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IPC Solution

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Small Cube System

Fanless Series

FX5407 User's Manual

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Part Number: FX5407

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- 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.fabiatech.com.

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Chapter 1 Introducing the FX5407 System

Overview

The FX5407 is an embedded system with Intel® Atom™ E3845 (Bay Trail) Processor low-power CPU module inside. This user's manual provides information on the physical features, installation, and BIOS setup of the FX5407.

Built to unleash the total potential of the Intel® Atom™ E3845 Processor, Able to support 1.91 GHz CPU, this unit supports one 10/100/1000 Base –TX LAN port, one PCIe mini card socket, audio-7.1 sound, two USB-2.0, one USB-2.0/3.0 ports, SATA/ SD/ CFAST socket, two So-DIMM socket supports up to 8GB DDR3L RAM, support one VGA and two HD display.

Each FX5407 has one port for I/O communications. One RS232/RS422/RS485 port is available.

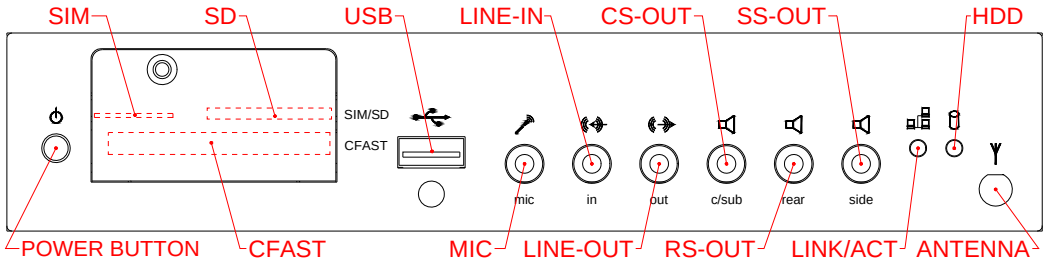
The FX5407 is perfect for ATM machines, KIOSK, point-of-sales/point-of- information, gaming and infotainment, measurement technology, lotteries, and banking and small Embedded Control. The unit is only 200 mm (W) X130 mm (D) X38 mm (H).

Series Comparison Table

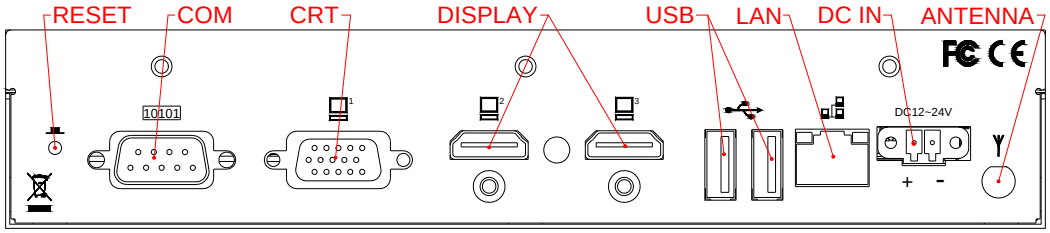
Model	FX5407
System Processor	Intel ® Atom™ E3845 1.91GHZ (Bay Trail)
*Memory 204 Pin-DIMM*2*	*DDR3L-1333 4GB / 8GB (Max.)*
Audio 7.1 Sound	*Line-In And MIC-In*
	Front-Out, Cent/LFE-Out Surround-Out, Side-Out
Display	*Two HD / VGA*
Multi I/O	*One RS232/RS422/RS485*
USB 2.0 / 3.0	*Two / One*
RJ45 LAN port (10/100/1000 Mbps)	*One Realtek RTL8111F*
PCIe Mini Card Socket	*One*
SIM Card Socket	*One*
Storage	*One CFAST Socket*
	One SD Socket
	One 2.5' SATA HDD Connector
Watchdog Timer	*Yes*
Operating Temperature	-20~+ 70℃ (-4~158℉)
Dimensions (Unit: mm)	200(W) x 130 (D) X 38 (H)

Layout

Front Panel



Rear Panel



Specifications

- ***Processor Board –***

  Intel ® Atom™ E3845 1.91GHZ (2M L2 Cache) Low Power Processor with 4GB DDR3L/1333-RAM

- ***I/O Outlets –***

  One 10/100/1000 base-TX Ethernet LAN port with RJ45

  Two HD display port and one VGA connector with DB15

  Six audio connectors for Microphone-in, Line-In, Front-Out, Cent/LFE-Out, Surround-Out and Side-Out

  Three USB ports with two USB 2.0 and one USB 3.0 ports

  One RS-232/RS422/RS485 port with DB9

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

  One DC-In terminal block with power button

- ***LED Indicator –***

  One power LED with power button, one hard disk/CF access LED, and one LAN-Access LED.

- ***Storage Bay-***

  CFAST Compact Flash socket for CFAST Compact Flash modules

  One SD socket supports SD/SDHC/SDXC Card

  One SATA 2.5" hard disk space

- ***Power requirement –***

  +9 ~ +24V DC, 1.2A maximum (0.8A typical) with DC 19V input

- ***Dimensions -***

  200mm (W) x 130mm (D) x 38mm (H)

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 FX5407 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 FX5407 is not supplied from us, please make sure the specification of the cable(s) is compatible with the FX5407 system.

Note: after you install the FX5407, it is recommended that you keep the diskette or CD 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 FX5407 package. Some accessories are optional items that are only shipped upon order.

- One FX5407 embedded system.
- Two screws for 2.5" SATA hard disk installation.
- Two screws for mini-card installation.
- One 2-pin apartable terminal block.
- One compact disc includes software utility and manual.

Optional:

- AK1006- Half size mini PCIe module adapter kits. (PN: 0606010028G)
- FX5403K1 1U Rack Mounting fixers and 4 screws.(PN: 0606010011G)
- FX5504k1 Panel Mounting fixers and 2 screws. (VESA 75*75 /100 *100). (PN:0606010012G)
- FX5407K1 Wall mounting fixers and 4 screws. (P/N: 0606010036R)
- FX5407K2 Wall mounting fixers and 4 screws. (P/N: 0606010037R)
- FX5407K3 LCD mounting fixers and 12 screws (50*50/75*75/100*100). (P/N: 0606010038R)

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, CFAST Compact Flash, and hard disk is sure that the power is disconnected or power switch to off from the system. If not, this may damage the system.

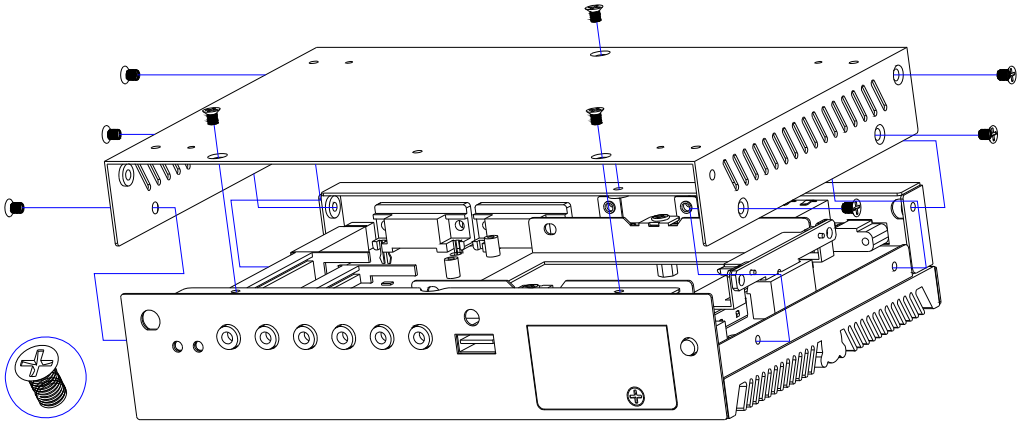
3. The ESD (Electricity Static Discharge) may be created from human body that touches the board. It may do damage to the board circuit.

❑ **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, CFAST Compact Flash modules, SD card, mini PCIe WLAN or GPRS module, DDR3L RAM module to the FX5407 and how to install the FX5407 fixers. (Please see the spots circled.)

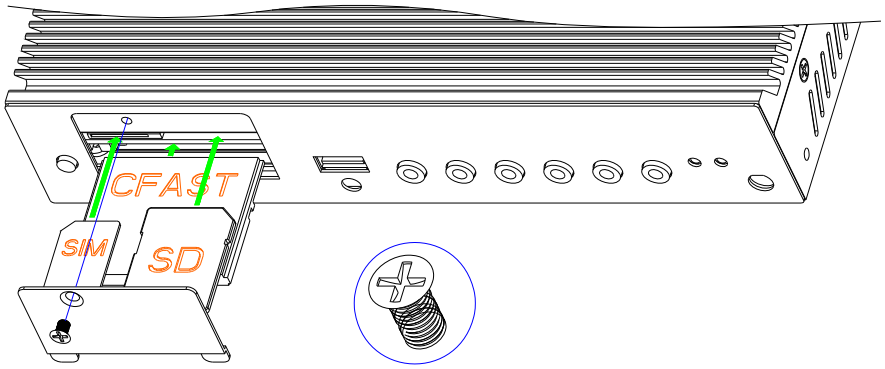
➢ **a. Unscrew bottom cover**

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



➢ **b. Installing CFAST Compact Flash, SD and SIM Card**

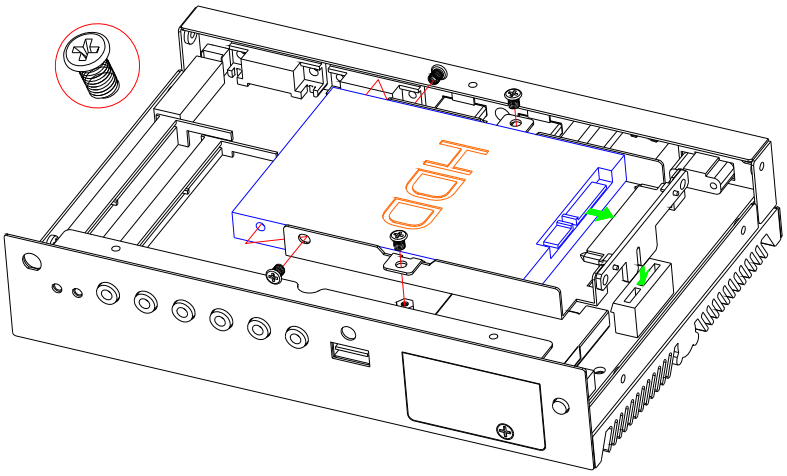
Use a cross-head screwdriver to remove screws that secure the front cover.



