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Small Cube System
Fanless Series
FX5409 User's Manual

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If you have problems or difficulties in using the system or setting up the relevant devices, BIOS and software that are not explained in this manual, please contact our service engineer for service, or send email to support@fabiotech.com.

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If your board requires servicing, contact the dealer from whom you purchased the product for service information. You can help assure efficient servicing of your product by following these guidelines:

- ❑ A list of your name, address, telephone, facsimile number, or email address where you may be reached during the day
- ❑ Description of you peripheral attachments
- ❑ Description of your software (operating system, version, application software, etc.) and BIOS configuration
- ❑ Description of the symptoms (Extract wording any message)

For updated BIOS, drivers, manuals, or product information, please visit us at www.fabiotech.com.

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Chapter 1 Introducing the FX5409 System

Overview

The FX5409 is an embedded system with Intel® Celeron® J3455 Processor low-power CPU module inside. This user's manual provides information on the physical features, installation, and BIOS setup of the FX5409.

Built to unleash the total potential of the Intel® Celeron® J3455 Processor, Able to support 1.5 GHz CPU, this unit supports two LAN port, one PCIe mini card socket, audio, GPIO, one USB-2.0, five USB-2.0/3.0 ports, SATA/m-SATA socket, Two So-DIMM socket supports up to 8GB DDR3L RAM, VGA and HD port display.

Each FX5409 has four ports for I/O communications. Two RS232/RS422/RS485 port and two RS232 ports is available.

The FX5409 is perfect for ATM machines, KIOSK, point-of-sales/point-of- information, gaming and infotainment, measurement technology, lotteries, and banking and small Embedded Control. The unit is only 200 mm (W) X130 mm (D) X52 mm (H).

Series Comparison Table

Model	FX5409
System Processor	Intel® Celeron® CPU J3455 1.5GHz
Cores / Threads	4 / 4
Code Name	Apollo lake
Burst Frequency	2.3GHz
Memory 204 Pin-DIMM*2	DDR3L-1866 4GB / 8GB (Max.)
Audio	Front: Ear-Phone And MIC-In
Display	VGA & HD
Multi I/O	Two RS232/RS422/RS485 & Two RS232
USB 2.0 / 3.0	One / Five
GPIO	4-In / 4-Out
RJ45 LAN port (10/100/1000/2500 Mbps)	Two Intel i225-V*
PCIe Mini Card Socket	One
SIM Card Socket	One
Storage	One PCIe Mini Card Socket for m-SATA One 2.5' SATA HDD Connector
Watchdog Timer	Yes
Operating Temperature	-20°C ~+ 55°C (-4~131°F)** -20°C ~+ 60°C (-4~140°F)***
Dimensions (Unit: mm)	200 (W) X130 (D) X52 (H)

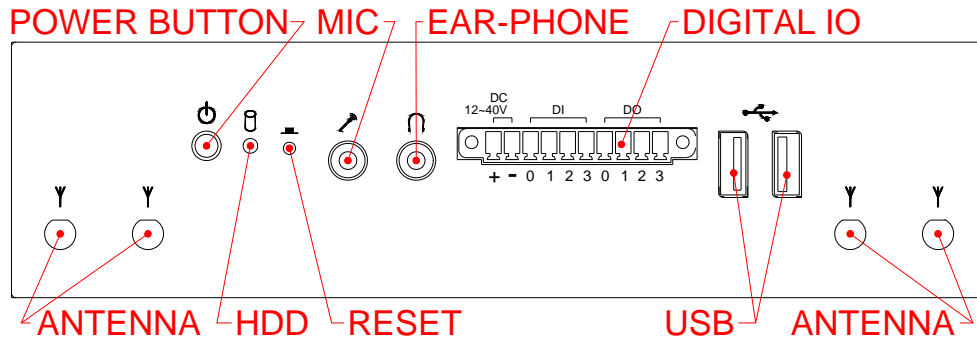
Note:* LAN port up to 2500 Base-T only for version 2.0 and later.

** LAN up to 2.5G (2500 Base-T): -20°C ~+55°C ,

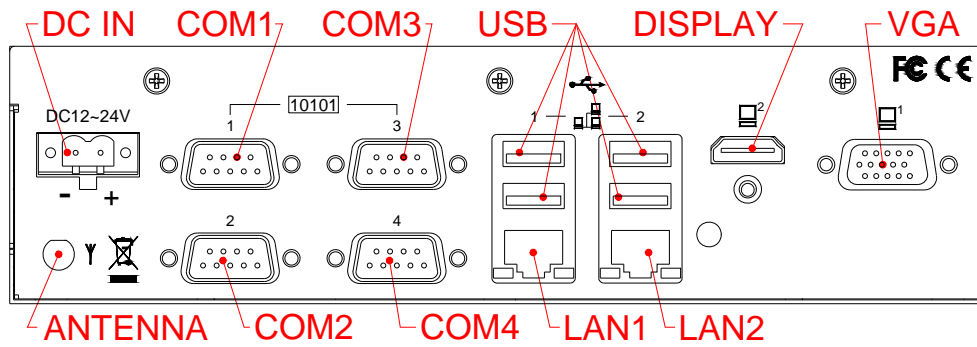
***LAN up to 1.0G (1000 Base-T): -20°C ~+60°C

Layout

Front Panel



Rear Panel



Specifications

❑ ***Processor Board –***

Intel® Celeron® (Apollo lake) CPU J3455 1.5GHz (2M Cache) Low Power Processor with 4GB DDR3L/1866 -RAM

❑ ***I/O Outlets –***

Two 10/100/1000/2500 Base-T Ethernet LAN port with RJ45

One VGA and one HD display port

Audio connectors for Microphone-in, and *Ear-Phone*

One USB 2.0 and five USB 3.0 ports

One terminal block for 4-In and 4-Out Isolated Digital I/Os

Two RS-232/RS422/RS485 port and two RS232 ports with DB9

One PCIe Mini card socket modules, especially for WLAN/GPRS module

One terminal block for DC-In and one power button

❑ ***LED Indicator –***

One power LED with power button, and one hard disk access LED

❑ ***Storage Bay-***

One m- SATA socket for Flash modules

One SATA 2.5" hard disk space

❑ ***Power requirement –***

DC-IN: 12 V~24V, +12V DC 3.7A Maximum (1.85A typical).

❑ ***Dimensions -***

200mm (W) X130mm (D) X52mm

Packing List

Upon receiving the package, verify the following things. Should any of the mentioned happens, contact us for immediate service.

- Unpack and inspect the FX5409 package for possible damage that may occur during the delivery process.
- Verify the accessories in the package according to the packing list and see if there is anything missing or incorrect package is included.
- If the cable(s) you use to install the FX5409 is not supplied from us, please make sure the specification of the cable(s) is compatible with the FX5409 system.

Note: After you install the FX5409, it is recommended that you keep the DVD that contains drivers and document files, and keep the document copies, or unused cables in the carton for future use.

The following lists the accessories that may be included in your FX5409 package. Some accessories are optional items that are only shipped upon order.

- One FX5409 embedded system.
- One pack of 2 apartable terminal blocks, 2-pin for Power input and 10-pin for GPIO.
- One Pack of (4+4) screws for 2.5" SATA hard disk installation and mini-card
- One compact disc includes software utility and manual.

Optional:

- AK1006- Half size mini PCIe module adapter kits. (PN: 0606010028G)
- FX5407K1 Wall mounting fixers and 4 screws. (P/N: 0606010036R)
- FX5504k1 Panel Mounting fixers and 2 screws. (VESA 75*75 /100 *100). (PN:0606010012G)
- FX5403K1 1U Rack Mounting fixers and 4 screws.(PN: 0606010011G)
- AK1010 – Din Rail Mount kit (PN: 0606010046G)

Chapter 2 Hardware Installation

This chapter introduces the system connectors & jumper settings, and guides you to apply them for field application.

Before Installation

Before you install the system, make sure you follow the following descriptions.

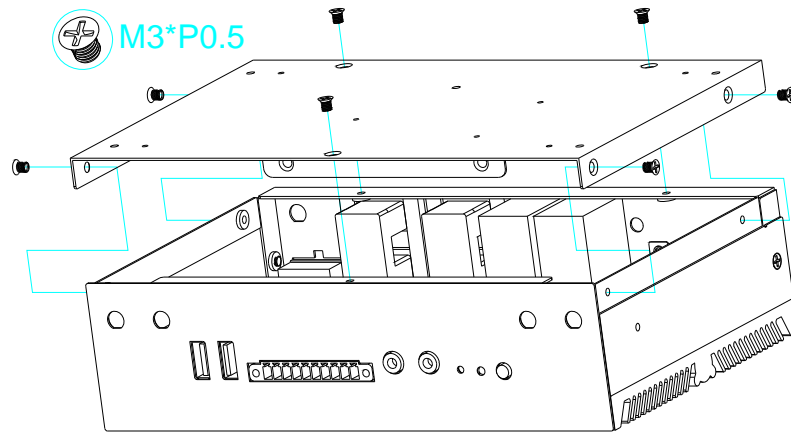
1. Before removing the cover, shut down the operation System and disconnect power cord and (or) unplug DC-In cable.
2. Install any connector, m-PCIE module, and hard disk is sure that the power is disconnected to off the system. If not, this may damage the system.
3. The ESD (Electricity Static Discharge) may be created from human body that touches the board. It may do damage to the board circuit.

❑ **To install hardware- remove the bottom Cover**

If you are installing following hardware items, you can remove the bottom cover. The following figure will guide you how to install SATA 2.5" HDD, mini PCIe WLAN or GPRS module, DDR3L RAM module to the FX5409 and how to install the FX5409 fixers. (Please see the spots circled.)

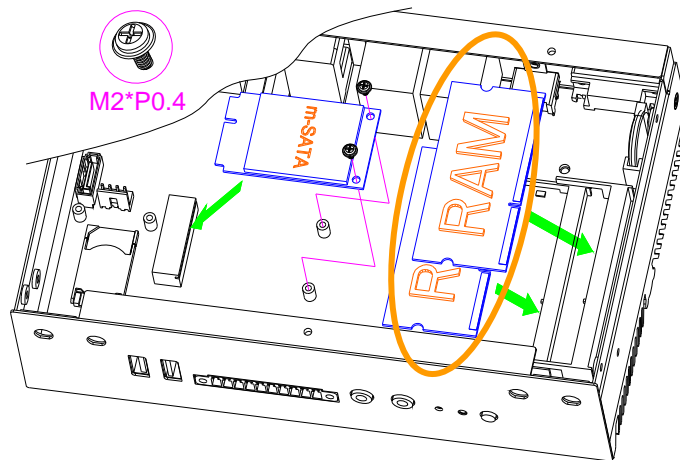
a. Unscrew bottom cover

Use a cross-head screwdriver to remove seven screws that secure the bottom cover.



b. Installing Memory: So-DIMM Socket for DDR3L RAM Modules

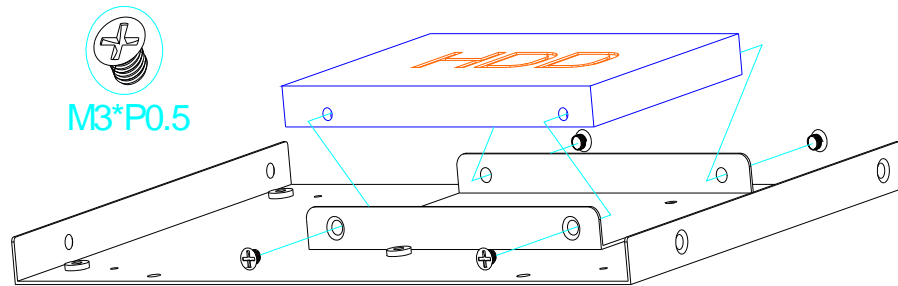
If you may extend additional memory to system, see as following figure. The So-DIMM socket supports 2GB to 4GB (Max. 8GB) of DDR3L RAM modules. Installing memory module to DIMM1 socket, when only one memory module. We recommend that installing dual channel (DIMM1 & DIMM2) RAM module made by the same part number and manufacturer.



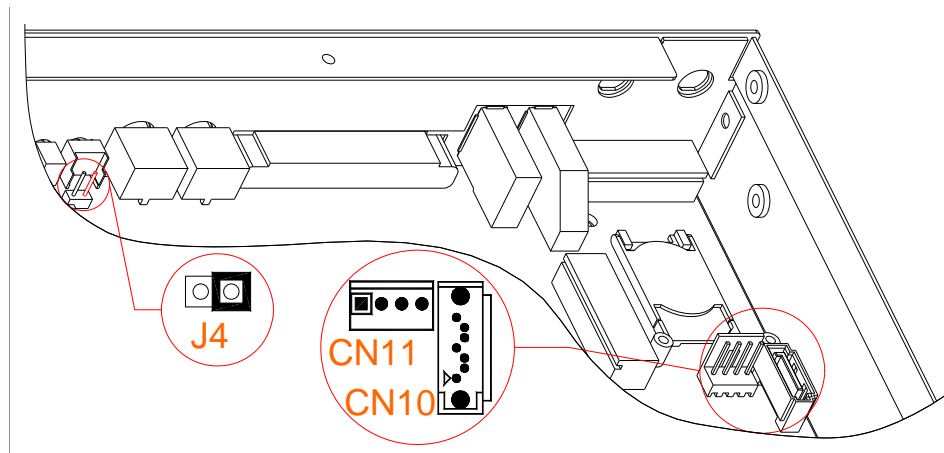
c. Installing hard disk: SATA Hard disk or SSD

Fasten screws up the Hard disk device to bottom inside HDD metal frame and connect the SATA HDD cable and power cable. See as following figure and rear pictures.

✧ *c1. Fasten screw the SATA HDD*



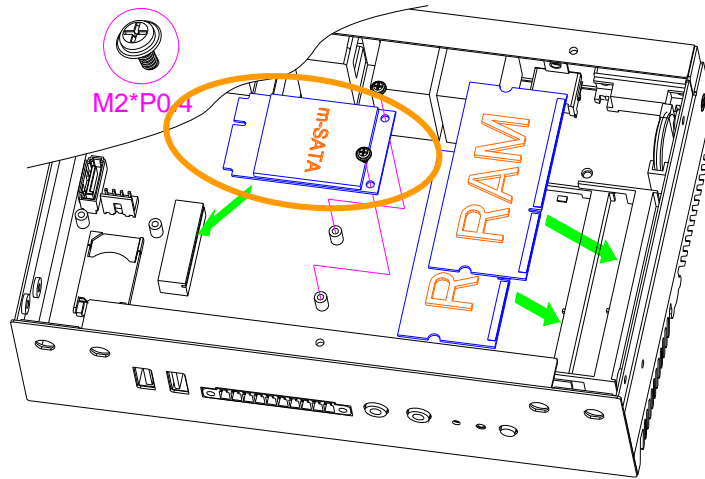
✧ *c2. Installing SATA Cable*



Note: Use caution when handling the hard disk to prevent damage to SATA connector as you inserted hard disk. Be careful with the orientation when installing connectors. The CN10 SATA connector used to connect a SATA 2.5" HDD with included SATA cable, CN11 is for SATA power connector. (The CN11 support +5V Voltage only)

d. Installing m-SATA Module

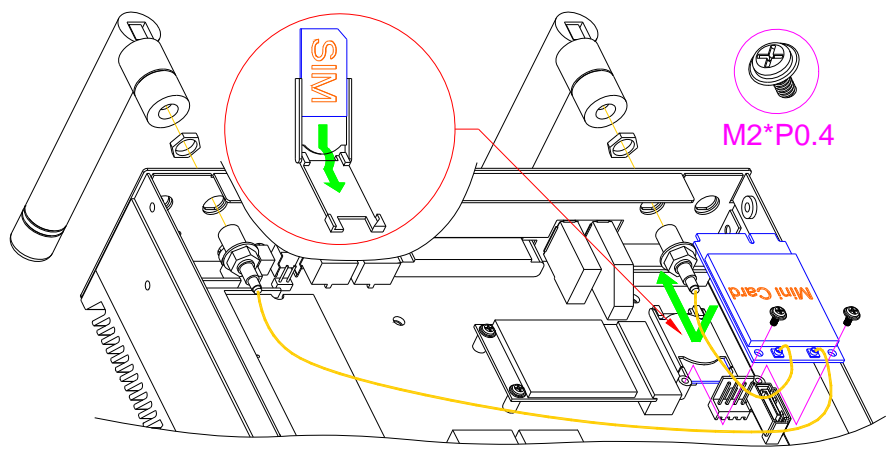
FX5409 supports m-SATA module; you may extend additional m-SATA module to system.



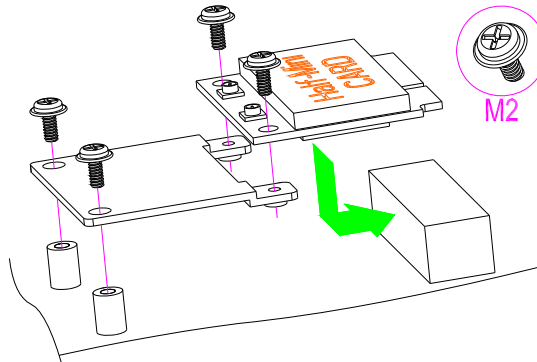
e. Installing PCIe Mini Card Module

FX5409 supports PCIe mini card socket; you may extend additional PCIe mini card module and SIM card to system. Connect to the antenna cable from rear and front side antenna holes to GPRS or Wireless LAN module and install the SIM card for GPRS. See following figures.

◇ e1. Installing PCIe Mini Card and SIM card



◇ e2. *Installing AK1006 kit (Optional): For Half Size Mini PCIe module*



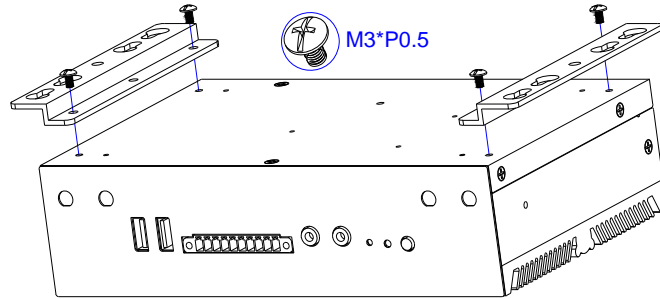
Note:

1. When installing PCIe GPRS Mini card on FX5409 system these is need the installing the SIM Card to SIM socket (Front side) of system.
2. The insert SIM card into the SIM card socket. Make sure that the SIM card is properly inserted and that golden contact area on the card is facing downwards.

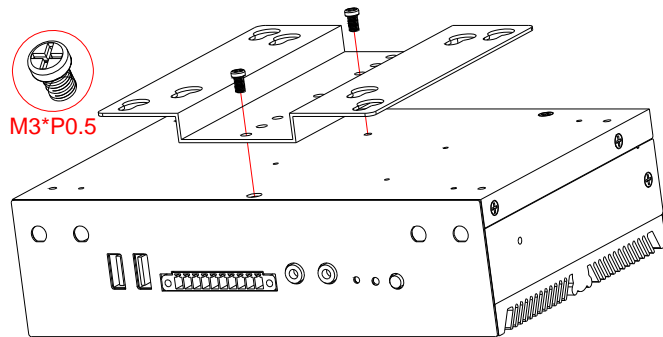
f. Installing the universal fixers

Please refer to the down side figure for installing the FX5409 with universal fixers.

