ARS200

Advanced Ruggedized System with 14th/13th Gen. Intel® Core™ U-Series Processors

User's Manual

Version 1.0
January 2026

iBASE

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Trademarks

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Compliance

CE

This product complies with applicable CE requirements.This product is in accordance with the directives of the European Union (EU). If users modify and/or install other devices in this equipment, the CE declaration of conformity may no longer apply.

FC

This product has been tested and found to comply with the limits for a Class B device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the manufacturer's instructions, may cause harmful interference to radio communications.

WEEE

This product must not be disposed of as normal household waste, in accordance with the EU directive for waste electrical and electronic equipment WEEE (2012/19/EU). Instead, it should be returned to a municipal recycling collection point. Check local regulations for disposal of electronic products.

Green IBASE

This product complies with RoHS 2 requirements, which prohibit the use of certain hazardous substances in electrical and electronic equipment. The following substances must not exceed the specified concentrations:

- Hexavalent chromium: 1,000 ppm
- Polybrominated biphenyls (PBBs): 1,000 ppm
- Polybrominated diphenyl ethers (PBDEs): 1,000 ppm
- Cadmium: 100 ppm
- Mercury: 1,000 ppm
- Lead: 1,000 ppm
- Bis(2-ethylhexyl) phthalate (DEHP): 1,000 ppm
- Butyl benzyl phthalate (BBP): 1,000 ppm
- Dibutyl phthalate (DBP): 1,000 ppm
- Diisobutyl phthalate (DIBP): 1,000 ppm

Important Safety Information

Carefully read the precautions before using the device.

Environmental conditions:

- Place the device on a stable, horizontal surface to prevent it from falling and causing damage.
- Ensure there is sufficient space around the device for proper ventilation.
- Operate the product within the ambient temperature range specified in this manual.

Caring for your IBASE products:

- Turn off the device and unplug all cables before cleaning to avoid electric shock / short circuit.
- Clean the chassis with a cloth and a neutral cleaning agent or diluted alcohol, then dry it with another clean cloth.
- Use a vacuum designed for electronics to remove dust, especially from air vents and slots, to prevent clogging.

Warning

- Do not use this product near water. Avoid spilling water or other liquids on the device.
- Do not place heavy objects on top of the device.
- Only use the type of power specified on the label. If unsure, consult your distributor or local power company.
- Ensure the correct voltage is applied to the device.
- Do not walk on or place objects on the power cord.
- If using an extension cord, ensure the total ampere rating of the connected devices does not exceed the cord's capacity.

Avoid Disassembly

Do not disassemble, repair, or modify the device, as it may pose hazards, cause damage to the device, or lead to injury or property damage.
Additionally, it will void the warranty.

CAUTION

Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to local regulations.

Warranty Policy

- **IBASE standard products:**

  24-month warranty from the date of shipment. If the date of shipment cannot be ascertained, the product serial numbers will be used to approximate the shipping date.

- **Third-party parts:**

  12-month (1-year) warranty from delivery for the Third-party parts that are not manufactured by IBASE, such as CPU, memory, storage device, power adapter, panel and touchscreen.

* Products, however, that fail due to misuse, accident, installation or unauthorized repair shall be treated as out of warranty and customers shall be billed for repair and shipping charges.

Technical Support & Services

1. Visit the IBASE website at www.ibase.com.tw to find the latest information about the product.
2. If you need any further assistance from your distributor or sales representative, prepare the following information about your product and elaborate upon the problem.
   - Product model name
   - Product serial number
   - Detailed description of the problem
   - The error messages in text or screenshots, if any
   - Peripheral configuration
   - Software in use (such as OS and application software, including the version numbers)

Table of Contents

Chapter 1
General Information

The information provided in this chapter includes:

- Introduction
- Features
- Specifications
- Product View
- Dimensions

1.1 Introduction

Powered by Intel® 14th/13th Gen Core™ U-series processors with up to 64GB DDR5-5600 memory, the ARS200 delivers high-performance, energy-efficient computing. Its modular design supports multiple M.2 slots for wireless and storage expansion, and provides rich I/O including dual 2.5GbE LAN, dual CANbus, and a SIM slot for 4G/5G LTE connectivity. Featuring an IP65-rated fanless enclosure, the ARS200 is resistant to dust, water, and harsh environments. It supports wide operating temperatures from -20°C to 70°C and accepts a 12V~24V DC input with built-in over-voltage, under-voltage, and reverse-polarity protection for stable 24/7 operation in outdoor and industrial deployments. Designed for rugged edge computing, the ARS200 ensures long-term reliability in demanding applications such as smart cities, transportation, and industrial automation, enabling dependable deployment in environments with unstable power, high humidity, or limited airflow.

1.2 Features

- Fanless system with IBASE ARS200 proprietary board
- Intel® i5-1345URE Processor
  (Raptor Lake-U platform)
- Front Panel Flexible I/O via M12 Connector
- 2x HDMI, 2 x 2.5G LAN, 2x USB 3.2, 2x COM
- 1x M.2 B-Key 3052, supports 5G/4G/LTE
- 1x M.2 E-Key 2230 supports Wi-Fi/BT
- 12V~24V DC wide-range power input
- Over/Under/Reverse Voltage Protection
- Wide-range operating temperature from -20°C to 70°C
- Waterproof, fanless design with IP65 rating

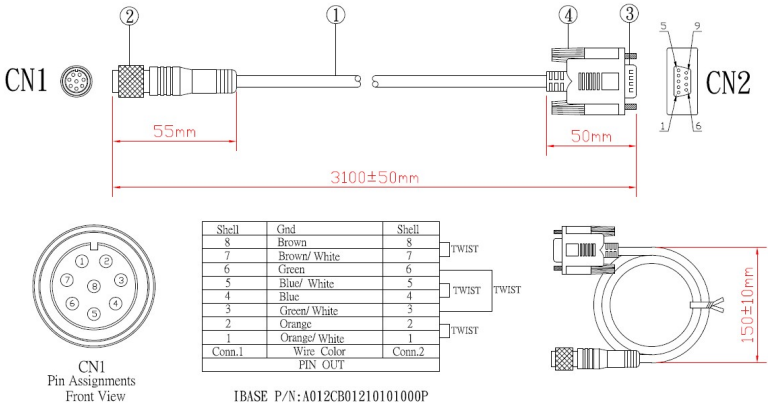
1.3 Packing List

Your product package should include the items listed below. If any of the items below are missing, contact the distributor or the dealer.

- ARS200 series Box PC
- Manuals & Driver Download Instructions
- DC-IN wire
- Power Adaptor (optional)

1.4 Optional Accessories

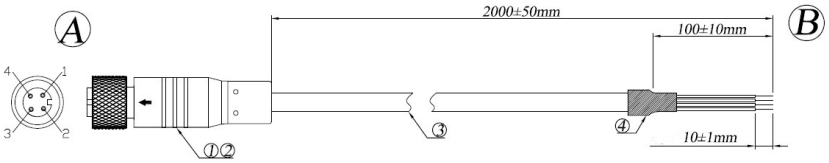
- COM Port (M12 8P Female)
  P/N: A012CB01210101000P



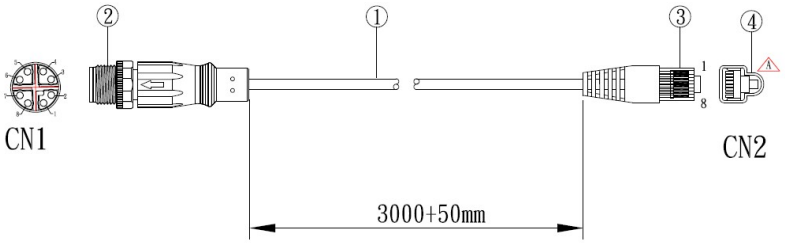
Shell	Gnd	Shell	
8	Brown	8	TWIST
7	Brown/ White	7	
6	Green	6	
5	Blue/ White	5	TWIST
4	Blue	4	TWIST
3	Green/ White	3	
2	Orange	2	TWIST
1	Orange/ White	1	
Conn.1	Wire Color	Conn.2	
	PIN OUT		

IBASE P/N:A012CB01210101000P

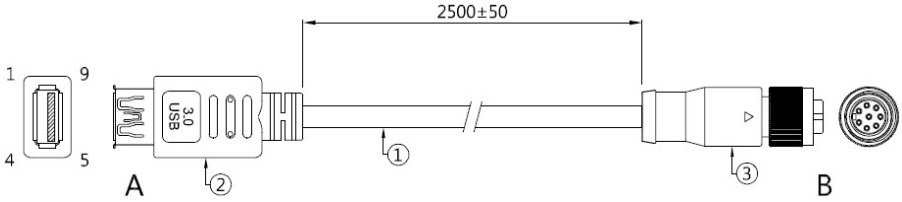
- DC Cable (M12 A-CODE 4P Male)
  P/N: C501PW39904121A00P



- LAN Cable (M12 X-CODE 8P Male)
  P/N: C501LAN6300A32000P



- USB Cable (M12 8P Female)
  P/N: C501USB1540A22A00P



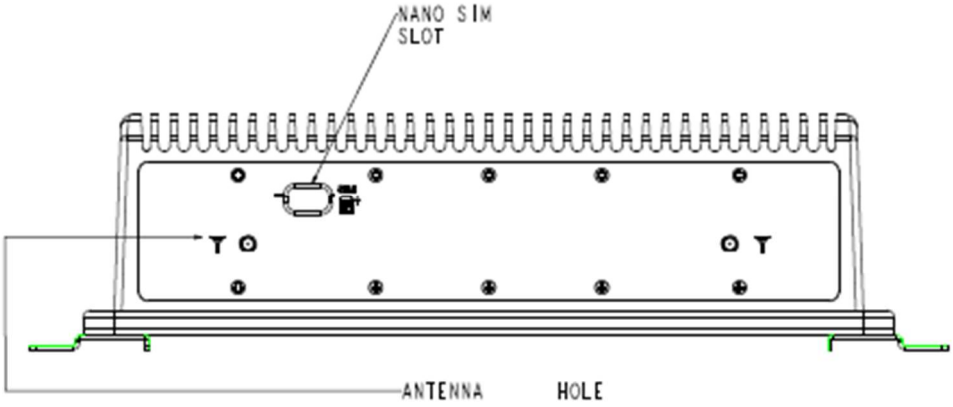
1.5 Specifications

Product	ARS200
Processor	Intel® Core™ i5-1345URE Processor (10-Core @ 4.6GHz)
Mainboard	AR-200-MB
Memory	1x DDR5-5600 SO-DIMM, Max. 64GB
Front Panel External I/O MAX 7 ports within DC-in	• 2x HDMI (C3 connector) • 2x 2.5G LAN (M12 to RJ45) • 2x USB 3.2 (M12 connector) • 1x RS-232/422/485 (M12 to DB9) • 1x RS-232 (M12 to DB9) • 1x 4-in/4-out Digital I/O (M12 to open wire) • 1x DC-IN with latch connector for 12V-24V
Rear Panel External I/O	• A SIM card slot with cover • 2x waterproof antenna openings (jack type)
Expansion Slots	• 1x 2230 M.2 E-Key socket (USB 2.0 + PCI-E) • 1x 3052 M.2 B-Key socket (USB 3.2 + PCI-E)
Storage	• 1x 2280 M.2 M+B Key for NVME Storage
Construction	Aluminum die-casting and heavy-duty steel
Chassis Color	Silver & Black
Mounting	• Desktop or wall mounting (wall mount kit included)
Dimensions	319 mm(W) x 230 mm(D) x 94 mm(H)
Weight	4.5 kg
Supported OS	Windows 11 and Ubuntu Linux
Certification	CE/ FCC Class B/ LVD

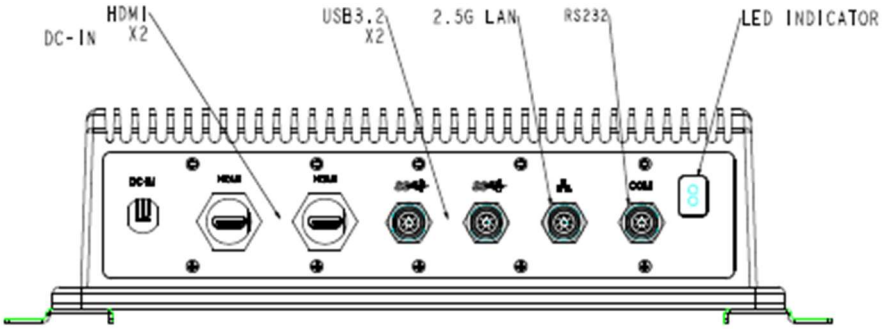
Environment	
Operating Temperature	- 20°C~70°C with air flow
Storage Temperature	- 40°C~85°C
Relative Humidity	5~90% @ 45°C (non-condensing)
Vibration	• Operating: 0.5Grms, 5~500Hz • Non-operating: 1Grms, 5~500Hz
Shock	• Operating: 30G/11 ms Duration • Non-operating: 40G/11 ms Duration

All specifications are subject to change without prior notice.