Note: The SD socket supports SD/SDHC/SDXC card.

➢ **c. Installing hard disk: SATA Hard disk or SSD**

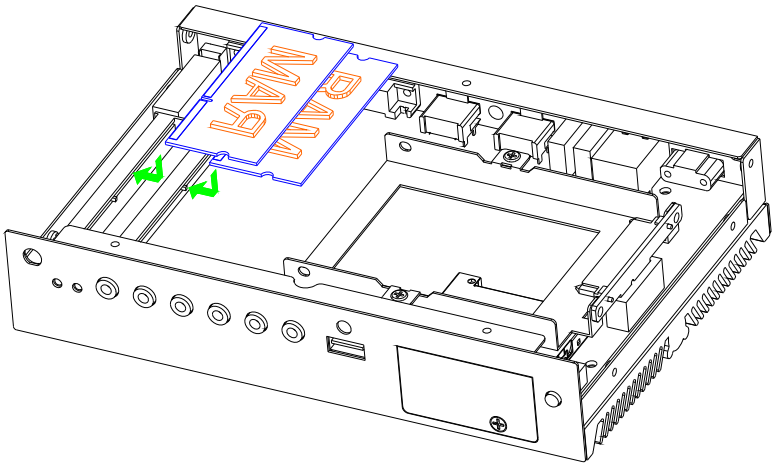
Faster Screws up the Hard disk device to HDD metal frame before plug to the SATA connector then insert to SATA slot and screws up metal frame to system. See following figure.



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.

➢ **d. Installing Memory: So-DIMM Socket for DDR3L RAM Modules**

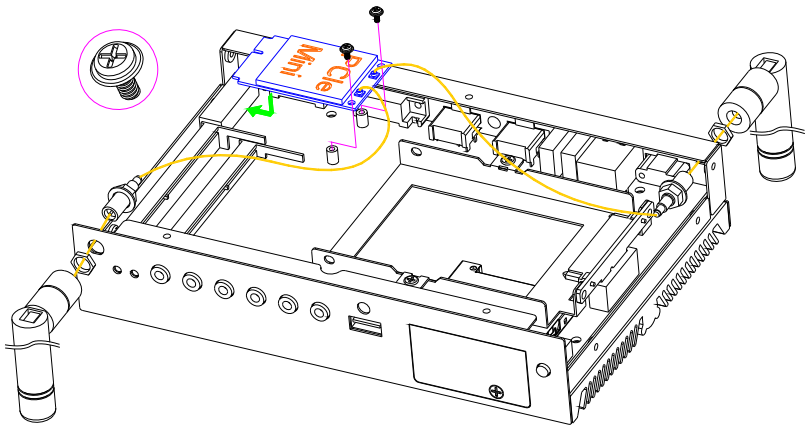
If you may extend additional memory to system, see as following figure. The 204 pin So-DIMM socket supports 2GB to 4GB of DDR3L RAM modules. Installing memory module to So-DIMM socket of down side, when only one memory module. We recommend that installing dual channel RAM module made by the same part number and manufacturer.



➢ e. Installing PCIe Mini Card Module

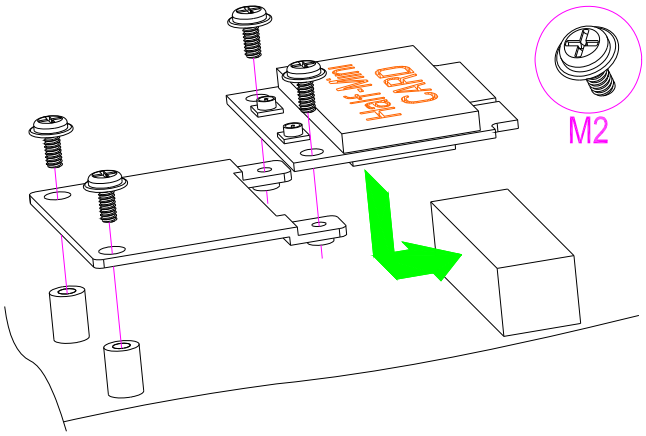
FX5407 supports PCIe mini card socket; you may extend additional PCIe mini card module and SIM card to system. Connect to the antenna cable from rear and front side antenna holes to GPRS or Wireless LAN module and install the SIM card for GPRS. See following figures.

✧ *e1. Installing PCIe Mini Card and SIM card*



Note: 1. When installing PCIe GPRS Mini card on FX5407 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.

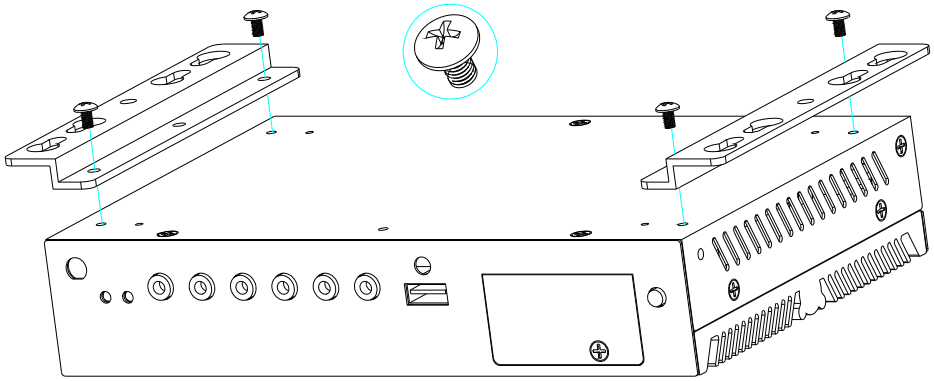
✧ *e2. Installing AK1006 kit (Optional): For Half Size Mini PCIe module*



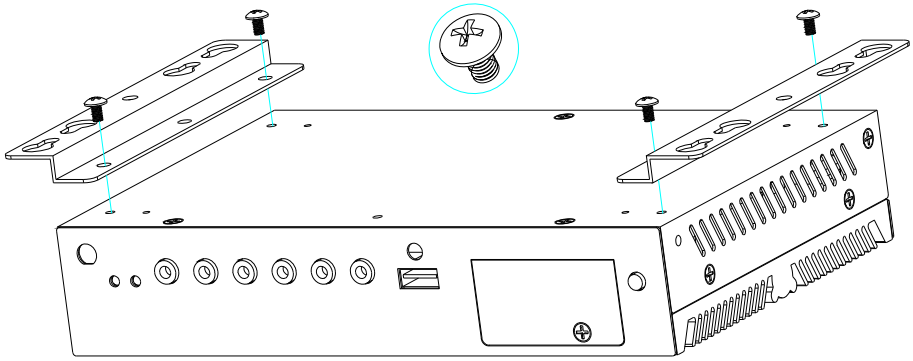
➢ **f. Installing the universal fixers**

Please refer to the down side figure for installing the FX5407 with universal fixers.