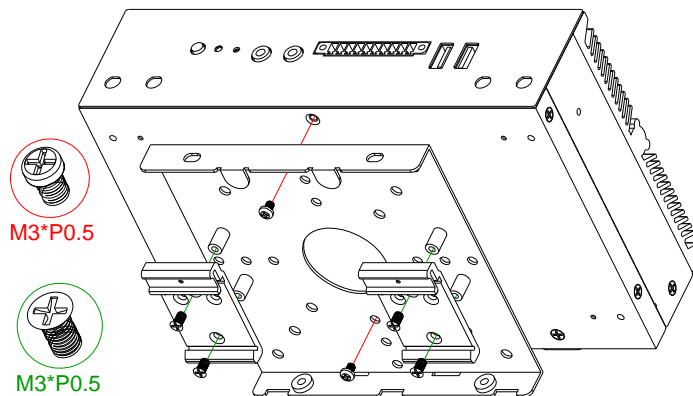
f1. FX5407 K1– Wall Mounting



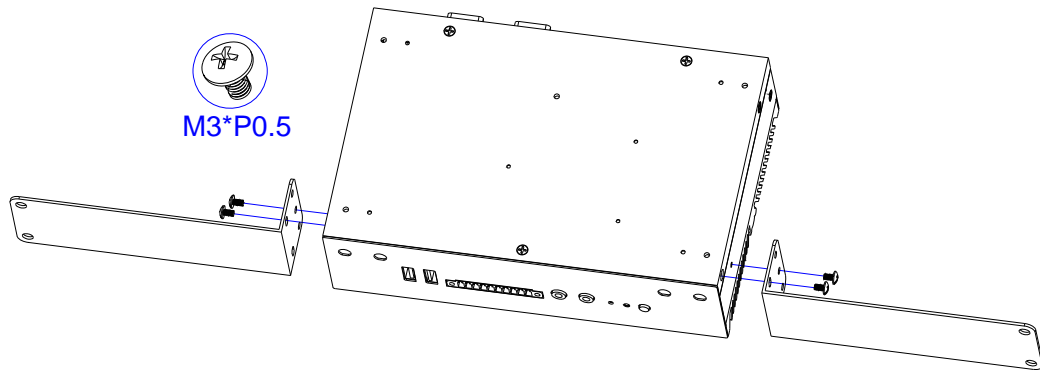
f2. FX5504k1–Panel Mounting



f3. AK1010 – DIN RAIL Mounting

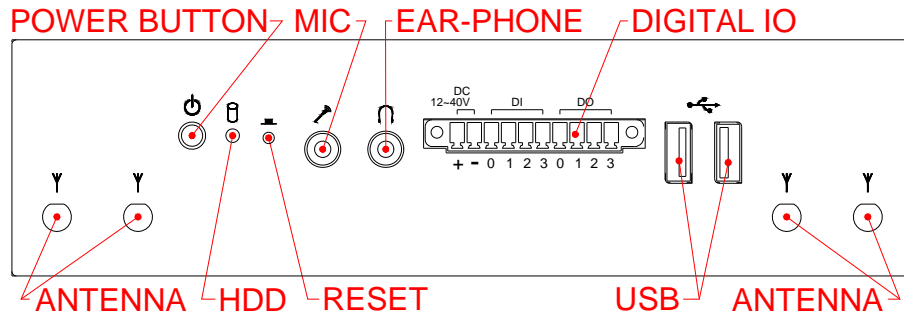


f4. FX5403K1 – Rack mounting Kit



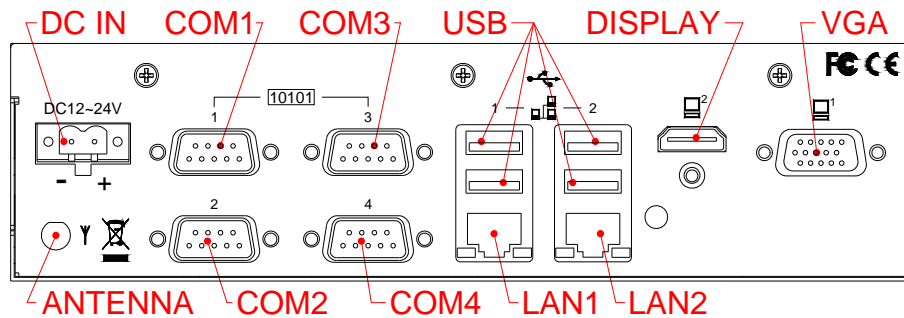
□ **LED Indicators**

The Power and HDD LED's has two distinctive statuses: Off for inactive operation and blinking light for activity.



□ **I/O Peripheral Connectors**

View from the rear and front side, if you are connecting the monitor, LAN, COM, Audio, USB, GPIO, VGA and HD to the FX5409. See following figure and a side pictures.



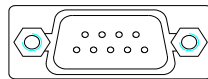
1. Connecting the Display: VGA and HD port



2. Connecting the COM port

The DB9 COM3~COM4 is standard RS232 serials port, and the COM1 and COM2 is designed for multiple proposes. The COM1/COM2 can select RS232/RS422/RS485 by [BIOS CMOS](#) setting. The following tables show the signal connections of these connectors.

COM
10101

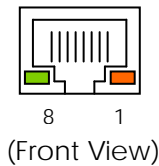


DB-9	RS-232	RS-422	RS-485
1	-DCD	TX-	485-
6	-DSR		
2	RXD	TX+	485+
7	-RTS		
3	-TXD	RX+	
8	-CTS		
4	-DTR	RX-	
9	-RI		
5	Ground		
Metal	Case Ground		

3. Connecting the LAN ports

The RJ45 connector with 2 LED's for WAN/LAN. The right side LED (lights up in orange or green) indicates data is being accessed and the left side LED (green) indicates on-line status. (On indicates on-line and off indicates off-line)The following lists the pin assignment and LED's status of RJ45.

LAN

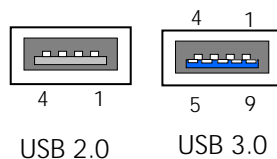


RJ45	LAN	RJ45	LAN
1	MDI0+	5	MDI2+
2	MDI0-	6	MDI2-
3	MDI1+	7	MDI3+
4	MDI1-	8	MDI3-
R_LED	Data Rate	L_LED	Link Status
Off	10M	Green	Active
Orange	100M/1000M		
Green	2500M		

4. Connecting the USB Ports

The system supports a six port USB connector. Any USB device can be attached to USB ports as plug-and-play function is supported. The rear panel of USB #1~4 can support USB3.0, and front panel USB #5 support USB 3.0,USB #6 support USB 2.0.

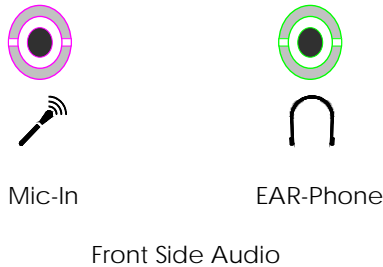
USB



(Front View)

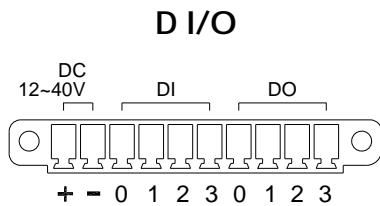
USB	Signal
1	USBV
2	USB D- (V2.0)
3	USB D+ (V2.0)
4	USBG
5	StdA_SSRX- (V3.0)
6	StdA_SSRX+ (V3.0)
7	USBG (V3.0)
8	StdA_SSTX- (V3.0)
9	StdA_SSTX+ (V3.0)

5. Connecting the Audio Microphone In/ EAR-Phone



6. Digital I/O Connector

The FX5409 provides 4-in and 4-out isolated digital I/O, output port is an open collector, you will need connections external voltage of Digital (+) and digital (-) connector.



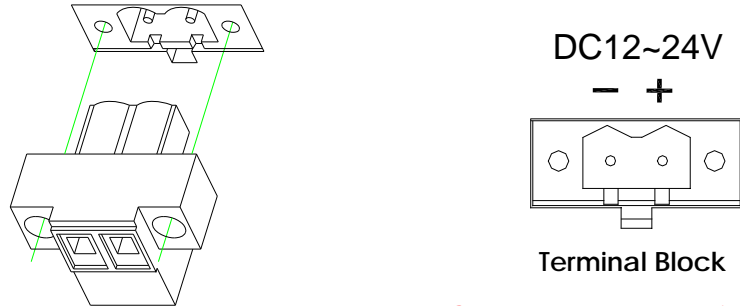
DI/O	Signal	Bit Location
+	Digital Voltage	Please refer to Chapter 4- Digital I/O - Software programming example
-	Digital Ground	
DI-0	Digital-IN0	
DI-1	Digital-IN1	
DI-2	Digital-IN2	
DI-3	Digital-IN3	
DO-0	Digital-Out0	
DO-1	Digital-Out1	
DO-2	Digital-Out2	
DO-3	Digital-Out3	

Note: Digital inputs accept DC12~40V Signal with isolated input. Digital outputs are active-low open collector output, and can drive up to 60V/400mA maximum.

□ **Connecting the DC Power and Power Button**

Power is supplied through an external AC/DC power adapter or power DC In. Take reference to the technical specification section for information about AC/DC power input voltage. See following figure.

1. DC Power Connector: Use external 2-pin apartable terminal block.

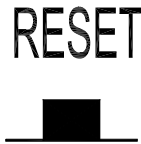


DC +12V~24V, 60VA minimum

2. Power Button & Reset Push Button: Pushing the Power button once will switch the FX5409 on and off, And Reset push button is switcher for system reset; Push and release the button will cause hard ware reset of FX5409 and restart system booting.

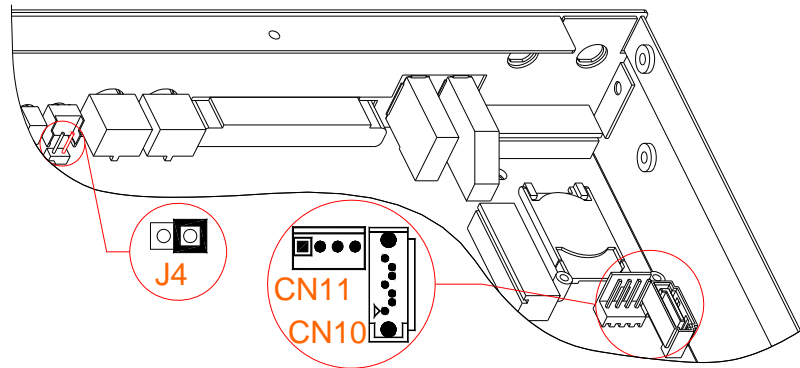


Power button: On/Off



Reset Push Button: Restart

❑ Jumper Setting



J4: Clear CMOS Setting

You can use J4 to clear CMOS data. The CMOS stores information like system date, time, boot up device, password, IRQ... which are set up with the BIOS. To clear the CMOS, set J4 to 1-2 closed and wait 3~5 sec then return to open before system powers off. The default setting is opened.

J4



Factory Preset



Clear CMOS Data

Note: When clear CMOS the "Administrator or User" password in the first time boot up needs the save it or set new password then save to CMOS (NVRAM).

Chapter 3 BIOS Setup

This chapter describes the BIOS setup.

Overview

BIOS are a program located on a Flash memory chip on a circuit board. It is used to initialize and set up the I/O peripherals and interface cards of the system, which includes time, date, hard disk drive, the ISA bus and connected devices such as the video display, diskette drive, and the keyboard. This program will not be lost when you turn off the system.

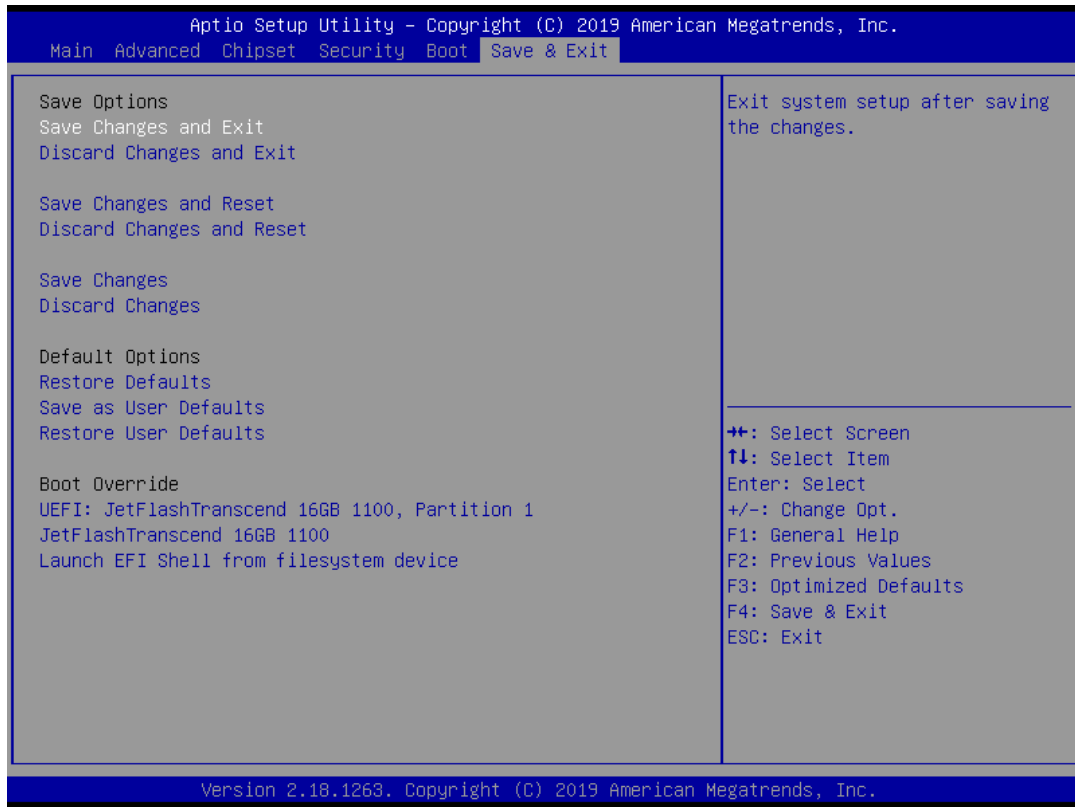
The BIOS provides a menu-driven interface to the console subsystem. The console subsystem contains special software, called firmware that interacts directly with the hardware components and facilitates interaction between the system hardware and the operating system.

The BIOS default values ensure that the system will function at its normal capability. In the worst situation the user may have corrupted the original settings set by the manufacturer.

All the changes you make will be saved in the system RAM and will not be lost after power-off.

When you start the system, the BIOS will perform a self-diagnostics test called Power On Self Test (POST) for all the attached devices, accessories, and the system. Press the [Del] key to enter the BIOS Setup program, and then the main menu will show on the screen.

Note: Change the parameters when you fully understand their functions and subsequence.



□ **BIOS Functions**

On the menu, you can perform the following functions

1. Main
2. Advanced
 - Trusted Computing
 - ACPI Settings
 - IT8786 Super IO Configuration
 - Hardware Monitor
 - Serial Port Console Redirection
 - CPU Configuration
 - Network Stack Configuration
 - CSM Configuration
 - USB Configuration
 - Platform Trust Technology
3. Chipset
 - North Bridge
 - South Bridge
 - Uncore Configuration
 - South Cluster Configuration
4. Security
5. Boot
6. Save & Exit

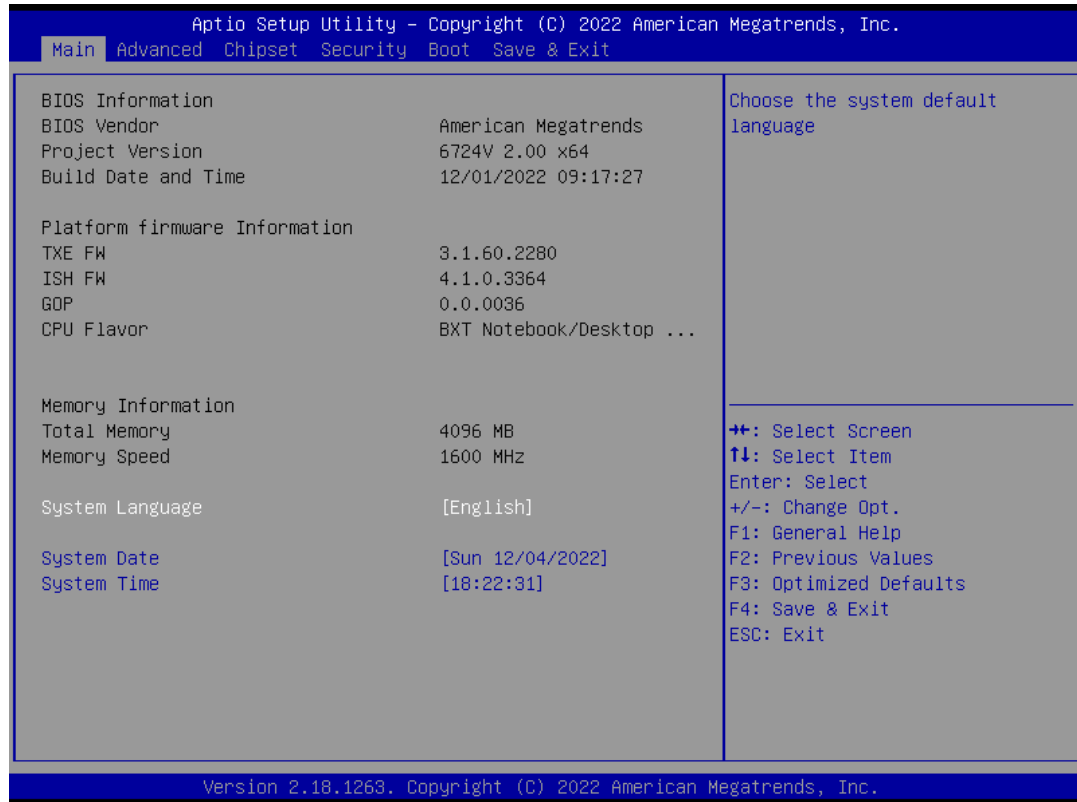
□ Keyboard Convention

On the BIOS, the following keys can be used to operate and manage the menu:

Key	Function
[↑][↓]	The Up and Down keys allow you to select item.
[←][→]	The Left and Right keys allow you to select screen.
[Enter]	The Enter key allows the user to select an option to edit its value or access a sub menu.
[+]/[-]	The Plus and Minus keys allow you to change the field value of a particular setup item.
[F1]	General Help.
[F2]	Previous Values.
[F3]	Optimized Defaults.
[F4]	Save current configuration and exit.
[ESC]	To exit the current menu or message.

Main Setup

This section describes BIOS version information and basic system hardware configuration. If the CPU board is already installed in a working system, you will not need to select this option anymore.



System Date & Time Setup

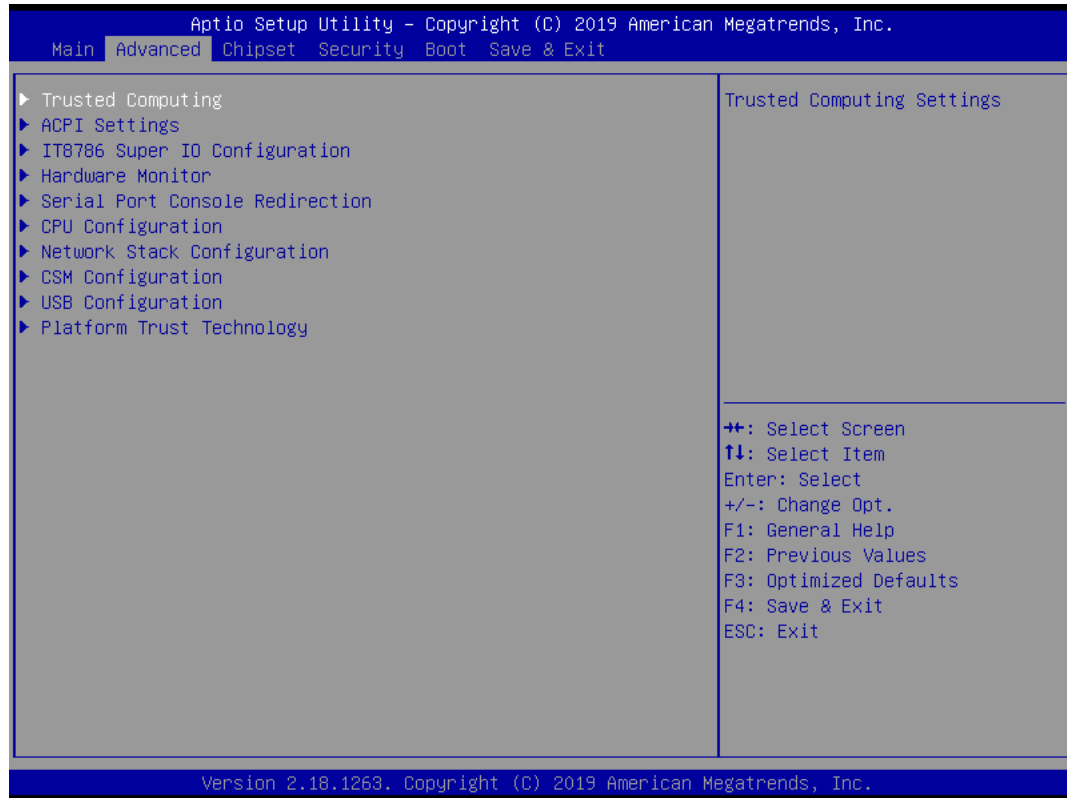
Highlight the <Date> field and then press the [+] / [-] keys or enter new values to set the current date. Follow the month, day and year format.

Highlight the <Time> field and then press the [+] / [-] keys or enter new values to set the current date. Follow the hour, minute and second format.

The user can bypass the date and time prompts by creating an AUTOEXEC.BAT file. For information on how to create this file, please refer to the MS-DOS manual.

