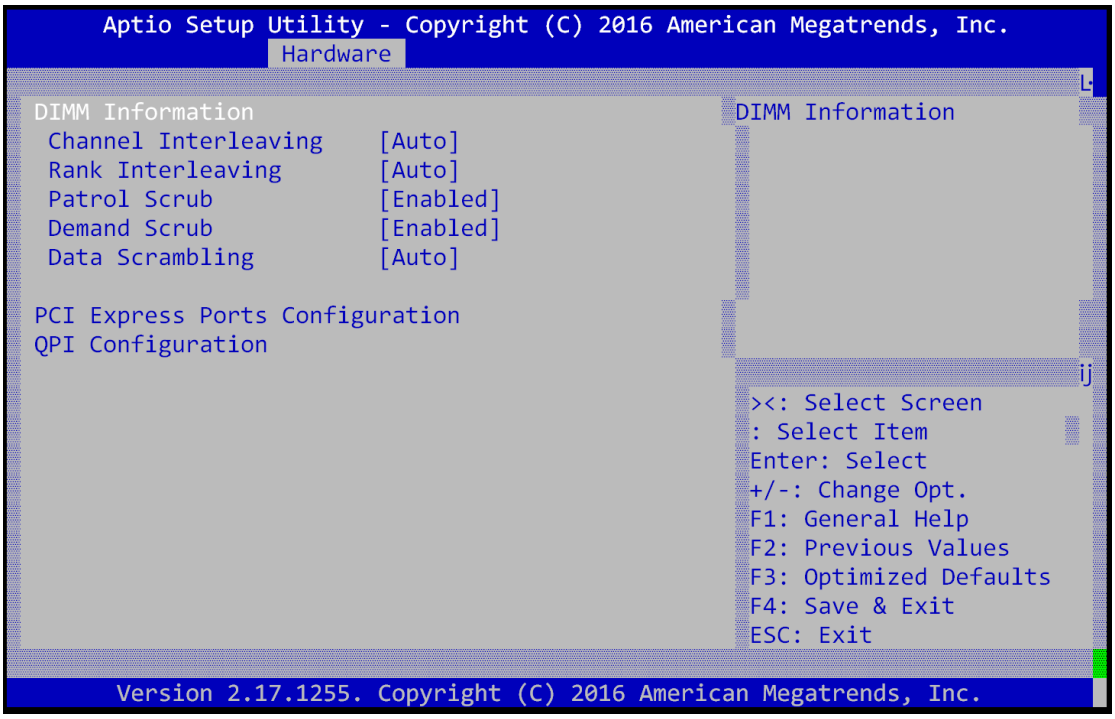


Figure 35: NorthBridge Configuration Menu

Group	Setup item	Access / Options	Description
DIMM Information	Total Memory	Display only	Displays information on the processor installed
	Memory Frequency		
	Channel Interleaving	Auto [1-way Interleave] [2-way Interleave] [3-way Interleave] [4-way Interleave]	Select Channel Interleaving setting
	Rank Interleaving	Auto [1-way Interleave] [2-way Interleave] [4-way Interleave] [8-way Interleave]	Select Rank Interleaving setting

	Patrol Scrub Enable	Enabled	Select to enable / disable Patrol Scrub Support
	Demand Scrub Enable	Enabled	Select to enable / disable Demand Scrub Support
	Data Scrambling	Auto	Select to auto to enable the Scrambler

Table 33: Northbridge Configuration Menu

3.2.3.3 PCI Express Port Configuration

This sub-menu contains settings for the PCIe subsystem. Some menu items are referred to as "PCI" settings. Although the FWA-3260 does not implement a PCI bus, these settings still apply to the platform as PCIe is using the same configuration mechanism as PCI.

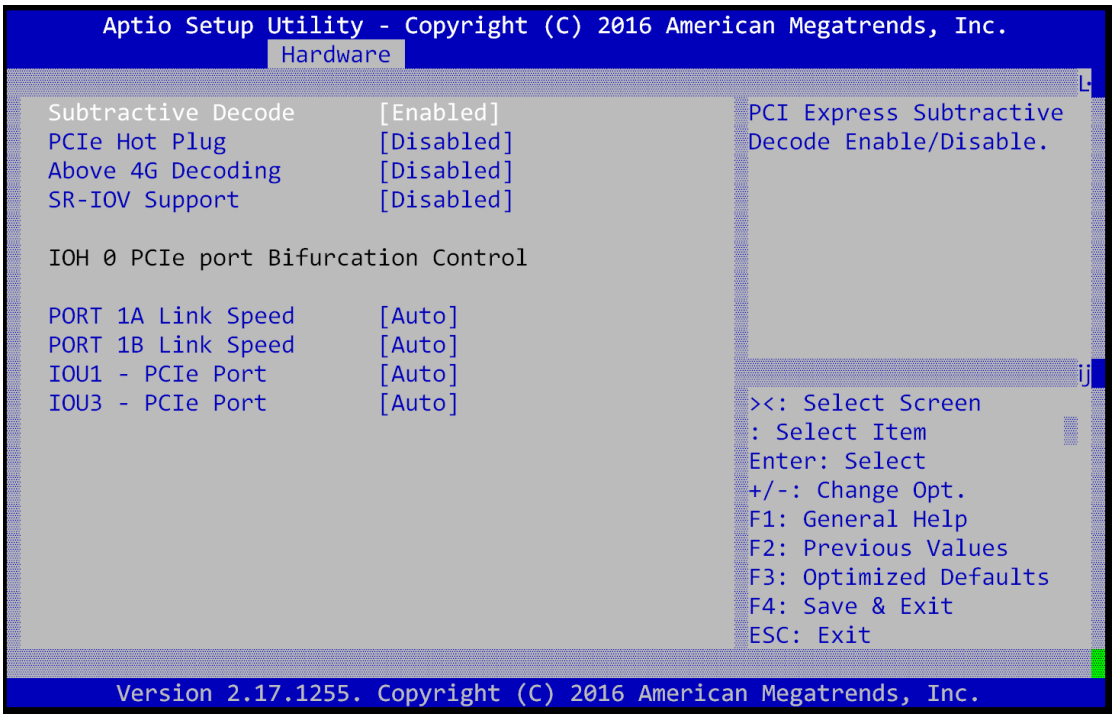


Figure 36: Hardware Setup: PCI Subsystem

Group	Setup item	Access / Options	Description
None	Subtractive Decode	Enabled Disable	PCI Express Subtractive Decode Enable/disable
	PCIe Hot Plug	Enabled Disable	Enable PCIe hot plug
	Above 4G Decoding	Enabled Disable	Enables or Disables 64bit capable Devices to be Mapped above 4GB in the Address

			Space.
	SR-IOV Support	Enabled Disable	Enable this for support Dingle Root IO virtualization
	Above 4G Decoding	Enabled / Disabled	Enables or Disables 64bit capable Devices to be Mapped above 4GB in the Address Space.
IOH 0 PCIe port Bifurcation Control	PORT 1A Link Speed	GEN1 GEN2 GEN3 AUTO	Change PCI Express Devices Settings.
	PORT 3A Link Speed	GEN1 GEN2 GEN3 AUTO	Change PCI Express Devices Settings.
	IOU1 - PCIe Port	x4x4x4x4 x4x4x8 x8x4x4 x8x8 x16 Auto	Select PCIe port bifurcation
	IOU3 - PCIe Port	x4x4x4x4 x4x4x8 x8x4x4 x8x8 x16 Auto	Select PCIe port bifurcation

Table 34: Hardware Setup: PCI Subsystem Menu Items

3.2.3.4 QPI Configuration

This sub-menu contains settings for the QPI configuration.

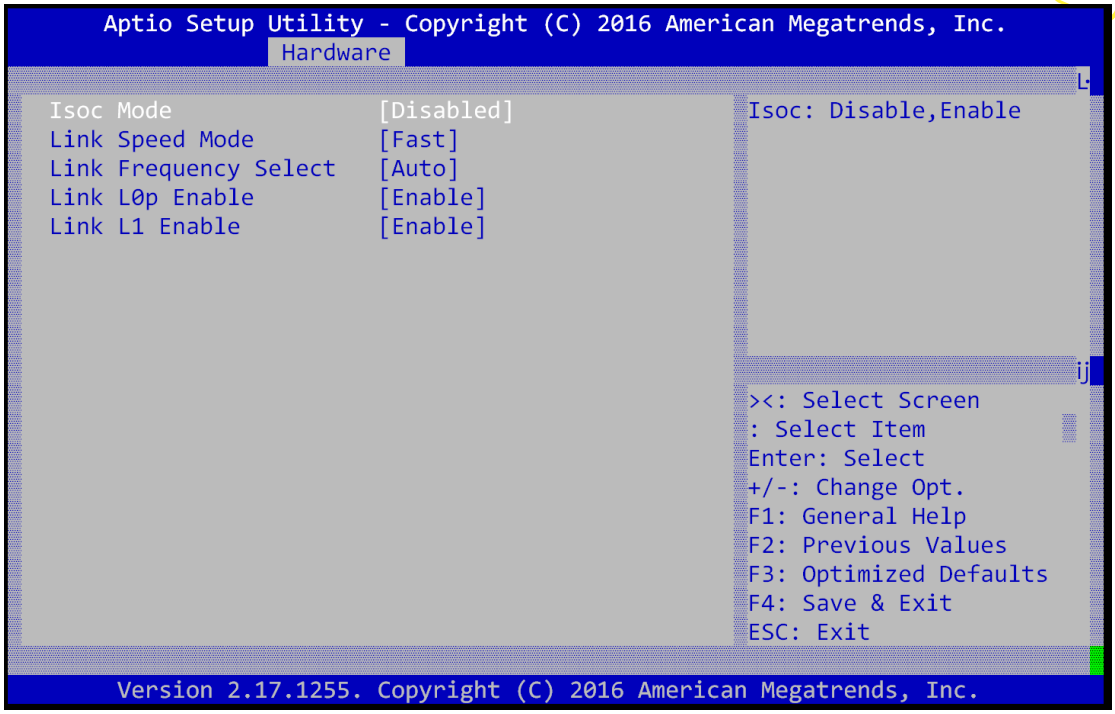


Figure 37: Hardware Setup: QPI configuration

Group	Setup item	Access / Options	Description
None	Isoc	Enabled Disable	Enable/disable ISOC
	Link Speed Mode	Fast Slow	Select QPI link speed as either the POR speed (Fast) or default speed (slow)
	Link Frequency Select	Auto 6.4 GB/s 8.0 GB/s 9.6 GB/s Auto Limited	Allows for Selecting the QPI link frequency
	Link0p Enable	Enabled Disabled	Enable/disable Link0
	Link1p Enable	Enabled Disabled	Enable/disable Link1

Table 35: Hardware Setup: QPI configuration Menu Items

3.2.3.5 Hardware Setup: South Bridge Configuration

This menu contains settings for the South Bridge for related SATA and USB and ACPI setting etc.