1.6 Product View



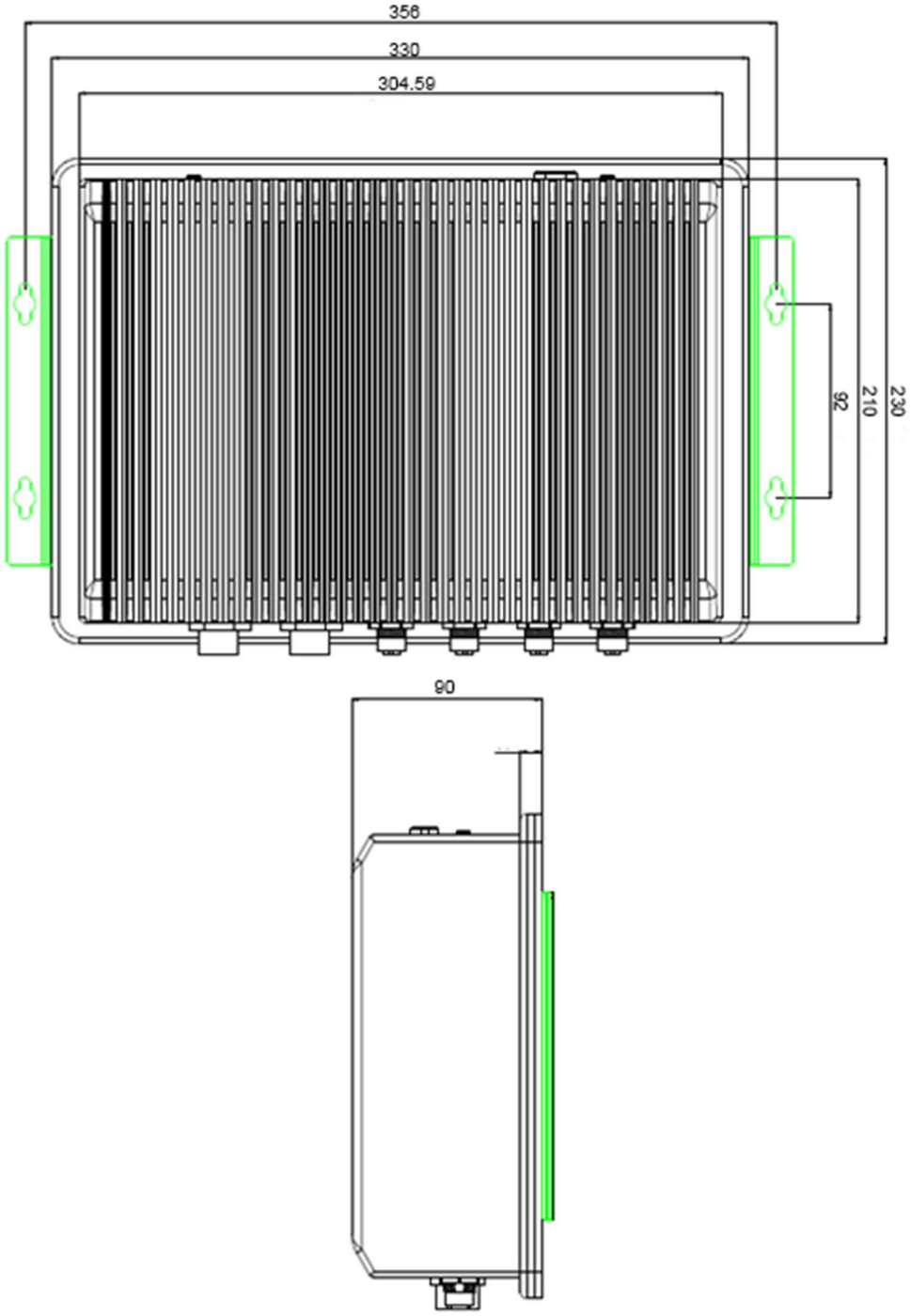
Rear External I/O



Front External I/O

1.7 Dimensions

Unit: mm



Chapter 2
Hardware Configuration

The information provided in this chapter includes:

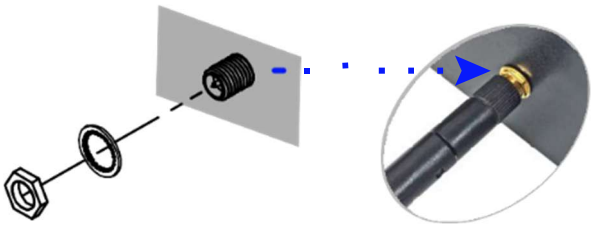
- Installations
- Information and locations of connectors

2.1 Installations

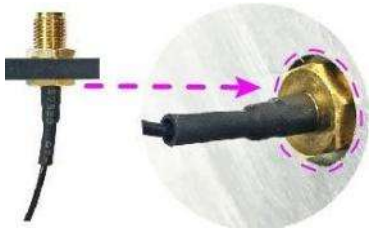
2.1.1 Wi-Fi / WWAN (4G/5G) Antenna Installation

Thread the Wi-Fi / 5G / 4G antenna extension cable through an antenna hole of the front I/O cover and fasten the antenna as shown below. Apply threadlocker (e.g., medium-strength) to the hex nut behind the front I/O cover to prevent the extension cable from falling if the cable becomes loose.

1. Thread and fasten the hex nut and the washer. Then install the antenna.



2. Apply medium-strength threadlocker to the hex nut behind the front I/O cover..



Info: Thread specification: 1/4"-36 UNC (approx. 6.35 mm major diameter).

2.1.2 Pinout for COM Ports, DC-In Power Connector

2.1.2.1. Power Input (M12, 4-pin, male)

Pin	Assigment	Pin	Assigment
1	DC Input	2	Ground
3	NC	4	Ground

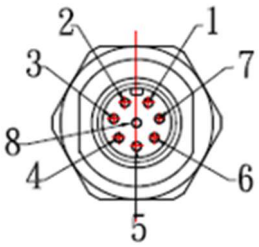
2.1.2.2. LAN Connector (M12, 8-pin, female, X-code)

Pin	Assigment	Pin	Assigment
1	MX1+	5	MX4+
2	MX1-	6	MX4-
3	MX2+	7	MX3+
4	MX2-	8	MX3-

2.1.2.3. USB Connector (M12, 8-pin, male, A-Coded)

Pin	Assigment	Pin	Assigment
1	VCC	2	TX-
3	RX+	4	RX-
5	GND	6	D+
7	D-	8	TX+

2.1.2.4. COM1 RS232/422/485 Ports



Pin	Assigment	Pin	Assigment
1	DCD	2	RXD
3	TXD	4	DTR
5	GND	6	RSR
7	RTS	8	CTS

Chapter 3
Driver Installation

The information provided in this chapter includes:

- Intel® Chipset Software Installation Utility
- Graphics Driver Installation
- HD Audio Drivers Installation
- Intel® ME Drivers Installation
- Intel® Serial I/O Drivers Installation
- LAN Driver Installation

Download Link:
https://drive.google.com/drive/folders/1PN30Iq0dLtG9jffwqcpj-Z6p61F01p62

3.1 Introduction

This section describes the installation procedures for software drivers. Visit the product support page on the IBASE website to download the drivers. Copy the compressed drivers file to your computer. Double click the file to decompress it. Run “CDGuide” to go to the main drivers page.

⚠ Important: Install the Intel® Chipset Software Installation Utility before installing other drivers.

3.2 Intel® Chipset Software Installation Utility

The Intel® Chipset drivers should be installed first before the software drivers to install INF files for Plug & Play function for the chipset components. Follow the instructions below to complete the installation.

1. Click **Intel** and then **Intel(R) Amston Lake Chipset Drivers**.

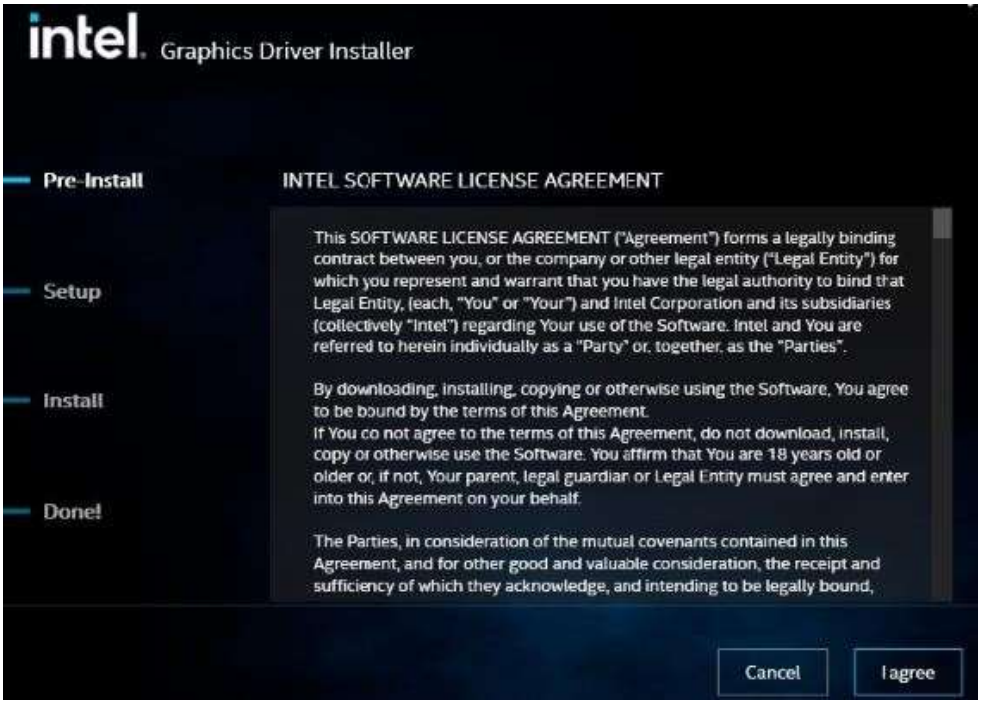
2. Click **Intel(R) Chipset Software Installation Utility**.

3. When the *Welcome* screen to the Intel® Chipset Device Software appears, click **Next**.
4. Accept the terms of the software license agreement. Click **Next**.
5. On the *Readme File Information* screen, click **Install** and then **Next**.
6. When the driver is completely installed, click **Finish**.

3.3 Graphics Driver Installation

1. Click **Intel** and then **Intel(R) Amston Lake Chipset Drivers**.
2. Click **Intel(R) Amston Lake Graphics Driver**.

3. In the *Intel Software License Agreement* screen, click **I agree**.

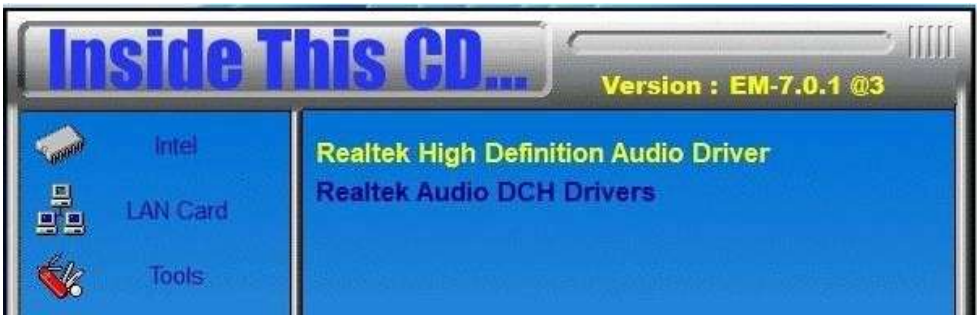


4. Click **Start** for the Installer to install the components shown below.

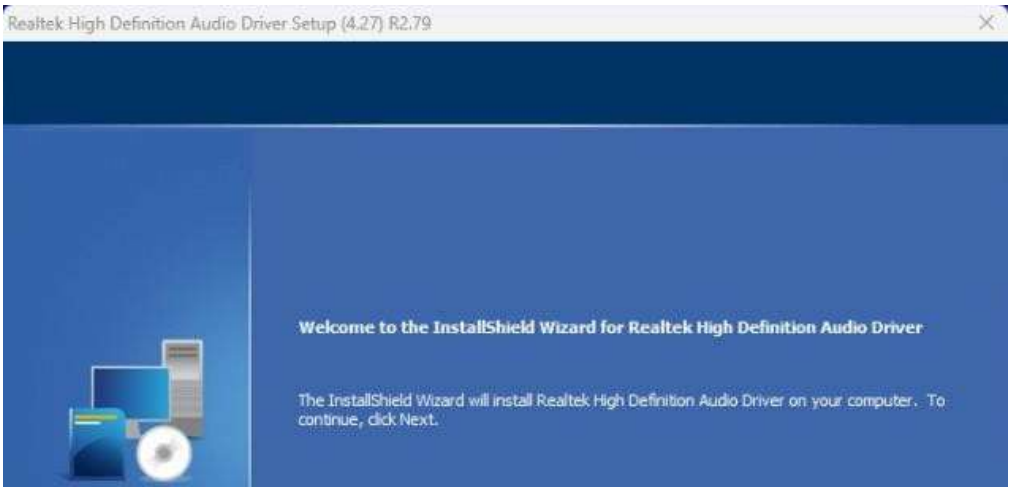
5. You need to restart your system in order to apply the driver changes. Click **Finish**.