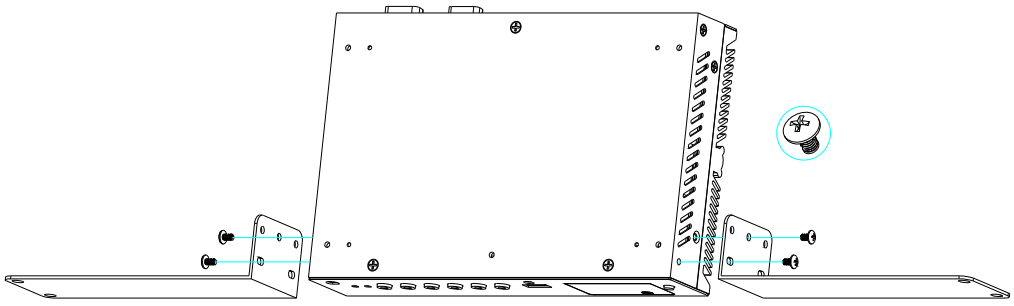
f1. FX5407 K1– Wall Mounting



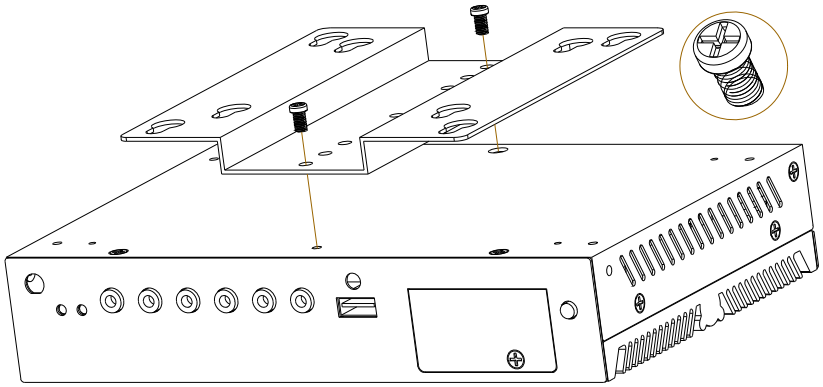
f2. FX5407k2– Wall Mounting



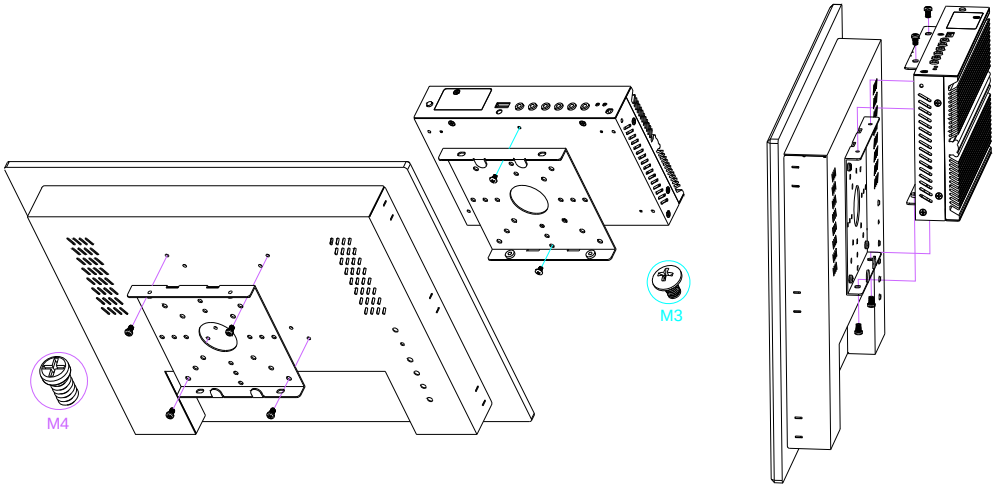
f3. FX5403K1 – 1U Rack Mount Kit



f4. FX5504K1– Panel Back Mounting (VESA Mount 100*100/75*75) Kit

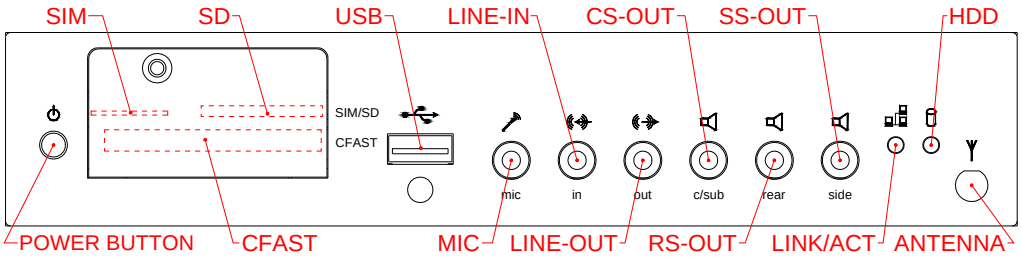


f5. FX5407K3 – LCD mounting Kit



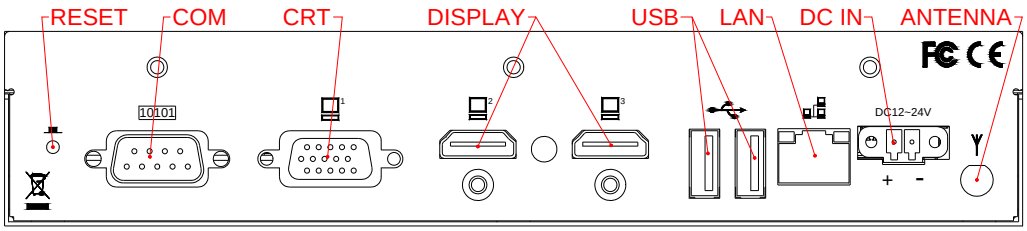
□ LED indicators

The Power button with LED and HDD LED has two distinctive statuses: Off for inactive and blinking light for activity operation. And the LINK/ACT LED for LAN port. The LED (Green) indicates on-line status.

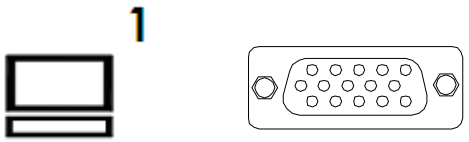


❑ I/O Peripheral Connectors

View from the rear and front side, if you are connecting the monitor, LAN, COM, Audio, USB, HD and VGA to the FX5407. See following figure and a side pictures.

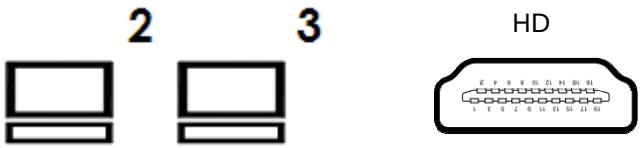


1. Connecting the Display-1: VGA (CRT)



DB15	Signal
1	Red
2	Green
3	Blue
13	Hsync
14	Vsync
12	DDC Data(*)
15	DDC Clock(*)
5 & 10	Digital Ground
6,7,8	Analog Ground
Others	Not Used

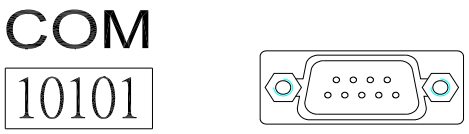
2. Connecting the Display-2/3: HD



Note: The Display "2" HD display port not support audio function.

3. Connecting the COM port

The DB9-COM1 is designed for multiple proposes. Its can select RS232/RS422/RS485 by BIOS CMOS setting. The following tables show the signal connections of DB9.

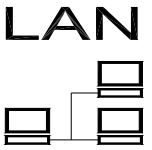


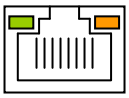
DB-9	RS-232	RS-422	RS-485
1	-DCD		
6	-DSR		
2	RXD	RX-	485-
7	-RTS	TX-	
3	-TXD	RX+	485+
8	-CTS	TX+	
4	-DTR		
9	-RI		
5	Ground		
Metal	Case Ground		

4. Connecting the LAN port

The RJ45 connector with 2 LED's for LAN. The orange LED indicates data is being accessed and the green LED indicates on-line status.

RJ45 connector



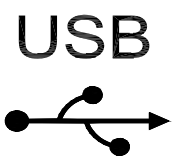


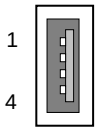
(Front View)

RJ45	LAN	RJ45	LAN
1	MDI0+	5	MDI2+
2	MDI0-	6	MDI2-
3	MDI1+	7	MDI3+
4	MDI1-	8	MDI3-

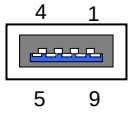
5. Connecting the USB Ports

The system supports a three port USB connector. Any USB device can be attached to USB ports as plug-and-play function is supported. The front side port USB #1 can support USB2.0/3.0, and rear side USB # 2/3 support USB 2.0.





USB 2.0



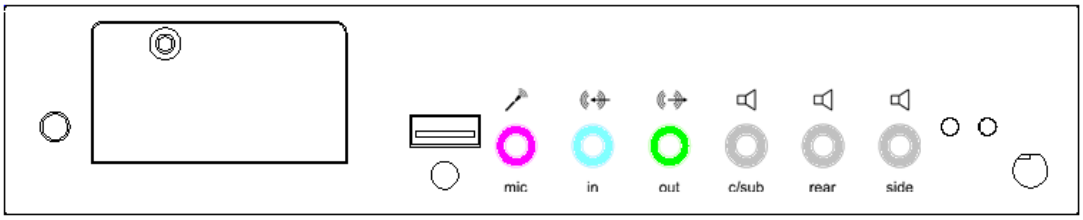
USB 3.0

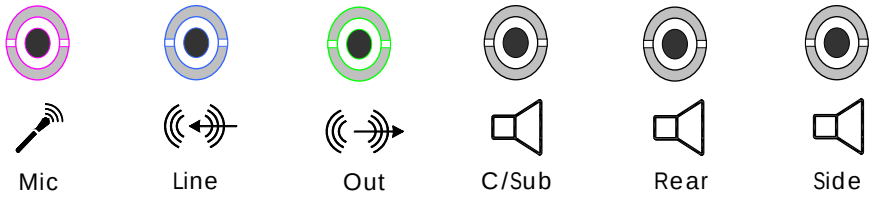
(Front View)

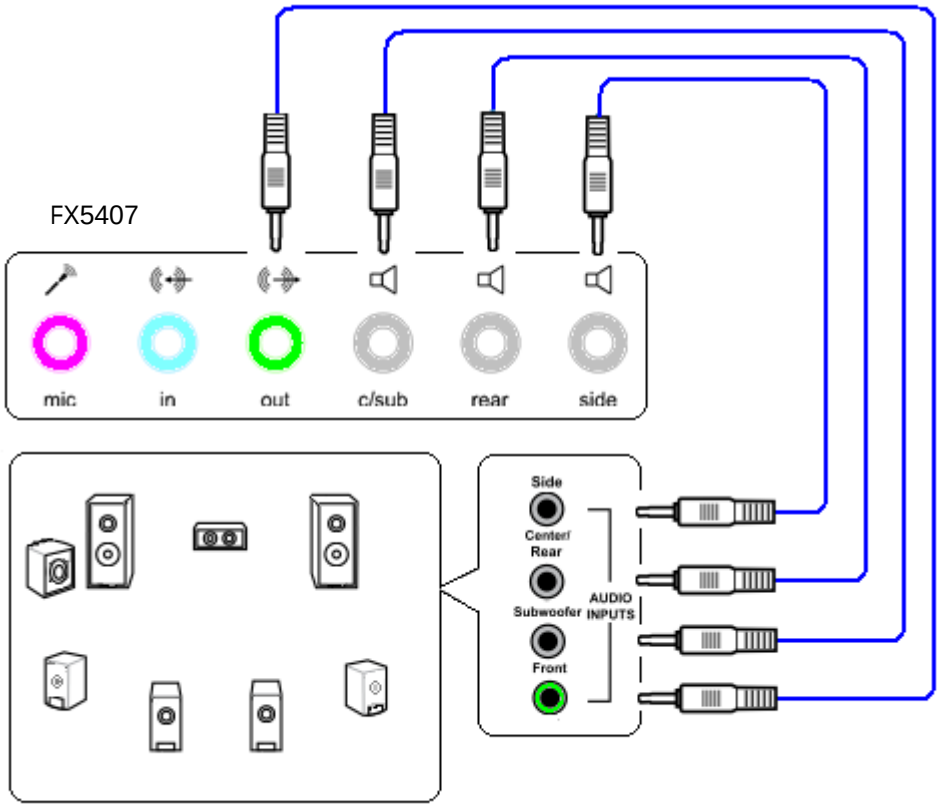
USB	Signal
1	USBV
2	USBD- (V2.0)
3	USBD+(V2.0)
4	USBG
5	StdA_SSRX-(V3.0)
6	StdA_SSRX+(V3.0)
7	USBG (V3.0)
8	StdA_SSTX-(V3.0)
9	StdA_SSTX+(V3.0)

6. Connecting the Audio Port

The system supports Audio 7.1 sound: Out (Front-Out), C/SUB (Center/Subwoofer), Rear (Speaker-Out), Side (Speaker-Out), Mic (Microphone-In), and In (Line -In). See following figure and a side pictures.