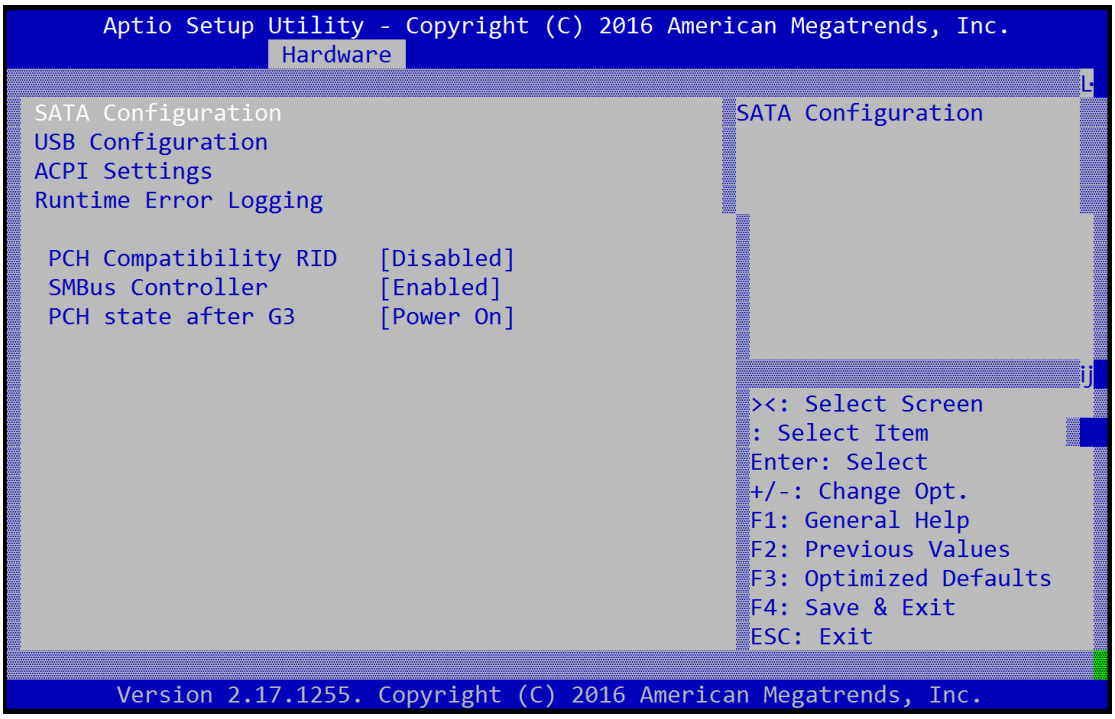


Figure 38: Hardware Setup: South Bridge configuration

Group	Setup item	Access / Options	Description
	SATA Configuration	N/A	Select sub-menu.
	USB Configuration	N/A	Select sub-menu.
	ACPI Settings	N/A	Select sub-menu.
	Runtime Error Logging	N/A	Select sub-menu.
	PCH Compatibility RID	Enable/Disable	Enable or Disable PCH's CCRID
	SMBus Controller	Enable/Disable	Enable or Disable SMBus CDevice
	PCH state after G3	Power on	Select S0/S5 for ACPI state after a G3

Table 36: Hardware Setup: *South Bridge* configuration Menu Items

3.2.3.5.1 South Bridge Configuration: SATA Configuration

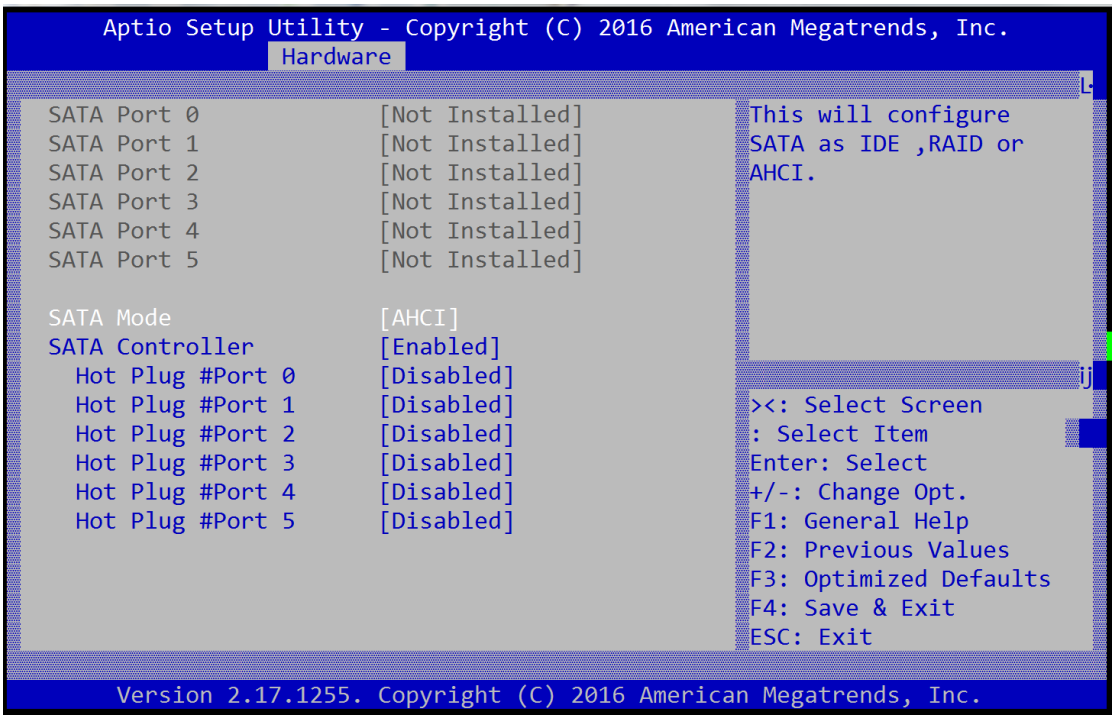


Figure 39: Hardware Setup: SATA configuration

Feature	Default	Description
SATA Port0	Display only	Show current SATA devices in use on the FWA-3260
SATA Port1	Display only	
SATA Port2	Display only	
SATA Port3	Display only	
SATA Port4	Display only	
SATA Port5	Display only	
SATA Mode	AHCI Mode	(1) IDE Mode. (2) AHCI Mode. (3) RAID Mode.
SATA Controller	Enabled	To enable the SATA controller

Table 37: Hardware Setup: *SATA* configuration Menu Items

3.2.3.6 USB Configuration

This menu contains settings for the USB configuration.

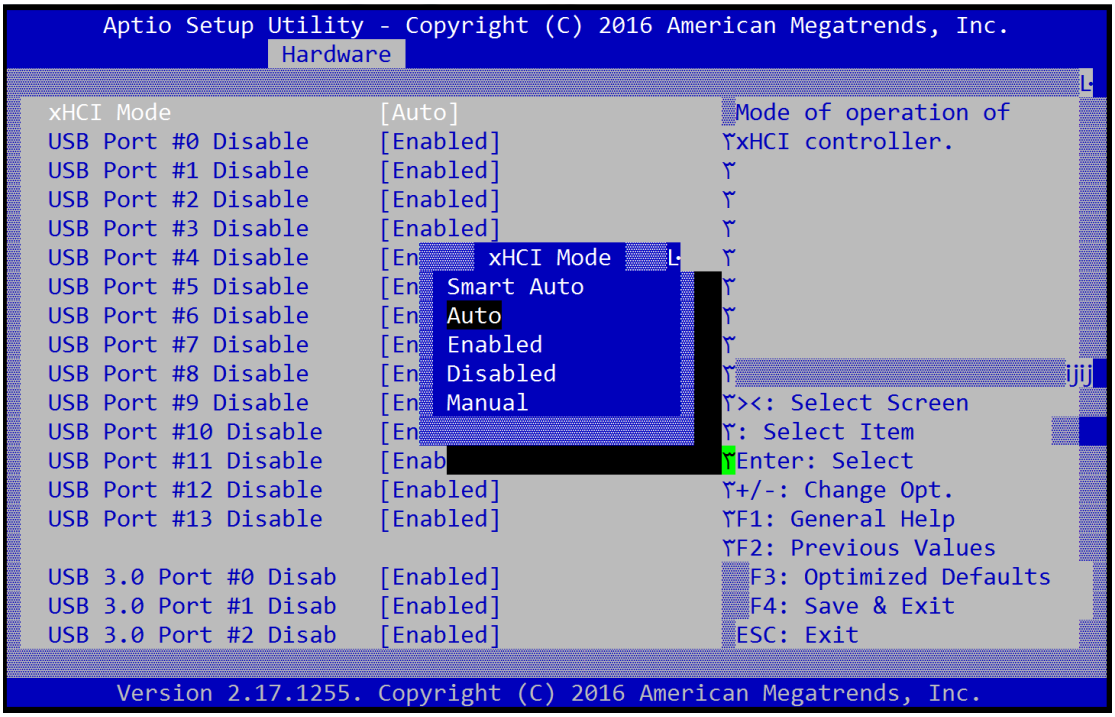


Figure 40: Hardware Setup: USB configuration

Group	Setup item	Access / Options	Description
None	xHCI Mode	Smart Auto Auto Enabled Disabled Manual	To set up the mode of operation of xHCI controller

Table 38: Hardware Setup: USB configuration Menu Items

3.2.3.7 ACPI Setting

This menu contains settings for the ACPI configuration.