3.4 Realtek HD Audio Driver Installation

1. Click **Intel** and then **Intel(R) Amston Lake Chipset Drivers**.
2. Click **Intel(R) Amston Lake Graphics Driver**.
3. Click **Realtek High Definition Audio Driver**.



4. On the *Welcome* screen of the InstallShield Wizard, click **Next**.

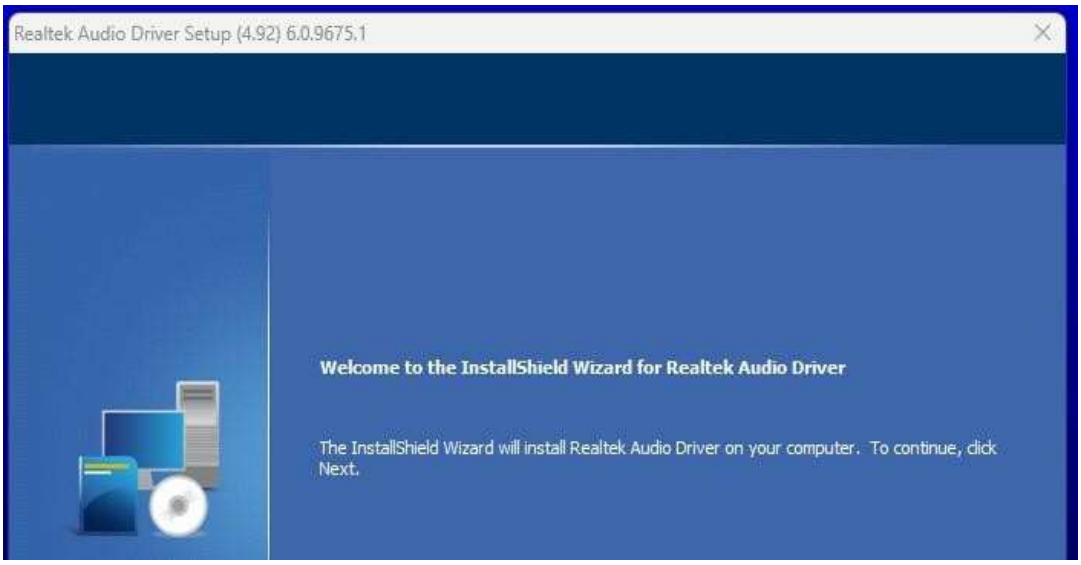


5. After installation has been completed, restart the computer for changes to take effect.

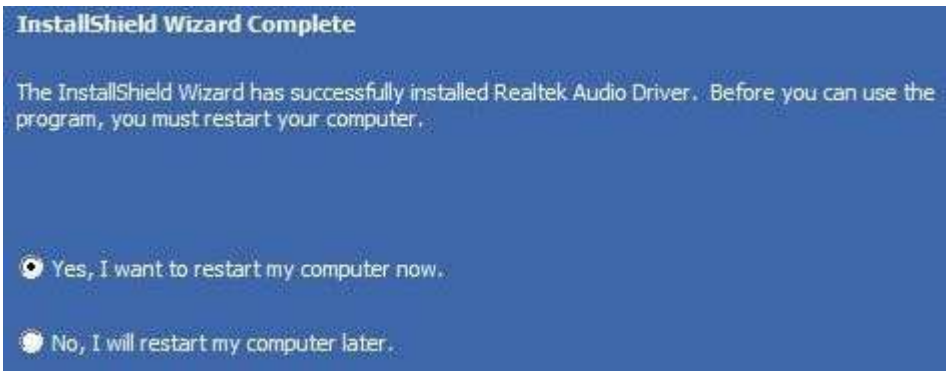
3.5 Realtek Audio DCH Drivers Installation

1. Click **Intel** and then **Intel(R) Amston Lake Chipset Drivers**.
2. Click **Realtek Audio DCH Drivers**.

3. On the *Welcome* screen of the InstallShield Wizard, click **Next**.



4. After installation has been completed, restart the computer.



3.6 Intel (R) ME Drivers Installation

1. Click **Intel** and then **Intel(R) Amston Lake Chipset Drivers**.

2. On the *Welcome* screen, click **Next**.

3. Click **Next** to accept the destination folder or click **Change** to choose another destination folder.
4. Click **Finish** when you have installed the ME components.

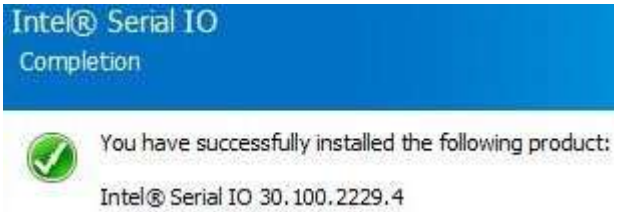
3.7 Intel® Serial IO Drivers Installation

1. Click **Intel** and then **Intel(R) Amston Lake Chipset Drivers**.
2. Click **Intel(R) Serial IO Drivers.**

3. When the *Welcome* screen appears, click **Next** to continue.

4. Accept the terms of the license agreement and click **Next**.
5. On the *Readme File Information* screen, click **Next**.
6. On the *Confirmation* screen, click **Next**.

7. On the *Completion* screen, click **Finish**.

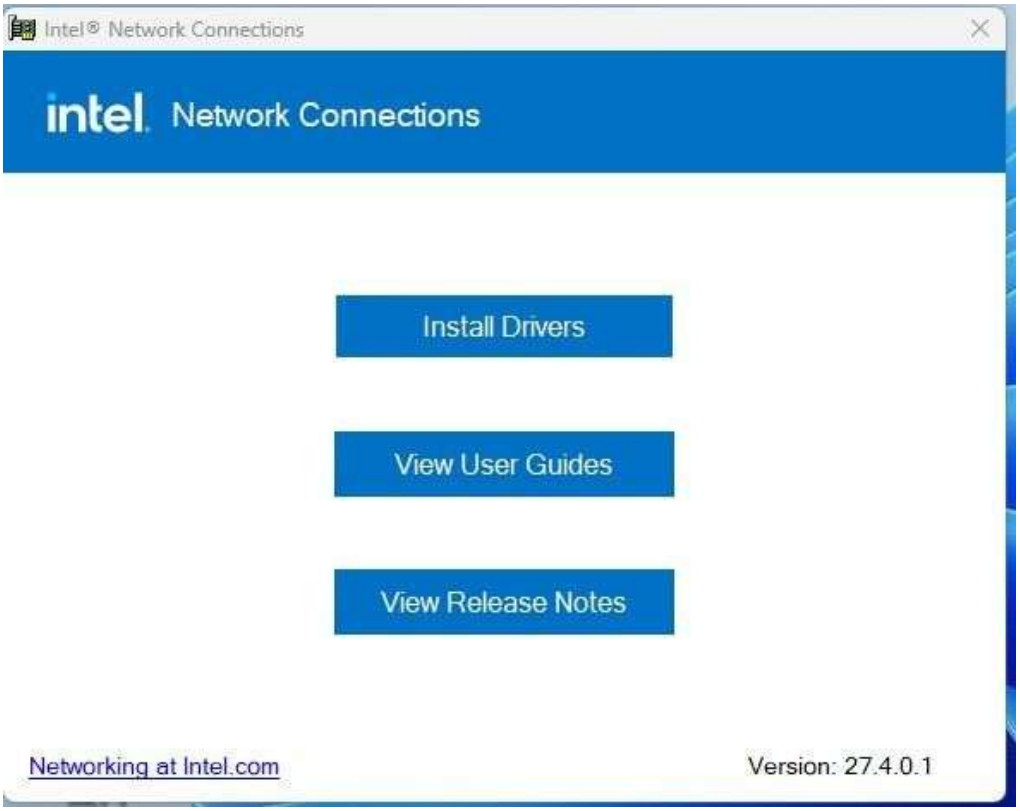


3.8 LAN Drivers Installation

1. Click **LAN Card** on the left and then **Intel LAN Controller Drivers**.

2. Click **Intel(R) I21x Gigabit Network Drivers**.

3. Click **Install Drivers**.



4. After the drivers have been successfully installed, click **Close**.

Chapter 4
BIOS Setup

This chapter describes the different settings available in the AMI BIOS that comes with the board. The topics covered in this chapter are as follows:

- Main Settings
- Advanced Settings
- Chipset Settings
- Security Settings
- Boot Settings
- Save & Exit

4.1 Introduction

The BIOS (Basic Input/Output System) installed in the ROM of your computer system supports Intel® processors. The BIOS provides critical low-level support for standard devices such as disk drives and serial ports. It also provides password protection as well as special support for detailed fine-tuning of the chipset controlling the entire system.

4.2 BIOS Setup

The BIOS provides a Setup utility program for specifying the system configurations and settings. The BIOS ROM of the system stores the Setup utility. When you turn on the computer, the BIOS is immediately activated. Press the <Del> key immediately allows you to enter the Setup utility. If you are a little bit late pressing the <Del> key, POST (Power On Self Test) will continue with its test routines, thus preventing you from invoking the Setup.

If you still need to enter Setup, restart the system by pressing the ”Reset” button or simultaneously pressing the <Ctrl>, <Alt> and <Delete> keys. You can also restart by turning the system Off and back On again.

The following message will appear on the screen:

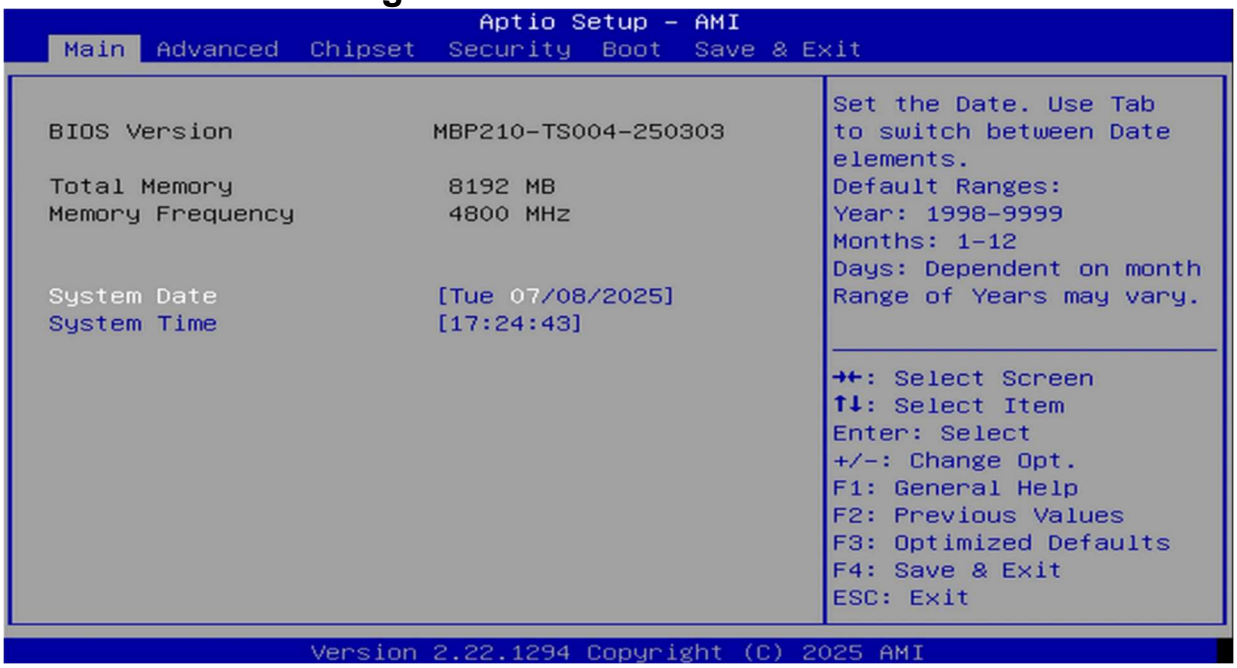
```
Press <DEL> to Enter Setup
```

In general, press the arrow keys to highlight items, <Enter> to select, the <PgUp> and <PgDn> keys to change entries, <F1> for help, and <Esc> to quit.

When you enter the BIOS Setup utility, the *Main Menu* screen will appear on the screen. The Main Menu allows you to select from various setup functions and exit choices.

Warning: It is strongly recommended that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both AMI and your system manufacturer to provide the absolute maximum performance and reliability. Incorrect settings may cause boot failure or instability.