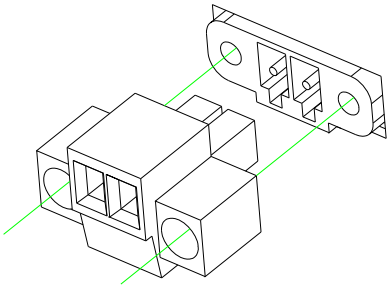


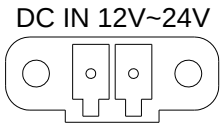
Connect to 7.1 Audio Channel Speakers

❑ Connecting the DC Power and Power Button

Power is supplied through an external power DC In. See following figure and a side pictures.

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





Terminal Block

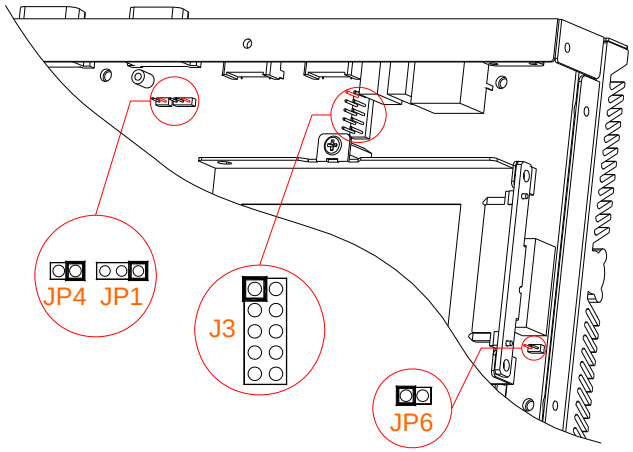
DC +9V~+24V, 28VA minimum

2. Power Button: The Power button controls the main power, plugging DC into DC power connector then push the Power button, when you final installed system hardware device. Pushing the Power button once will switch the FX5407 on and off.

Power button: On/Off

❑ Jumper Setting

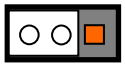
The COM1 is designed for multiple proposes, using JP4 is to select RS485 terminator resistor. JP1 is used to select 3VSB /3.3V voltage with PCIe mini card module. (Refer PCIe mini card module specification.) JP6 is used to clear CMOS data, and other connectors are reserved for other usage.



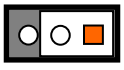
➢ a. JP1: Select 3VSB/3.3V Voltage for PCIe Mini Card Module

When installing the PCIe Mini card module, if the card doesn't work properly (Refer PCIe module card specification pin-24 3.3VAUX.), you can select 3VSB/3.3V voltage. (Defaulted 2, 3 closed.)

JP1



3.3V StandBy/3.3VSB
Factory Preset



3.3V/Voltage

➢ b. JP4: RS-485 Terminator Setting

JP4

RS-485
Terminator Disabled
Factory Preset

RS-485
Terminator Enabled

➢ c. JP6: Clear CMOS Setting

You can use JP6 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 JP6 to 1-2 closed and wait 3~5 sec then return to open before system powers off. The default setting is opened.

JP6

1 2

Factory Preset

1 2

Clear CMOS Data

Note: When clear the "Administrator or User" password in the first time boot 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.

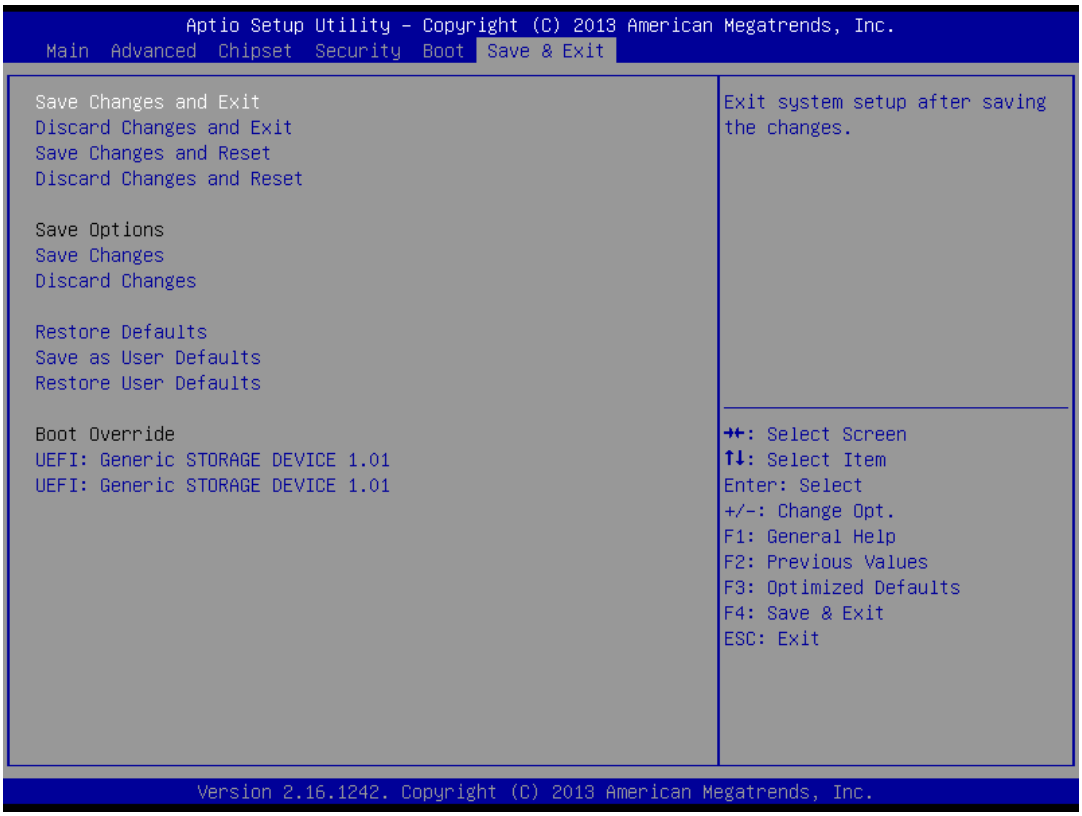
The BIOS provides a menu-driven interface to the console subsystem. The console subsystem contains special software, called firmware that interacts directly with the hardware components and facilitates interaction between the system hardware and the operating system.

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
   - ACPI Settings
   - W83627 Super IO Configuration
   - H/W Monitor
   - Serial Port Console Redirection
   - CPU Configuration
   - IDE Configuration
   - Miscellaneous Configuration
   - SCC Configuration
   - Network Stack Configuration
   - CSM Configuration
   - USB Configuration
   - Security Configuration
3. Chipset
   - Host Bridge
   - South Bridge
4. Security
5. Boot
6. Save & Exit