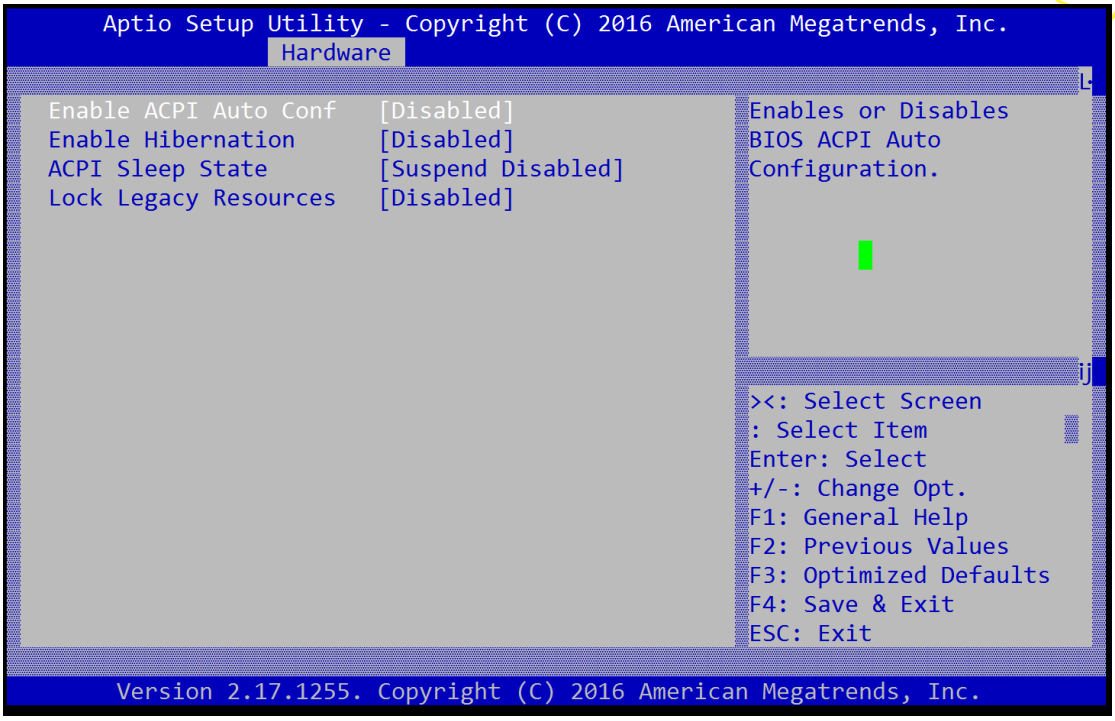


Figure 41: Hardware Setup: ACPI configuration

Group	Setup item	Access / Options	Description
None	Enable ACPI Auto Configuration	Enabled Disabled	Enable or disable BIOS ACPI auto configuration
	Enable Hibernation	Enabled Disabled	Enable the system ability to hibernate (OS/S4 sleep state), this option may be not effective with some O.S
	ACPI Sleep State	Suspend Disabled S1 (CPU Stop Clock)	Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.
	Lock Legacy Resources	Enabled Disabled	Enable lock of legacy resources

Table 39: Hardware Setup: ACPI configuration Menu Items

3.2.3.8 Runtime Error logging

This sub-menu contains settings for the Runtime error logging configuration.

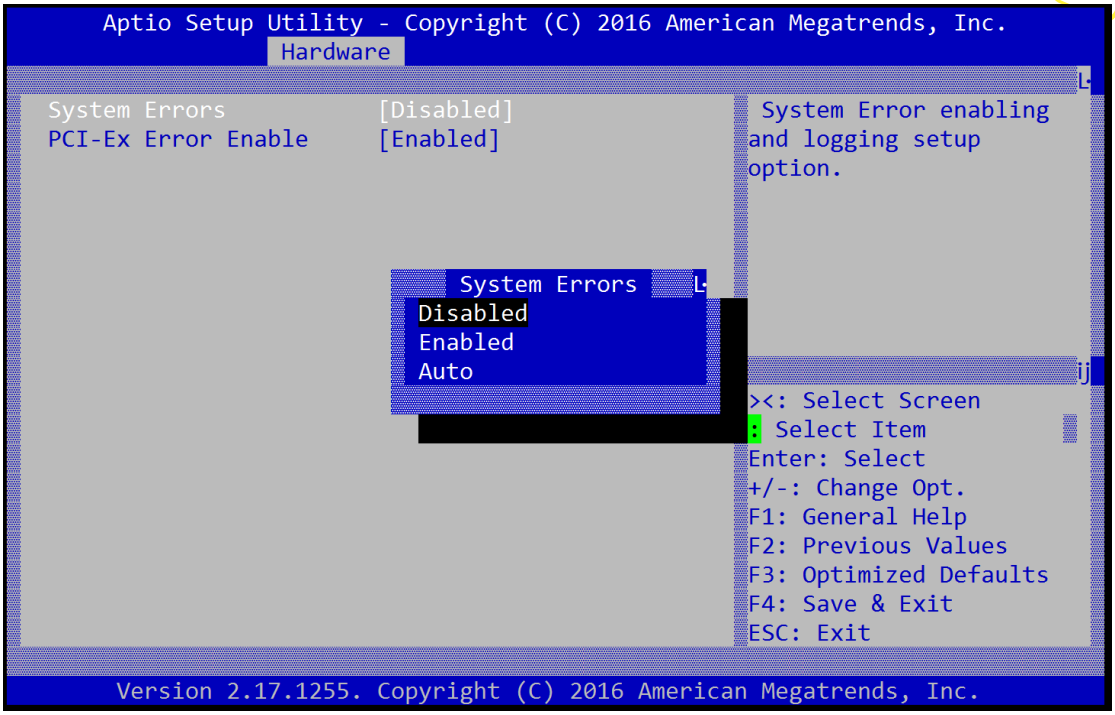


Figure 42: Hardware Setup: Runtime Error logging configuration

Group	Setup item	Access / Options	Description
None	System Errors	Enabled Disabled Auto	System error enabling and logging setup option
	PCI-Ex Error Enable	Enabled Disabled	Enable or Disable PCI-Ex Error

Table 40: Hardware Setup: Runtime Error logging Menu Items

3.2.4 Server Mgmt

The Server Mgmt menu supports configuring BMC related features such as OS Watchdog Timer, etc.

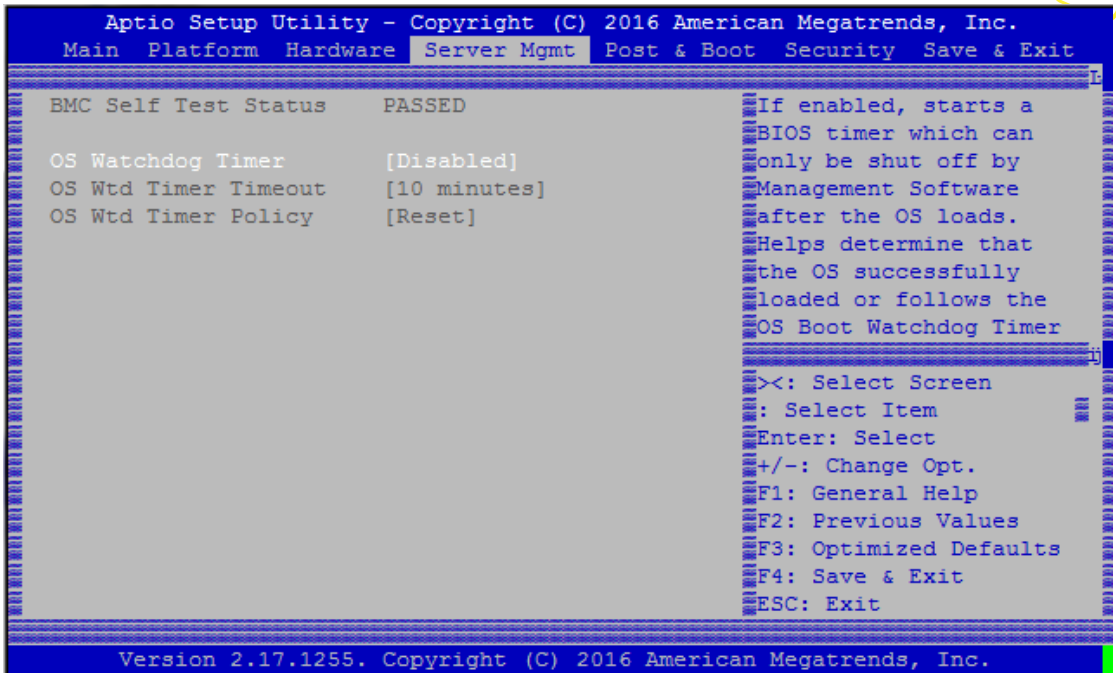


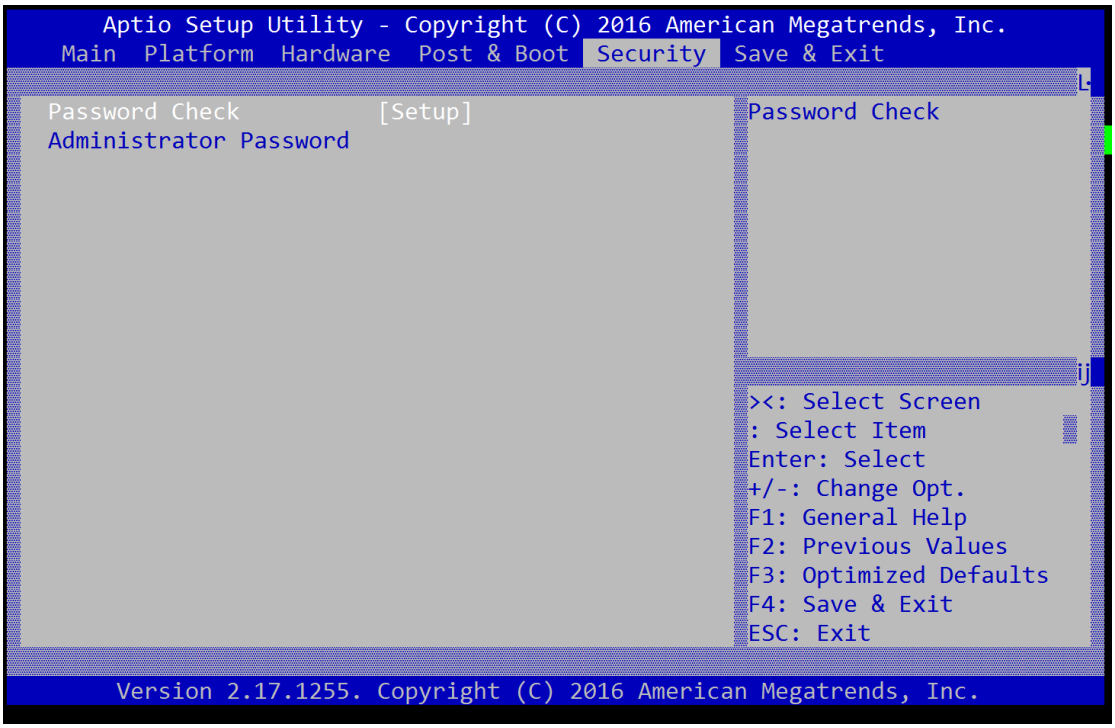
Figure 43: Server Mgmt configuration

Group	Setup item	Access / Options	Description
None	BMC Self Test Status	Display only (Passed)	BMC self test status indication during power on process
	OS Watchdog Timer	Enable Disable	If enabled, starts a BIOS timer which can only be shut off by Management Software after the OS loads. Helps determine that the OS successfully loaded or follows the OS Boot Watchdog Timer
	OS Wtd Timer Timeout	5 minutes 10 minutes 15 minutes 20 minutes	Configure the length of the OS Boot Watchdog Timer. Not available if OS Boot Watchdog Timer is disabled.
	OS Wtd Timer Policy	Do Nothing Reset Power Down	Configure how the system should respond if the OS Boot Watchdog Timer expires. Not available if OS Boot Watchdog Timer is disabled.