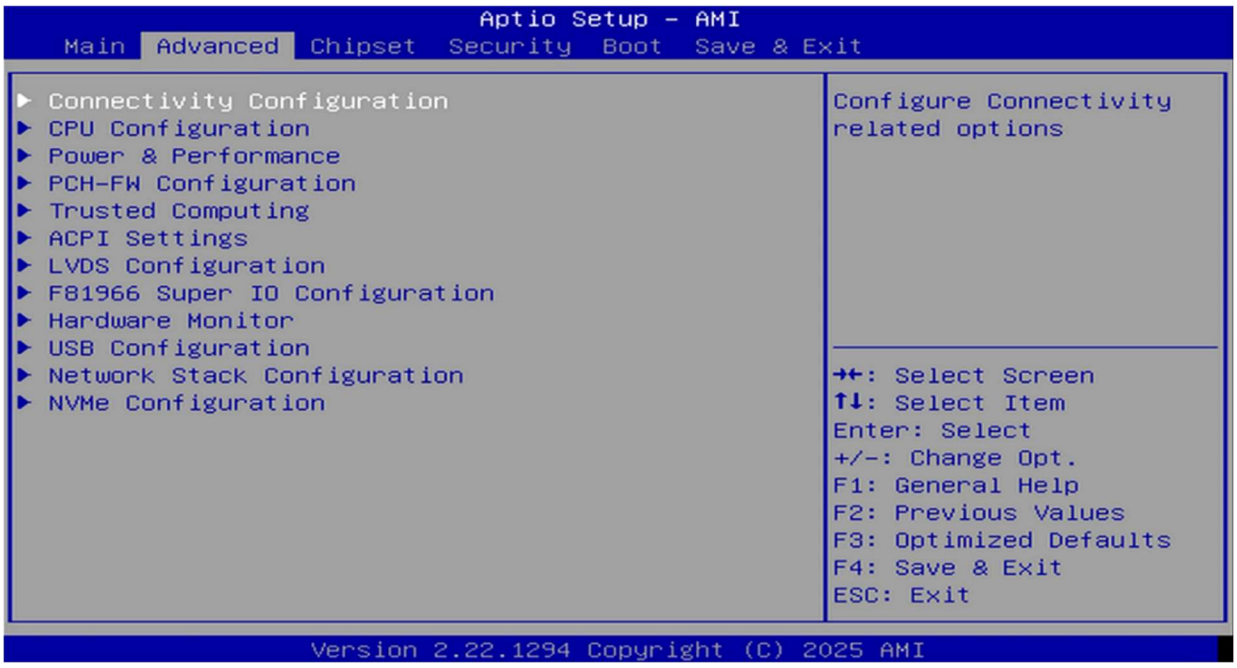
4.3 Main Settings



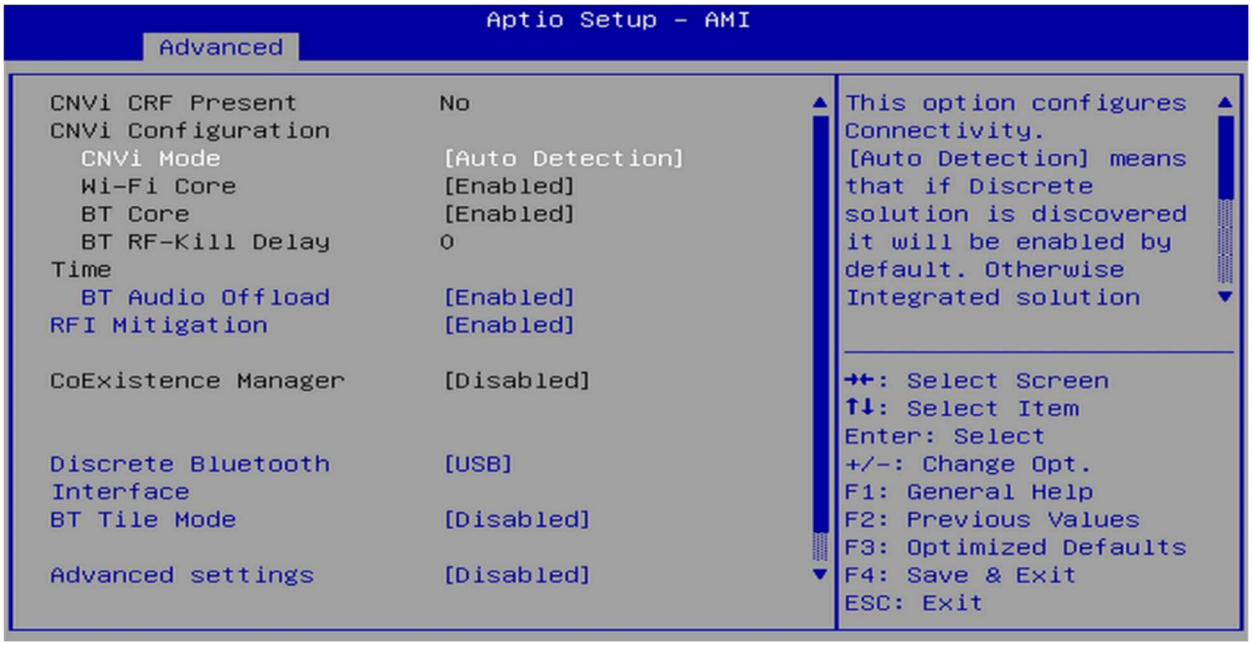
BIOS Setting	Description
System Date	Sets the date. Use the <Tab> key to switch between the date elements.
System Time	Set the time. Use the <Tab> key to switch between the time elements.

4.4 Advanced Settings

This section allows you to configure, improve your system and to set up some system features according to your preference.

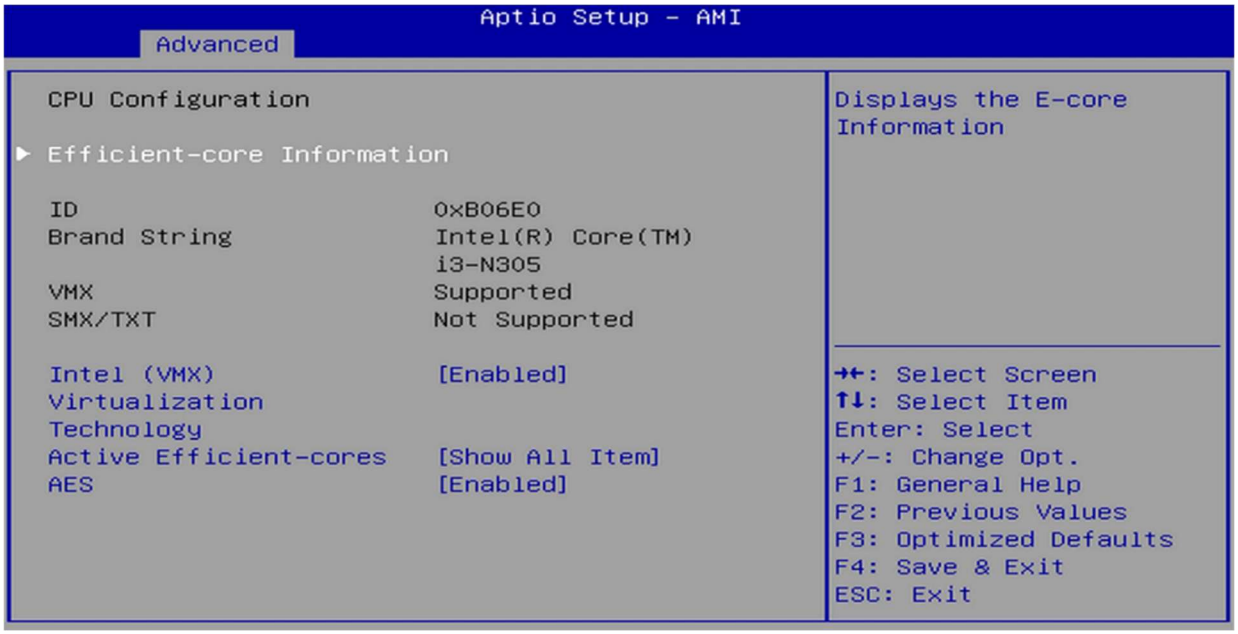


4.4.1 Connectivity Configuration



BIOS Setting	Description
CNVI Mode	This option configures Connectivity. ***Auto Detection*** – means that if Discrete solution is discovered it will be enabled by default. Otherwise Integrated solution (CNVi) will be enabled; ***Disable Integrated*** – disables Integrated Solution.
RFI Mitigation	This is an option intended to enable/disable DDR- RFIM feature for Connectivity. This feature may result in temporary slowdown of the DDR speed.
Discrete Bluetooth Interface	Serial IO UART0 needs to be enabled to select BT interface.
BT Tile Mode	Options: Enabled/Disabled
Advanced Settings	Configure ACPI objects for wireless devices Default: Disabled
WWAN Configuration	Configure WWAN related options. WWAN Device: enable or disable M.2 WWAN device

4.4.2 CPU Configuration

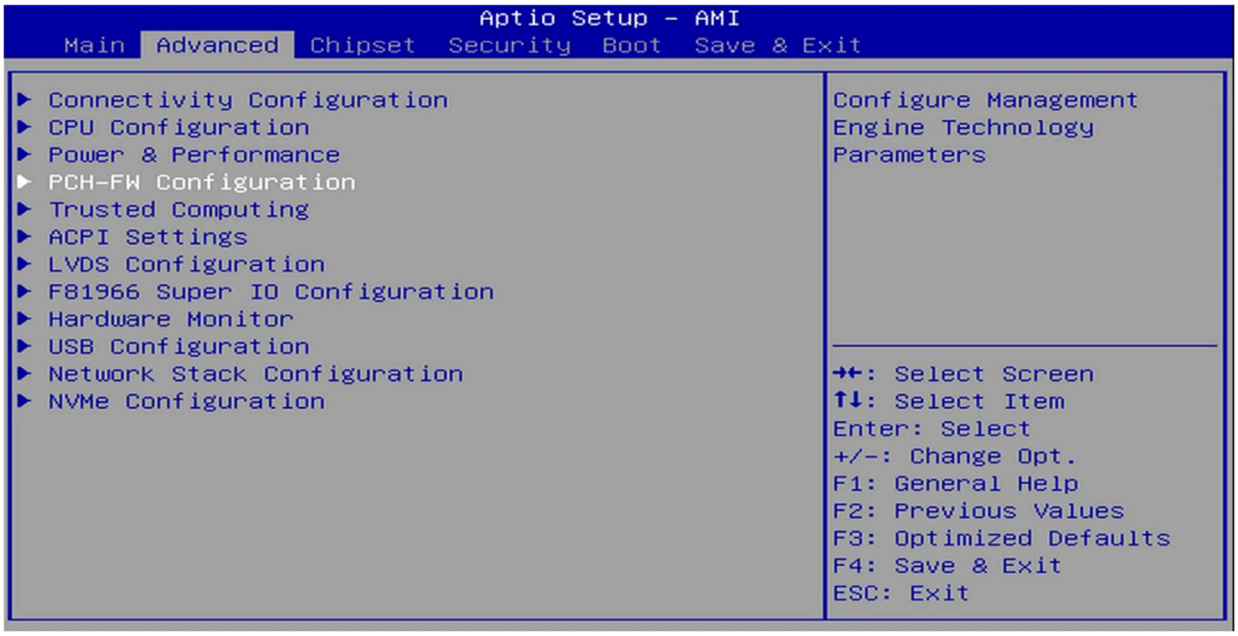


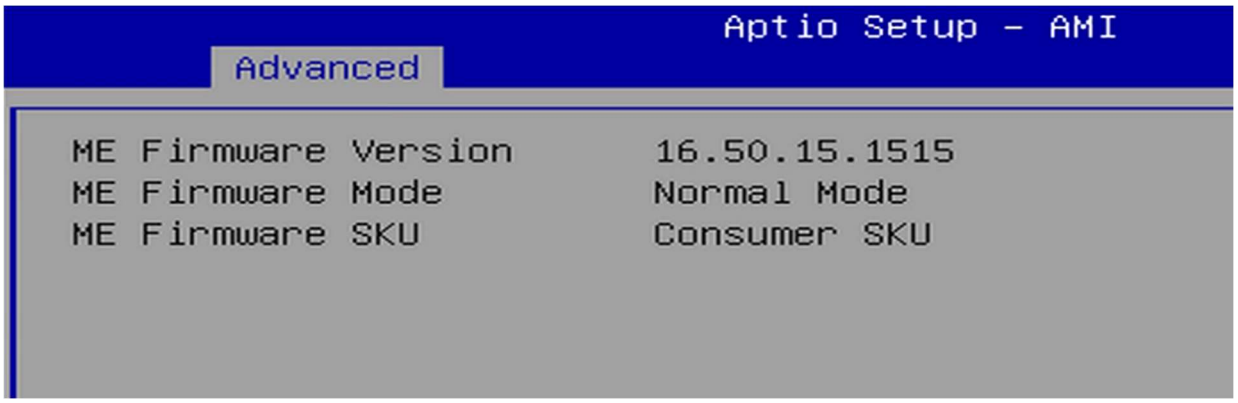
BIOS Setting	Description
Efficient-core Information	Displays the E-core Information.
Intel (VMX) Virtualization Technology	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Active Efficient-cores	Number of E-cores to enable in each processor package. Note: Number of cores and E-cores are looked at together. When both are (0,0), Pcode will enable all cores.
AES	Enable/Disable AES (Advanced Encryption Standard)