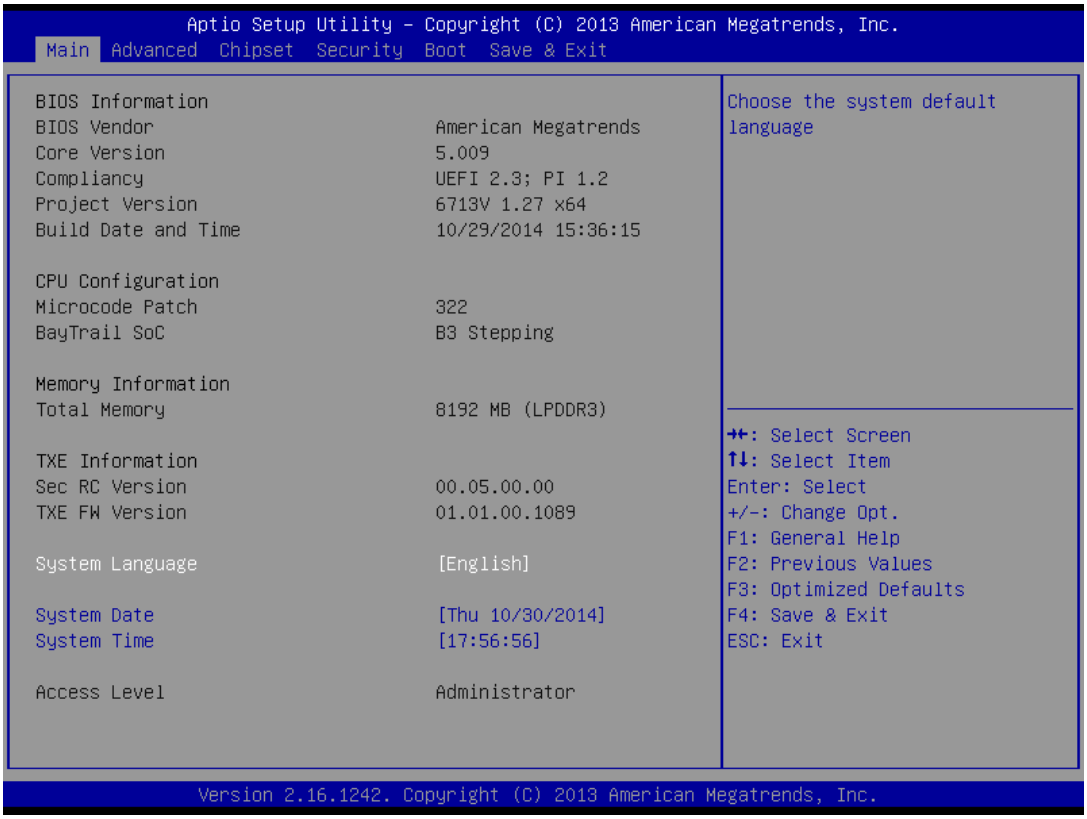
- **Keyboard Convention**

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**

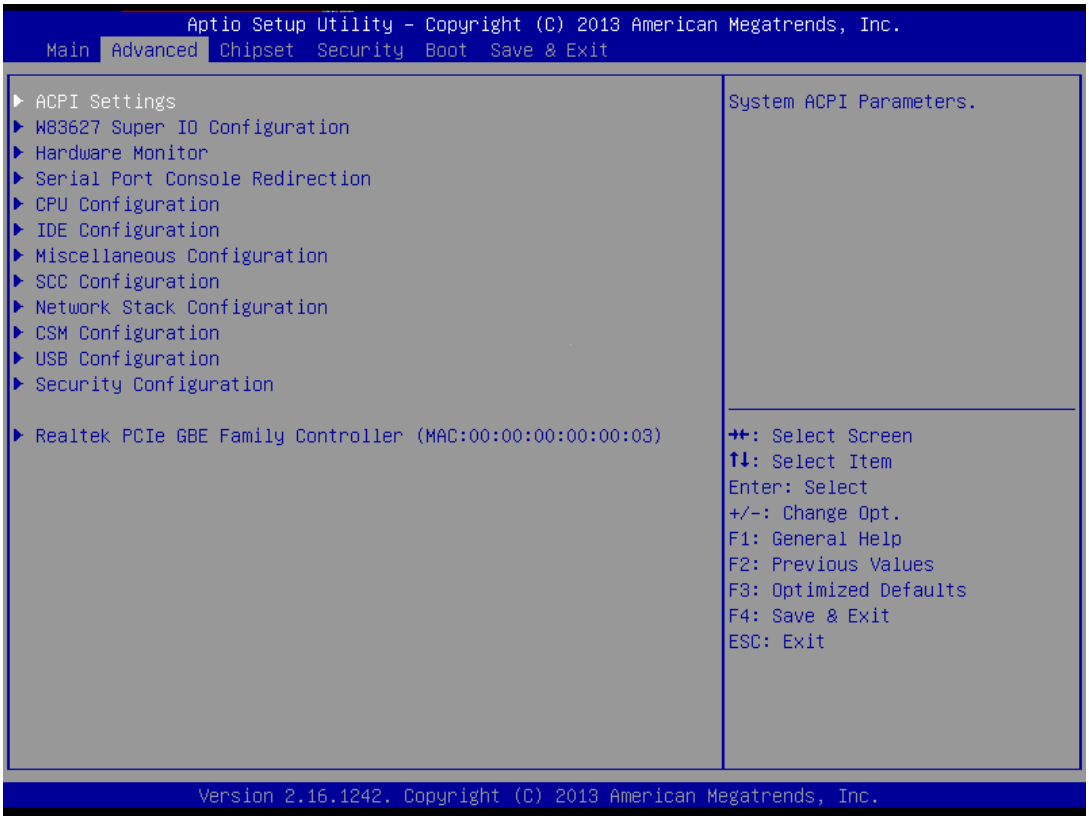
Highlight the <Date> field and then press the [+]/ [-] keys or enter new values to set the current date. Follow the month, day and year format.

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.

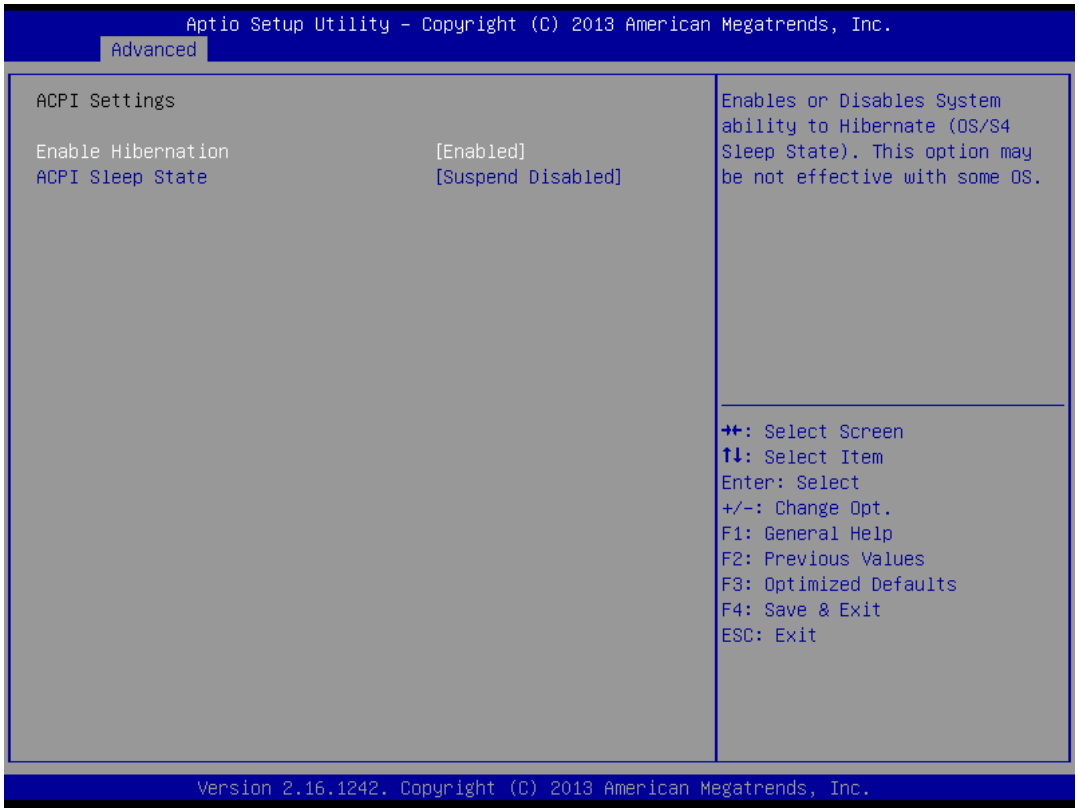
Advanced Setup

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



❑ ACPI settings

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



➢ 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

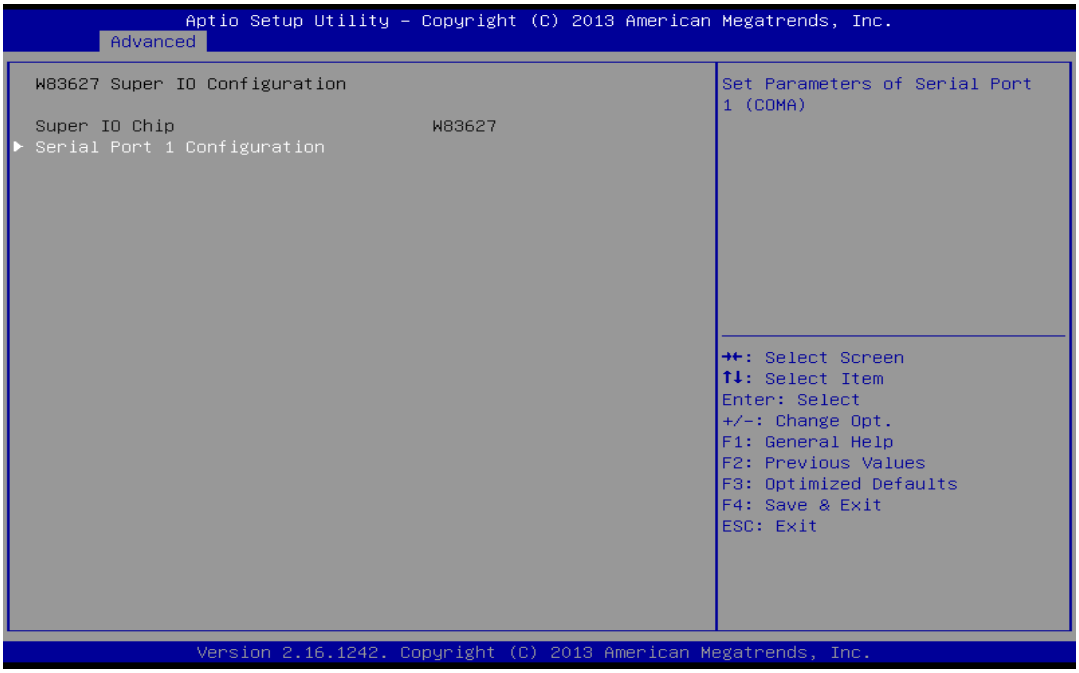
This item allows users to select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.

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

Default setting: Suspend Disabled

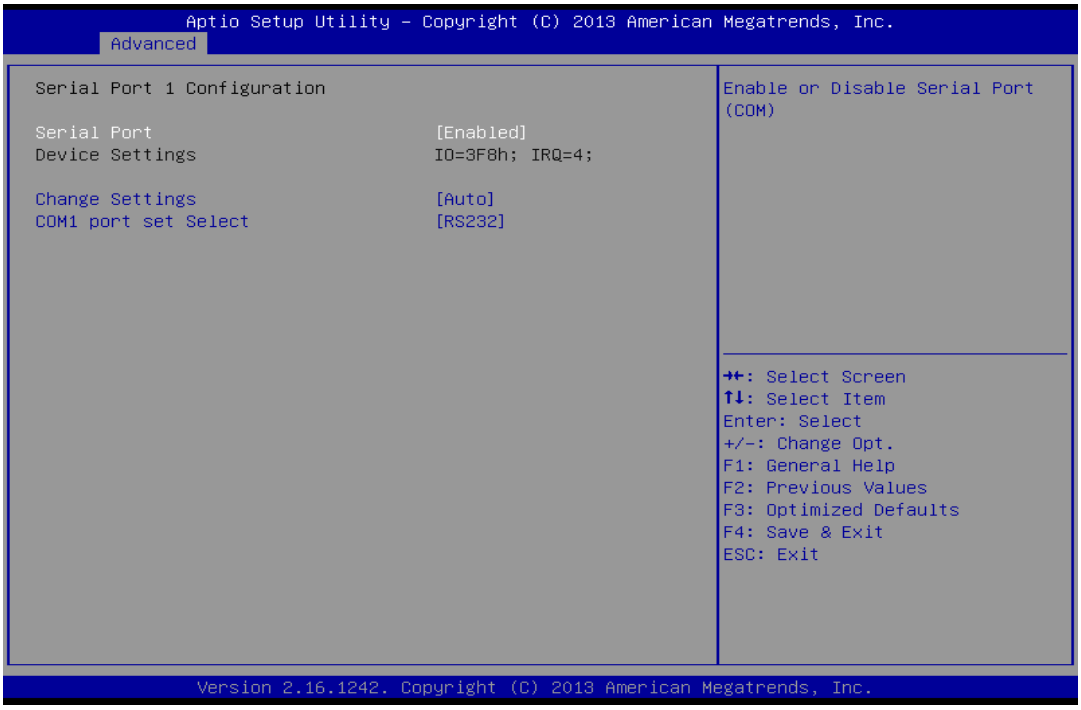
❑ W83627 Super IO Configuration

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



➢ Serial Port 1 Configuration

These fields select the I/O port address for Serial port 1.