Advanced Setup

Select the Advanced tab from the setup screen to enter the Advanced BIOS Setup screen. You can select any of the items in the left frame of the screen, such as USB Configuration, to go to the sub menu for that item. You can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screen is shown below. The sub menus are described on the following pages



□ **Trusted Computing**



Security Device Support

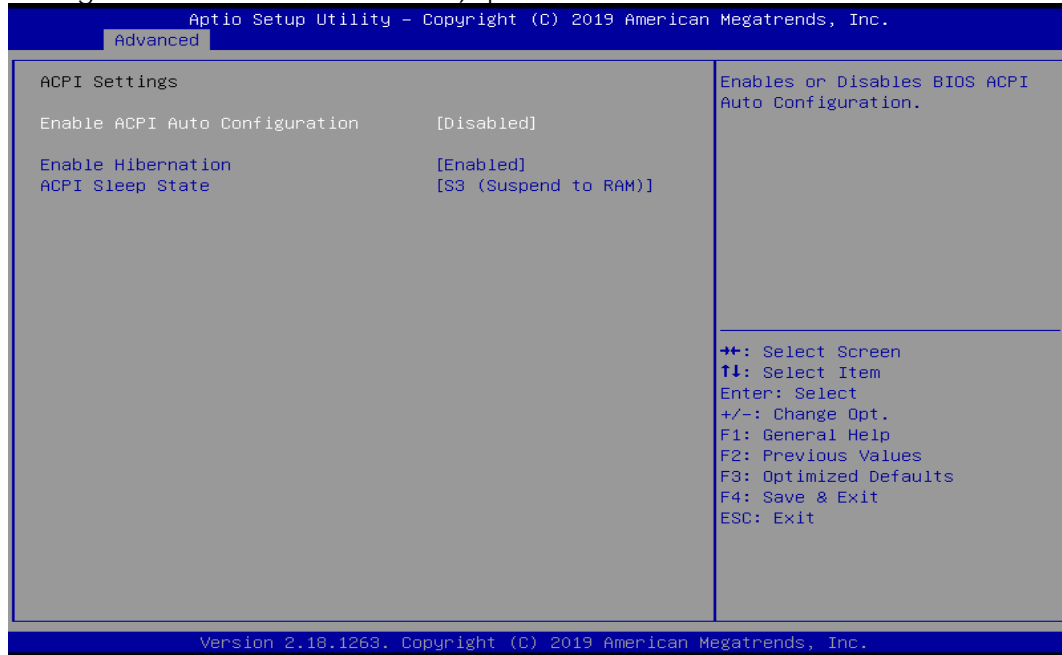
Use this item allows to enable or disable BIOS support for security device. TCG EFI protocol and INT1A interface will not be available.

Available Options: Disabled, and Enabled

Default setting: Enabled

❑ **ACPI settings**

This field specifies allow you set this value to utilize the ACPI (Advanced Configuration and Power Interface) specification.



Enable ACPI Auto Configuration

This item allows users to enable or disable BIOS ACPI Auto configuration.

Available Options: Disabled, Enabled

Default setting: Disabled

Enable Hibernation

This item allows users to enable or disable system ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some OS.

Available Options: Disabled, Enabled

Default setting: Enabled

ACPI Sleep State

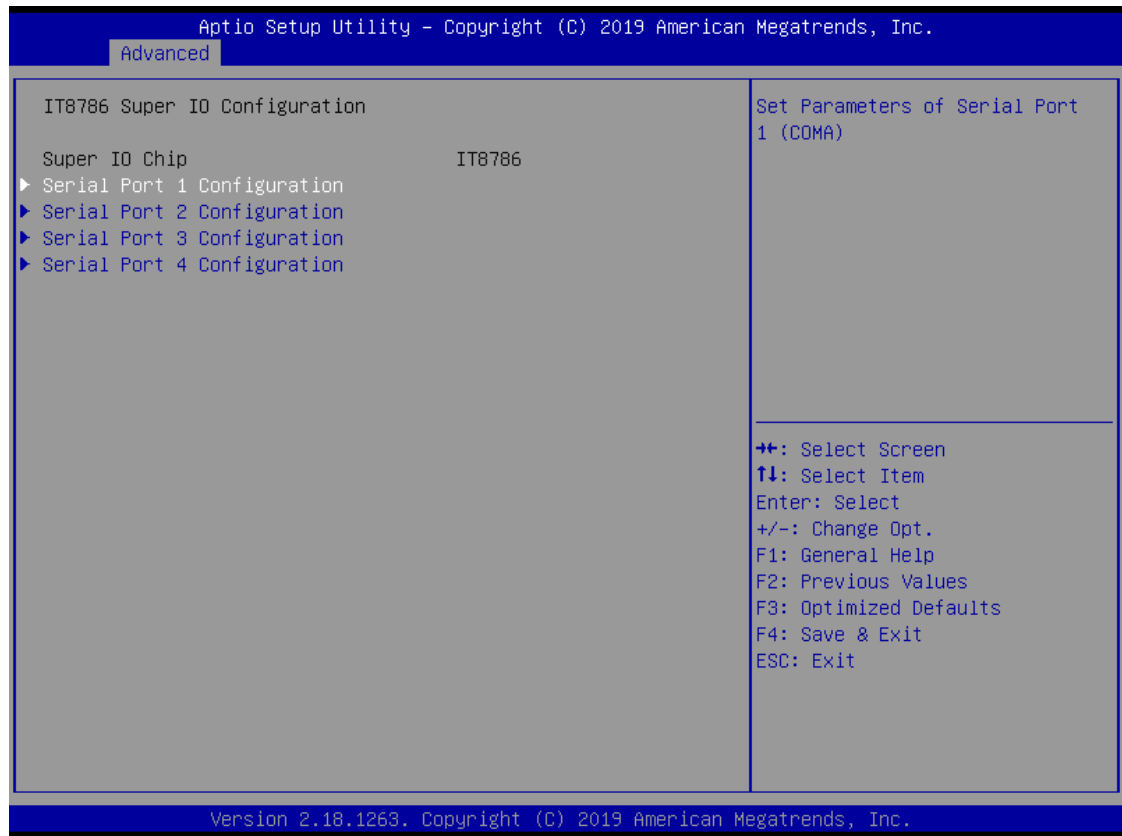
This item allows users to select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.

Available Options: Suspend Disabled and S3 (Suspend to RAM)

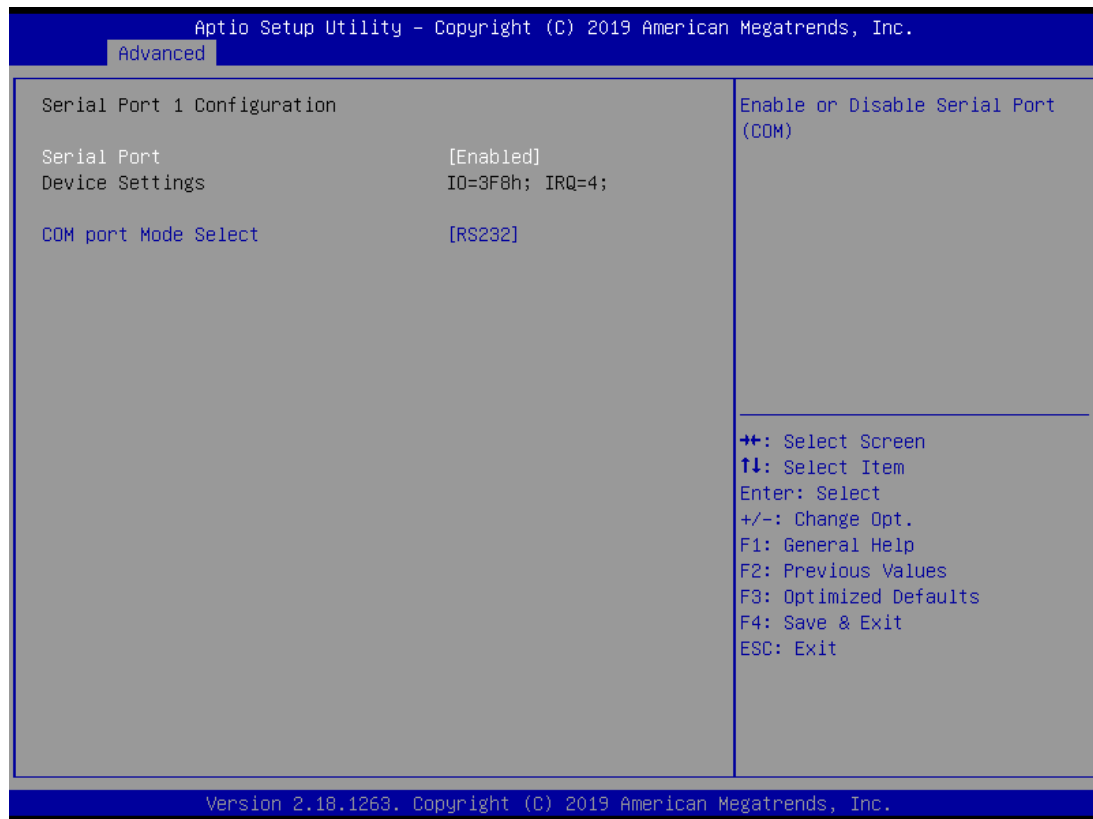
Default setting: S3 (Suspend to RAM)

□ IT8786 Super IO Configuration

This section describes the function of Super I/O settings.



Serial Port 1/2 Configuration (COM1/COM2)



✧ *Serial Port 1/2*

This item allows users to select the enable or disable Serial port.

Available Options: Enabled, and Disabled.

Default setting: Enabled

Device Settings: COM1-3F8/IRQ4, COM2-2F8/IRQ3

COM1/2 Port Mode Select

This item allows users can select RS-232, RS-422 and RS-485 of select COM1/2.

Available Options: RS-232, RS-422, RS485, RS422 with Terminal Resistor and RS485 with Terminal Resistor

Default setting: RS-232

Serial Port 3/4 Configuration (COM3/COM4)



✧ *Serial Port 3/4*

This item allows users to select the enable or disable Serial port.

Available Options: Disabled, and Enabled

Default setting: Enabled

✧ *Serial Port*

This item allows users to select the enable or disable Serial port.

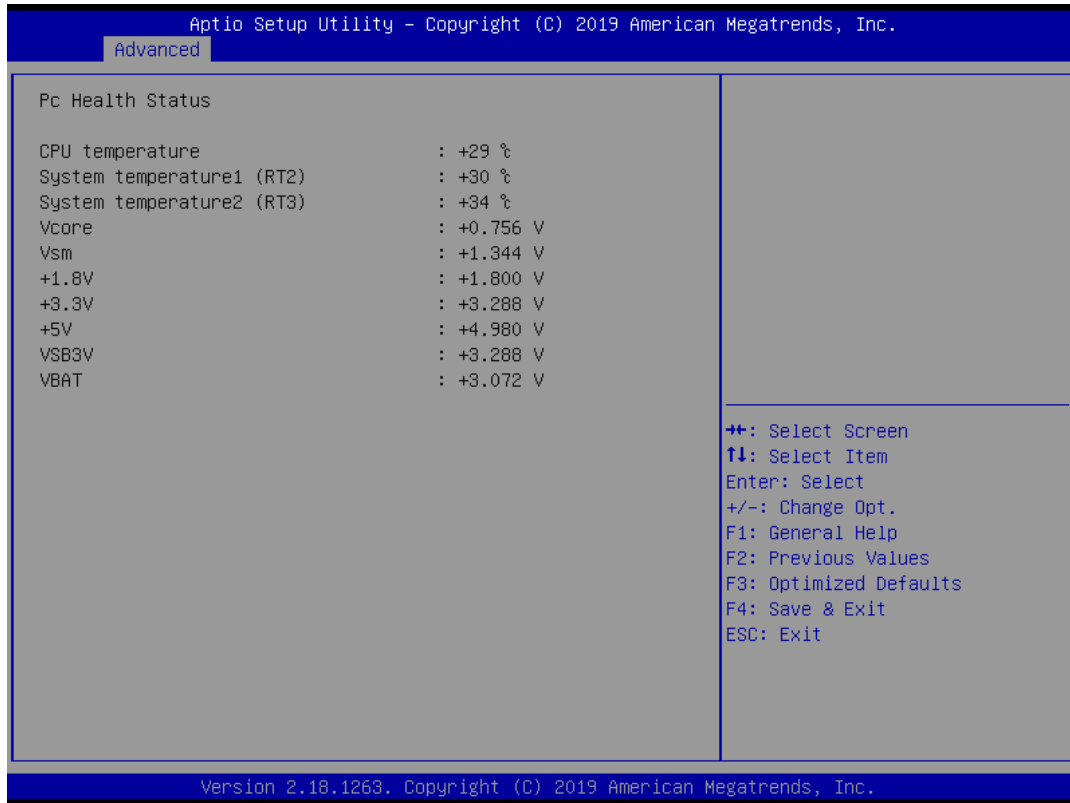
Available Options: Enabled, and Disabled.

Default setting: Enabled

Device Settings: COM3-3E8/IRQ6, COM4-2E8/IRQ11

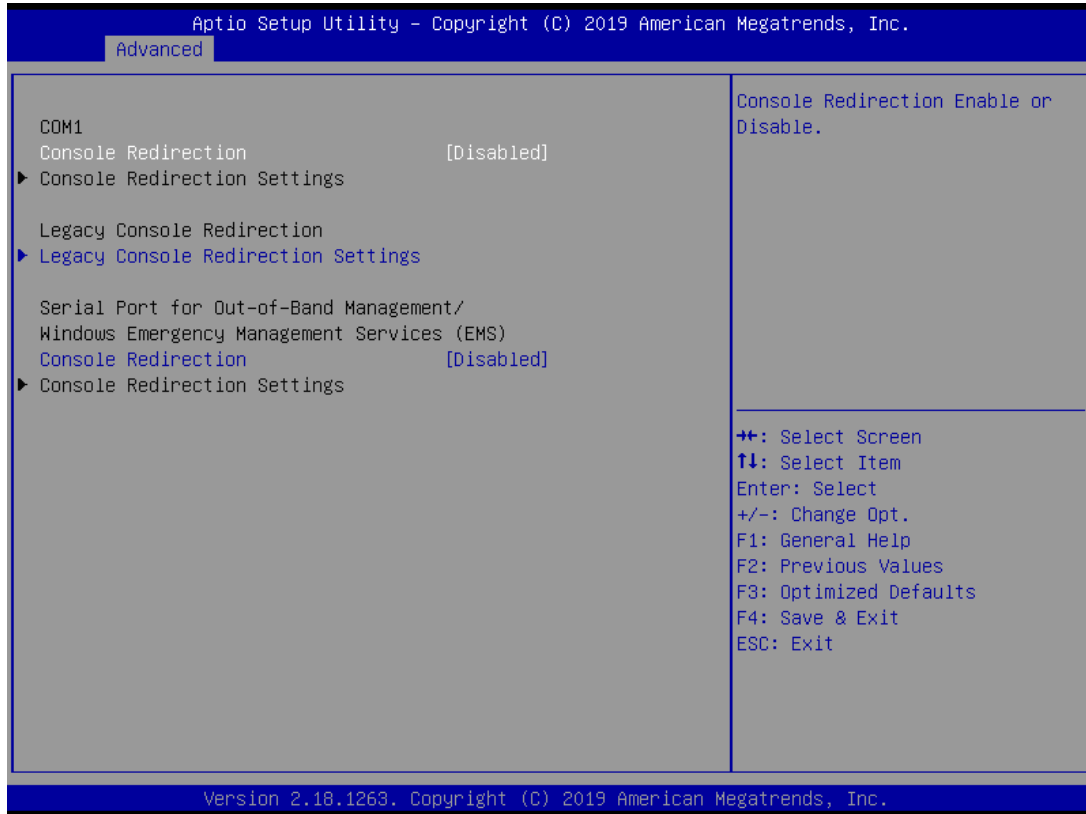
❑ **Hardware Monitor**

On the PC Health status this Setup screen, you can view the system hardware health status, and set shutdown temperature or other feature.



□ **Serial Port Console Redirection**

This option turns on console redirection support in the BIOS and is the default setting. The remote access feature requires the use of the COM1 connector located at the rear panel of the FX5409.



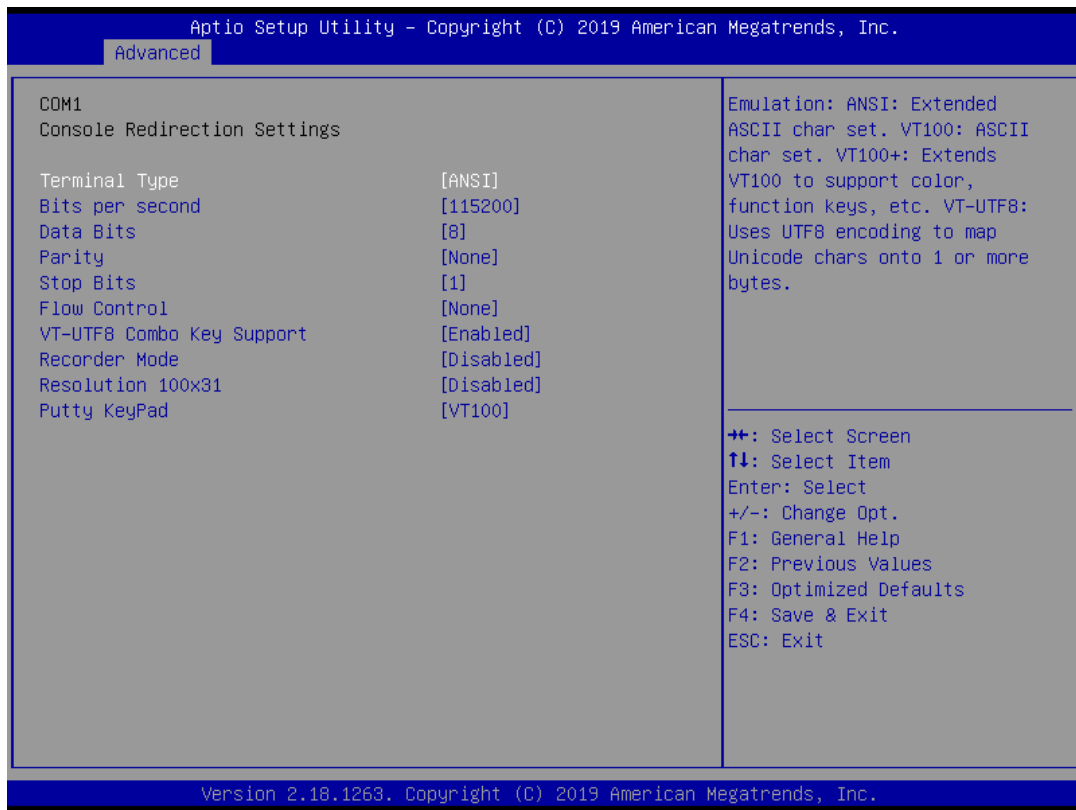
COM1 - Console Redirection

This field is select console redirection Enable or disable.

Available Options: Enabled, and Disabled

Default setting: Disabled

✧ **Console Redirection Setting**



Terminal Type

This field is selecting the target terminal type.

Available Options: VT100, VT100+, VT-UTF8, and ANSI

Default setting: ANSI

Bits per Second

This field is select Serial ports can use baud rate. Just keep in mind that speed must match terminal setting.

Available Options: 9600, 19200, 38400, 57600, and 115200

Default setting: 115200

Data Bit

This field is select Serial ports can use data bit. Just keep in mind that the data bits must match terminal setting.

Available Options: 7 Bots, and 8 Bits

Default setting: 8 Bits

Parity

This field is select Serial ports can use parity mode. Just keep in mind parity must match terminal setting.

Available Options: None, Even, Odd, Mark, and Space

Default setting: None

Stop Bit

This field is select Serial ports can use any mode. Just keep in mind that the bits per second and stop bits must match terminal setting.

Available Options: 1 Bit, and 2 Bit

Default setting: 1 Bit

Flow Control

This field is Serial ports can use flow control for console redirection.

Available Options: None, and Hardware RTS/CTS

Default setting: None

VT-UTF8 Combo Key Support

This field is select VT-UTF8 combination key support for ANSI/VT100 terminals.

Available Options: Enabled and Disabled

Default setting: Enabled

Recorder Mode

On this mode enabled only text will be sent. This is to capture Terminal data.