4.4.3 Power & Performance

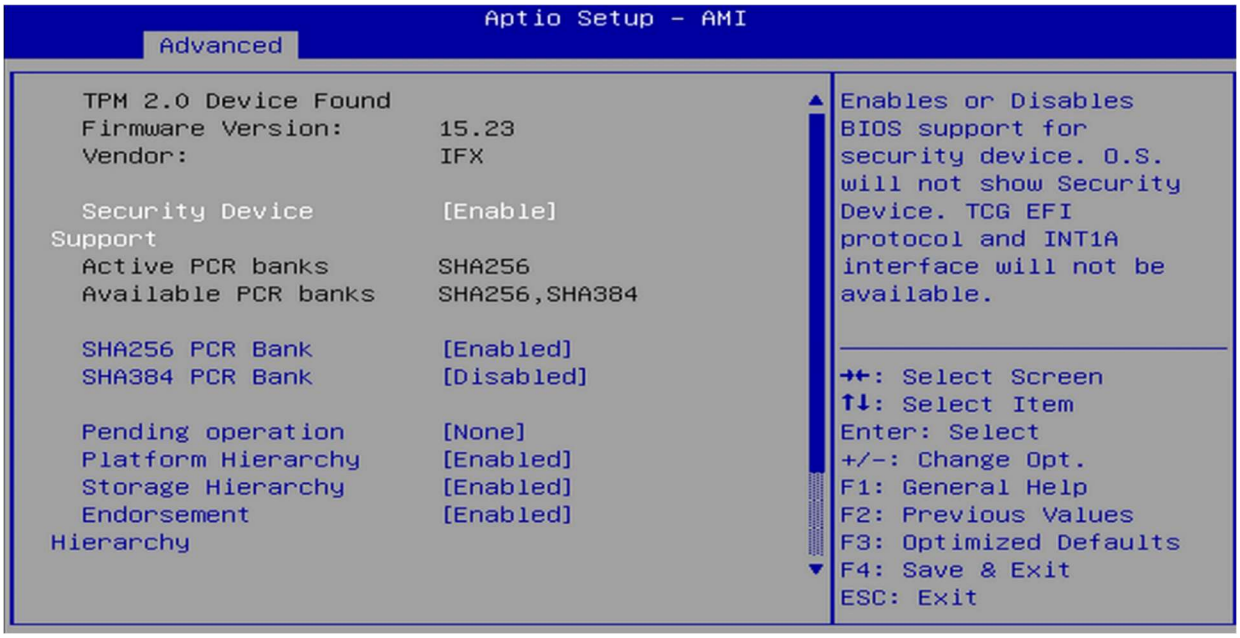
BIOS Setting	Description
CPU – Power Management Control	CPU – Power Management Control Options
Intel Speedstep	Allows more than two frequency ranges to be supported
Intel Speed Shift Technology	Enable/Disable Intel Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P- states.

4.4.4 PCH-FW Configuration



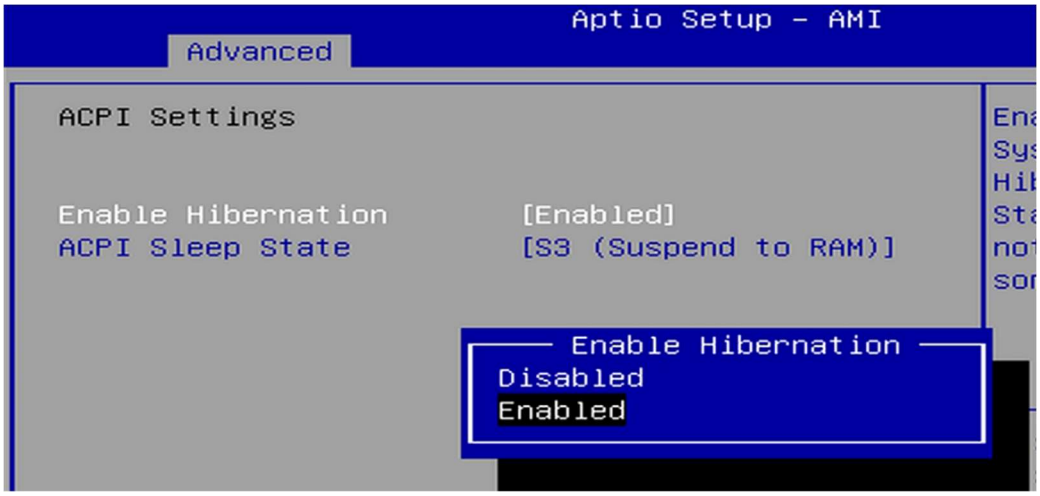


4.4.5 Trusted Computing



BIOS Setting	Description
Security Device Support	Enables / Disables BIOS support for security device. OS will not show security device. TCG EFI protocol and INT1A interface will not be available.
SHA256 PCR Bank	Options: Enabled / Disabled
SHA384 PCR Bank	Options: Enabled / Disabled
Pending operation	Schedule an operation for the security device. Note: Your computer will reboot during restart in order to change state of security device.
Platform Hierarchy	Enables / Disables platform hierarchy.
Storage Hierarchy	Enables / Disables storage hierarchy.
Endorsement Hierarchy	Enables / Disables endorsement hierarchy.
Physical Presence Spec Version	Select to tell O.S. to support PPI Spec Version 1.2 or 1.3. Note some HCK tests might not support 1.3.
Device Select	TPM 1.2 will restrict support to TPM 1.2 devices. TPM 2.0 will restrict support to TPM 2.0 devices. Auto will support both with the default set to TPM 2.0 devices if not found, TPM 1.2 devices will be enumerated.

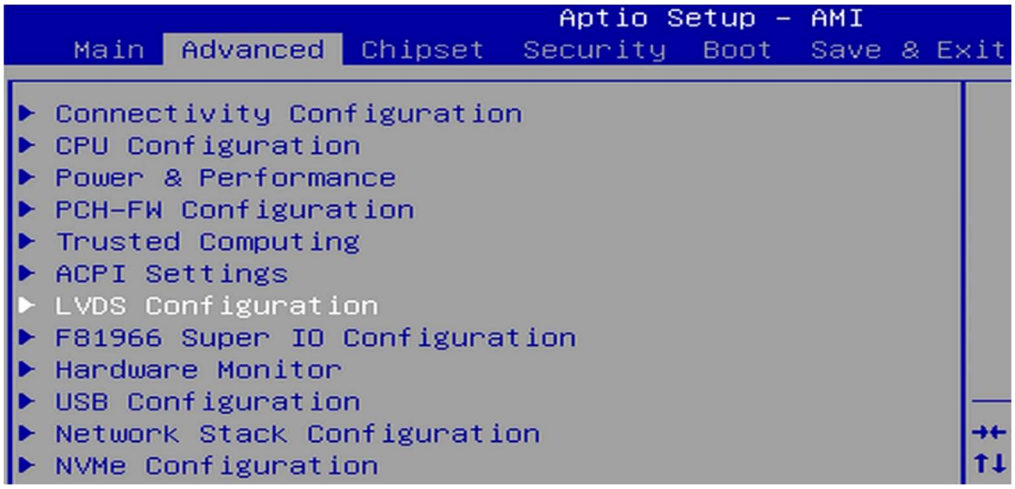
4.4.6 ACPI Settings

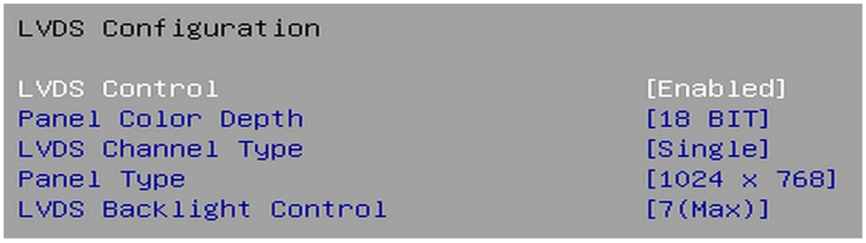


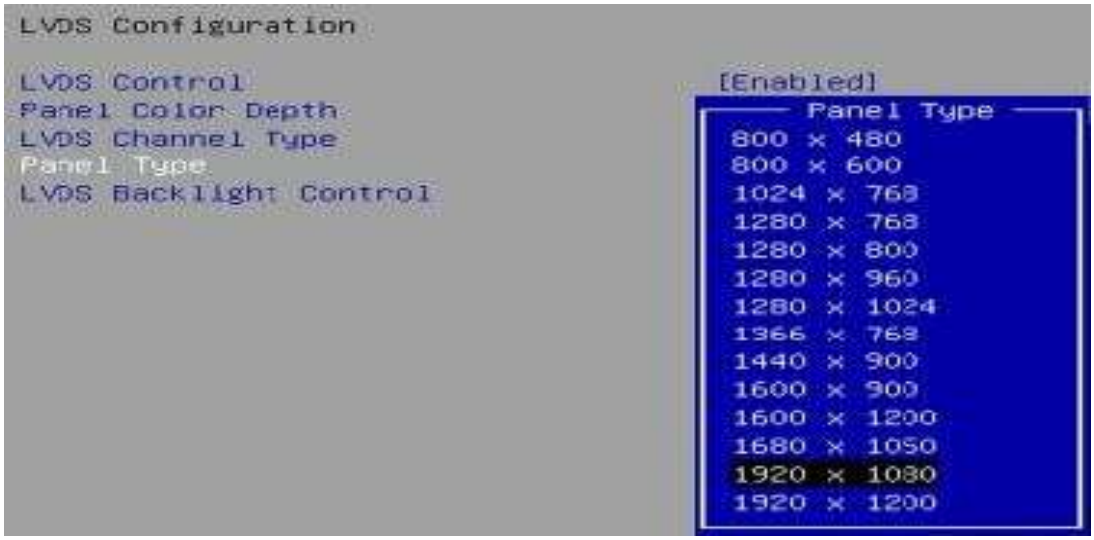
BIOS Setting	Description
Enable Hibernation	Enables / Disables the system ability to hibernate (OS/S4 Sleep State). This option may be not effective with some OS.
ACPI Sleep State	Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.

4.4.7 LVDS Configuration

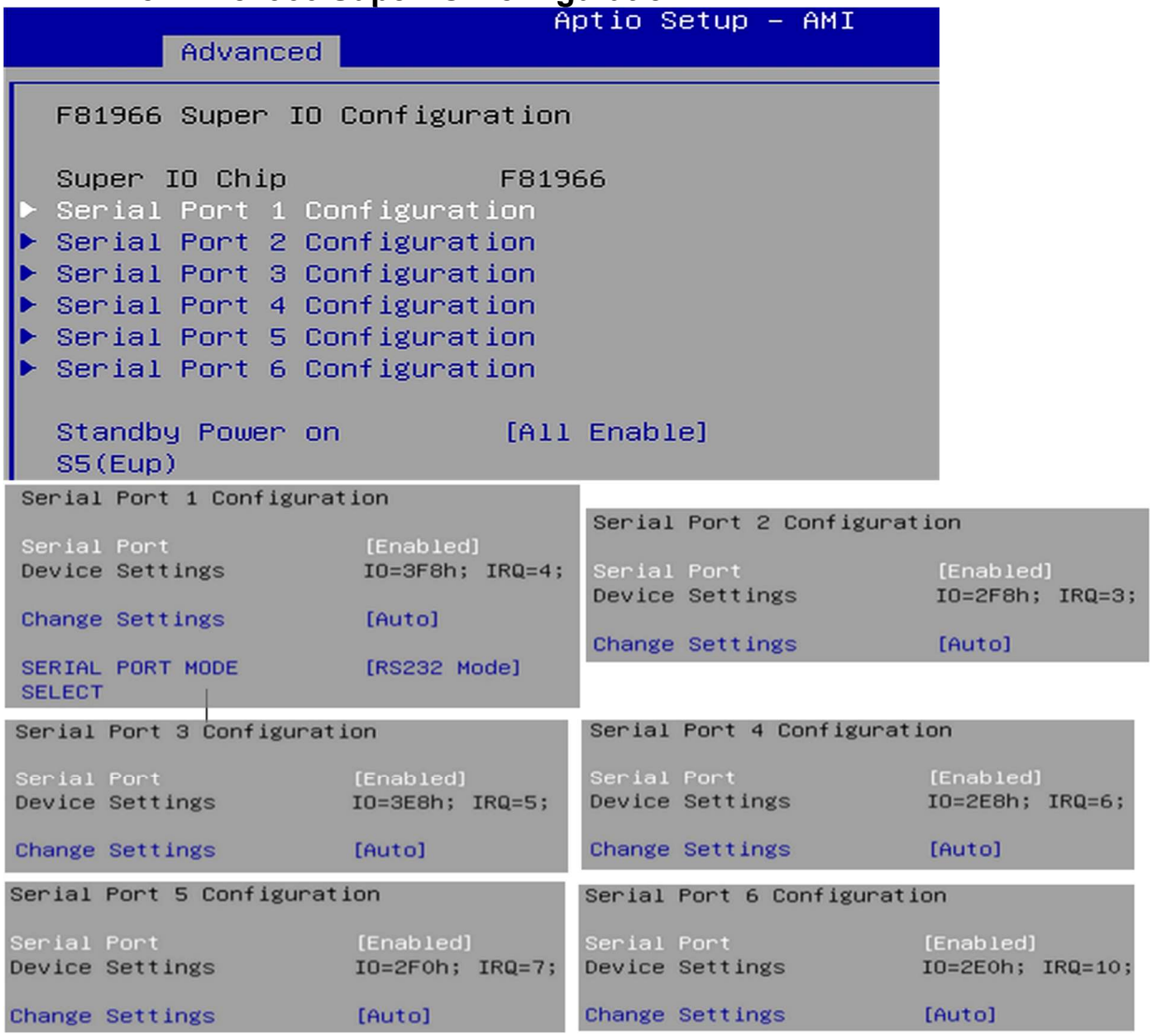
ARS200 Default is Disable.