✧ ***Serial Port***

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

Available Options: Enabled, and Disabled.

Default setting: Enabled

Change Settings

This item allows users to select the port address and IRQ...

Available Options: Auto, IO=3F8; IRQ=IRQ4, IO=3F8; IRQ=IRQ3/4/5/7/9/10/11/12, IO=2F8; IRQ=IRQ3/4/5/7/9/10/11/12, IO=3E8; IRQ=IRQ3/4/5/7/9/10/11/12, and IO=2E8; IRQ=IRQ3/4/5/7/9/10/11/12

Default setting: Auto

COM1 Port Set Select

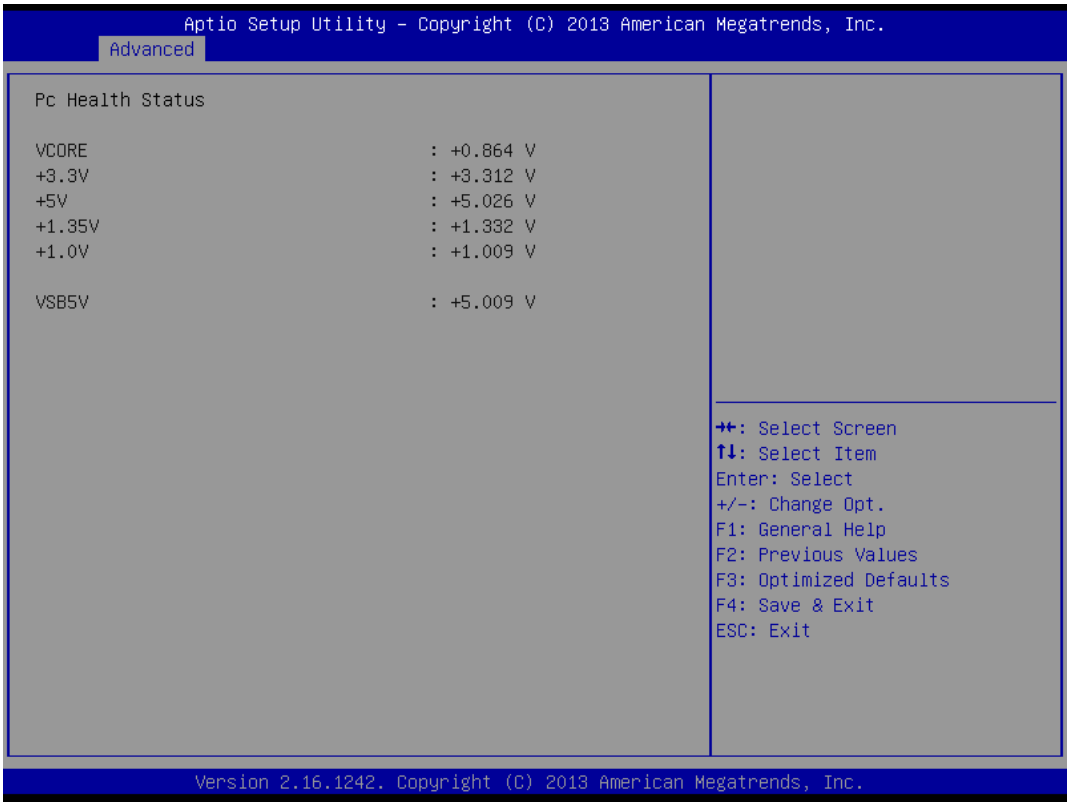
This item allows users can select RS-232, RS-422 and RS-485 of select COM1.

Available Options: RS-232, RS-422, and RS485

Default setting: RS-232

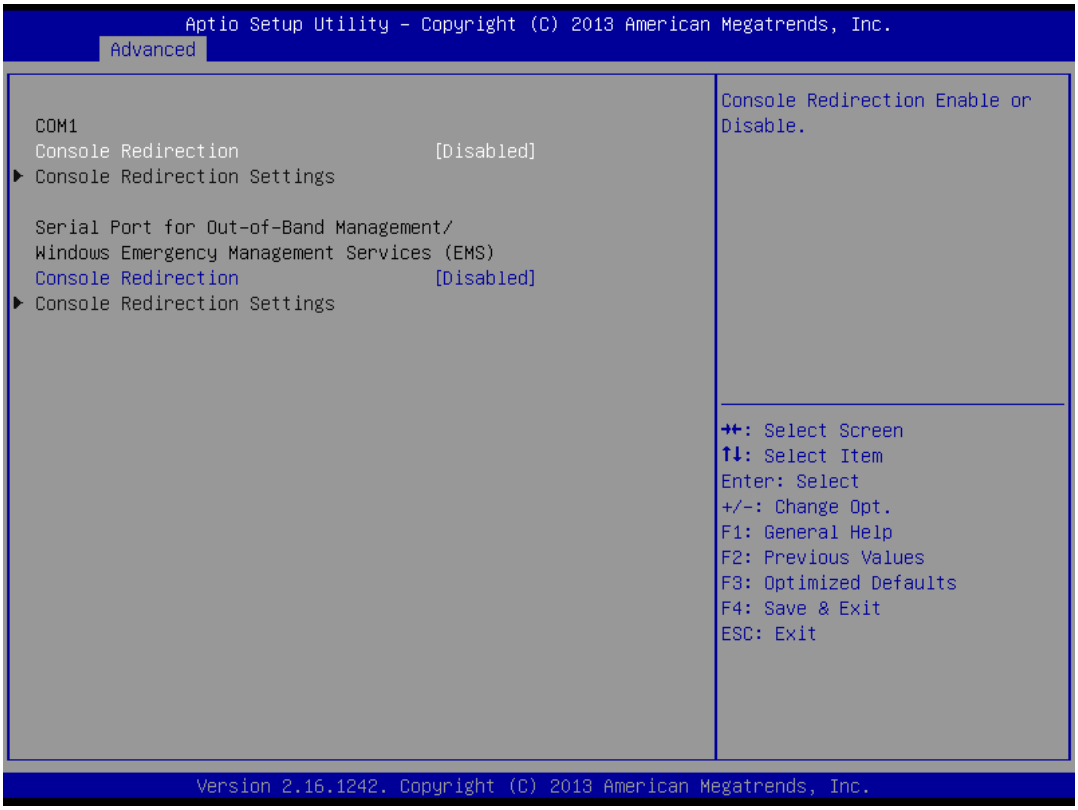
❑ Hardware Health Configuration

On the Hardware Monitor Setup screen, you can monitor the system, CPU voltage, and +5V voltage...



□ 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 FX5407.