Table 41: *Server Mgmt configuration* Menu Items

3.2.5 Security Setup

"**Administrator Password**" allows users to configure the system so that a password after being installed is required each time the system boots, and/or an attempt is made to enter the Setup program.



Note:

- If set the "Password Check" is [Setup], then this only limits access to Setup and is only asked for when entering Setup.
- If set the "Password Check" is [Always], then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights.
- The password length must be in the following range:
  - Minimum length: 3
  - Maximum length: 20

3.2.6 POST & Boot Menu

Users can configure the system boot priority settings via the boot page. The default setting of boot priority of boot option #1 is "UEFI: Built-in EFI Shell"; Users can define the boot priorities based on the application.

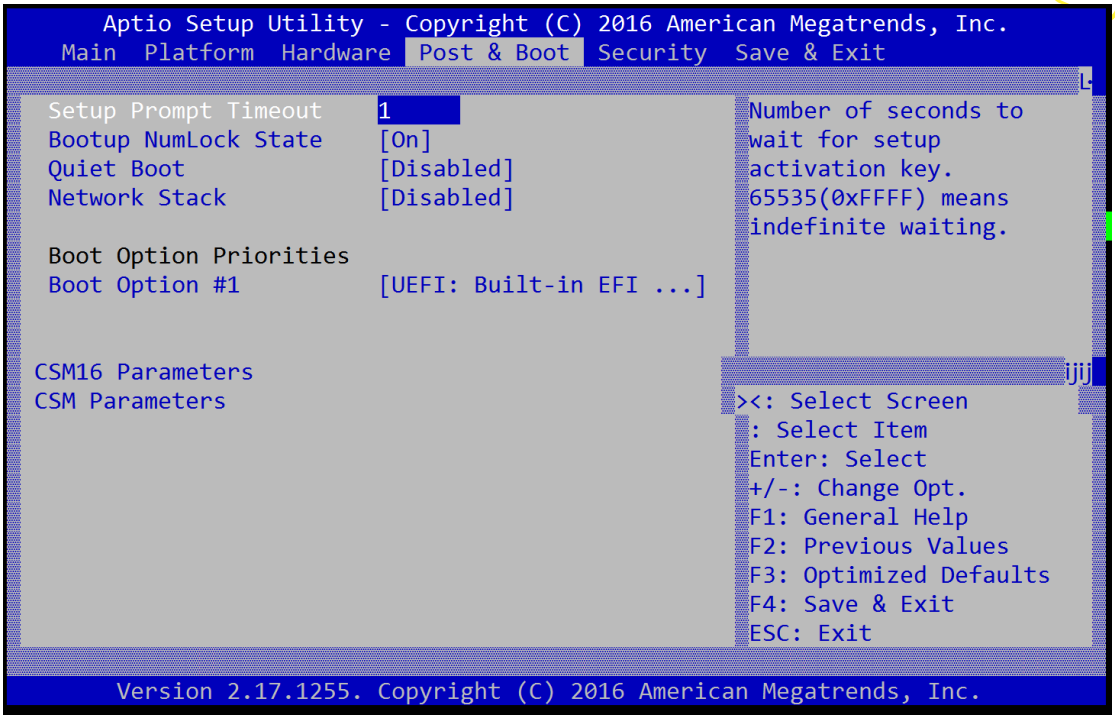


Figure 44 Boot Configuration

Feature	Default	Description
Setup Prompt Timeout	1	Number of seconds to wait for setup activation key.
Bootup NumLock State	On	Select the keyboard NumLock state.
Quiet Boot	Disabled	Enables or disables Quiet Boot option.
Network Stack	Disabled	Enables or disables boot via Network (PXE)
Boot Option Priority	User Defined	Sets the system boot order.
CSM16 Parameters	Option ROM Messages	Force BIOS Keep Current
CSM Parameters	CSM Support	Enable the CSM support

Table 42 Boot Configuration

3.2.6.1 Compatibility Support Module (CSM) Configuration

This submenu allows users to configure the support for legacy BIOS mechanisms and option ROMs.

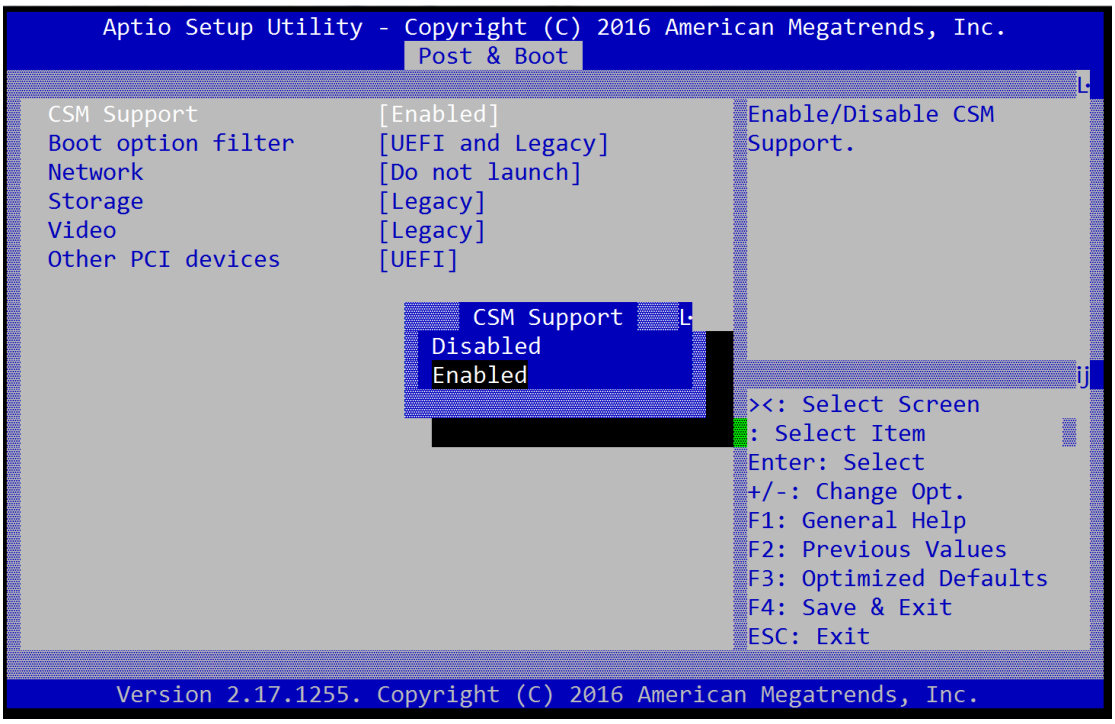


Figure 45: Post & Boot Setup: CSM Configuration Menu

Group	Setup item	Access / Options	Description
None	CSM Support	Enabled Disabled	Enables or disables the Compatibility Support Module.
	Boot option filter	UEFI and Legacy Legacy Only UEFI Only	This item allows to control the execution of legacy and UEFI compliant Option ROMs
	Network	Do not launch UEFI Legacy	This item allows a more granular control of OptionROM execution depending of the type of extension device.
	Storage		
	Video		
	Other PCI device ROM		

Table 43: CSM Configuration Menu

3.2.7 Save & Exit Menu

The FWA-3260 BIOS allows users to store BIOS configuration results as “User Defaults.” Users can select “Save as User Defaults” to record all changes which had been made in previous pages as the default setting for further use.

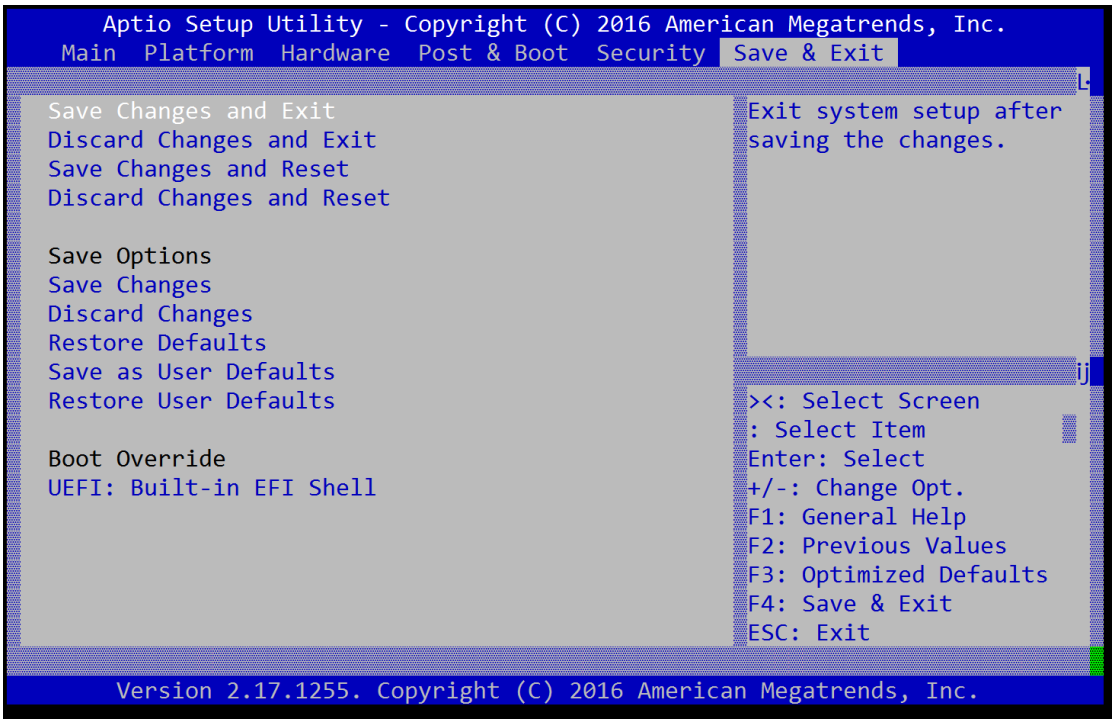


Figure 46: Save & Exit Menu

Group	Setup item	Description
None	Save Changes and Exit	Exit setup after saving the changes. Does not update User defaults.
	Discard Changes and Exit	Exit setup without saving any changes.
	Save Changes and Reset	Reset system after saving the changes. Does not update User Defaults.
	Discard Changes and Reset	Reset system without saving the changes.
Save Options	Save Changes	Save Changes made so far to any of the setup options.
	Discard Changes	Discard Changes made so far to any of the setup options.
	Restore Defaults	Restores the BIOS factory defaults to all the setup options.