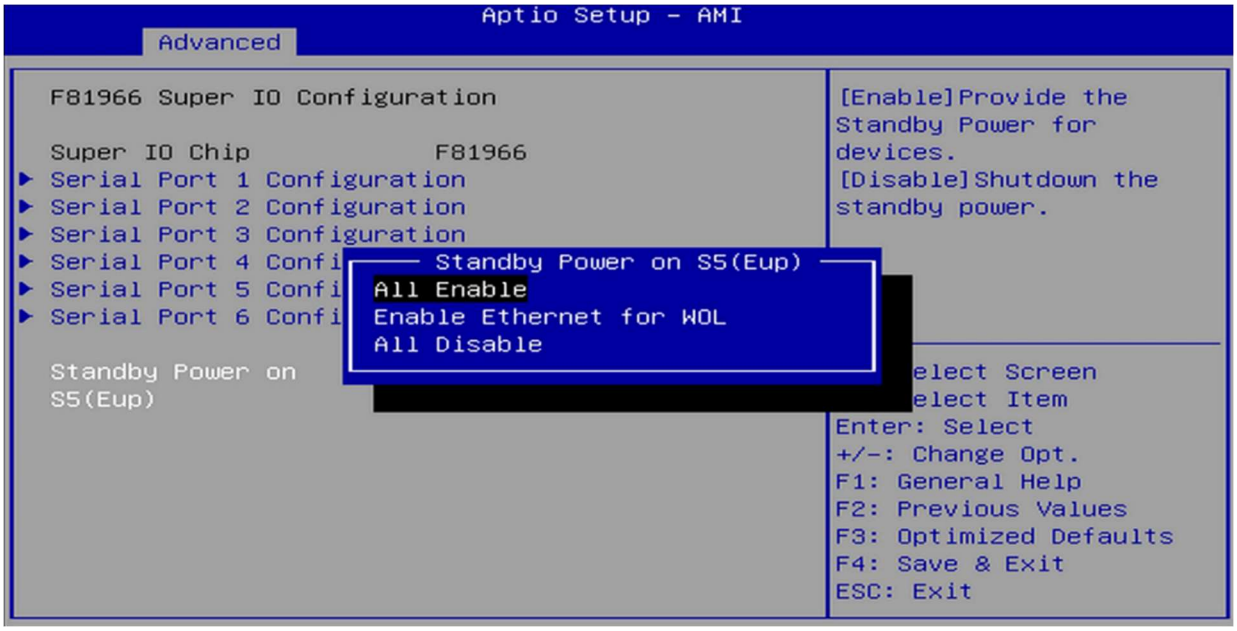


4.4.8 F81966 Super IO Configuration

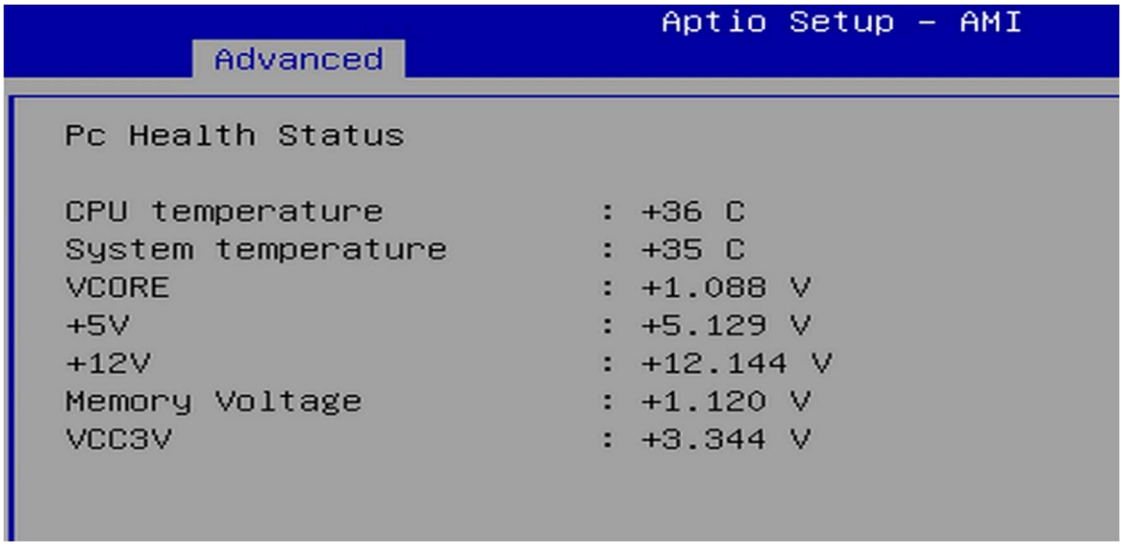


BIOS Setting	Description
Serial Port Configuration	Sets parameters of Serial Port 1/2/3/4
Standby Power on S5 (Eup)	Enable – provide the standby power for devices. Disable – shutdown the standby power.

4.4.9 Standby Power on S5(Eup)

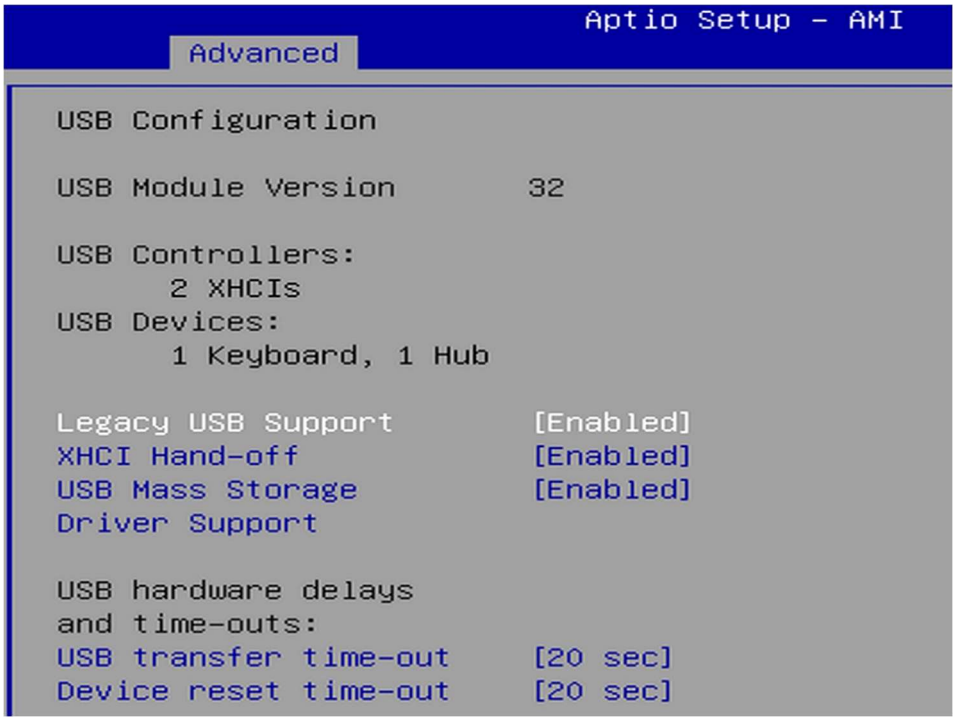


4.4.10 Hardware Monitor



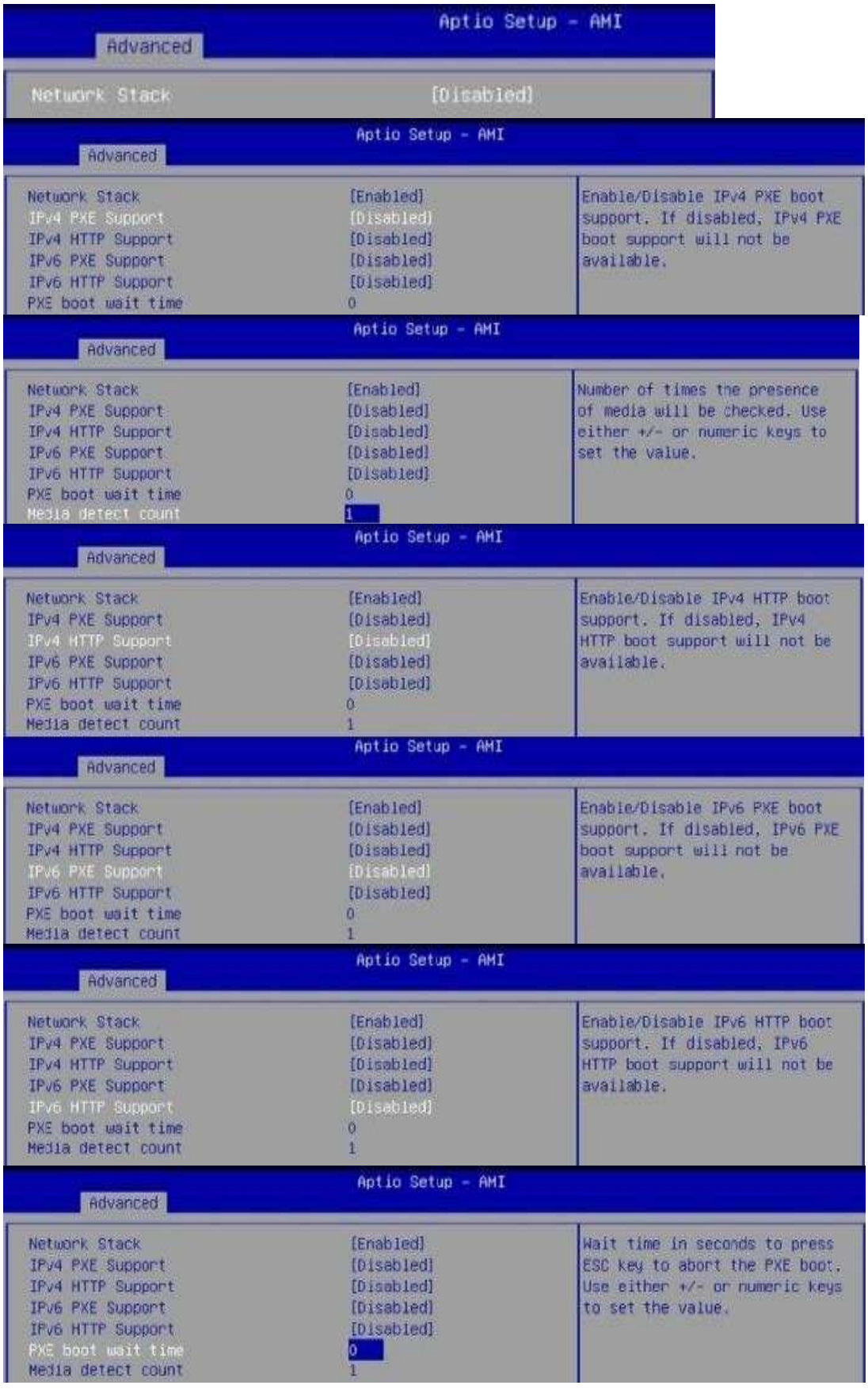
BIOS Setting	Description
Temperatures / Voltages	These fields are the parameters of the hardware monitoring function feature of the motherboard. The values are read-only values as monitored by the system and show the PC health status.

4.4.11 USB Configuration



BIOS Setting	Description
Legacy USB Support	• **Enabled** enables Legacy USB support. • **Auto** disables legacy support if there is no USB device connected. • **Disabled** keeps USB devices available only for EFI applications.
XHCI Hand-off	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
USB Mass Storage Driver Support	Enables / Disables the support for USB mass storage driver.
USB Transfer time-out	The time-out value (1 / 5 10 / 20 secs) for Control, Bulk, and Interrupt transfers.
Device reset time-out	USB mass storage device Start Unit command time-out
Device power-up delay	Max.time the device will take before it properly reports itself to the Host Controller. '**Auto**' uses default value: for a Root port it is 100ms, for a Hub port the delay is taken from Hub descriptor.