Available Options: Enabled and Disabled

Default setting: Disabled

Resolution 100x31

This item is select Enables or disables extended terminal resolution

Available Options: Enabled and Disabled

Default setting: Disabled

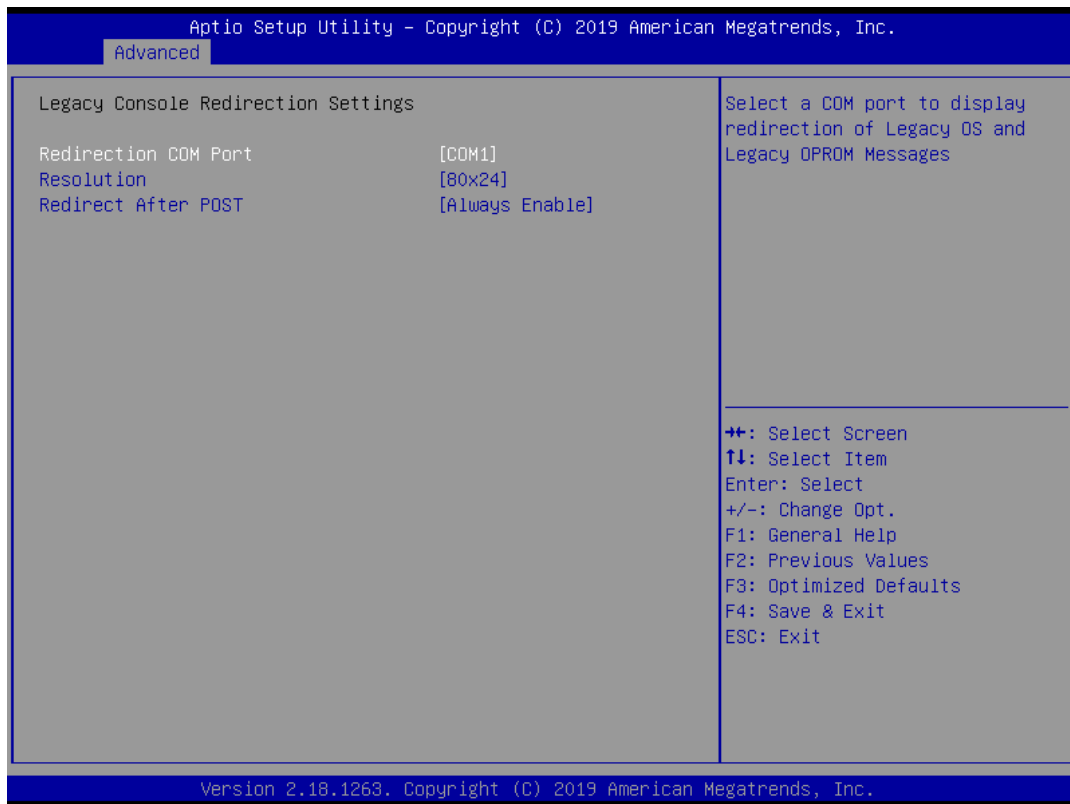
Putty Keypad

This item is select Function Key and Keypad on Putty

Available Options: VT100, LINUX, XTERMR6, SCO, ESCN and VT400

Default setting: VT100

✧ *Legacy Console Redirection Setting*



Resolution

This item is select extended terminal resolution

Available Options: 80x24 and 80x25

Default setting: 80x24

Redirection After Post

These fields is select redirection is active during post and during boot loader or always active or off active. (Some Oss may not work if set to Always)

Available Options: Boot Loader and Always Enable

Default setting: Always Enable

Console Redirection (OBM/EMS)

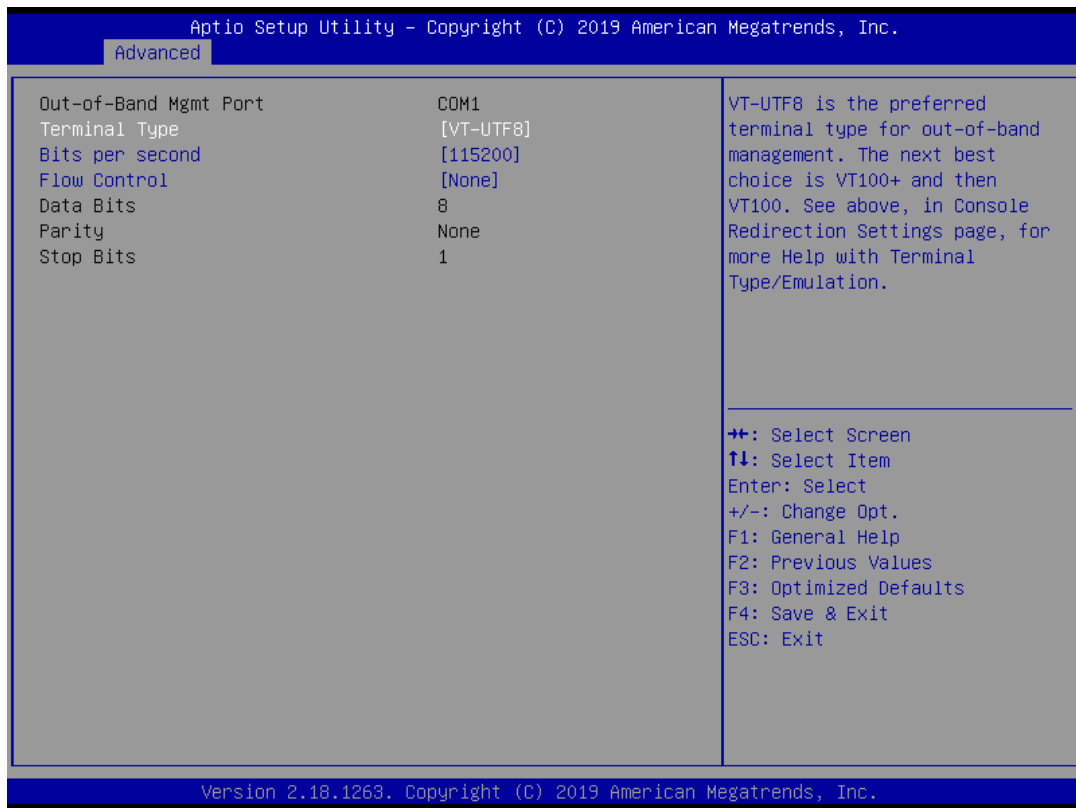
This field is select console redirection Enable or disable. Serial Port for Out-of-Band Management/ Windows Emergency Management Services (EMS)

Available Options: Enabled and Disabled

Default setting: Disabled

✧ *Console Redirection Setting – Out of Band Mgmt Port*

Microsoft Windows Emergency Management Services (EMS) allows for remote management of a Windows Server OS through a serial port.



Terminal Type

This field is Emulation: ANSI: Extended ASCII char set. VT100: ASCII char set. VT100+: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes..

Available Options: VT100, VT100+, VT-UTF8, and ANSI

Default setting: VT-UTF8

Bits per Second

This field is select Serial ports can use baud rate. Just keep in mind that speed must match terminal setting.

Available Options: 9600, 19200, 57600, and 115200

Default setting: 115200

Flow Control

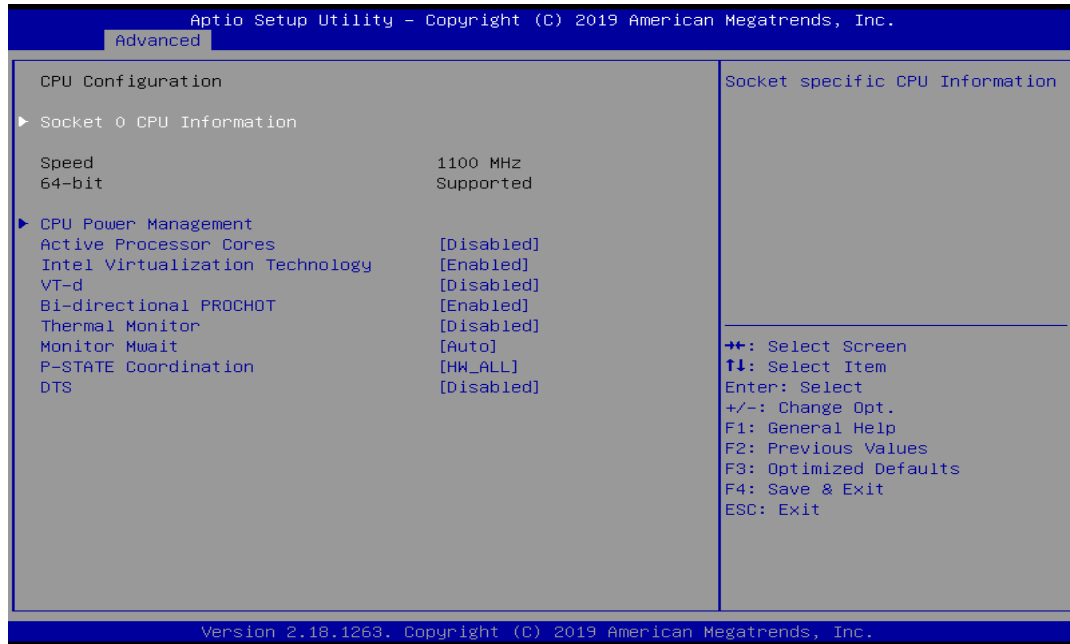
The flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.

Available Options: None, Hardware RTS/CTS, and Software Xon/Xoff

Default setting: None

□ CPU Configuration

You can use this screen to select options for the CPU information. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option.



Active Processor Cores

This field specifies the Number of Cores to enable in each processor package.

Available Options: Disabled, and Enabled

Default setting: Disabled

Intel Virtualization Technology

When enabled, a VMM can utilize the additional hardware capabilities provided by Vander pool Technology.

Available Options: Disabled, and Enabled

Default setting: Enabled

VT-d

The Item is Check to enable VT-d function on MCH.

Available Options: Disabled, and Enabled

Default setting: Disabled

Bi-directional PROCHOT

This field allows users to enable or disable the Bi-directional PROCHOT, when a processor thermal sensor trips (either core), the PROCHOT# will be driven. If bi-direction is enabled, external agents can drive PROCHOT# to throttle the processor

Available Options: Disabled, and Enabled

Default setting: Enabled

P-STATE Coordination

This field allows users to enable or disable P-STATE Coordination Type.

Available Options: HW_ALL, SW_ALL, SW_ANY

Default setting: HW_ALL

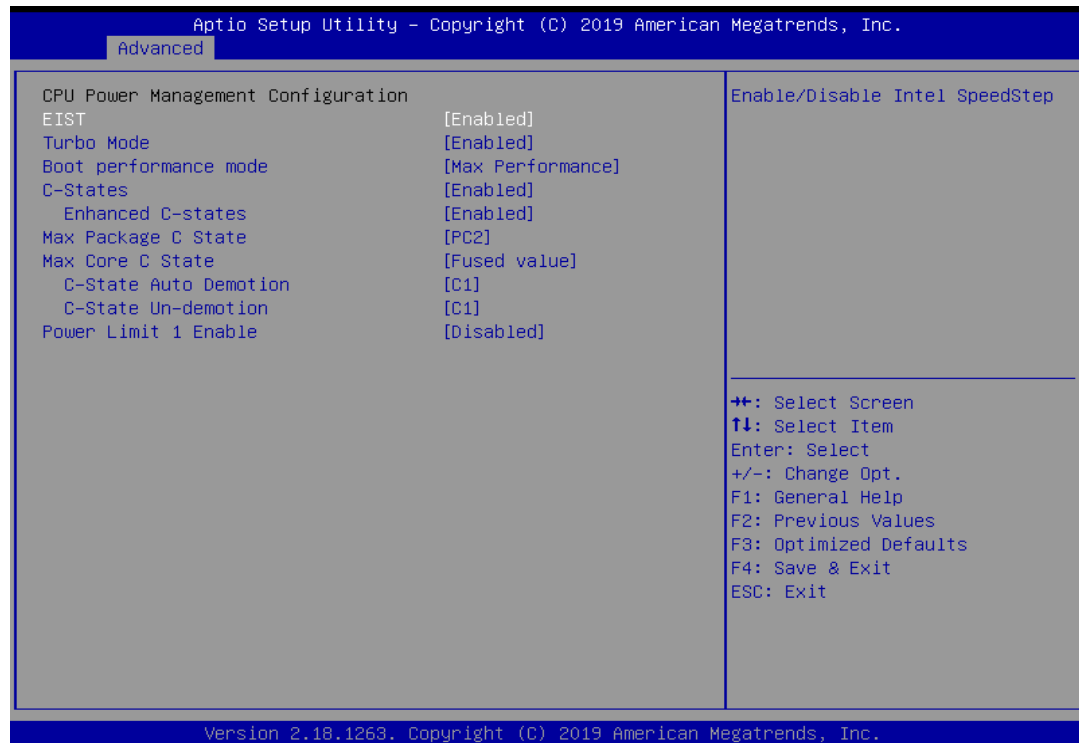
✧ DTS

This field allows the users to enable or disable the Digital Thermal Sensor.

Available Options: Disabled, and Enabled

Default setting: Disabled

CPU Power Manager



✧ ***EIST***

This field allows users to enable or disable Intel Speed Step.

Available Options: Disabled, and Enabled

Default setting: Enabled

✧ ***Turbo Model***

This field allows users to enable or disable Turbo Mode.

Available Options: Disabled, and Enabled

Default setting: Enabled

✧ ***Boot Performance Mode***

This item allows you to select Max turbo mode or not. The Max Turbo mode can run the processing cores faster than the marked frequency when at least part of the CPU is operating either under power, temperature, or other current specifications limits, as designated by the hardware.

Available Options: MAX Performance, and Max Battery

Default setting: Max Performance

✧ ***C- States***

This field allows users to select CPU C state.

Available Options: Disabled, and Enabled

Default setting: Enabled

Enhanced C-States

This field allows users to enable or disable C1E, when Enabled CPU will switch to minimum speed when all core cores enter C- state.

Available Options: Disabled, and Enabled

Default setting: Enabled

✧ ***Max Package C- State***

This field allows users to select control the max package C state that processor will support.

Available Options: PC1, PC2, and C0

Default setting: PC2

✧ ***Max Core C- State***

This option controls the max core C state that core will support.

Available Options: Fused value, C10, C9, C8, C7, C6, C1 and Unlimited

Default setting: Fused value

C-States Auto Demotion

This field allows users to enable or disable C-State Auto Demotion.

Available Options: Disabled, and C1

Default setting: C1

C-States Un-demotion

This field allows users to enable or disable C-State Un-demotion.

Available Options: Disabled, and C1

Default setting: C1

✧ ***Power Limit 1 Enable***

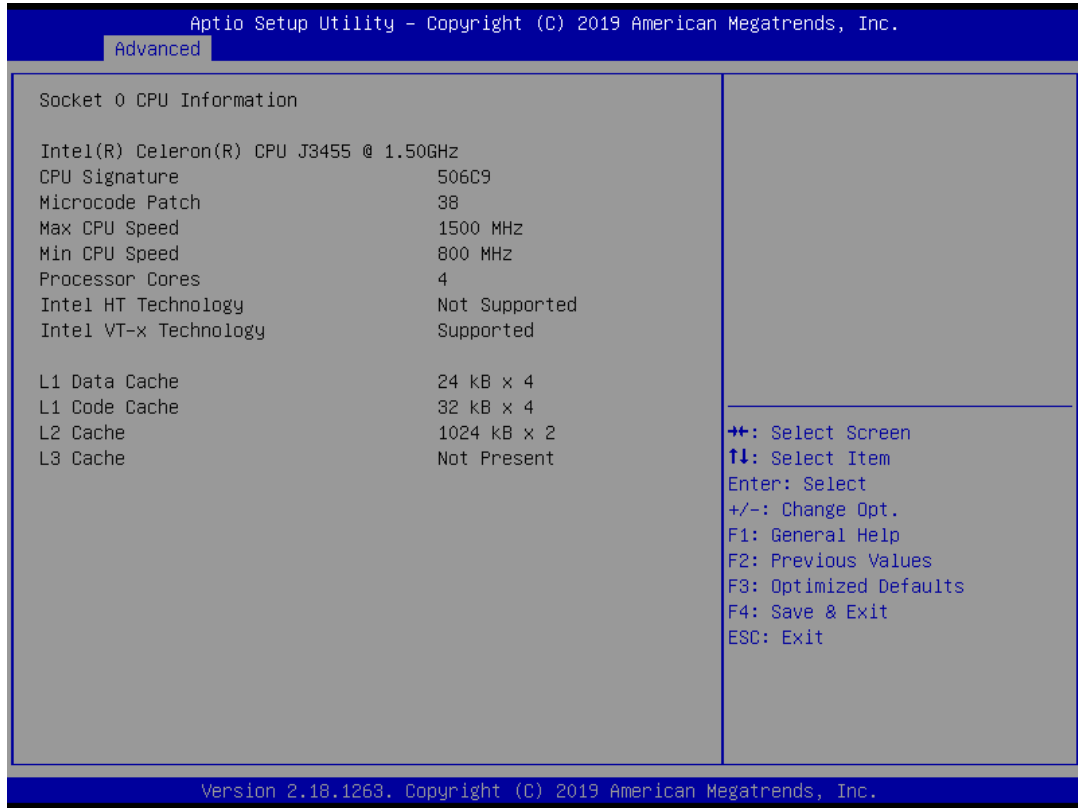
This field allows users to enable or disable Turbo Mode.

Available Options: Disabled, and Enabled

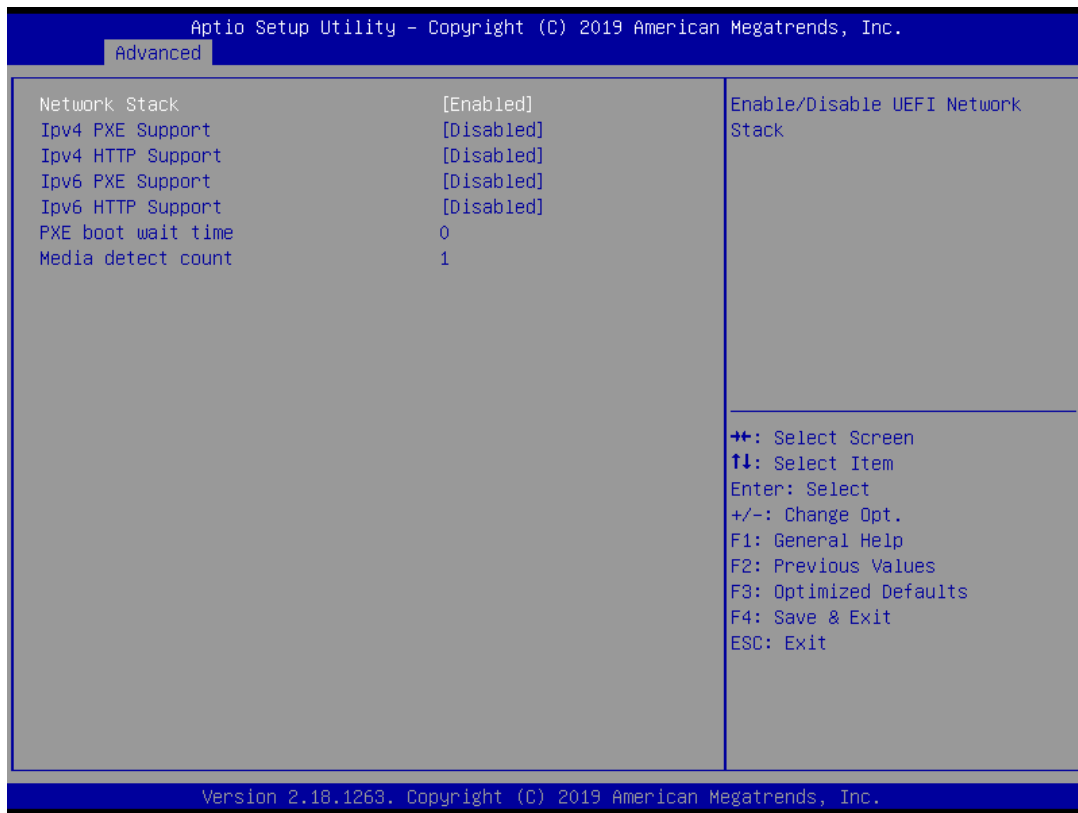
Default setting: Disabled

Socket CPU 0 information

Display CPU Information, like CPU speed and L1/L2 cache and support function.



❑ **Network Stack Configuration**



Network Stack

This field specifies the PXE boot ROM of the onboard LAN chip.

Available Options: Disabled, and Enabled

Default setting: Disabled

✧ ***IPV4 Support***

This field specifies the Enable Ipv4 PXE Boot Support.

Available Options: Disabled, and Enabled

Default setting: Disabled

✧ ***IPV6 Support***

This field specifies the Enable Ipv6 PXE Boot Support.

Available Options: Disabled, and Enabled

Default setting: Disabled

✧ ***IPV4/IPV6 Http Support***

This field specifies the Enable Ipv4 or Ipv6 Http Support.

Available Options: Disabled, and Enabled

Default setting: Disabled

✧ ***PXE boot wait time***

This field specifies the Wait time to press ESC key to abort the PXE boot.