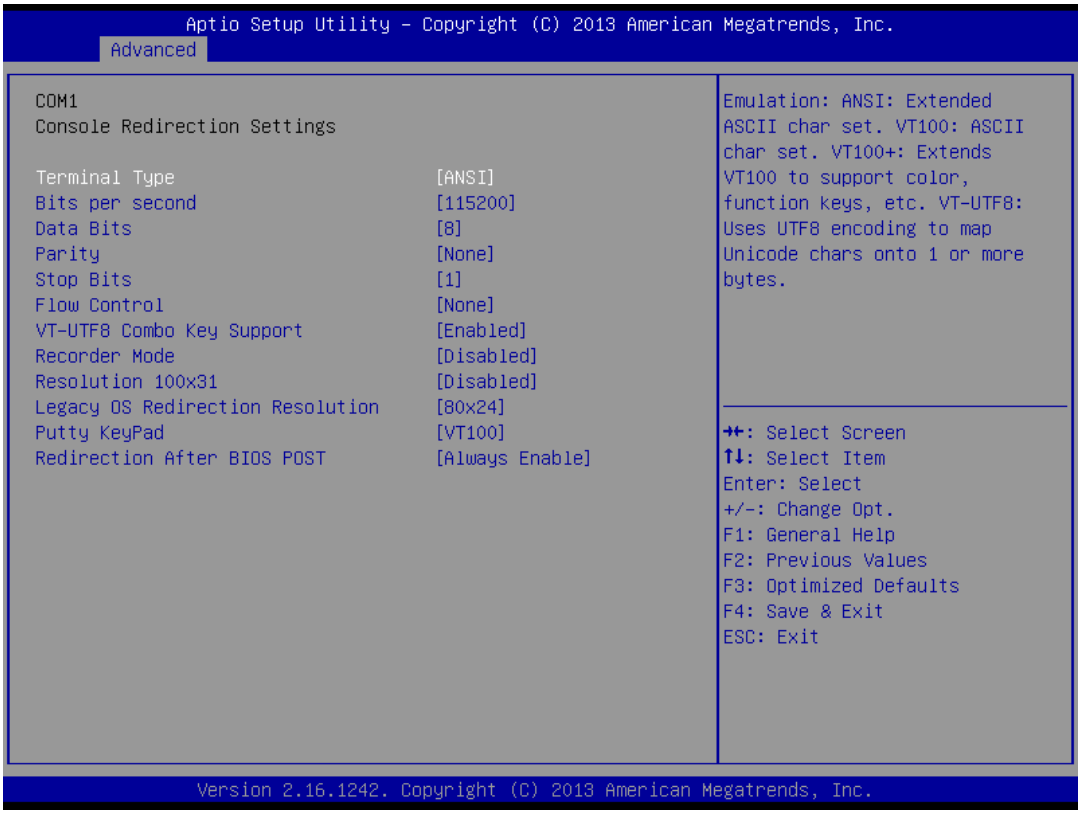
➢ COM1 - Console Redirection

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-UTFB, and PC_ANS1

Default setting: VT100

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

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, Mark, and Spcae

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

Legacy OS Redirection Resolution

On Legacy OS, the Number of Rows and Columns supported redirection

Available Options: 80x24, and 80x25

Default setting: 80x24

Putty Keypad

This item is select Function Key and Keypad on Putty

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

Default setting: VT100

Redirection After BIOS 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)**

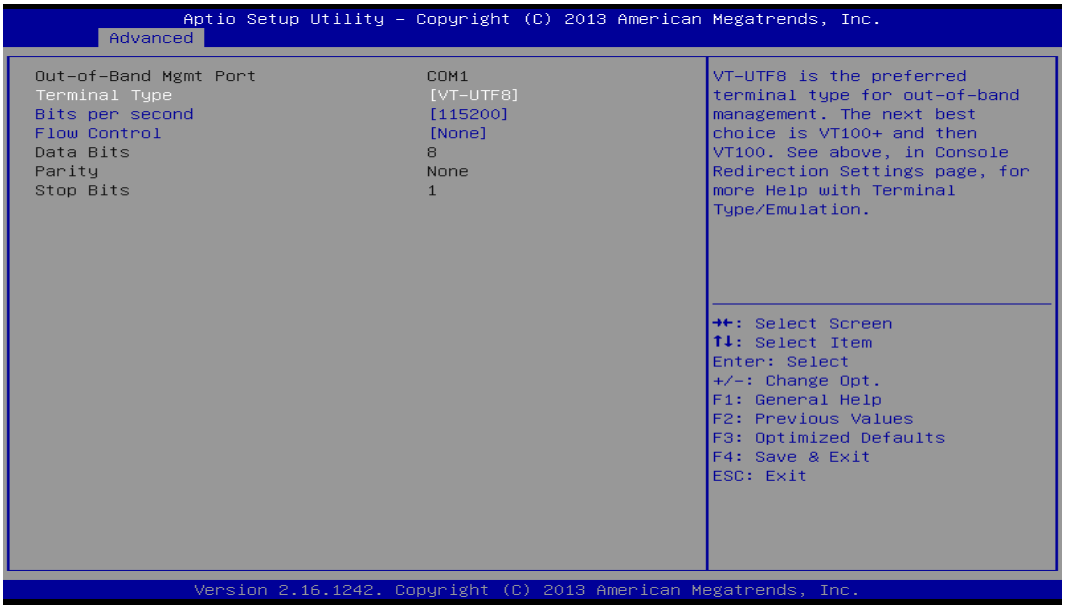
This field is select console redirection Enable or disable. Serial Port for Out-of-Band Management/ Windows Emergency Management Services (EMS)

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-UTFB, and PC_ANS1

Default setting: VT100

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

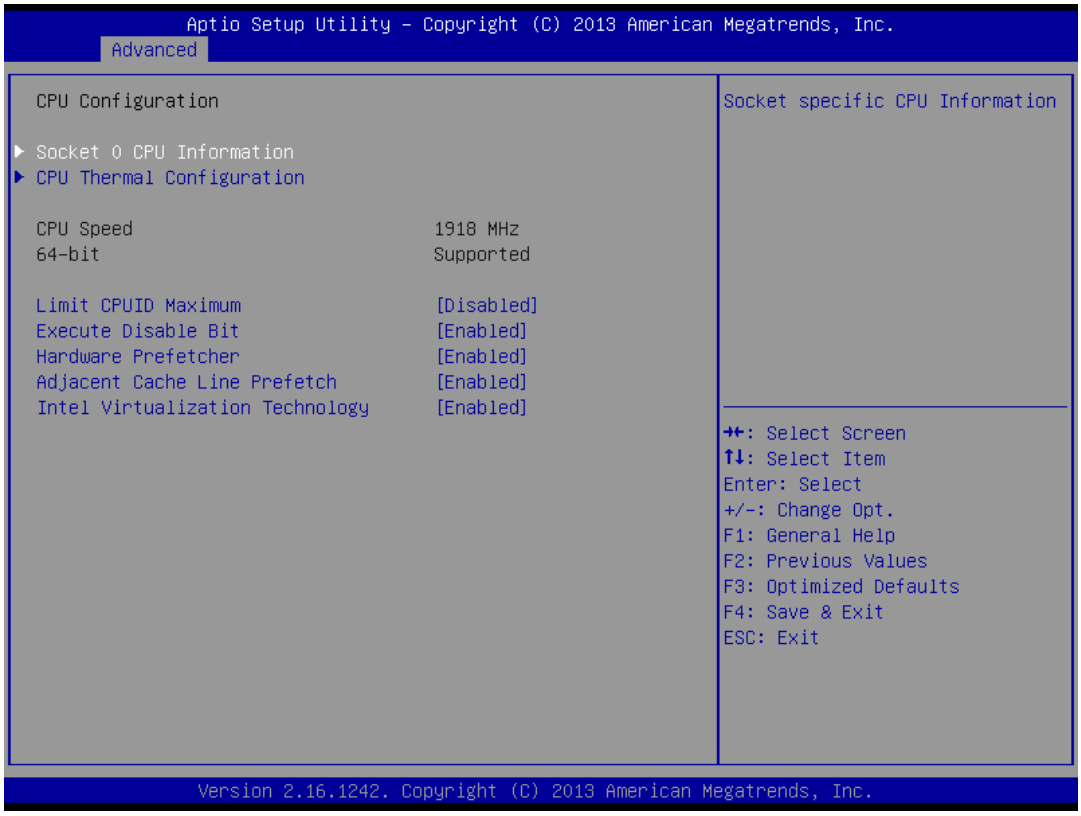
The flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop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



➢ Limit CPUID Maximum

This field allows users to enable or disable limit CPUID maximum, to disable this item when Windows XP.

Available Options: Disabled, and Enabled

Default setting: Disabled

➢ Execute Disable Bit

This field allows users to enable or disable the No-Execution page protection. XD can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS. (Windows Server 2003 SP1, Windows XP SP2, SuSE Linux 9.2, RedHat Enterprise 3 Update 3.x)

Available Options: Disabled, and Enabled

Default setting: Enabled

- **Hardware Prefetcher**

This field allows the users to enable or disable the Mid Level Cache (L2) streamer prefetcher.

Available Options: Disabled, and Enabled

Default setting: Enabled

- **Adjust Cache Line Prefetch**

This field allows the users to enable or disable the Mid Level Cache (L2) prefetching of adjacent cache lines.

Available Options: Disabled, and Enabled

Default setting: Enabled

- **Intel Virtualization Technology**

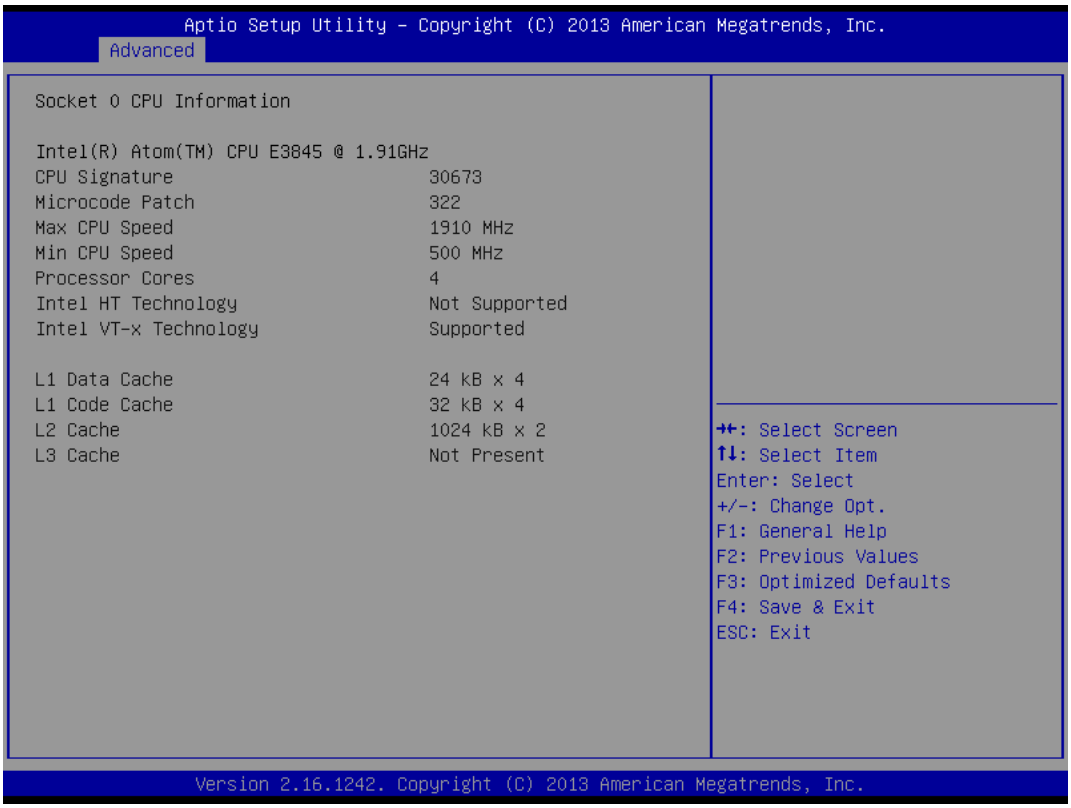
When enabled, a VMM can utilize the additional hardware capabilities provided by Vander pool Technology.