4.4.12 Network Stack Configuration



4.4.13 NVME Configuration

4.5 Chipset Settings

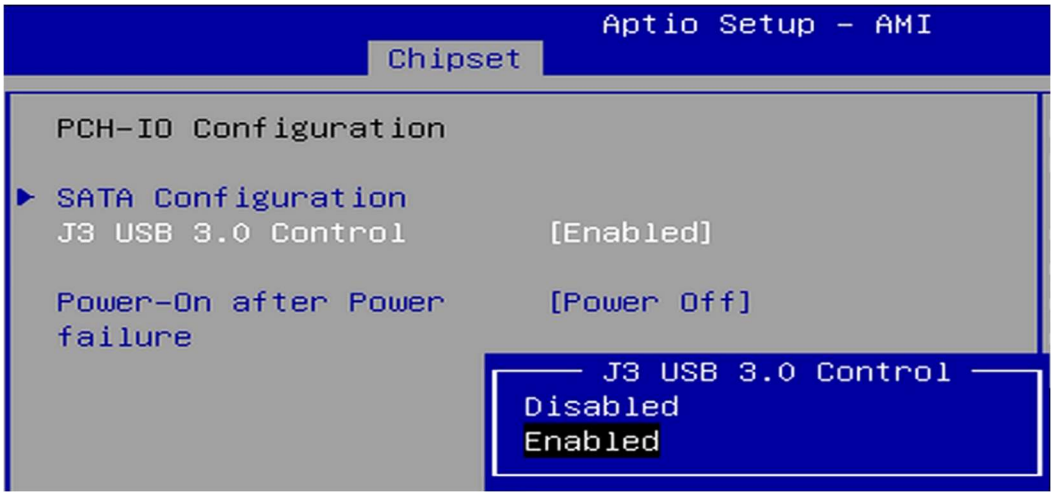
BIOS Setting	Description
System Agent (SA) Configuration	System Agent (SA) parameters
PCH-IO Configuration	PCH parameters

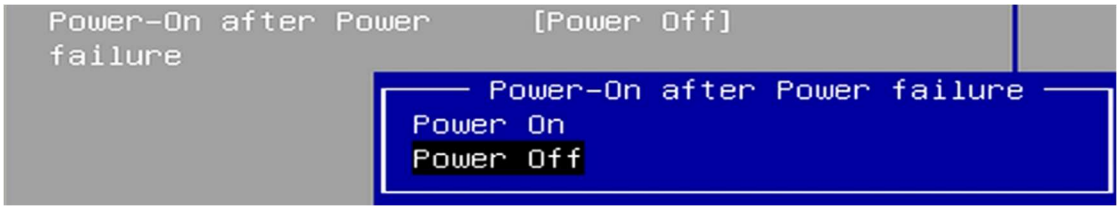
4.5.1 Graphics Configuration :

BIOS Setting	Description
Graphics Turbo IMON Current	Graphics turbo IMON current values supported (14-31)
GTT Size	Sets the GTT size as 2 MB, 4 MB, or 8 MB.
Aperture Size	Select the aperture size. Note: Above 4 GB MMIO BIOS assignment is automatically enabled when selecting 2048 MB aperture. To use this feature, disable CSM support.
PSMI Support	PSMI Enable/Disable
DVMT Pre-Allocated	Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device
Graphics Configuration	VT-d capability

4.5.2 PCH-IO Configuration

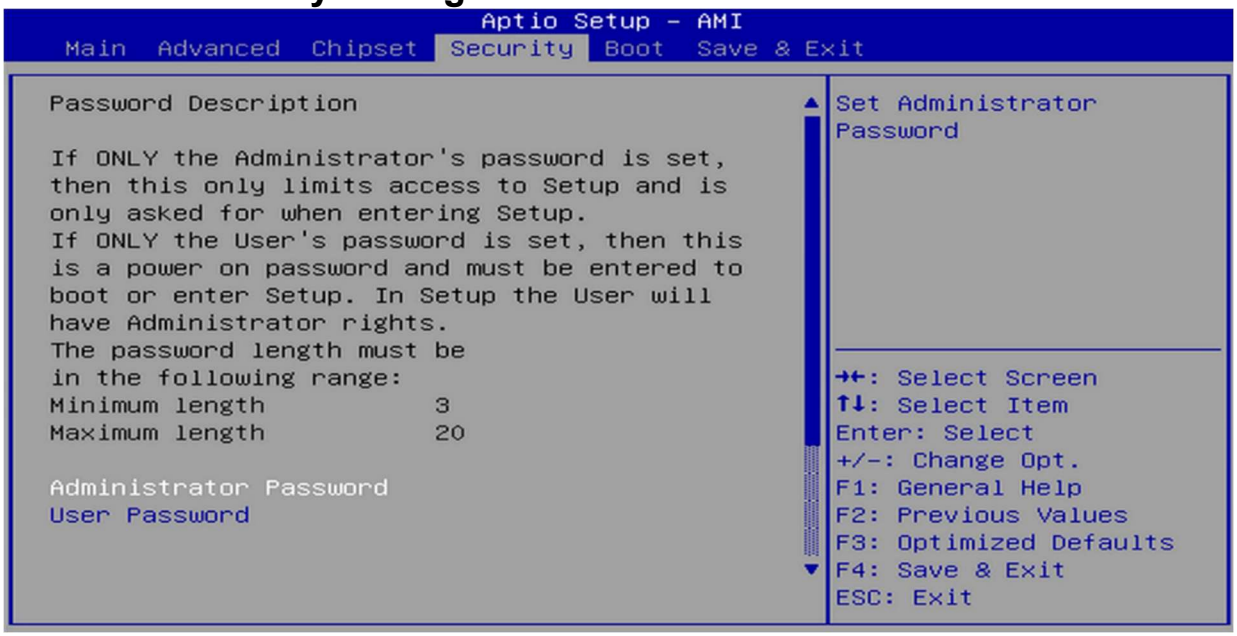
J3 USB 3.0 Control



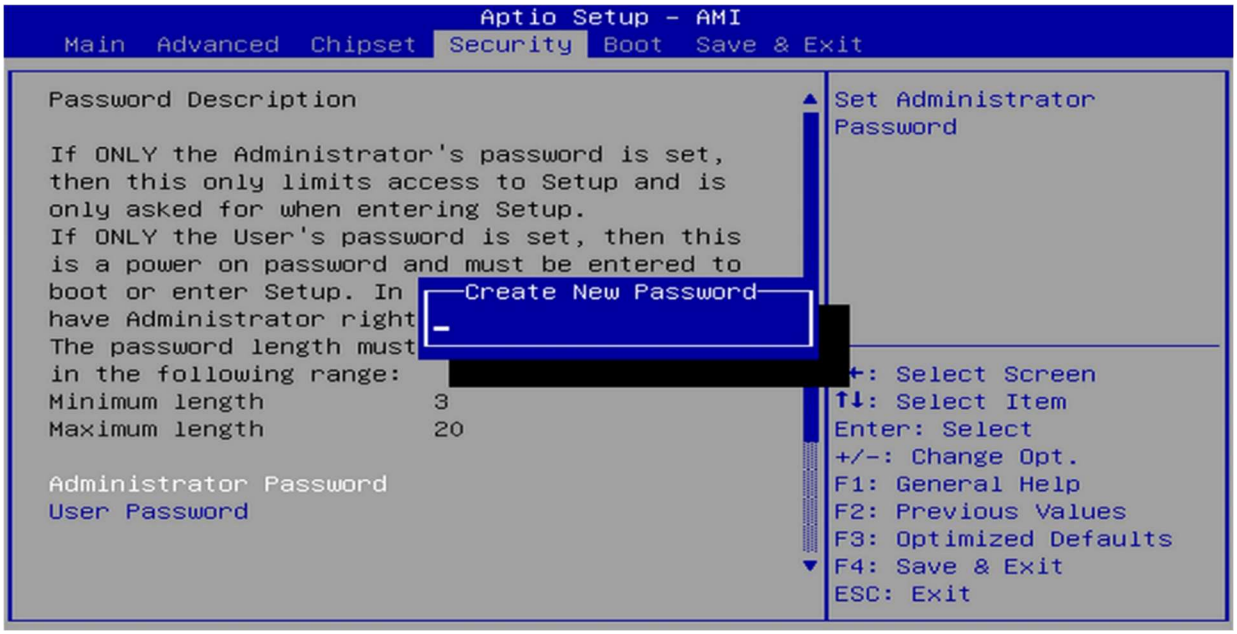


BIOS Setting	Description
SATA and RST Configuration	SATA device options and settings
SATA Controller(s)	Enables / Disables the Serial ATA.
SATA Mode Selection	Selects IDE or AHCI Mode.
Serial ATA Port 0~2	Enables / Disables Serial Port 0 ~ 2.
SATA Ports Hot Plug	Enables / Disables SATA Ports HotPlug.
Power-On After Power failure	Specify what state to go to when power is re- applied after a power failure (G3 state)

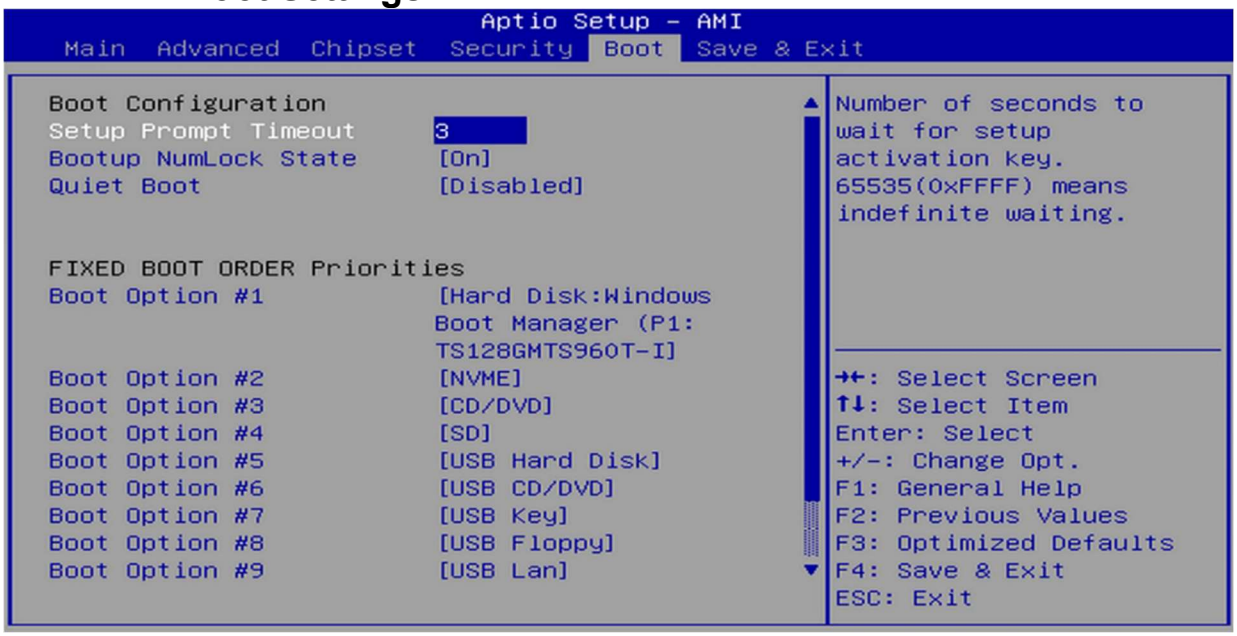
4.6 Security Settings



BIOS Setting	Description
Setup Administrator Password	Sets an administrator password for the setup utility.
User Password	Sets a user password.
Secure Boot	Secure Boot feature is Active if Secure Boot is Enabled. Platform Key(PK) is enrolled and the System is in user mode. The mode change requires platform reset.