	Save as User Defaults	Saves the Current BIOS Settings as User Defaults.
	Restore User Defaults	Restores the User defaults to all the setup options.
Boot Override	UEFI: < boot device>	This option allows you to override the specified boot order and use a different boot device for the next boot.

Table 44: Save & Exit Menu Options

3.3 Installing Components

Please make sure you follow the safety guidelines presented in section1.1 when making changes to the hardware.

3.3.1 Removing the top cover

You need:

- a PH2 screw driver

The top cover is secured by a total of 7 screws, 2 each on the left, rear and right side:

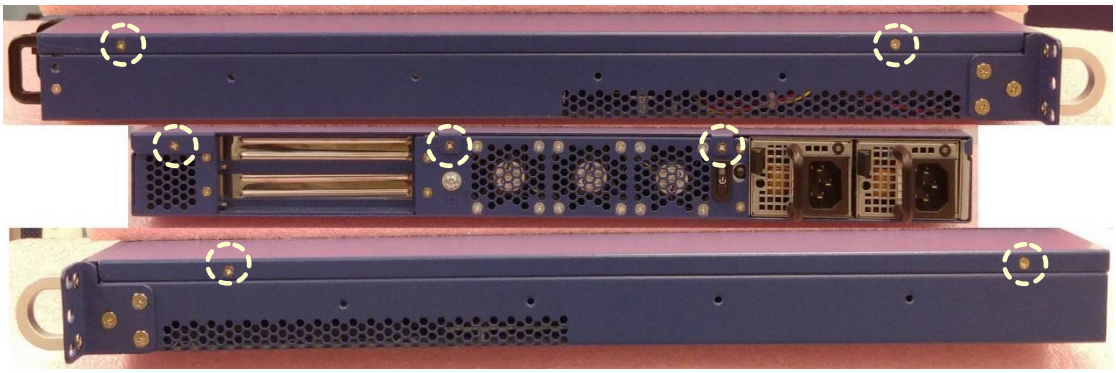


Figure 47: Top cover screw locations (left/rear/right)

To remove the top cover, remove these screws using a PH1 screw driver. Be sure to keep the screws in a safe place for top cover re-installation.

After that, slide the top cover backwards until the front flange of the top cover disengages with the unit's face plate:

Figure 48: Slide Top Cover back

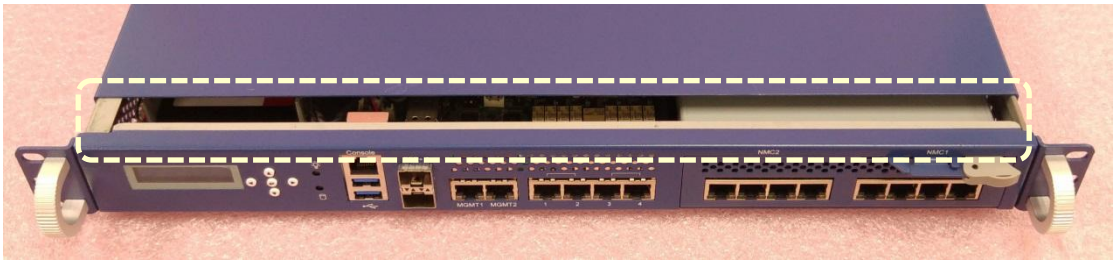


Figure 49: Top Cover Flange Disengagement

Now lift off and remove the top cover.

3.3.2 Reinstalling the top cover

You need:

- a PH2 screw driver

To re-install the top cover slide it onto the unit from the top with the top cover flange facing the unit's face plate. Keep a gap of about an inch between the front plate and the flange.

After that, slide the top cover forward until the flange is fully seated underneath the face plate.

Now insert the screws in the 7 locations shown above. Tighten each screw only lightly then move on to the next screw. After all screws have been inserted, tighten them.

3.3.3 Disk Installation

3.3.3.1 2.5" HDD drive

You need:

- a PH2 screw driver
- a standard 2.5" SATA HDD
- the HDD screw kit (included in the unit)
- the HDD carrier plate (included in the unit)
- the SATA cable (included in the unit)

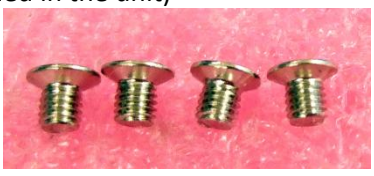


Figure 50: Screws for HDD mounting

After removing the top cover, follow the instructions below for 2.5" disk installation:

1) Remove the plastic bag that protects the HDD carrier plate.

2) The HDD carrier plate has three holes on each side to accommodate different HDD vendor's mounting hole locations. Each of the holes provides a dampening rubber to reduce disk vibration.

   Do not remove the rubbers as this may lead to performance degradation or even malfunction.

   Insert the HDD drive from the top into the carrier plate. Align the HDD's mounting threads with 2 of the 2 holes on each side of the carrier plate. The holes to use may vary from disk vendor to disk vendor. For some vendors, all four holes may align.

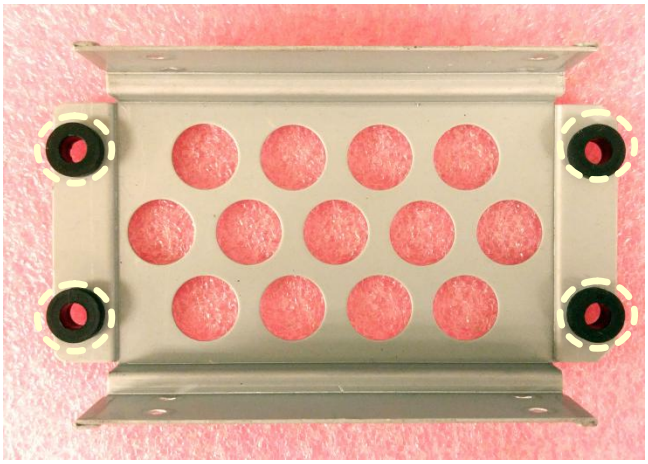


Figure 51: HDD Carrier plate dampeners

Figure 52: Carrier plate and HDD alignment

3) Insert the screws supplied as part of the HDD kit into the holes and HDD threads. Make a few turns on each screw only using a PH2 screw driver until the threads start to engage. Then move on to the next screw. When all screws have been inserted, fasten the screws tightly.

Figure 53: Screw insertion and fastening

4) Move the carrier plate into the system location M1 and align the carrier plate's mounting holes with the standoffs in the chassis.

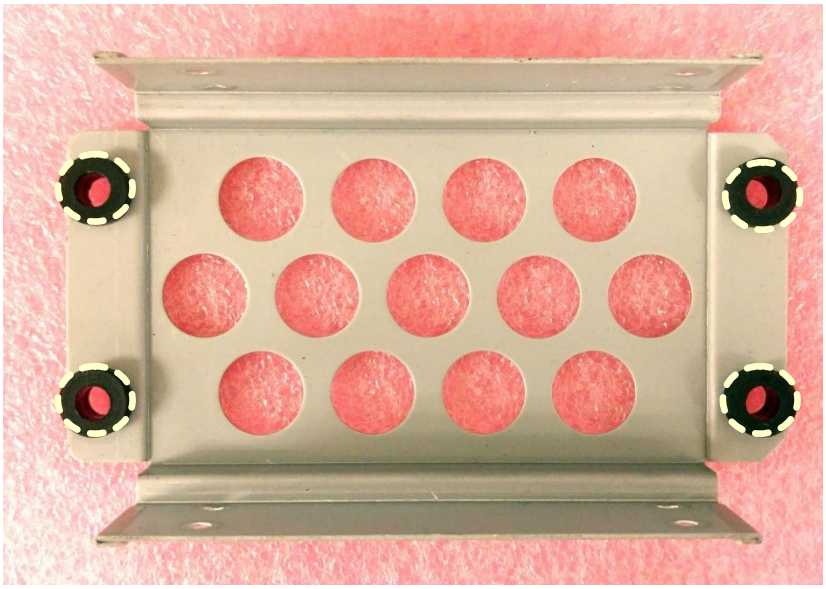


Figure 54: HDD Carrier plate screw locations

5) Insert the carrier plate mounting screws and start to fix them from the front side (i.e. the side facing the FWA-3260 motherboard).
Securely tighten the screws using a PH2 screw driver after having inserted all four screws.

Figure 55: Insertion of the carrier into the chassis

6) Connect the SATA cable delivered with the unit to the disk as well as the mother board connector. Please make yourself aware of the keying mechanism in the SATA connector before inserting the cable.

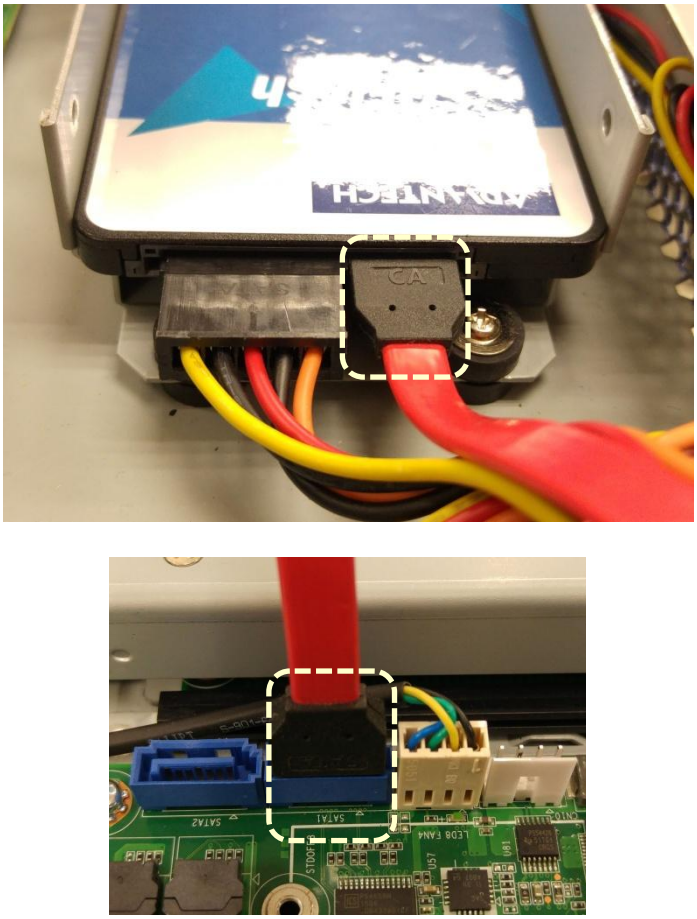


Figure 56: SATA cabling

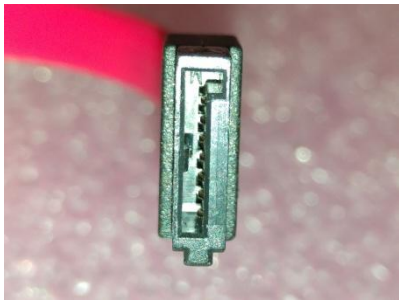


Figure 57: SATA Connector keying

7) Connect the HDD power cable to the disk. Please make yourself aware of the keying mechanism in the power connector before inserting the cable.