Default setting: 0

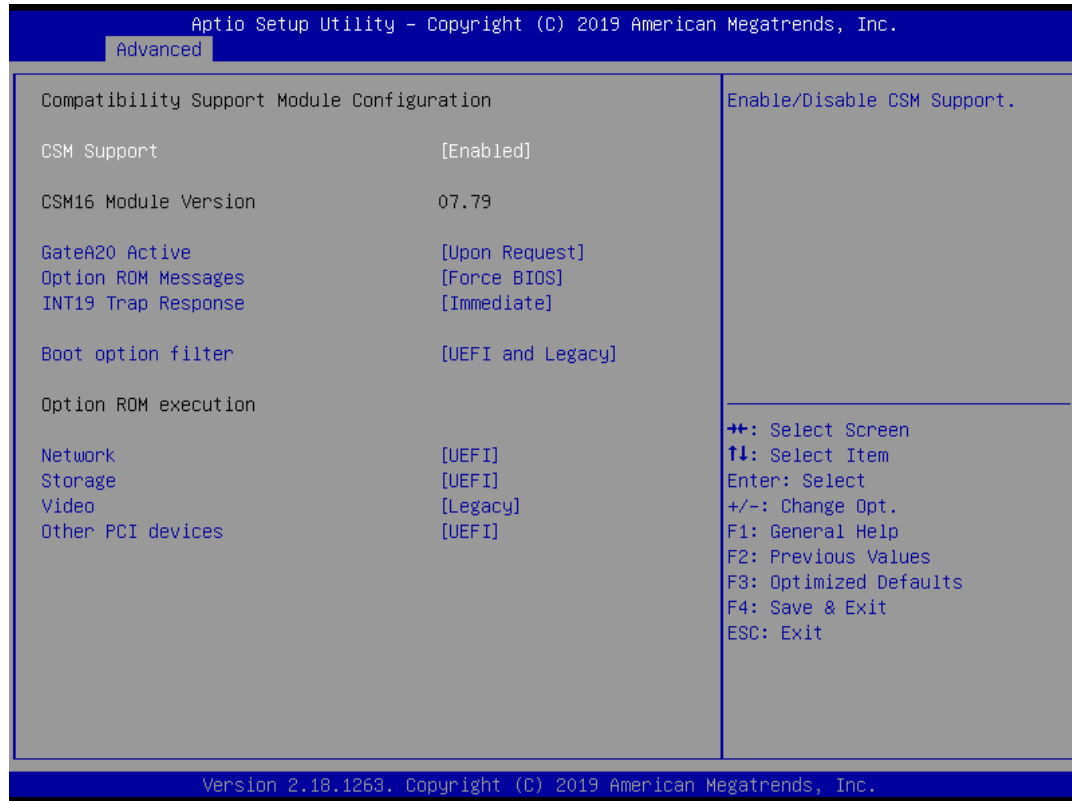
✧ ***PXE boot wait time***

This field specifies the Wait time the number of time presence of media will be checked.

Default setting: 1

□ **CSM Configuration**

The CSM (Compatibility Support Module) is Option ROM Execution, boot options filter, etc.



CSM Support

This item allows users to enable or disable CSM.

Available Options: Disabled, and Enabled

Default setting: Enabled

Boot Option Filter

This option controls Legacy/UEFI ROMs priority.

Available Options: UEFI and Legacy, Legacy only, and UEFI only

Default setting: UEFI and Legacy

GateA20 Active

UPON REQUEST - GA20 can be disabled using BIOS services. ALWAYS - do not allow disabling GA20; this option is useful when any RT code is executed above 1MB.

Available Options: UPON REQUEST, and ALWAYS

Default setting: UPON REQUEST

Option ROM Message

Set display mode for Option ROM.

Available Options: Force BIOS, and Keep Current

Default setting: Force BIOS

INT19 Trap Response

BIOS reaction on INT19 trapping by Option ROM: IMMEDIATE - execute the trap right away; POSTPONED - execute the trap during legacy boot.

Available Options: Immediate, and Postponed

Default setting: Immediate

Network

This item is controls the execution of UEFI PXE OpROM.

Available Options: Do not Launch, and UEFI

Default setting: UEFI

Video

This item is controls the execution of UEFI and Legacy Video opROM.

Available Options: Do not Launch, Legacy, and UEFI

Default setting: Legacy

Storage

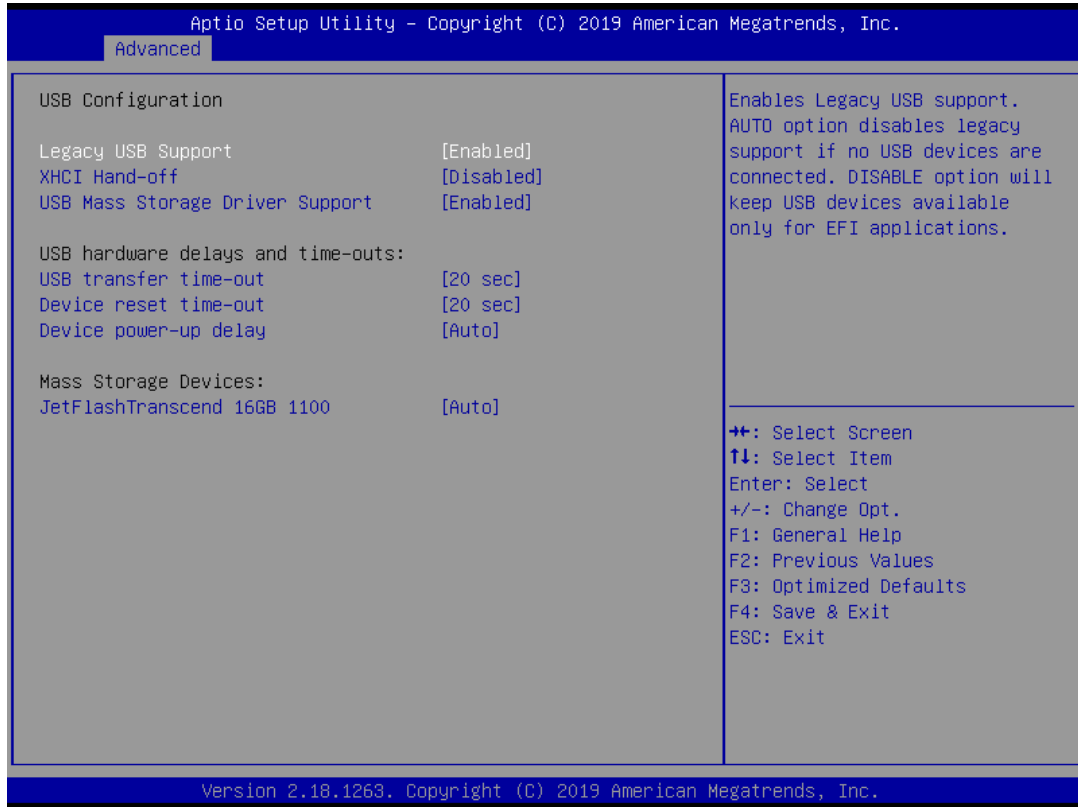
This item is controls the execution of UEFI and Legacy Storage opROM.

Available Options: Do not Launch, Legacy, and UEFI

Default setting: UEFI

❑ USB Configuration

You can use this screen to select options for the USB Configuration.



Legacy USB Support

Legacy USB Support refers to the USB mouse and USB keyboard support. Normally if this option is not enabled; any attached USB mouse or USB keyboard will not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, any attached USB mouse or USB keyboard can control the system even when there is no USB drivers loaded on the system. Set this value to Enabled or Disabled the Legacy USB Support.

Available Options: Disabled, Auto, and Enabled

Default setting: Enabled

XHCI Hand-Off

This is a workaround for OS without XHCI Hand-Off support. The XHCI ownership change should claim by XHCI driver.

Available Options: Disabled, and Enabled

Default setting: Enabled

USB Mass Storage Driver Support

Mass storage device emulation type. If the emulation FDD, recommended formatted as FAT32 format.

Available Options: Disabled, and Enabled

Default setting: Enabled

USB transfer time-out

The time-out value for control, bulk, and interrupt transfers.

Available Options: 1 sec, 5 sec, 10 sec, and 20 sec

Default setting: 20 sec

Device reset time-out

USB mass storage device start unit command time-out.

Available Options: 10 sec, 20 sec, 30 sec, and 40 sec

Default setting: 20 sec

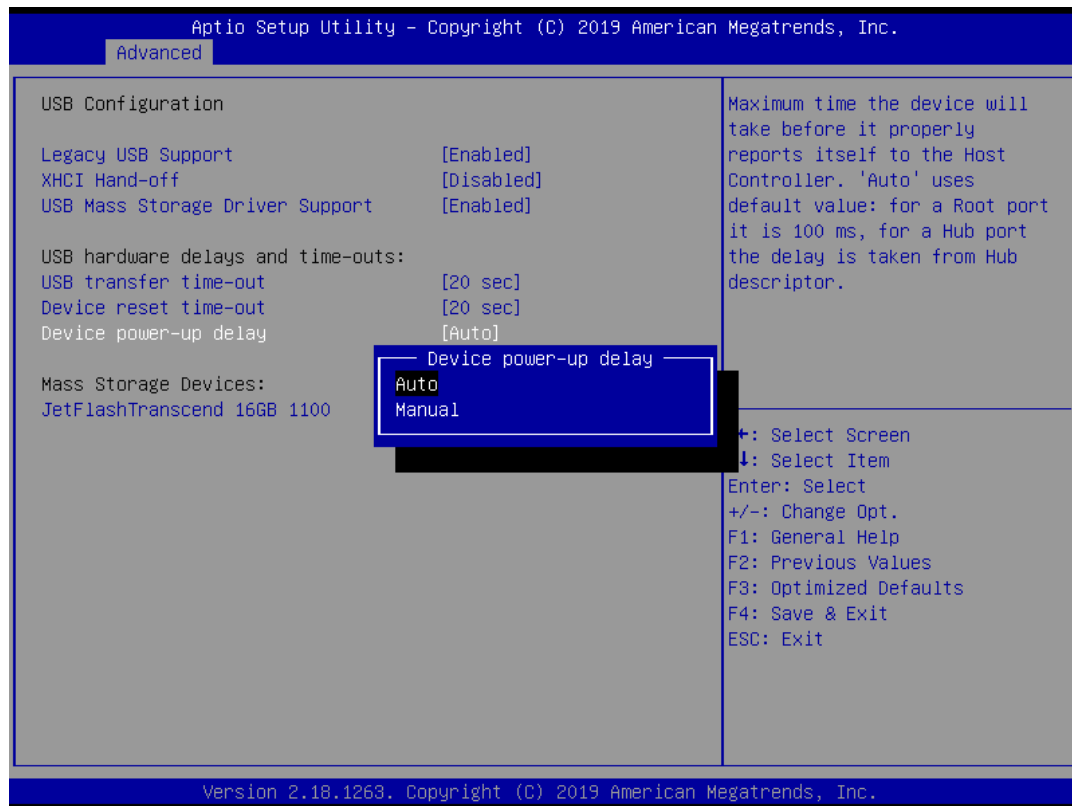
Device power-up delay

Maximum time the device will take before it properly reports itself to the Host controller. 'Auto' uses default value: for a Root port it is 100 ms, for a Hub port the delay is take from Hub descriptor.

Available Options: Auto, and manual

Default setting: Auto

Device power-up delay > Select "Manual"



✧ ***Device Power-Up delay in second***

Delay range is 1...40 seconds, in one second increments

Available Options: 1, 5, 10, 20, 30, and 40 Sec

Default setting: 5 Sec

Mass Storage Devices:

Mass storage device emulation type. 'AUTO' enumerates devices according to their media format. Optical drives are emulated as 'CDROM'; drives with no media will be emulated according to a drive type.

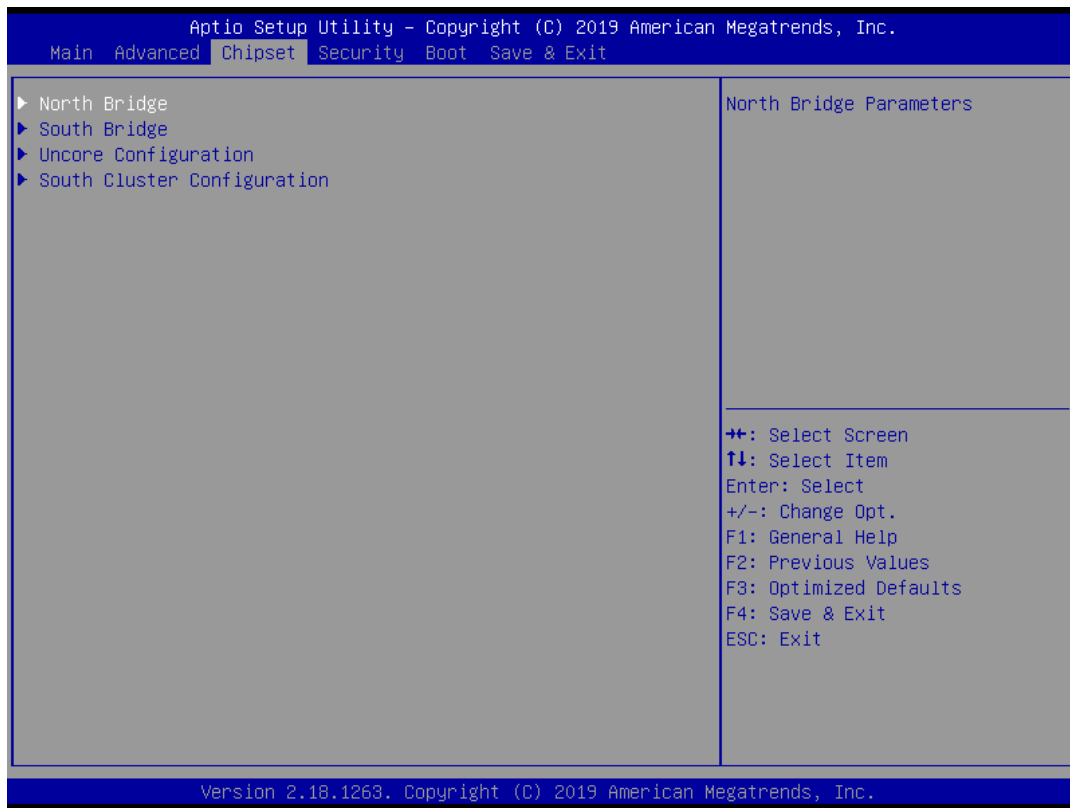
Available Options: Auto, Floppy, Forced FDD, Hard Disk, and CD-ROM

Default setting: Auto

Chipset

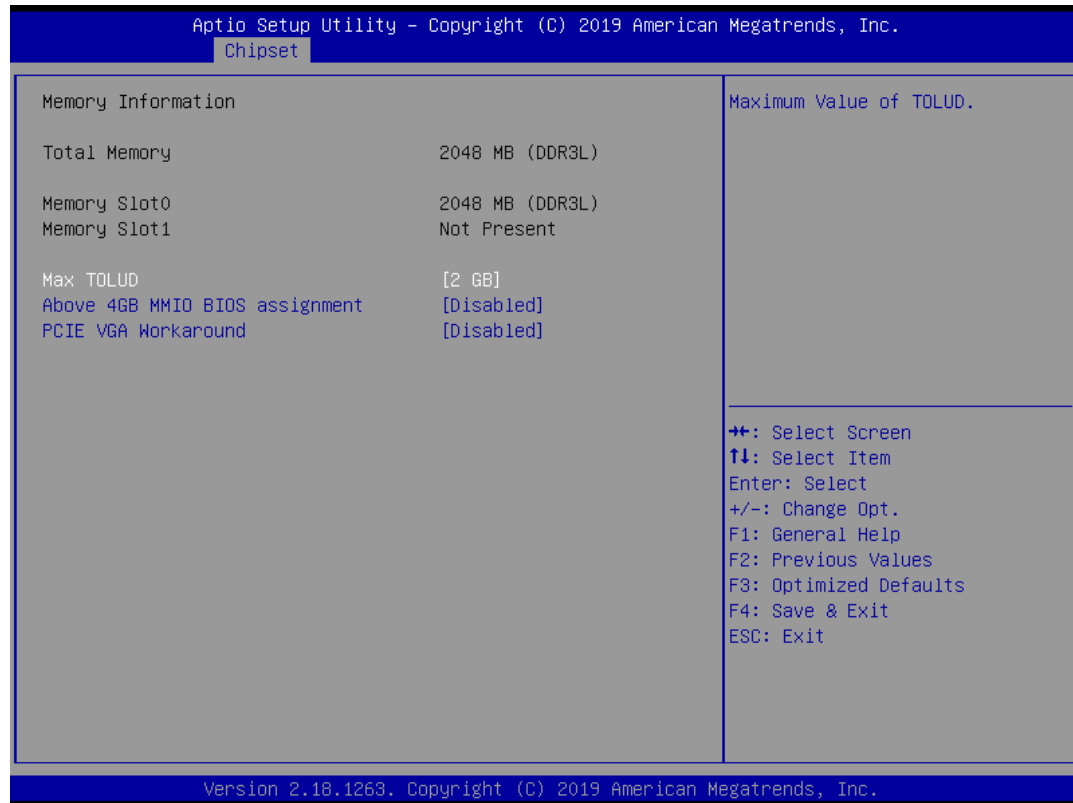
This section describes the configuration of the board's chipset features.

- North Configuration
- South Configuration
- Uncore Configuration
- South Cluster Configuration



□ **North Bridge**

You can use this screen to select options for the North Bridge Configuration. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option.



Max TOLUD

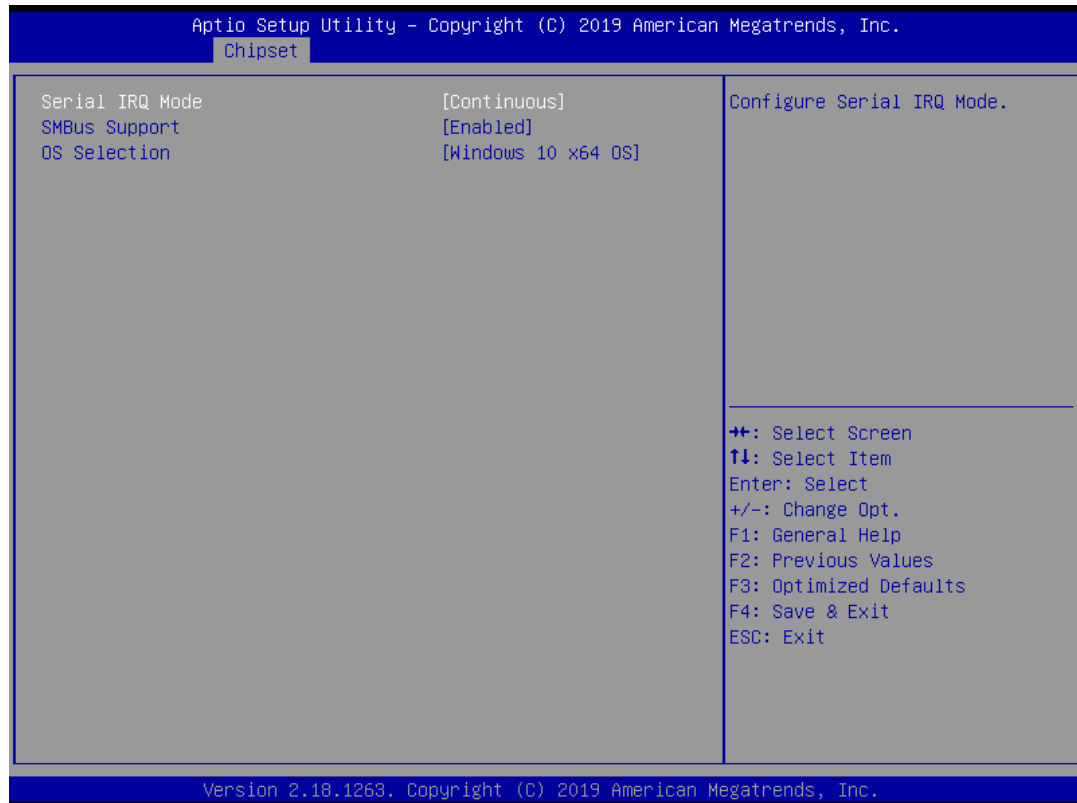
This field is Max value of TOLUD; Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller.

Available Options: Dynamic, 2GB, 2.25GB, 2.5GB, 2.75GB , and 3B

Default setting: 2GB

❑ South Bridge

You can use this screen to select options for the South Bridge Configuration. South Bridge is a chipset on the motherboard that controls the USB, LAN port, and audio function.



Serial IRQ Mode

This item is Configure Serial IRQ Mode.

Available Options: Continuous, and Quiet

Default setting: Continuous

OS Selection

The Item is Select OS configuration, When Install Windows need select to use Windows.