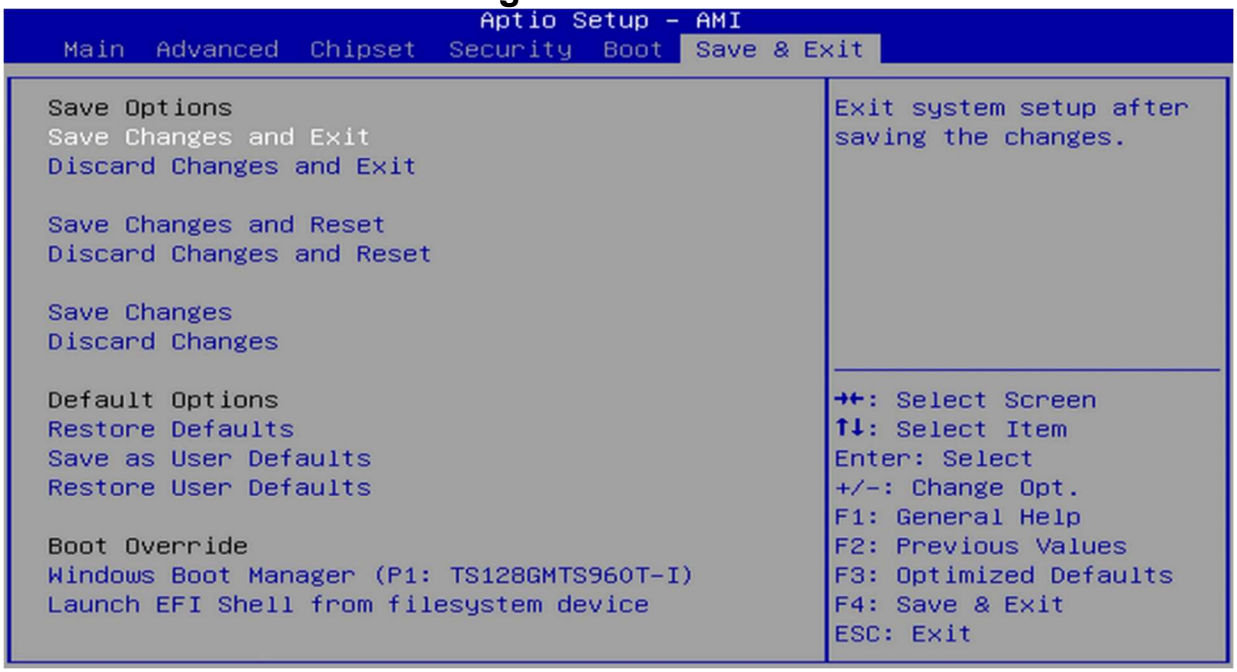


4.7 Boot Settings



BIOS Setting	Description
Setup Prompt Timeout	Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting.
Bootup Num Lock State	Turns on/off the keyboard Num Lock state.
Quiet Boot	Enables / Disables Quiet Boot option.
FIXED BOOT ORDER Priorities	Sets the system boot order
UEFI Hard Disk Drive BBS Priorities	Specifies the boot device priority sequence from available UEFI hard disk drives.

4.8 Save & Exit Settings



BIOS Setting	Description
Save Changes and Exit	Exits system setup after saving the changes.
Discard Changes and Exit	Exits system setup without saving any changes.
Save Changes and Reset	Resets the system after saving the changes.
Discard Changes and Reset	Resets system setup without saving any changes.
Save Changes	Saves changes done so far to any of the setup options.
Discard Changes	Discards changes done so far to any of the setup options.
Restore Defaults	Restores / Loads defaults values for all the setup options.
Save as User Defaults	Saves the changes done so far as user defaults.
Restore User Defaults	Restores the user defaults to all the setup options.
Launch EFI Shell from filesystem device	Attempts to Launch EFI Shell application (Shell.efi) from one of the available filesystem devices.

Appendix

This section provides the mapping addresses of peripheral devices and the sample code of watchdog timer configuration.

- I/O Port Address Map
- Interrupt Request Lines (IRQ)
- Watchdog Timer Configuration

A. I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses which also becomes the identity of the device. The following table lists the I/O port addresses used.

Address	Device Description
0x00000A00-0x00000A0F	Motherboard resources
0x00000A10-0x00000A1F	Motherboard resources
0x0000002E-0x0000002F	Motherboard resources
0x0000004E-0x0000004F	Motherboard resources
0x00000061-0x00000061	Motherboard resources
0x00000063-0x00000063	Motherboard resources
0x00000065-0x00000065	Motherboard resources
0x00000067-0x00000067	Motherboard resources
0x00000070-0x00000070	Motherboard resources
0x00000080-0x00000080	Motherboard resources
0x00000092-0x00000092	Motherboard resources
0x000000B2-0x000000B3	Motherboard resources
0x00000680-0x0000069F	Motherboard resources
0x0000164E-0x0000164F	Motherboard resources
0x00000040-0x00000043	System timer
0x00000050-0x00000053	System timer
0x000003F8-0x000003FF	Communications Port (COM1)
0x000002F8-0x000002FF	Communications Port (COM2)
0x000003E8-0x000003EF	Communications Port (COM3)
0x000002E8-0x000002EF	Communications Port (COM4)
0x0000EFA0-0x0000EFBF	SMBus - 54A3
0x00003000-0x0000303F	Intel(R) UHD Graphics
0x00001854-0x00001857	Motherboard resources
0x00000000-0x00000CF7	PCI Express Root Complex
0x00000D00-0x0000FFFF	PCI Express Root Complex
0x00003090-0x00003097	Standard SATA AHCI Controller
0x00003080-0x00003083	Standard SATA AHCI Controller

0x00003060-0x0000307F	Standard SATA AHCI Controller
0x00002000-0x000020FE	Motherboard resources
0x00000020-0x00000021	Programmable interrupt controller
0x00000024-0x00000025	Programmable interrupt controller
0x00000028-0x00000029	Programmable interrupt controller
0x0000002C-0x0000002D	Programmable interrupt controller
0x00000030-0x00000031	Programmable interrupt controller
0x00000034-0x00000035	Programmable interrupt controller
0x00000038-0x00000039	Programmable interrupt controller
0x0000003C-0x0000003D	Programmable interrupt controller
0x000000A0-0x000000A1	Programmable interrupt controller
0x000000A4-0x000000A5	Programmable interrupt controller
0x000000A8-0x000000A9	Programmable interrupt controller
0x000000AC-0x000000AD	Programmable interrupt controller
0x000000B0-0x000000B1	Programmable interrupt controller
0x000000B4-0x000000B5	Programmable interrupt controller
0x000000B8-0x000000B9	Programmable interrupt controller
0x000000BC-0x000000BD	Programmable interrupt controller
0x000004D0-0x000004D1	Programmable interrupt controller
0x00000060-0x00000060	Standard PS/2 Keyboard
0x00000064-0x00000064	Standard PS/2 Keyboard

B. Interrupt Request Lines (IRQ)

Peripheral devices use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on board.

Level	Function
IRQ 0	System timer
IRQ 1	Standard PS/2 Keyboard
IRQ 3	Communications Port (COM2)
IRQ 5	Communications Port (COM3)
IRQ 10	Communications Port (COM4)
IRQ 12	Microsoft PS/2 Mouse
IRQ 14	Intel(R) Serial IO GPIO Host Controller - INTC1057
IRQ 16	Intel(R) Serial IO UART Host Controller - 54A8
IRQ 19	High Definition Audio Controller
IRQ 55 ~ IRQ 204	Microsoft ACPI-Compliant System
IRQ 256 ~ IRQ 511	Microsoft ACPI-Compliant System
IRQ 4294967280	Intel(R) Management Engine Interface #1
IRQ 4294967281~85	Intel(R) Ethernet Controller I226-IT
IRQ 4294967293	Intel(R) UHD Graphics
IRQ 4294967286~90	Intel(R) Ethernet Controller I226-IT #2
IRQ 4294967291	Intel(R) USB 3.10 eXtensible Host Controller - 1.20 (Microsoft)
IRQ 4294967292	Intel(R) USB 3.20 eXtensible Host Controller - 1.20 (Microsoft)
IRQ 4294967294	Standard SATA AHCI Controller

C. Watchdog Timer Configuration

The Watchdog Timer (WDT) is used to generate a variety of output signals after a user programmable count. The WDT is suitable for the use in the prevention of system lock-up, such as when software becomes trapped in a deadlock. Under these sorts of circumstances, the timer will count to zero and the selected outputs will be driven.

Under normal circumstance, you will need to restart the WDT at regular intervals before the timer counts to zero.

Sample Code

```
//---------------------------------------------------------------------------
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//---------------------------------------------------------------------------
#include <dos.h>
#include <conio.h>
#include <stdio.h>
#include <stdlib.h>
#include "F81964.H"
//---------------------------------------------------------------------------
int main (int argc, char *argv[]); void EnableWDT(int);
void DisableWDT(void);
//---------------------------------------------------------------------------
int main (int argc, char *argv[])
{
        unsigned char bBuf;
        unsigned char bTime;
        char **endptr;

        char SIO;
        printf("Fintek 81866 watch dog program\n");
        SIO = Init_F81964();
        if (SIO == 0)
        {
                printf("Can not detect Fintek 81866, program abort.\n");
                return(1);
        }//if (SIO == 0)

        if (argc != 2)
        {
                printf(" Parameter incorrect!!\n");
                return (1);
        }

        bTime = strtol (argv[1], endptr, 10);
```

```
        printf("System will reset after %d seconds\n", bTime);

        if (bTime)
        {       EnableWDT(bTime); }
        else
        {       DisableWDT();  }
        return 0;
}
//---------------------------------------------------------------------
void EnableWDT(int interval)
{
        unsigned char bBuf;

        bBuf = Get_F81964_Reg(0x2B);
        bBuf &= (~0x20);
        Set_F81964_Reg(0x2B, bBuf);             //Enable WDTO

        Set_F81964_LD(0x07);                    //switch to logic device 7
        Set_F81964_Reg(0x30, 0x01);             //enable timer

        bBuf = Get_F81964_Reg(0xF5);
        bBuf &= (~0x0F);
        bBuf |= 0x52;
        Set_F81964_Reg(0xF5, bBuf);             //count mode is second
        Set_F81964_Reg(0xF6, interval);         //set timer
        bBuf = Get_F81964_Reg(0xFA);
        bBuf |= 0x01;
        Set_F81964_Reg(0xFA, bBuf);             //enable WDTO output

        bBuf = Get_F81964_Reg(0xF5);
        bBuf |= 0x20;
        Set_F81964_Reg(0xF5, bBuf);             //start counting
}
//---------------------------------------------------------------------
void DisableWDT(void)
{
        unsigned char bBuf;
        Set_F81964_LD(0x07);                    //switch to logic device 7
        bBuf = Get_F81964_Reg(0xFA);
        bBuf &= ~0x01;
        Set_F81964_Reg(0xFA, bBuf);             //disable WDTO output

        bBuf = Get_F81964_Reg(0xF5);
        bBuf &= ~0x20;
        bBuf |= 0x40;
        Set_F81964_Reg(0xF5, bBuf);             //disable WDT
}
//---------------------------------------------------------------------
```

```
//---------------------------------------------------------------------------
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A
PARTICULAR
// PURPOSE.
//
//---------------------------------------------------------------------------
#include "F81964.H"
#include <dos.h>
//---------------------------------------------------------------------------
unsigned int F81964_BASE; void Unlock_F81964 (void); void Lock_F81964 (void);
//---------------------------------------------------------------------------
unsigned int Init_F81964(void)
{
	unsigned int result;
	unsigned char ucDid;

	F81964_BASE = 0x4E;
	result = F81964_BASE;

	ucDid = Get_F81964_Reg(0x20);
	if (ucDid == 0x07)			//Fintek 81866
	{	goto Init_Finish;}

	F81964_BASE = 0x2E;
	result = F81964_BASE;

	ucDid = Get_F81964_Reg(0x20);
	if (ucDid == 0x07)			//Fintek 81866
	{	goto Init_Finish;}

	F81964_BASE = 0x00;
	result = F81964_BASE;

Init_Finish:
	return (result);
}
//---------------------------------------------------------------------------
void Unlock_F81964 (void)
{
	outportb(F81964_INDEX_PORT, F81964_UNLOCK);
	outportb(F81964_INDEX_PORT, F81964_UNLOCK);
}
//---------------------------------------------------------------------------
void Lock_F81964 (void)
{
	outportb(F81964_INDEX_PORT, F81964_LOCK);
}
//---------------------------------------------------------------------------
void Set_F81964_LD( unsigned char LD)
{
	Unlock_F81964();
```

```
        outportb(F81964_INDEX_PORT, F81964_REG_LD);
        outportb(F81964_DATA_PORT, LD); Lock_F81964();
}
//-----------------------------------------------------------------------
void Set_F81964_Reg( unsigned char REG, unsigned char DATA)
{
        Unlock_F81964();
        outportb(F81964_INDEX_PORT, REG);
        outportb(F81964_DATA_PORT, DATA);
        Lock_F81964();
}
//-----------------------------------------------------------------------
unsigned char Get_F81964_Reg(unsigned char REG)
{
        unsigned char Result;
        Unlock_F81964();
        outportb(F81964_INDEX_PORT, REG);
        Result = inportb(F81964_DATA_PORT);
        Lock_F81964();
        return Result;
}
//-----------------------------------------------------------------------
```

```
//-----------------------------------------------------------------------
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A
PARTICULAR
// PURPOSE.
//
//-----------------------------------------------------------------------
#ifndef         F81964_H
#define         F81964_H      1
//-----------------------------------------------------------------------
#define     F81964_INDEX_PORT       (F81964_BASE)
#define     F81964_DATA_PORT        (F81964_BASE+1)
//-----------------------------------------------------------------------
#define     F81964_REG_LD       0x07
//-----------------------------------------------------------------------
#define F81964_UNLOCK 0x87
#define     F81964_LOCK  0xAA
//-----------------------------------------------------------------------
unsigned int Init_F81964(void);
void Set_F81964_LD( unsigned char);
void Set_F81964_Reg( unsigned char, unsigned char); unsigned char
Get_F81964_Reg( unsigned char);
//-----------------------------------------------------------------------
#endif //      F81964_H
```