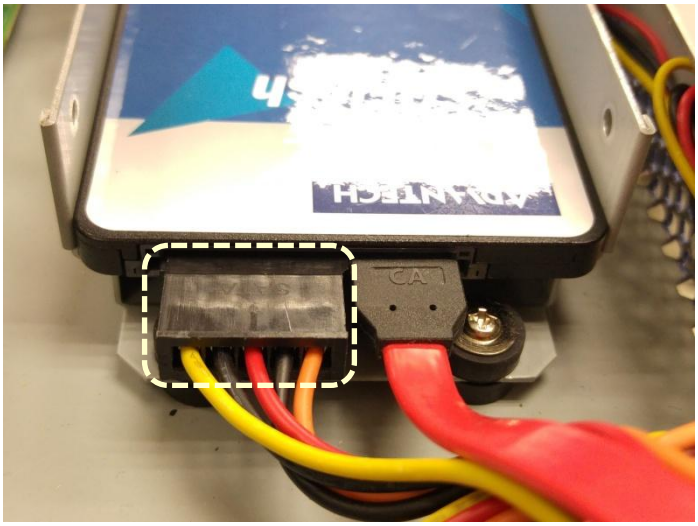


Figure 58: HDD Power cable

3.3.3.2 M.2 SSD

You need:

- a PH1 screw driver
- a standard M.2 SSD
- the M.2 SSD mounting screw (included in the unit)

Figure 59: M.2 SSD mounting screw

An M.2 SSD compliant SSD can be installed at location M3:

1) Make sure the M.2 SSD disk is compliant with the socket and that the mechanical keys match

Figure 60: m.2 SSD key alignment

2) Insert the M.2 SSD module in the connector under an angle of around 45°. The gold contacts of the module will almost disappear in the connector when the module is fully seated.

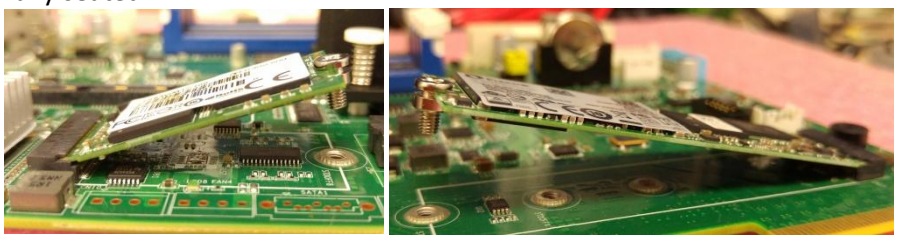


Figure 61: M.2 SSD angled insertion

3) Push down the module softly until it is in horizontal position. If the module is correctly seated, the module's right hand mount hole will align with the threaded standoff in the FWA-3260 motherboard. Insert the M.2 SSD mounting screw and tighten it.

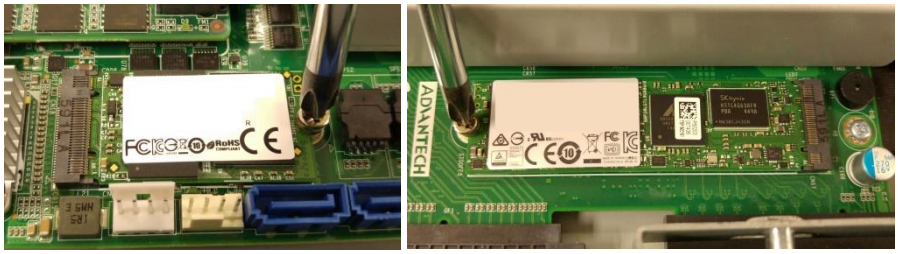


Figure 62: M.2 SSD mounting

3.3.4 Memory Installation

After removing the top cover, follow the instructions below for DIMM installation:

1) Double check that the DIMMs to be installed match the requirements of section 2.4.5.
2) Open the white latches on the left and right sides of the DIMMs by turning it outwards as indicated by the arrows below.

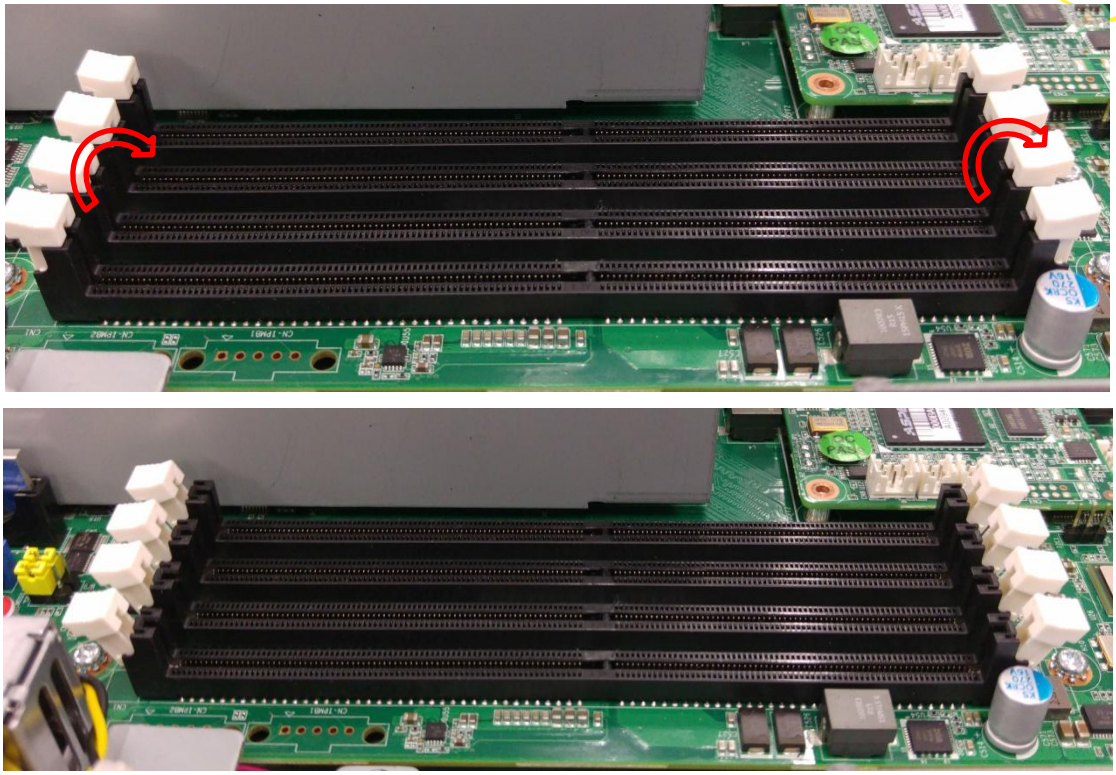


Figure 63: Opening DIMM latches

3) Select DIMM orientation so that the keys in the DIMM module and socket match.

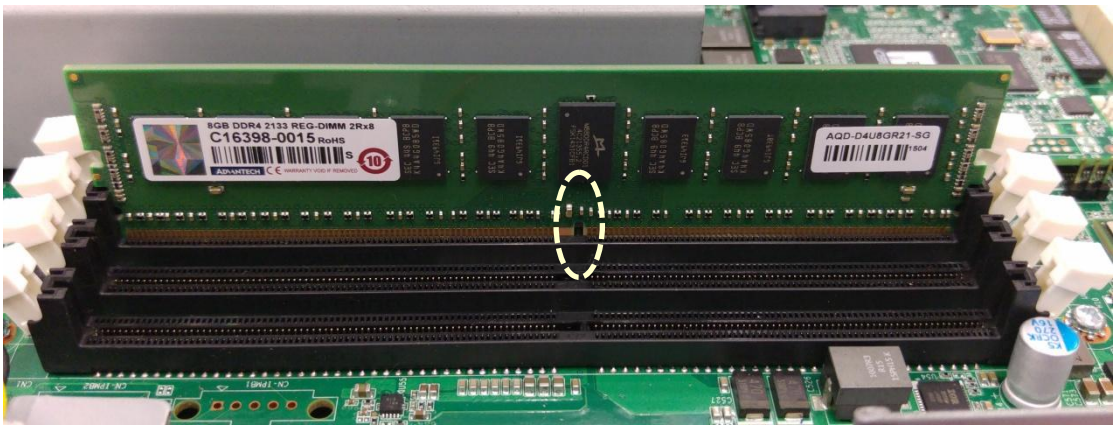


Figure 64: DIMM key alignment

4) Insert the DIMM from the top using the guide rails on the left and right of the DIMM sockets.

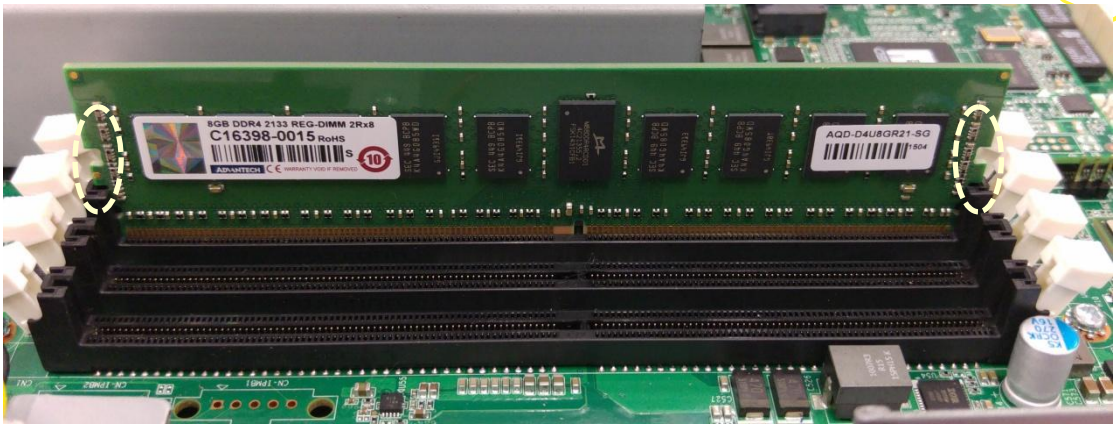
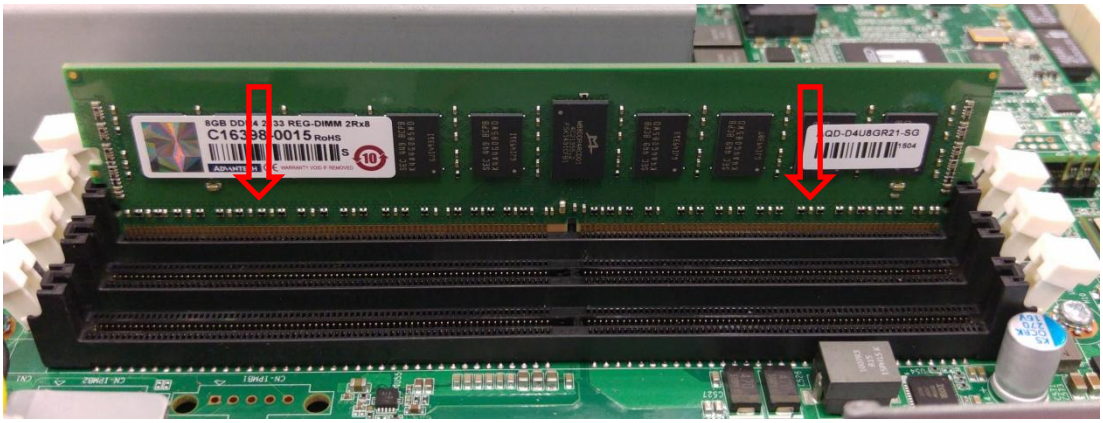


Figure 65: DIMM insertion into slide rails

5) Put your thumbs near the right and left end of the DIMM and press down the DIMM evenly until the white latches fully close with a click.