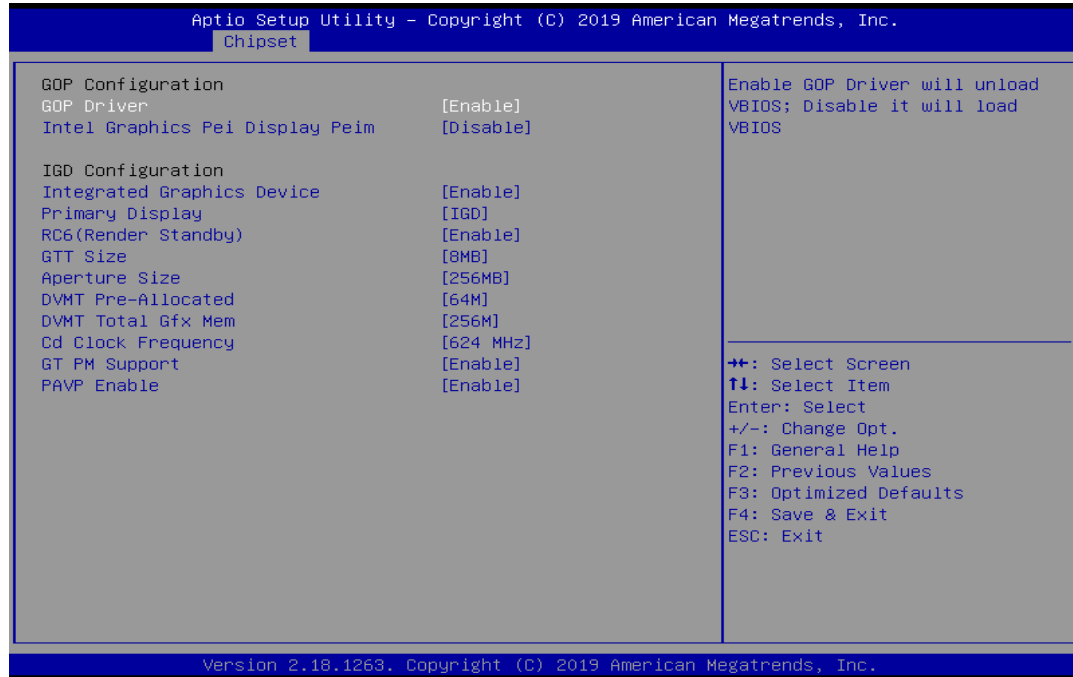
Available Options: Windows 10 x64 OS, Inter Linux, and MSDOS

Default setting: Windows 10 x64 OS

Note: *User need to go to this item to select the OS mode before installing corresponding OS driver, otherwise problems will occur when installing the driver.*

□ **Uncore Configuration**

You can use this screen to select options for the Uncore Configuration. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option.



GOP Configuration > GOP Driver

The Item is Enable GOP Driver will unload VBIOS; Disable it will load VBIOS.

Available Options: Disabled, and Enabled

Default setting: Enabled

Integrated Graphics Device

The Item can select Enable: Enable Integrated Graphics Device (IGD) when selected as the Primary Video Adaptor. Disable: Always disable IGD

Available Options: Disabled, and Enabled

Default setting: Enabled

GTT Size

This field specifies allows you to select the GTT size.

Available Options: 2MB, 4MB, and 8MB

Default setting: 4 MB

Aperture Size

This field specifies allows you to select the aperture size.

Available Options: 128MB, 256MB, and 512MB

Default setting: 256 MB

DVMT Pre- Allocated

The Item is select DVMT 5.0 Pre-Allocated (Fixed) graphics memory size used by the internal graphics device.

Available Options: 64MB, 96MB, 128MB, 160MB, 192MB, 224MB, 256MB, 288MB, 320MB, 352MB, 384MB, 416MB, 448MB, 480MB, and 512MB

Default setting: 512MB

DVMT Total GFX Mem

This field specifies allows you to select the maximum amount of graphics memory of DVMT 5.0 to be shared with the system memory.

Available Options: 128MB, 256MB, and MAX

Default setting: 256 MB

PAVP

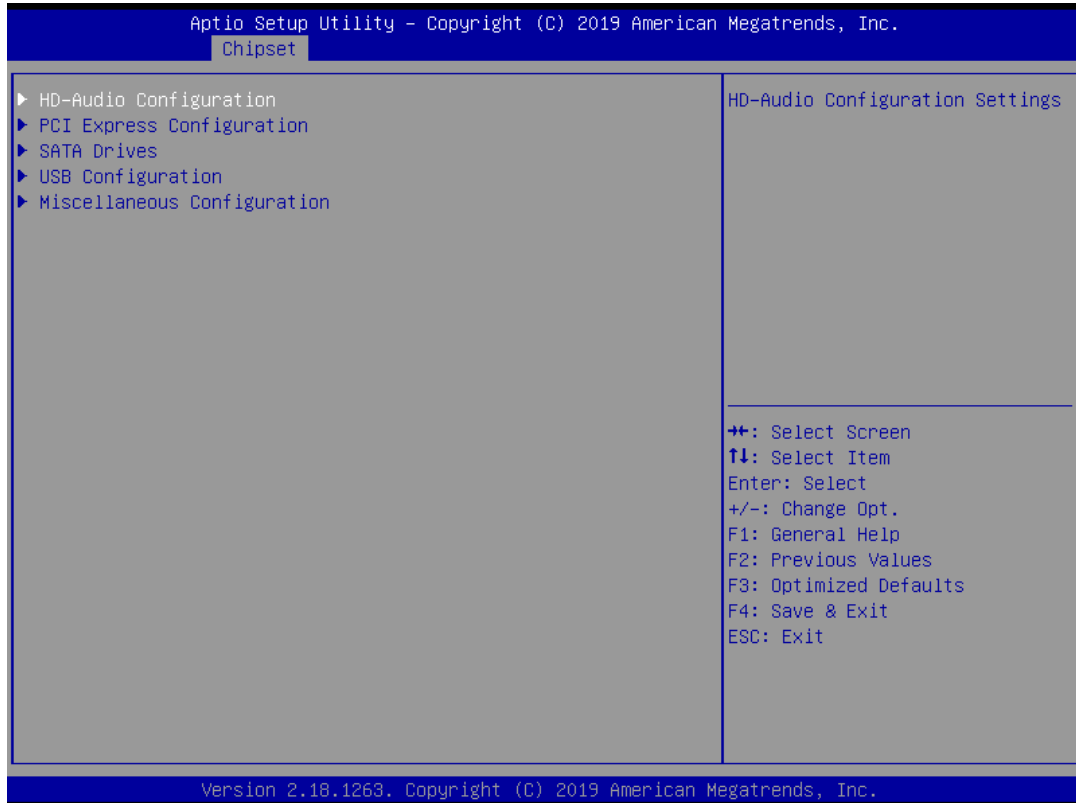
The Item is can Select Enable/Disable Protected Audio Video Control.

Available Options: Disabled, and Enabled

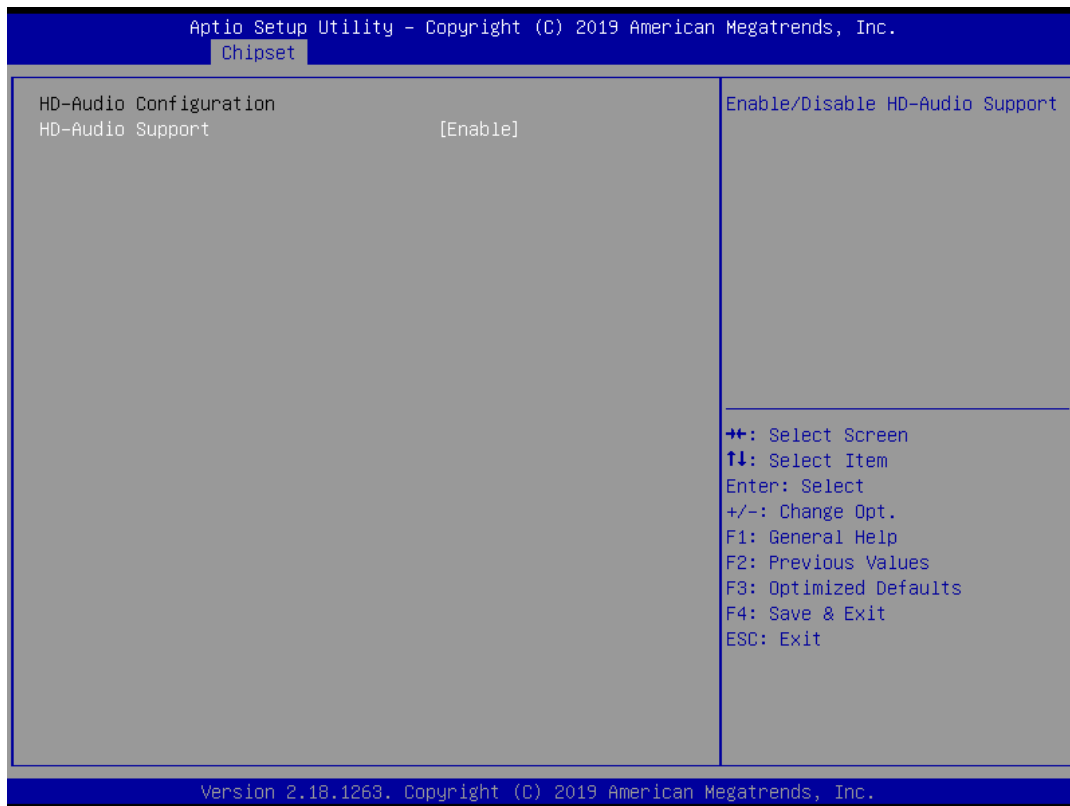
Default setting: Disabled

❑ South Cluster Configuration

You can use this screen to select options for the South Cluster Configuration. This is chipset on the motherboard that controls the USB, LAN port, and audio function.



HD Audio



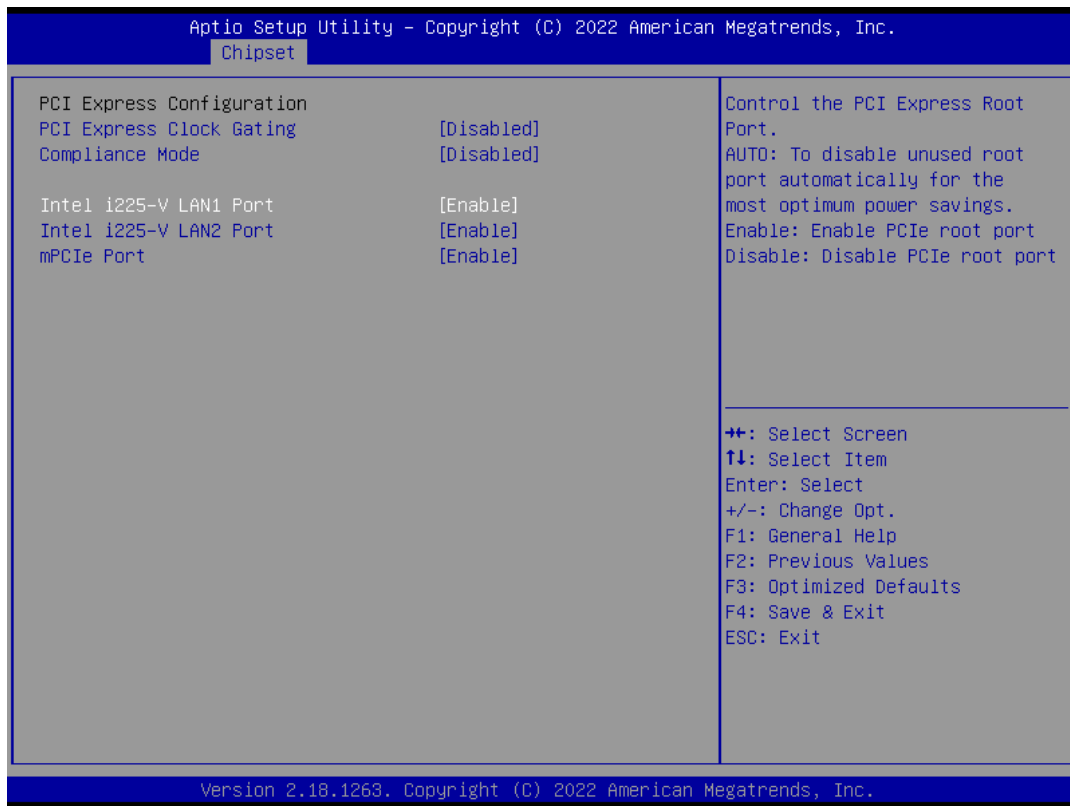
✧ *HD-Audio Support*

This item allows users to enable or disable HD-Audio Controller.

Available Options: Disabled, and Enabled

Default setting: Enabled

PCI Express Configuration



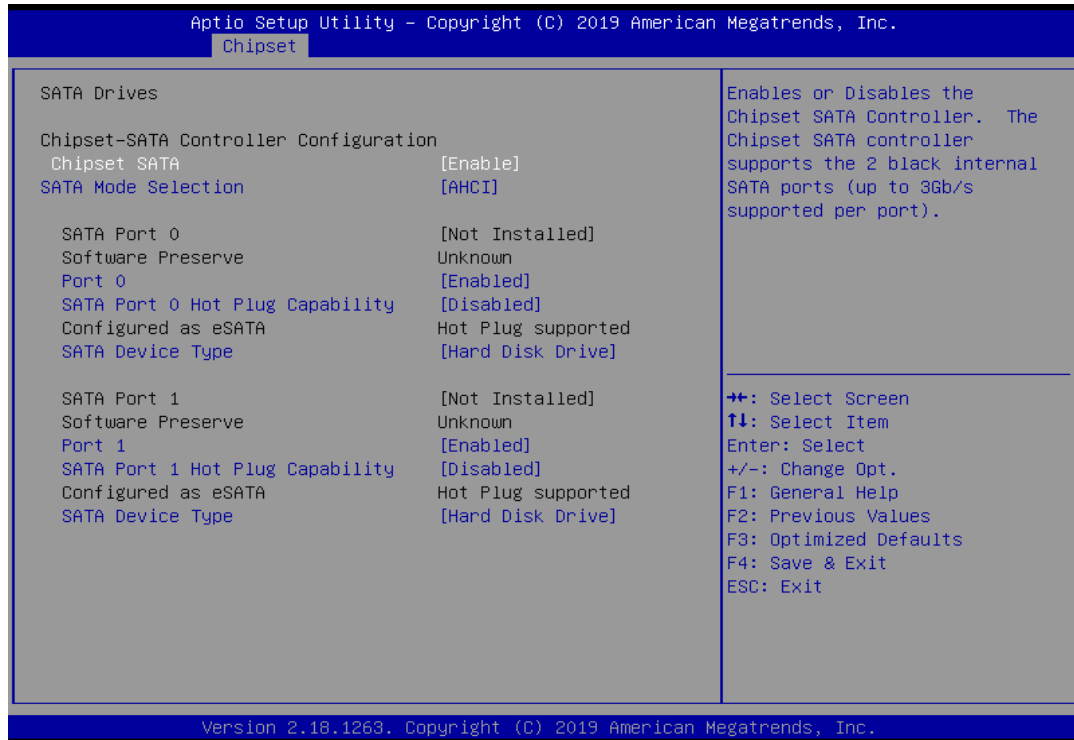
❖ *Intel i225-V LAN1/2 & m-PCIe Port*

The o item allows users to enable or disable on board PCIe Mini card and LAN.

Available Options: Auto, Disabled, and Enabled

Default setting: Enabled

SATA Configuration



Chipset SATA

This item allows users to enable or disable SATA Controller.

Available Options: Disabled, and Enabled

Default setting: Enabled

SATA Port0/Port1

The system SATA port 0 is SATA HDD, SATA port 1 is m-SATA, and this item allows users to enable or disable SATA port 0 or SATA port 1.

Available Options: Disabled, and Enabled

Default setting: Enabled

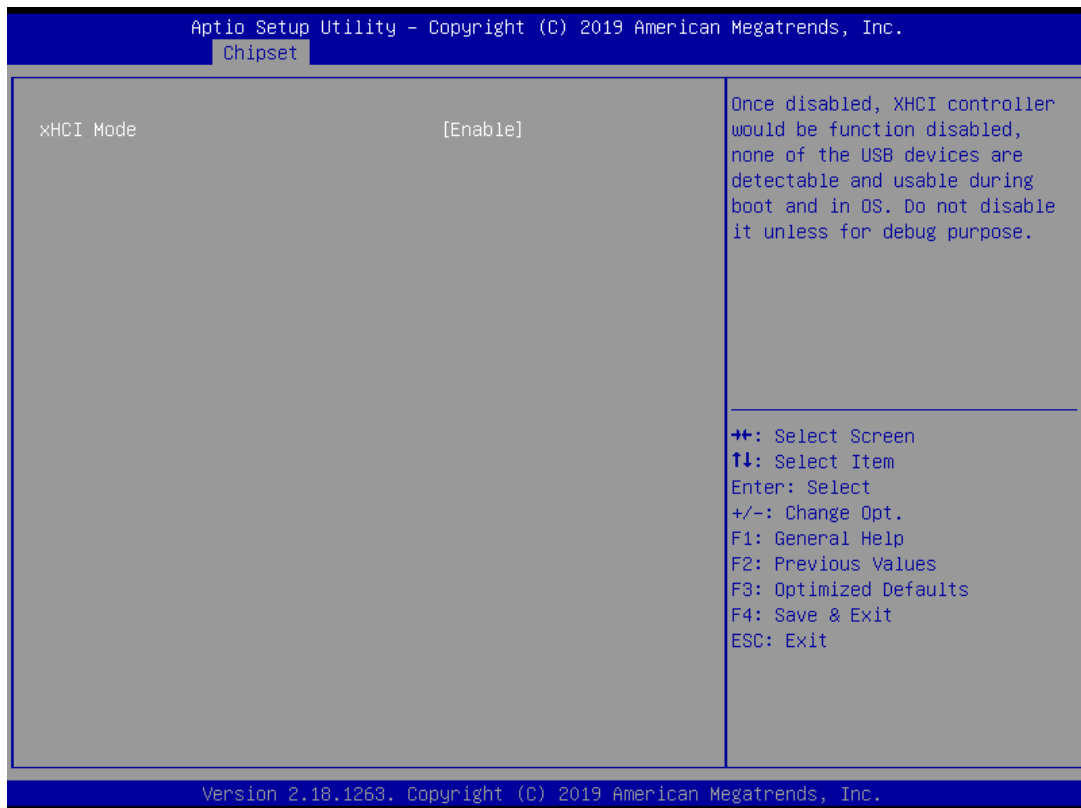
SATA Port0/Port1 Hot Plug Capability

The system SATA CFAST/HDD corresponding SATA port 0/1 hot plug, this item allows users to enable or disable SATA port 0/1.

Available Options: Disabled, and Enabled

Default setting: Disabled

USB Configuration



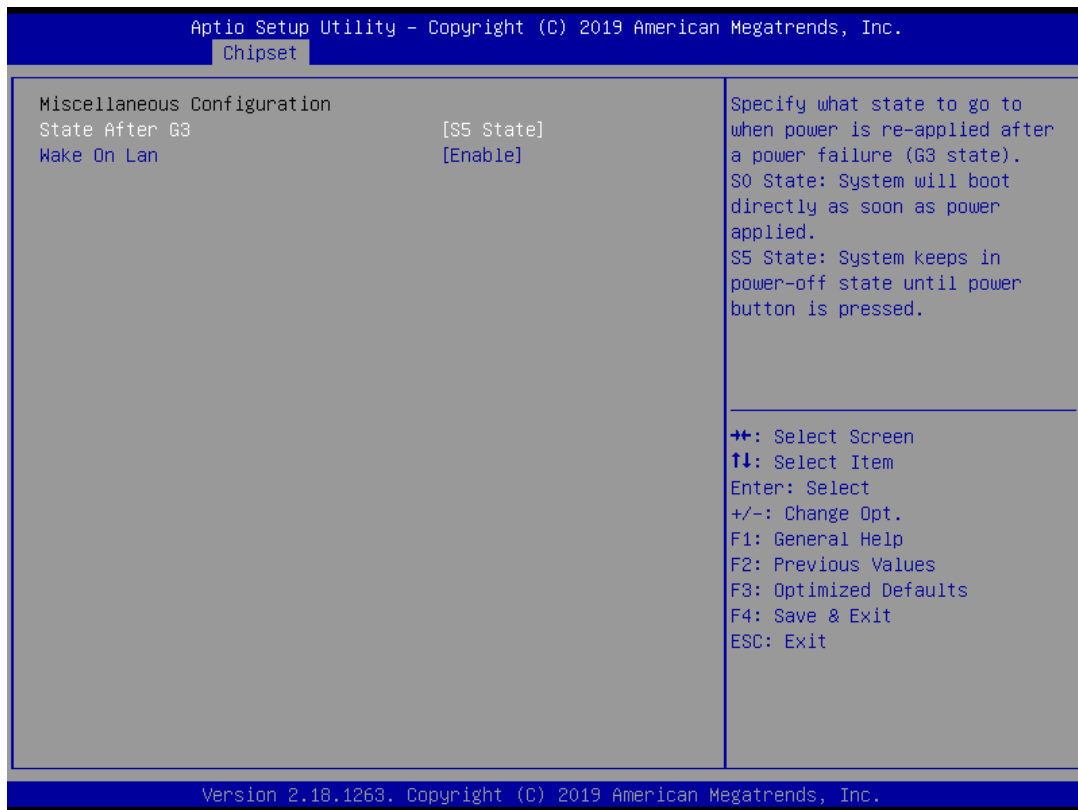
✧ *XHCI Mode*

This item allows users to enable or disable USB Controller.

Available Options: Disabled, and Enabled

Default setting: Enabled

Miscellaneous Configuration



After G3 On

This field is specify what state to go to when power is re-applied after power failure (G3 State).The states S0(G0) is working of power state, the states S5(G2) is soft off of power state.