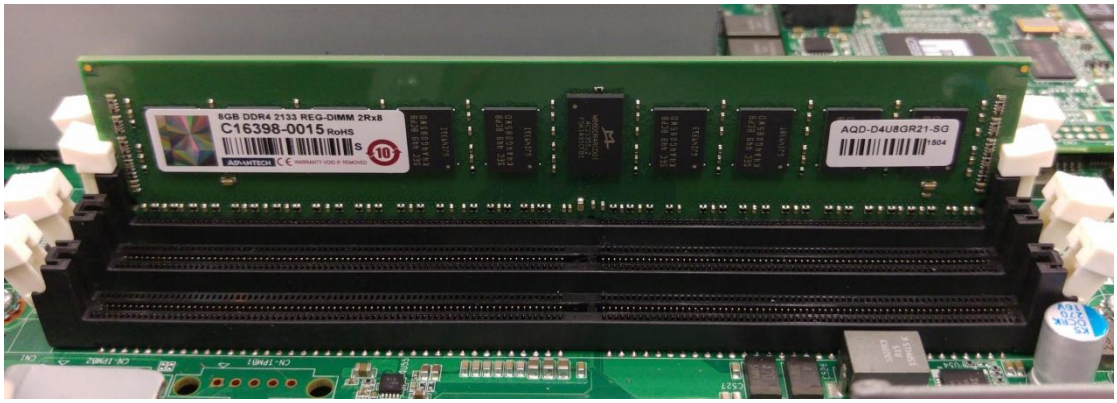


Figure 66: Seating the DIMM in the socket

6) In case you want to install another DIMM, repeat steps 1) to 5) accordingly.

3.4 Firmware Upgrades

3.4.1 BIOS

The BIOS can be upgraded using “flashrom” under Linux. flashrom Version 0.9.7-r1855 or newer is required. Or go for IPMI command with HPM.1 to upgrade the BIOS (SKUs depends, only FWA-3260A with LOM support this features, please refer to the file of “Advantech_FWA_3260_Advanced_Platform_Management_Users_Guide_Rev0_1” in details

flashrom is available via www.flasrom.org or as part of all major Linux distributions. Documentation on flashrom can also be found there.

Start flashrom with the following parameters to update the BIOS on the FWA-3260:

-w (**BIOS Name**) –p internal: laptop=this _is _not_laptop

```
[root@FWA-3231 home]# flashrom  -w 2320V044.bin -p internal:laptop=this_is_not_
_laptop
flashrom v0.9.8-r1888 on Linux 2.6.32-431.el6.x86_64 (x86_64)
flashrom is free software, get the source code at http://www.flashrom.org

Calibrating delay loop... OK.
Found chipset "Intel Avoton/Rangeley".
This chipset is marked as untested. If you are using an up-to-date version
of flashrom *and* were (not) able to successfully update your firmware with it,
then please email a report to flashrom@flashrom.org including a verbose (-V) lo
g.
Thank you!
Enabling flash write... Warning: SPI Configuration Lockdown activated.
OK.
Found Winbond flash chip "W25Q64.V" (8192 kB, SPI) mapped at physical address 0
x00000000ff800000.
Reading old flash chip contents... done.
Erasing and writing flash chip... Erase/write done.
Verifying flash... VERIFIED.
[root@FWA-3231 home]#
```

3.4.2 LAN Bypass

LAN Bypass Firmware can be upgraded via the LAN Bypass Software. Please refer to the Advanced LAN Bypass User’s Manual for details.

3.5 Replacing FRUs

Please make sure you follow the safety guidelines presented in section1.1 when making changes to the hardware.

For instruction on how to remove and install the top cover of the unit please refer to section 3.3.

3.5.1 Disk drives

3.5.1.1 2.5" HDD

You need:

- a PH2 screw driver

a standard 2.5" SATA HDDTo remove the HDD, proceed in the reverse of the installation procedure in section 3.3.3.1:

5) Detach the HDD power and SATA cables
6) Remove the four screws on the corners of the HDD carrier plate and remove the HDD carrier plate from the system
7) Remove the HDD mounting screws and extract the HDD from the carrier plate.
8) Install a new HDD by following the instructions in section 3.3.3.1.

3.5.1.2 M.2 SSD

You need:

- a PH1 screw driver
- a standard m.2 SSD

To remove a m.2 SSD proceed in the reverse of the installation procedure in section 3.3.3.2:

1) Remove the m.2 mounting screw. Please be sure to hold the screw as the spring mechanism in the m.2 connector will flip the m.2 module upwards once the screw is lose.
2) Extract the m.2 module

Install a new SSD following the mounting instructions of the same section.

3.5.2 CMOS Battery

You need:

- A BR2032 battery

Warning!
There is the danger of explosion if the battery is replaced incorrectly. Replace the battery only with the same or equivalent type specified above.
Dispose of used batteries according to the manufacturer's instructions.

To replace the RTC's battery located at B1, pull the spring clip securing the battery forward with your finger tip. Please handle with care and do not bend the spring clip. Then extract the battery vertically.

Figure 67: Unlocking the battery

Keeping the spring clip pulled towards you, insert the replacement battery.

Please make sure you insert the battery in correct polarity with the positive pole facing the front panel and the negative pole facing the CPU heatsink. Trying to insert the battery with incorrect orientation/polarity will damage the battery holder. Additional security risks apply as stated above.

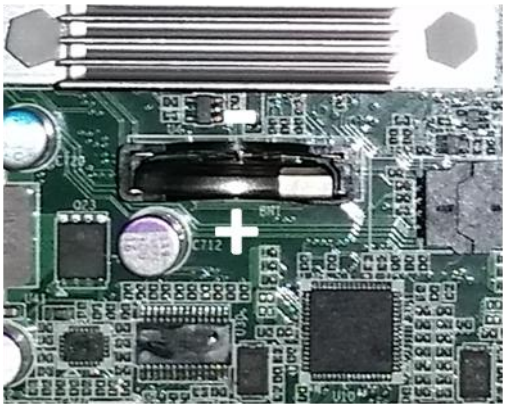


Figure 68 Battery Polarity

When the coin cell is seated release the spring clip and control that it moves back into its original position and that it secures the battery correctly.

3.5.3 DIMMs

To replace a DIMM module, basically extract the DIMM module by pushing the DIMM socket latches outward. As the latches flip completely open, the DIMM module will be automatically extracted from the socket. Pull the DIMM module out vertically.

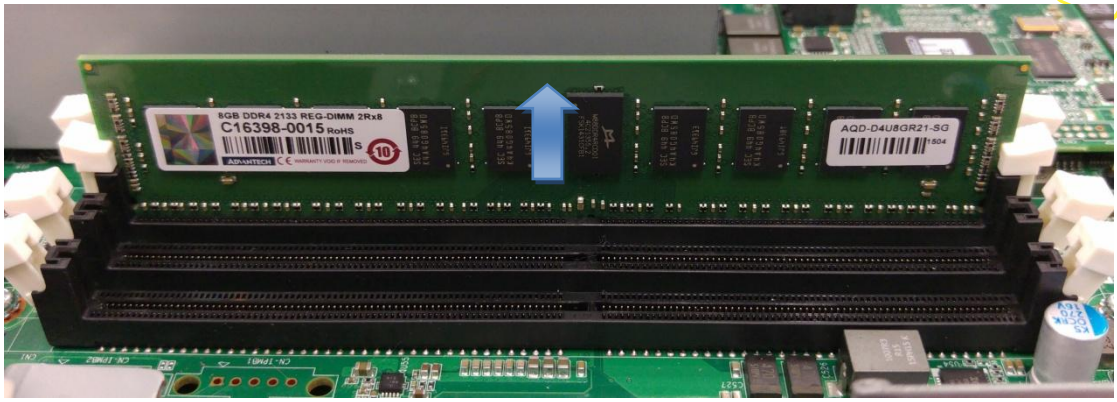


Figure 69: Unlocking and removing a DIMM

To insert a new DIMM please follow the process described in section 3.3.4.

A. APPENDIX: CONNECTOR PINOUT AND LED INFORMATION

A.1) Console Port (RS232)

This connector can be found at position F5.

Please note that this RJ45 connector for the console, in contrast to RJ45 connectors for network ports, does not feature any integrated LEDs.