Available Options: S0 State, S5 State, and Last State

Default setting: S5

Wake ON Lan

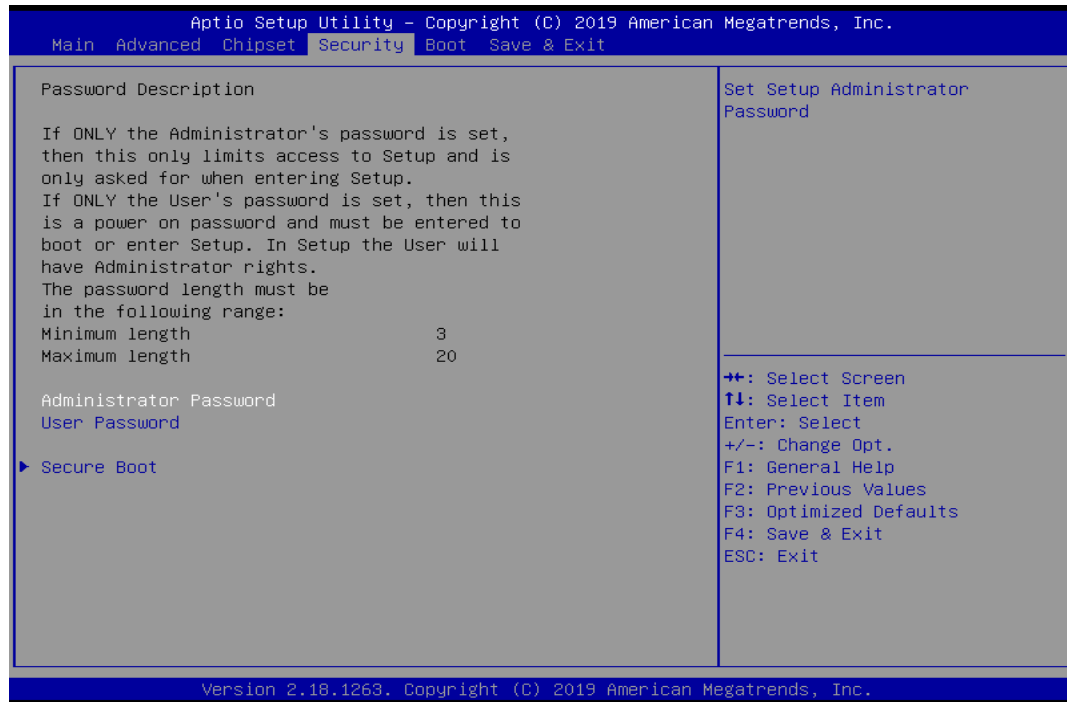
This item is can select Enabled to integrated LAN to wake up the system.

Available Options: Disabled, and Enabled

Default setting: Enabled

Security

Security Setup provides both Administrator and User password. If you use both passwords, the Administrator password must be set first. The system can be configured so that all users must enter a password every time the system boots or when Setup is executed, using either the Administrator password or User password. The Administrator and User passwords activate two different levels of password security. If you select password support, you are prompted for a three to twenty character password. Type the password on the keyboard. The password does not appear on the screen when typed. Make sure you write it down. If you forget it, you must drain NVRAM and reconfigure.



Install Administrator/User Password

Select Administrator/User Password item, press <Enter> and type new password (up to 3 character length) and confirm new password. The screen does not display the characters entered.

✧ *Change Administrator/User Password*

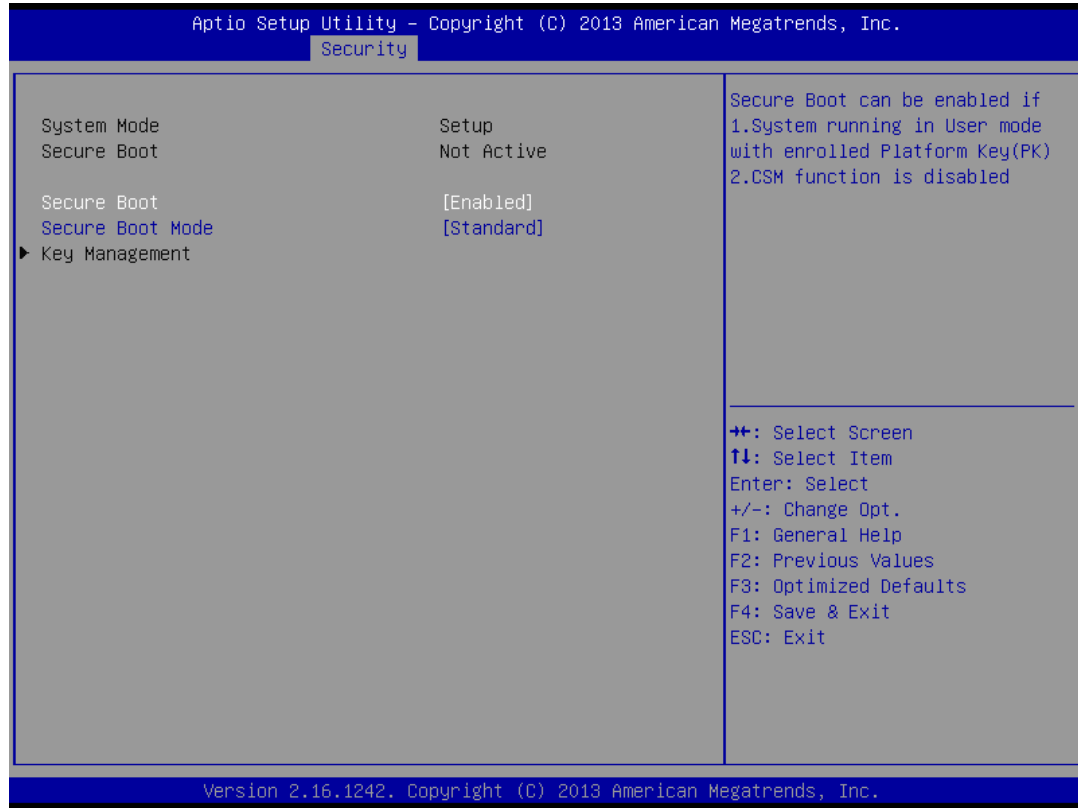
Select Administrator/user password item, press <Enter> and type current password, at the next dialog type new password and confirm new password.

✧ *Clear Old Password*

Select Administrator/user password item, press <Enter> and type current password, at the next dialog press <Enter> to Clear Old Password.

Security Boot menu

Customizable Secure Boot settings



✦ *Secure Boot*

Secure Boot can be enabled if 1.System running in User mode with enrolled Platform Key (PK) 2.CSM function is disabled

Available Options: Disabled, and Enabled

Default setting: Enabled

✦ *Secure Boot Mode*

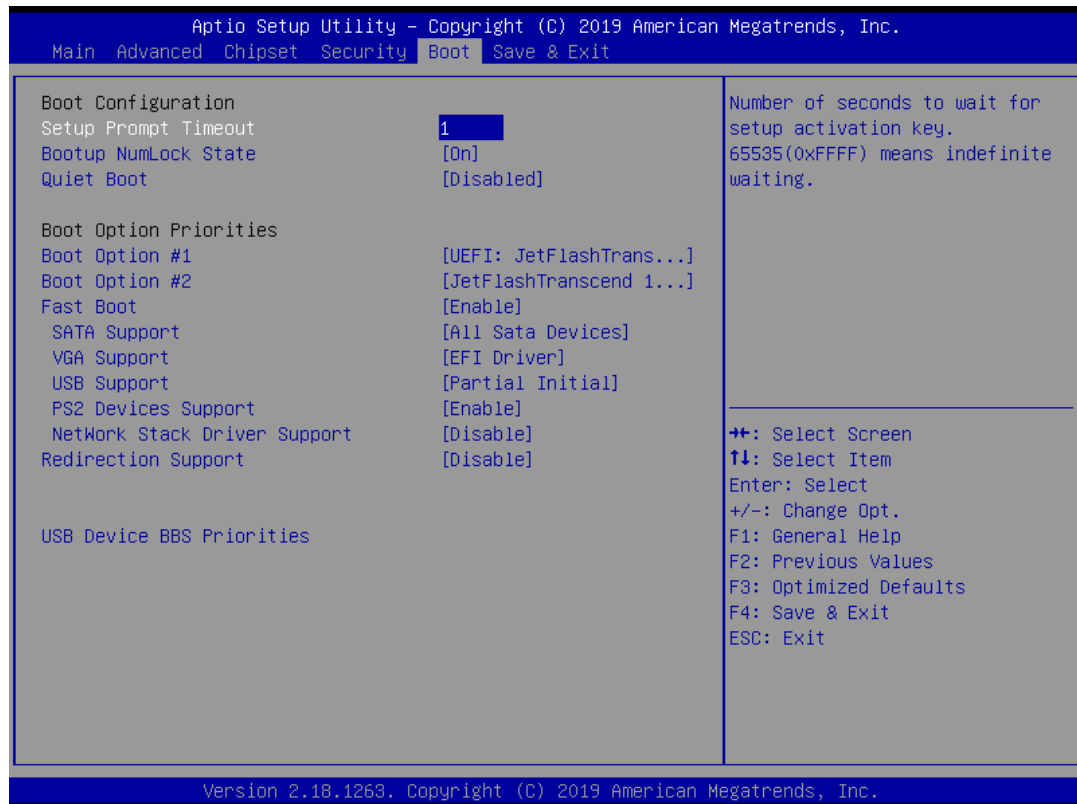
Secure Boot mode selector. 'Custom' Mode enables users to change Image Execution policy and manage Secure Boot Keys.

Available Options: Standard, and Customer

Default setting: Standard

Boot

Select the *Boot* tab from the setup screen to enter the Boot BIOS Setup screen. You can select any of the items in the left frame of the screen, such as Boot Device Priority, to go to the sub menu for that item. You can display a Boot BIOS Setup option by highlighting it using the <Arrow> keys. All Boot Setup options are described in this section.



Setup Prompt Timeout

This item allows users to select the number of seconds to wait for setup activation key.

Available Options: 1~65535

Default setting: 1

Bootup NumLock State

This field is used to activate the Num Lock function upon system boot. If the setting is on, after a boot, the Num Lock light is lit, and user can use the number key.

Available Options: On, and Off

Default setting: On

Quiet Boot

This item allows users to enable or disable Quiet boot option. If Enable, an OEM LOGO is shown instead of POST messages.

Available Options: Disabled, and Enabled

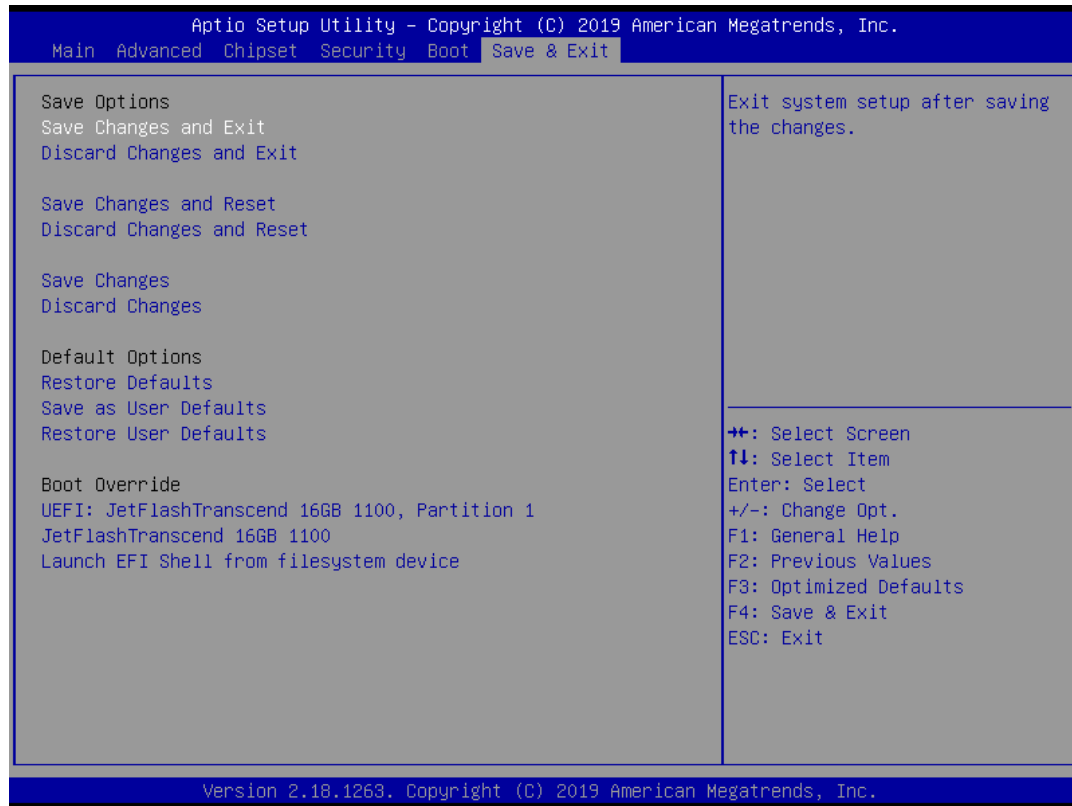
Default setting: Disabled

Boot Option Priorities

This item allows users to set boot device priority. Set the boot device options to determine the sequence in which the system checks which device to boot from. The settings are Hard Driver BBS Priorities (*Removable Storage Dev., Hard Drive*), and CD/DVD ROM Driver BBS Priorities (*USB CDROM*).

Note: When you select a boot Option category from the boot menu, a list of devices in that category appears. For example, if the system has hard disk drives and USB storage connected, then the list will show all hard disk drives attached.

Save & Exit



Save Changes and Exit

When you have completed the system configuration changes, select this option to save the changes and Exit, so the new system configuration parameters can take effect.

Discard Changes and Exit

Select this option to quit without making any modifications to the system configuration.

Save Changes and Reset

When you have completed the system configuration changes, select this option to save the changes and reboot the system, so the new system configuration parameters can take effect. The following window will appear after selecting the 'Save Changes and Reset' option selected. Reset the system after saving the changes.

Discard Changes and Reset

Select this option to reboot the system without saving the changes done in the setup configuration.

Save Changes

When you have completed the system configuration changes, select this option to save your system configuration and continue. For some of the options it required to reset the system to take effect...

Discard Changes

When you have completed the system configuration changes, select this option to undo the previous changes.

Restore Defaults

Restore/Load Default values for all the setup options.

Save as User Defaults

Save the changes done so far as User Defaults.

Restore User Defaults

Restore the User Defaults to all the setup option.

Chapter 4 Software Installation

The enclosed DVD disk includes FX5409 VGA, System, Audio, LAN and USB driver. To install and configure you FX5409 system, you need to perform the following steps.

System Driver

Windows 10 X64- System Driver

Installs Intel Apollo lake system Chipset, the driver include the Core PCI, PCIE, USB and SATA Device Drive.

- Step 1: To install the system driver, insert the DVD ROM into the DVD ROM device, and enter DRIVER> SysChip> Apollolake> SYS.
- Step 2: Execute SetupChipset.exe file.
- Step 3: The screen shows the SETUP type. Press any key to enter the main menu.
- Step 4: As the setup is completed, the system will generate the message as follows.

Yes, I want to restart my computer now. Installation is done!

No, I will restart my computer later.

System must be restart then complete the installation.

ISH_BUS Driver

WIN10 X64 Driver

- Step 1: To install the ISH_BUS driver, insert the DVD ROM into the DVD ROM device, and enter DRIVER> SysChip> Apollolake> ISH
- Step 2: Execute SetupISS.exe.

TXE Driver

WIN10 X64 Driver

- Step 1: To install the TXE driver, insert the DVD ROM into the DVD ROM device, and enter DRIVER > TXE> Apollolake.
- Step 2: Execute SETUPTXE.exe file.
- Step 3: The screen shows the SETUP type. Press any key to enter the main menu.
- Step 4: As the setup is completed, the system will generate the message as follows.
Read License Agreement and click "Yes" to proceed.
Review Readme File Information and click "Next" to proceed.
When the "Setup Progress" is complete click "Next" to proceed.
Lastly, the "Setup Complete" screen appears so click "Finish" to restart your computer.

LAN Driver (Intel I225-V)

WIN10 X64 Driver

- Step 1: To install the LAN driver, insert the DVD ROM into the DVD ROM device, and enter DRIVER> LAN> I225V
- Step 2: Open Device Manager [Start Manual (Right Click)-> Device Manager]
- Step 3: Click on Other Device > Ethernet Controller >Update Driver > Select Specify a location > Browse > Select "e2f.inf" file from DVD.
- Step 4: Click on OK >Next >Yes >Finish

Note: This LAN driver support WIN10* RS5 (1809) ~ WIN10*(21H2) & WIN11* Family.

VGA Driver

WIN 10 x64 Driver

Step 1: To install the VGA driver, insert the DVD ROM into the DVD ROM device, and enter DRIVER> VGA> Apollolake.

Step 2: Execute Installer.exe file.

Step 3: The screen shows the SETUP type. Press any key to enter the main menu.

Step 4: As the setup is completed, the system will generate the message as follows.

Yes, I want to restart my computer now. Installation is done.

No, I will restart my computer later.

System must be restart then complete the installation.

Note: In the DRIVER>VGA>Apollolake directory, a Readme_xxx.txt & Install_xxx.txt file is included to provide installation information. This driver support WIN10* RS5 (1809) ~ WIN10*(21H2) & WIN11* Family.

Audio Driver

WIN 10 X64 Driver

Step 1: To install the AUDIO driver, insert the DVD ROM into the DVD ROM device, and enter DRIVER> AUDIO> ALC888_R270> Windows.

Step 2: Execute Setup.exe file.

Step 3: The screen shows the SETUP type. Press any key to enter the main menu.

Step 4: As the setup is completed, the system will generate the message as follows.

Yes, I want to restart my computer now. Installation is done!

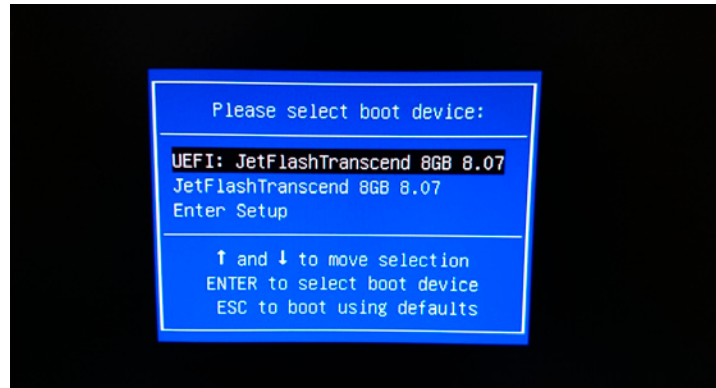
No, I will restart my computer later.

System must be restart then complete the installation.

EFI BIOS Flash Utility

In the <UTILITY> directory, there is the [AFUEFIX64.zip](#) EFI BIOS flash tool (Include fpt64.efi and fparts.txt file), Follow these steps to upgrade BIOS:

- Step 1: Uncompress the [AFUEFIX64.zip](#) BIOS flash tool and copy new BIOS file to the root directory of USB-Stick.
- Step 2: Press [F11] after system start-up to enter Boot Menu, Select **UEFI: Jetxxx** (USB-Stick).



- Step 3: Using the **"map"** shell command will list device mapping table. To change the current file system to the mapped fs0 file system: **"fs0:"** (Select to USB stick removable storage, if only plug USB Stick, use **"fs0"** shell command)

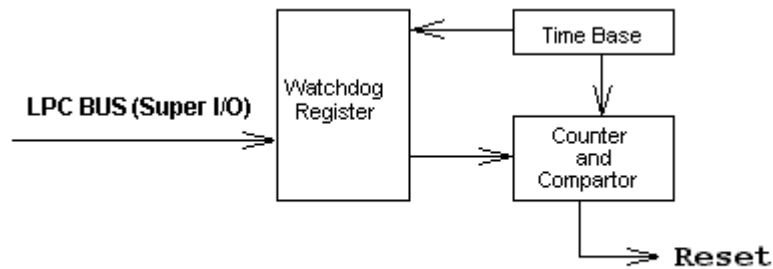
```
Shell> map
Device mapping table
  fs0 :Removable HardDisk - Alias hd17b0e0c0b blk0
        PciRoot(0x0)/Pci(0x1D,0x0)/USB(0x1,0x0)/USB(0x4,0x0)/USB(0x2,0x0)/HD
x403947)
  blk0 :Removable HardDisk - Alias hd17b0e0c0b fs0
        PciRoot(0x0)/Pci(0x1D,0x0)/USB(0x1,0x0)/USB(0x4,0x0)/USB(0x2,0x0)/HD
x403947)
  blk1 :Removable BlockDevice - Alias (null)
        PciRoot(0x0)/Pci(0x1D,0x0)/USB(0x1,0x0)/USB(0x4,0x0)/USB(0x2,0x0)
  hd17b0e0c0b :Removable HardDisk - Alias fs0 blk0
        PciRoot(0x0)/Pci(0x1D,0x0)/USB(0x1,0x0)/USB(0x4,0x0)/USB(0x2,
,0x3F,0x403947)
Shell> _
```

- Step 4: Use the **"Afuefix64 xxxxxVxx.ROM /x /s /p /n /fdr"** program to update the new BIOS.
- Step 5: Power off the system or use **"reset"** shell command, when BIOS update is successful.
- Step 6: Restores BIOS default, when updates the BIOS and reboots the system at the first time.

Watchdog Timer

This section describes how to use the Watchdog Timer, including disabled, enabled, and trigger functions.

The system is equipped with a programmable time-out period watchdog timer. You can use your own program to enable the watchdog timer. Once you have enabled the watchdog timer, the program should trigger the I/O every time before the timer times out. If your program fails to trigger or disable this timer before it times out, e.g. because of a system hang-up, it will generate a reset signal to reset the system. The time-out period can be programmed to be set from 1 to 65535 seconds or minutes.



The DVD includes a Watch Dog demo file. In the WATCHDOG/ ITE8786 /TURBOC: Library and Test Program written in Turbo C++

The WATCHDOG includes a demonstration program established for users who would like to configure the Watchdog timer by themselves.

Watchdog Timer Setting

The watchdog timer is a circuit that may be used from your program software to detect system crashes or hang-ups. The watchdog timer is automatically disabled after reset.

Once you have enabled the watchdog timer, your program must trigger the watchdog timer every time before it times out. After you trigger the watchdog timer, it will be set to non-zero value to watchdog counter and start to count down again. If your program fails to trigger the watchdog timer before time-out, it will generate a reset pulse to reset the system.

The factor of the watchdog timer time-out constant is approximately 1 second. The period for the watchdog timer time-out is between 1 to FFFF timer factors.

If you want to reset your system when watchdog times out, the following table listed the relation of timer factors between time-out periods.

Time Factor	Time-Out Period (Seconds)	Time-Out Period (Minutes)
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
"	"	"
"	"	"
"	"	"
FFFF	FFFF	FFFF

❑ **Watchdog Timer Enabled**

To enable the watchdog timer, you have to output a byte of timer factor to the watchdog register whose address is 2eh and data port is 2fH. The following is a Demo program, which demonstrates how to enable the watchdog timer and set the time-out period at 28 seconds.

```

;-----
; Enter the extended function mode
;-----
outputb(0x2e,0x87); // Enter to extended function mode
outputb(0x2e,0x01);
outputb(0x2e,0x55);
outputb(0x2e,0x55);
;-----
; Logical device 7, configuration registers Index 72h-Bit 7, 73H (LSB)/74H (MSB)
;-----
outputb(0x2e,0x72); // Index 72h- Time and Watchdog Register
outputb(0x2f,0xc0); // Set Bit 7 is 1: Second and Bit6: Enabled Watchdog.
//outputb(0x2f,0x40); // Set Bit 7 is 0: Minute.

outputb(0x2e,0x74); // Set Timer Value counter1 0100~FF00 (MSB)
outputb(0x2f,0x00);

outputb(0x2e,0x73); // Set Timer Value counter0 0001~00FF (LSB)
outputb(0x2f,0x28); // Set timeout interval as 28seconds and start counting

```

❑ **Watchdog Timer Trigger**

After you enable the watchdog timer, your program must write the same factor as enabling to the watchdog register at least once every time-out period to its previous setting. You can change the time-out period by writing another timer factor to the watchdog register at any time, and you must trigger the watchdog before the new time-out period in next trigger.

❑ **Watchdog Timer Disabled**

To disable the watchdog timer, simply write a 00H to the watchdog register.

```

;-----
; Logical device 7, configuration registers Index 72h Bit 6
;-----
outputb(0x2e,0x72); // Index 72h- Time and Watchdog Register
outputb(0x2f,0x80); // Set Bit6 to 0 Disabled Watchdog.

```

Digital I/O (GPIO) programming

The following is a Demo program, which demonstrates how to read and write the data of GPIO.

```
-----  
; Configuration the Digital IO port is A06h-(GPO) Bit0, Bit1, Bit2, Bit3/ (GPI) Bit 4, Bit 5,  
; Bit 6, Bit 7  
; A06h-Bit0/Bit1/ Bit2/Bit3 (GPO-0 ~ GPO-3, Write data)  
;     When set to a "1", respective GPO port is programmed as 'High'.  
;     When set to a "0", respective GPO port is programmed as 'Low'.  
; A06h-Bit4/ Bit5 / Bit6/ Bit7 (GPI-0 ~ GP1-3, Read data)  
;     Its respective bit only read.  
-----  
outportb(0xA06, 0x01);      // Set GPO-0 (Bit0) TO ACTIVE.  
//outportb(0xA06, 0x02);    // Set GPO-1 (Bit1) TO ACTIVE.  
//outportb(0xA06, 0x0f);    // Set GPO-1/2/3/4 (Bit0/1/2/3) TO ACTIVE.  
  
Ctemp = inportb(0XA06);     // read GPI-0 (Bit-4) ~ GPI-3(Bit-7) value"  
printf("GPI(Input)= %x ",Ctemp);
```

Chapter 5 Technical Reference

This section outlines the errors that may occur when you operate the system, and also gives you the suggestions on solving the problems.

Topic include:

- Technical Reference
- Dimension

Technical Reference

Physical and Environmental

Temperature: Operating -20°C ~ 60°C

Relative humidity 5 % to 95 % non-condensing

Surface Temperature of Chassis :

5°C to 45°C (W/HDD or m-SATA)/ -20°C to 60°C (W W.T /SSD or W.T m-SATA)/ -20°C to 55°C (Intel i225 LAN up to 2500Base-T) /-20°C to 60°C (Intel i225 LAN up to 1000Base-T)

□ **Serial Ports**

The ACEs (Asynchronous Communication Elements ACE1 to ACE2) are used to convert parallel data to a serial format on the transmit side and convert serial data to parallel on the receiver side. The serial format, in order of transmission and reception, is a start bit, followed by five to eight data bits, a parity bit (if programmed) and one, one and half (five-bit format only) or two stop bits. The ACEs are capable of handling divisors of 1 to 65535, and produce a 16x clock for driving the internal transmitter logic.

Provisions are also included to use this 16x clock to drive the receiver logic, also included in the ACE a completed MODEM control capability, and a processor interrupt system that may be software tailored to the computing time required to handle the communications link.

The following table is a summary of each ACE accessible register

DLAB	Port Address	Register
0	Base + 0	Receiver buffer (read)
		Transmitter holding register (write)
0	Base + 1	Interrupt enable
X	Base + 2	Interrupt identification (read only)
X	Base + 3	Line control
X	Base + 4	MODEM control
X	Base + 5	Line status
X	Base + 6	MODEM status
X	Base + 7	Scratched register
1	Base + 0	Divisor latch (least significant byte)
1	Base + 1	Divisor latch (most significant byte)

Receiver Buffer Register (RBR)

Bit 0-7: Received data byte (Read Only)

Transmitter Holding Register (THR)

Bit 0-7: Transmitter holding data byte (Write Only)

Interrupt Enable Register (IER)

Bit 0: Enable Received Data Available Interrupt (ERBFI)

Bit 1: Enable Transmitter Holding Empty Interrupt (ETBEI)

Bit 2: Enable Receiver Line Status Interrupt (ELSI)

Bit 3: Enable MODEM Status Interrupt (EDSSI)

Bit 4: Must be 0

Bit 5: Must be 0

Bit 6: Must be 0

Bit 7: Must be 0

Interrupt Identification Register (IIR)

Bit 0: "0" if Interrupt Pending

Bit 1: Interrupt ID Bit 0

Bit 2: Interrupt ID Bit 1

Bit 3: Must be 0

Bit 4: Must be 0

Bit 5: Must be 0

Bit 6: Must be 0

Bit 7: Must be 0

Line Control Register (LCR)

Bit 0: Word Length Select Bit 0 (WLS0)

Bit 1: Word Length Select Bit 1 (WLS1)

WLS1	WLS0	Word Length
0	0	5 Bits
0	1	6 Bits
1	0	7 Bits
1	1	8 Bits

Bit 2: Number of Stop Bit (STB)

Bit 3: Parity Enable (PEN)

Bit 4: Even Parity Select (EPS)

Bit 5: Stick Parity

Bit 6: Set Break

Bit 7: Divisor Latch Access Bit (DLAB)

MODEM Control Register (MCR)

Bit 0: Data Terminal Ready (DTR)

Bit 1: Request to Send (RTS)

Bit 2: Out 1 (OUT 1)

Bit 3: Out 2 (OUT 2)

Bit 4: Loop

Bit 5: Must be 0

Bit 6: Must be 0

Bit 7: Must be 0

Line Status Register (LSR)

Bit 0: Data Ready (DR)

Bit 1: Overrun Error (OR)

Bit 2: Parity Error (PE)

Bit 3: Framing Error (FE)

Bit 4: Break Interrupt (BI)

Bit 5: Transmitter Holding Register Empty (THRE)

Bit 6: Transmitter Shift Register Empty (TSRE)

Bit 7: Must be 0

MODEM Status Register (MSR)

Bit 0: Delta Clear to Send (DCTS)

Bit 1: Delta Data Set Ready (DDSR)

Bit 2: Training Edge Ring Indicator (TERI)

Bit 3: Delta Receive Line Signal Detect (DSLSD)

Bit 4: Clear to Send (CTS)

Bit 5: Data Set Ready (DSR)

Bit 6: Ring Indicator (RI)

Bit 7: Received Line Signal Detect (RSLD)

Divisor Latch (LS, MS)

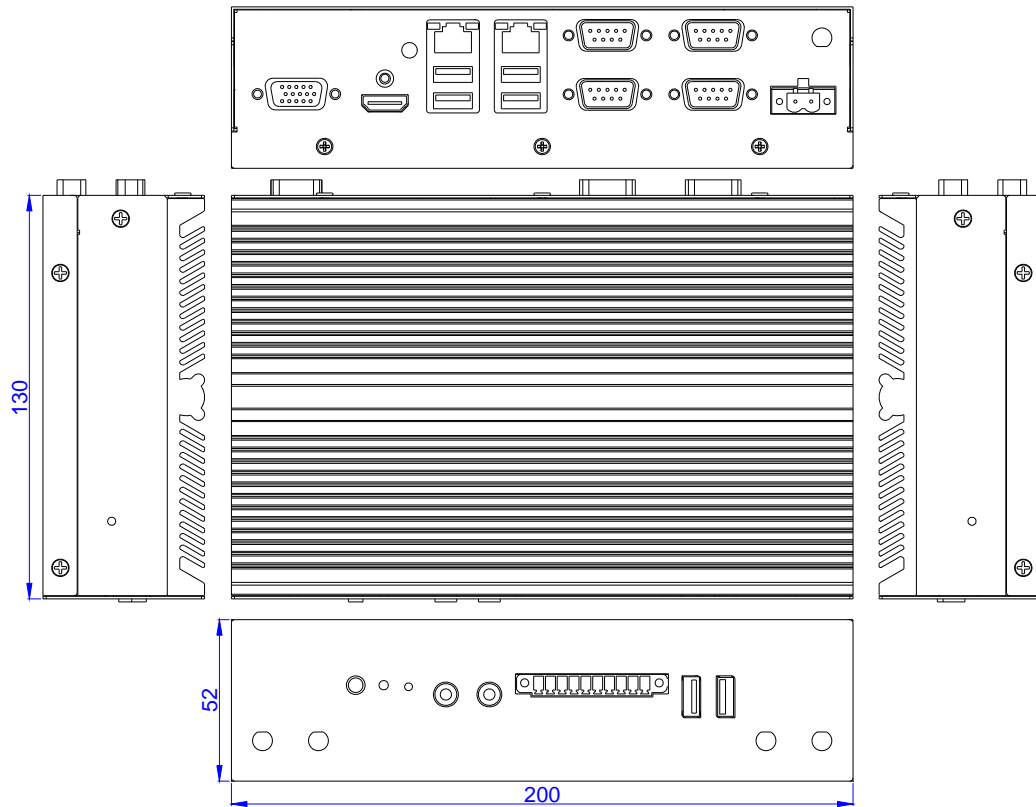
	LS	MS
Bit 0:	Bit 0	Bit 8
Bit 1:	Bit 1	Bit 9
Bit 2:	Bit 2	Bit 10
Bit 3:	Bit 3	Bit 11
Bit 4:	Bit 4	Bit 12
Bit 5:	Bit 5	Bit 13
Bit 6:	Bit 6	Bit 14
Bit 7:	Bit 7	Bit 15

Desired Baud Rate	Divisor Used to Generate 16x Clock
300	384
600	192
1200	96
1800	64
2400	48
3600	32
4800	24
9600	12
14400	8
19200	6
28800	4
38400	3
57600	2
115200	1

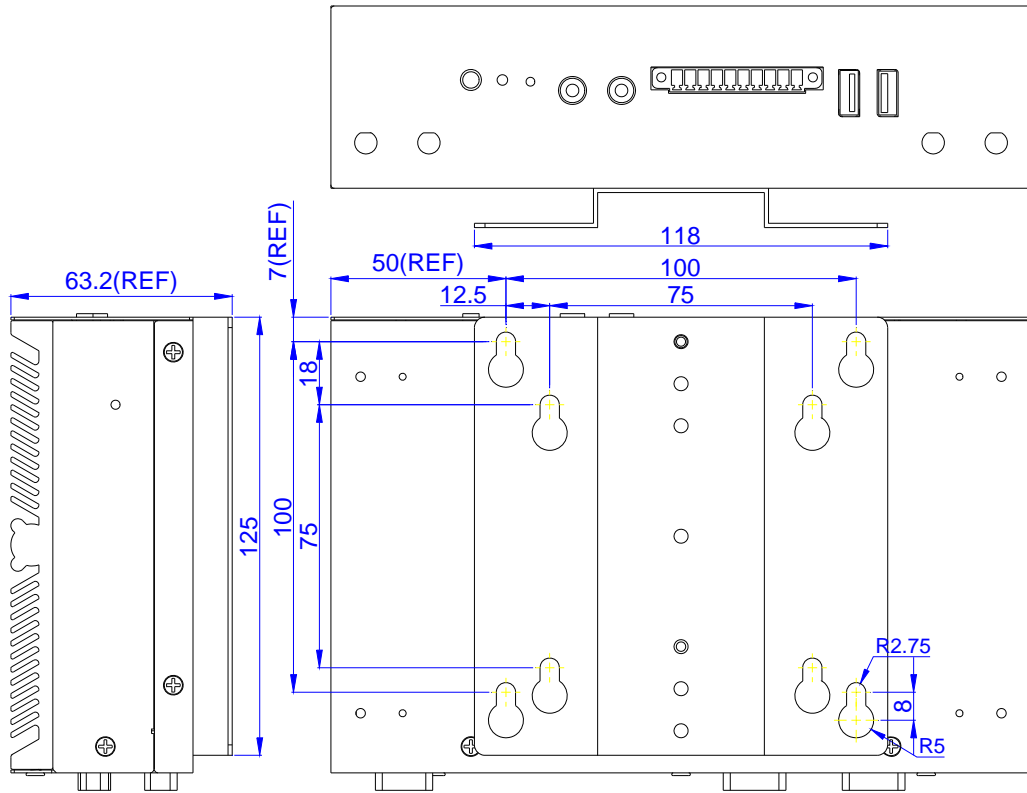
Appendix

Dimension

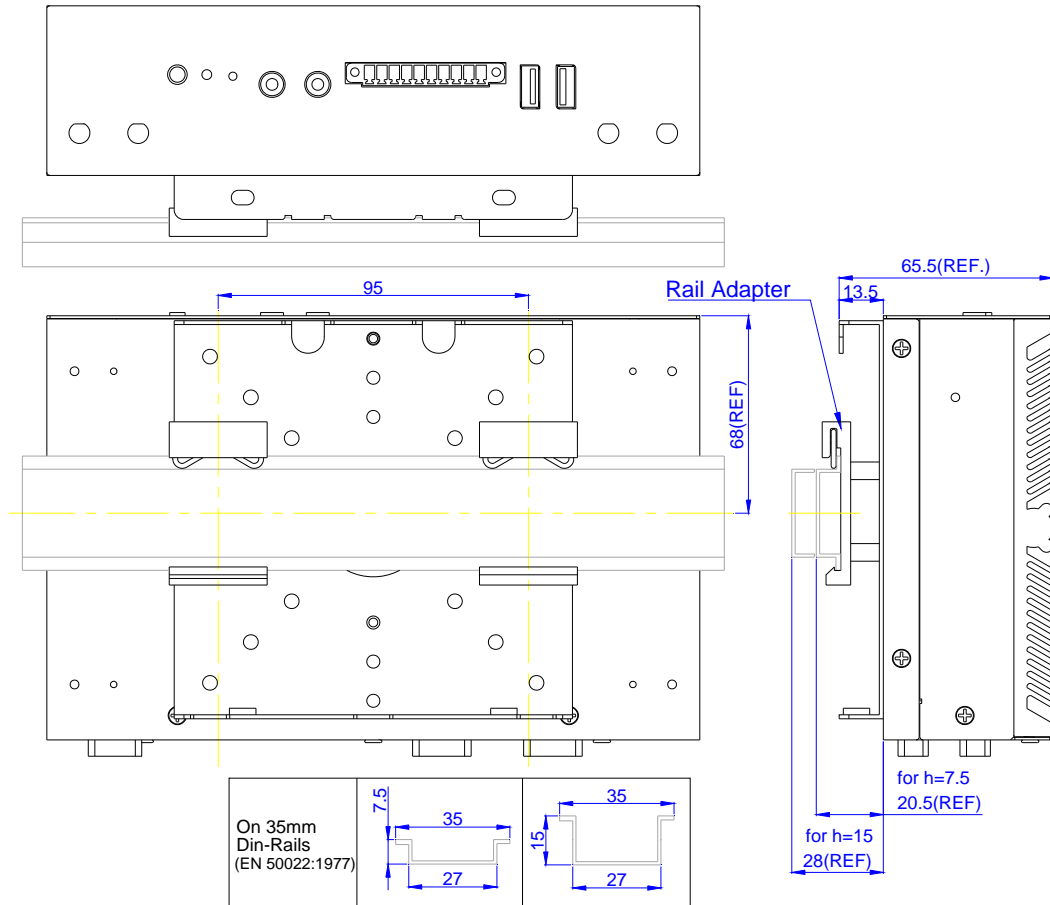
a. FX5409



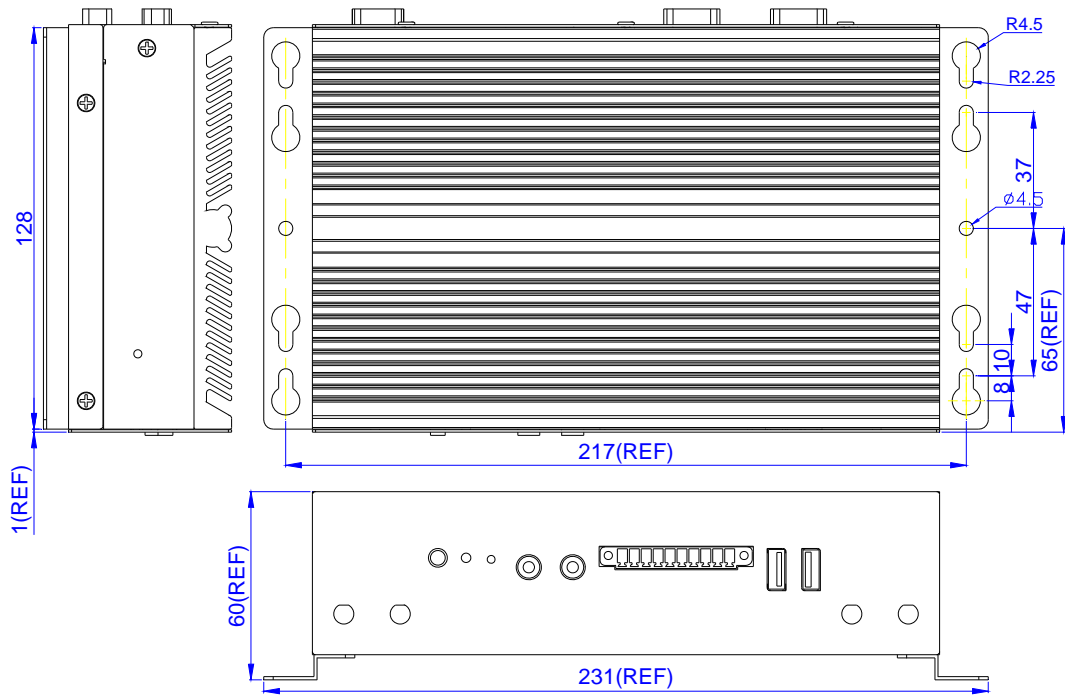
b. FX5504K1 Panel Mount universal fixers



c. AK1010 DIN Rain Mount Kit



d. FX5407K1 Wall Mount universal fixers



e. FX5403K1 Rack Mount