Figure 70: RJ45 Console connector

Pin No.	Signal Name	Description
1	n.c.	Not connected
2	n.c.	Not connected
3	TX	Transmit Data (Output from FWA-3260)
4	GND	Digital Circuit Ground
5	GND	Digital Circuit Ground
6	RX	Receive Data (input to FWA-3260)
7	n.c.	Not connected
8	n.c.	Not connected

Table 45: Console connector pin assignment

A.2) USB Type A connectors

These connectors can be found at position

Figure 71: Stacked USB Type A connector

Pin No.	Signal Name	Description
1	VCC_USB0	USB Supply Voltage Port 0 (5V@500mA, fused)
2	USB0N	USB Port 0 Differential Pair
3	USB0P	
4	GND	Digital Circuit Ground
5	VCC_USB1	USB Supply Voltage Port 1 (5V@500mA, fused)
6	USB1N	USB Port 1 Differential Pair
7	USB1P	
8	GND	Digital Circuit Ground

Table 46: Stacked USB Type A connector pin assignment

A.3) RJ45 10/100/1000 BASE-T ports

These connectors can be found at positions F6 through F7

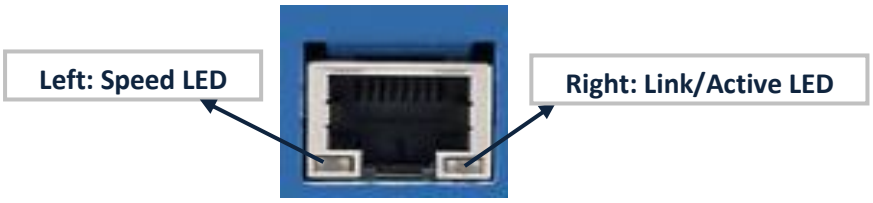


Figure 72: RJ45 10/100/1000 Base-T connector

A.3.1) Connector Pinout

Pin No.	Signal Name	Description
1	MDI[0]+	Media Dependent Interface[0]+
2	MDI[0]-	Media Dependent Interface[0]-

Pin No.	Signal Name	Description
3	MDI[1]+	Media Dependent Interface[1]+
4	MDI[2]+	Media Dependent Interface[2]+
5	MDI[2]-	Media Dependent Interface[2]-
6	MDI[1]-	Media Dependent Interface[1]-
7	MDI[3]+	Media Dependent Interface[3]+
8	MDI[3]-	Media Dependent Interface[3]-

Table 47: RJ45 10/100/1000 Base-T connector pin assignment

A.3.2) LED Definition

Speed LED	**Left (Green / Amber Color)**	**Link/Active LED**	**Right (Green / Amber Color)**
10 Mbps	Off	**Link**	Turn on Green
100 Mbps	Static Amber	**Active**	Blinking Green
1000 Mbps	Static Green	**Bypass Status: Disconnect**	Blinking Amber
		Bypass Status: Bypass	Static Amber

Table 48: RJ45 connector LED indication

Note: Bypass States are only signalled on the traffic LAN ports. Management LAN ports do not have this extra LED colour & signalling.

B. BIOS POST CODES

POST Codes are diagnostic codes sent by the BIOS to IO address 0x80. A POST adapter needs to be installed in the system to view these POST Codes. Codes not listed are reserved by AMI.

POST Code	Description
0x01	Power on. Reset type detection (soft/hard).
0x02	AP initialization before microcode loading
0x03	North Bridge initialization before microcode loading
0x04	South Bridge initialization before microcode loading
0x05	unused
0x06	Microcode loading
0x07	AP initialization after microcode loading
0x08	North Bridge initialization after microcode loading
0x09	South Bridge initialization after microcode loading
0x0A	unused
0x0B	Cache initialization
0x0E	Microcode not found
0x0F	Microcode not loaded
0x10	PEI Core is started
0x11	Pre-memory CPU initialization is started
0x12	Pre-memory CPU initialization (CPU module specific)
0x13	Pre-memory CPU initialization (CPU module specific)
0x14	Pre-memory CPU initialization (CPU module specific)
0x15	Pre-memory North Bridge initialization is started
0x16	Pre-Memory North Bridge initialization (North Bridge module specific)
0x17	Pre-Memory North Bridge initialization (North Bridge module specific)
0x18	Pre-Memory North Bridge initialization (North Bridge module specific)

POST Code	Description
0x19	Pre-memory South Bridge initialization is started
0x1A	Pre-memory South Bridge initialization (South Bridge module specific)
0x1B	Pre-memory South Bridge initialization (South Bridge module specific)
0x1C	Pre-memory South Bridge initialization (South Bridge module specific)
0x1D – 0x2A	unused
0x2B	Memory initialization. Serial Presence Detect (SPD) data reading
0x2C	Memory initialization. Memory presence detection
0x2D	Memory initialization. Programming memory timing information
0x2E	Memory initialization. Configuring memory
0x2F	Memory initialization (other).
0x30	Reserved for ASL
0x31	Memory Installed
0x32	CPU post-memory initialization is started
0x33	CPU post-memory initialization. Cache initialization
0x34	CPU post-memory initialization. Application Processor(s) (AP) initialization
0x35	CPU post-memory initialization. Boot Strap Processor (BSP) selection
0x36	CPU post-memory initialization. System Management Mode (SMM) initialization
0x37	Post-Memory North Bridge initialization is started
0x38	Post-Memory North Bridge initialization (North Bridge module specific)
0x39	Post-Memory North Bridge initialization (North Bridge module specific)
0x3A	Post-Memory North Bridge initialization (North Bridge module specific)
0x3B	Post-Memory South Bridge initialization is started
0x3C	Post-Memory South Bridge initialization (South Bridge module specific)
0x3D	Post-Memory South Bridge initialization (South Bridge module

POST Code	Description
	specific)
0x3E	Post-Memory South Bridge initialization (South Bridge module specific)
0x3F -0x4E	unused
0x4F	DXE IPL is started
0x50	Memory initialization error. Invalid memory type or incompatible memory speed
0x51	Memory initialization error. SPD reading has failed
0x52	Memory initialization error. Invalid memory size or memory modules do not match.
0x53	Memory initialization error. No usable memory detected
0x54	Unspecified memory initialization error.
0x55	Memory not installed
0x56	Invalid CPU type or Speed
0x57	CPU mismatch
0x58	CPU self test failed or possible CPU cache error
0x59	CPU micro-code is not found or micro-code update is failed
0x5A	Internal CPU error
0x5B	reset PPI is not available
0x60	DXE Core is started
0x61	NVRAM initialization
0x62	Installation of the South Bridge Runtime Services
0x63	CPU DXE initialization is started
0x64	CPU DXE initialization (CPU module specific)
0x65	CPU DXE initialization (CPU module specific)
0x66	CPU DXE initialization (CPU module specific)
0x67	CPU DXE initialization (CPU module specific)
0x68	PCI host bridge initialization
0x69	North Bridge DXE initialization is started

POST Code	Description
0x6A	North Bridge DXE SMM initialization is started
0x6B	North Bridge DXE initialization (North Bridge module specific)
0x6C	North Bridge DXE initialization (North Bridge module specific)
0x6D	North Bridge DXE initialization (North Bridge module specific)
0x6E	North Bridge DXE initialization (North Bridge module specific)
0x6F	North Bridge DXE initialization (North Bridge module specific)
0x70	South Bridge DXE initialization is started
0x71	South Bridge DXE SMM initialization is started
0x72	South Bridge devices initialization
0x72	South Bridge DXE Initialization (South Bridge module specific)
0x73	South Bridge DXE Initialization (South Bridge module specific)
0x74	South Bridge DXE Initialization (South Bridge module specific)
0x75	South Bridge DXE Initialization (South Bridge module specific)
0x76	South Bridge DXE Initialization (South Bridge module specific)
0x77	South Bridge DXE Initialization (South Bridge module specific)
0x78	ACPI module initialization
0x79	CSM initialization
0x80 – 0x8F	unused
0x90	Boot Device Selection (BDS) phase is started
0x91	Driver connecting is started
0x92	PCI Bus initialization is started
0x93	PCI Bus Hot Plug Controller Initialization
0x94	PCI Bus Enumeration
0x95	PCI Bus Request Resources
0x96	PCI Bus Assign Resources
0x97	Console Output devices connect
0x98	Console input devices connect

POST Code	Description
0x99	Super IO Initialization
0x9A	USB initialization is started
0x9B	USB Reset
0x9C	USB Detect
0x9D	USB Enable
0xA0	IDE initialization is started
0xA1	IDE Reset
0xA2	IDE Detect
0xA3	IDE Enable
0xA4	SCSI initialization is started
0xA5	SCSI Reset
0xA6	SCSI Detect
0xA7	SCSI Enable
0xA8	Setup Verifying Password
0xA9	Start of Setup
0xAA	Reserved for ASL
0xAB	Setup Input Wait
0xAC	Reserved for ASL
0xAD	Ready To Boot event
0xAE	Legacy Boot event
0xAF	Exit Boot Services event
0xB0	Runtime Set Virtual Address MAP Begin
0xB1	Runtime Set Virtual Address MAP End
0XB2	Legacy Option ROM Initialization
0xB3	System Reset
0XB4	USB hot plug
0xB5	PCI bus hot plug

POST Code	Description
0xB6	Clean-up of NVRAM
0xB7	Configuration Reset (reset of NVRAM settings)
0xC0 – 0xCF	unused
0xD0	CPU initialization error
0xD1	North Bridge initialization error
0xD2	South Bridge initialization error
0xD3	Some of the Architectural Protocols are not available
0xD4	PCI resource allocation error. Out of Resources
0xD5	No Space for Legacy Option ROM
0xD6	No Console Output Devices are found
0xD7	No Console Input Devices are found
0xD8	Invalid password
0xD9	Error loading Boot Option (LoadImage returned error)
0xDA	Boot Option is failed (StartImage returned error)
0xDB	Flash update is failed
0xDC	Reset protocol is not available
0XE0	S3 Resume is stared (S3 Resume PPI is called by the DXE IPL)
0xE1	S3 Boot Script execution
0xE2	Video repost
0xE3	OS S3 wake vector call
0xE8	S3 Resume Failed
0xE9	S3 Resume PPI not Found
0xEA	S3 Resume Boot Script Error
0xEB	S3 OS Wake Error
0xF0 – 0xF4	unused
0xf8 – 0xFA	unused

Table 49: BIOS POST Codes

C. APPENDIX: POWER SUPPLY SPECIFICATION

The FWA-3260 is available with a 250W AC PSU and 300W redundant AC PSU. The specifications for this power supply are listed below. Please consult your Advantech representative reg. other power supply options.

Item	Specification	Comment / Conditions
Rating	250W	0..25°C ambient
AC input voltage	90-264V, 47-63Hz	Auto ranging
Input Current	3.5A rms max.@115V 2.0A rms max.@230V	
Hold up time	16ms min.	@ full load
Efficiency	70% minimum	@ full load
MTBF	100,000h @25°C and full load	Acc. to MIL-HDBK-217
Safety	UL, CB, CE,CCC,CE, BSMI, KCC PFC acc. EN61000-3-2	(EN60950)
EMI Compliance	• FCC Part 15 Subpart J, Class 'B' 115 Vac operation. • CISPR 22 Class 'B' 230 Vac operation. • BSMI	
Environment	RoHS	"5 of 6" compliant
Protection	Output Overload Output Short Circuit Output Over Voltage Protection Over Temperature Protection	

Table 50: Single AC Power Supply Specification

D. APPENDIX: DECLARATION OF CONFORMITY

The FWA-3260 has been successfully tested for compliance to the regulations below. Should you need a signed copy of the declaration of conformity or the related test reports, please contact your Advantech representative.

CE

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring.

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 or her own expense.

E. APPENDIX: WARRANTY AND RMA

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, 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 merchandise 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.