Available Options: Disabled, and Enabled

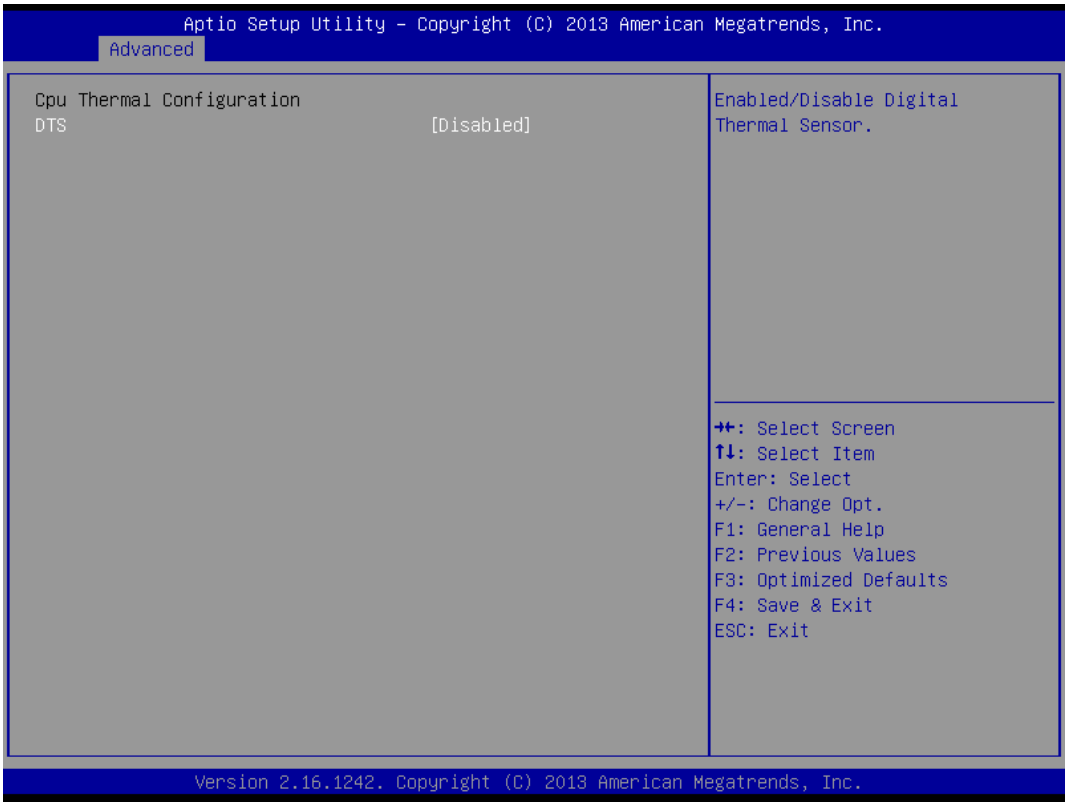
Default setting: Enabled

- **Socket CPU 0 information**

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



➢ **CPU Thermal Configuration**



✧ ***DTS***

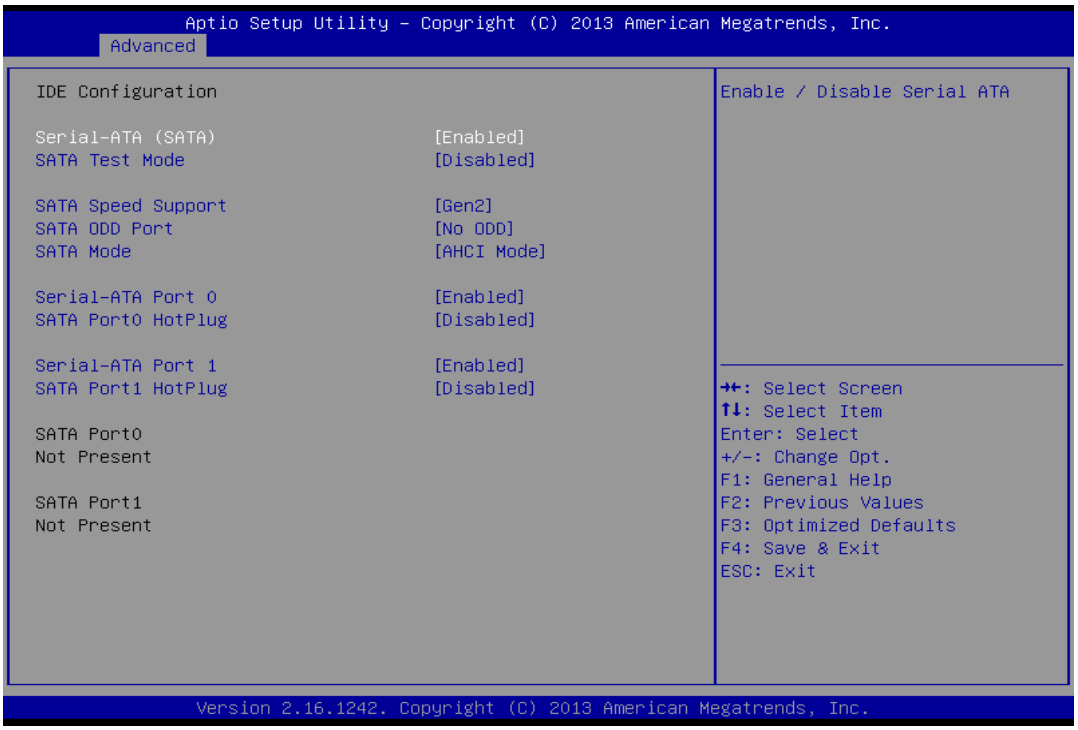
This field allows the users to enable or disable the Digital Thermal Sensor.

Available Options: Disabled, and Enabled

Default setting: Disabled

❑ IDE Configuration

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



➢ Serial-ATA (SATA)

This item allows users to enable or disable SATA Controller.

Available Options: Disabled, and Enabled

Default setting: Enabled

➢ SATA Test Mode

This item allows users to enable or disable SATA test mode.

Available Options: Disabled, and Enabled

Default setting: Disabled

➢ SATA Speed Support

This item allows users can select SATA speed.

Available Options: Gen1, and Gen2

Default setting: Gen2

- **SATA ODD Port**

Select a SATA ODD is Port0 or Port1 configuration.

Available Options: NO ODD, Port 0 ODD, and Port 1 ODD

Default setting: No ODD

- **SATA Mode**

Select a configuration for SATA controller. Install Windows XP in AHCI mode need to use the F6 Method pre-installed AHCI driver, if you select IDE mode, you do not need to pre-install.

Available Options: IDE, and AHCI

Default setting: AHCI

- **SATA Port0/Port1**

The system CFAST socket corresponding SATA port 0, SATA pot 1 is SATA HDD, this item allows users to enable or disable SATA port 0 or SATA port1.

Available Options: Disabled, and Enabled

Default setting: Enabled

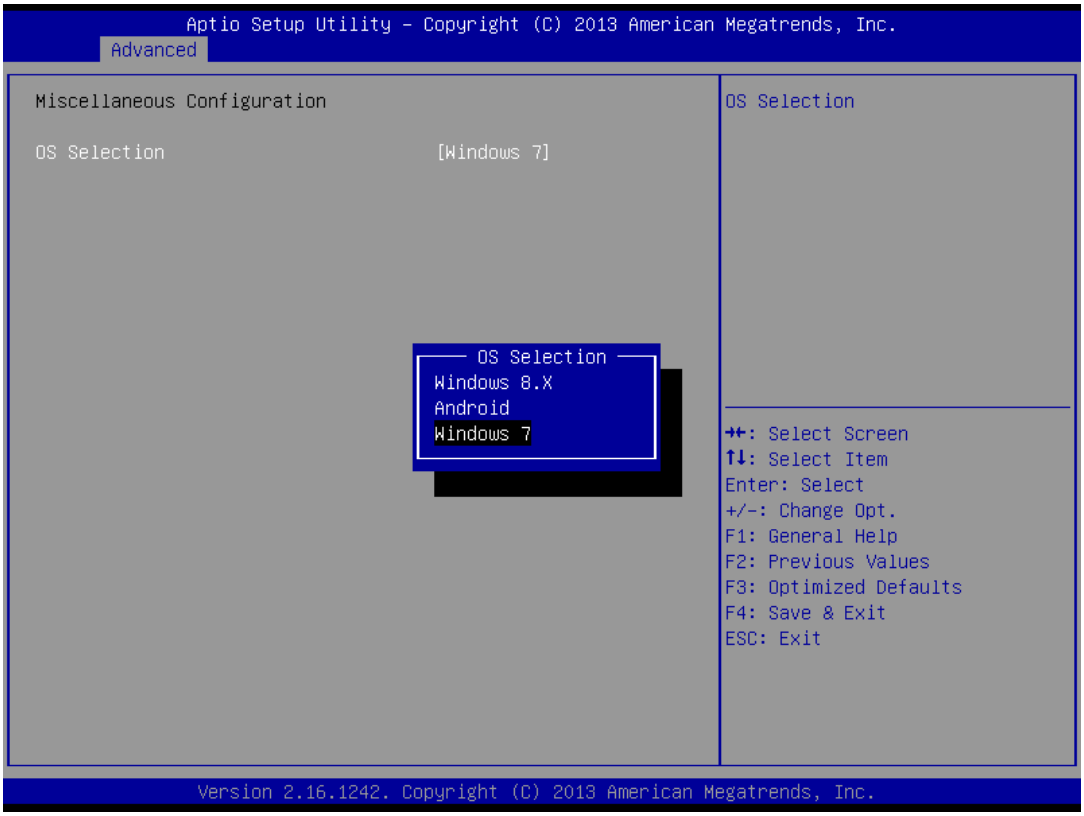
- **SATA Port0/Port1 HotPlug**

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

❑ Miscellaneous Configuration



➢ OS Selection

The Item is Select OS configuration, When Install Windows 8 or 8.1 need select to use Windows 8.X. If using the Android OS, please refer https://01.org/android-ia.

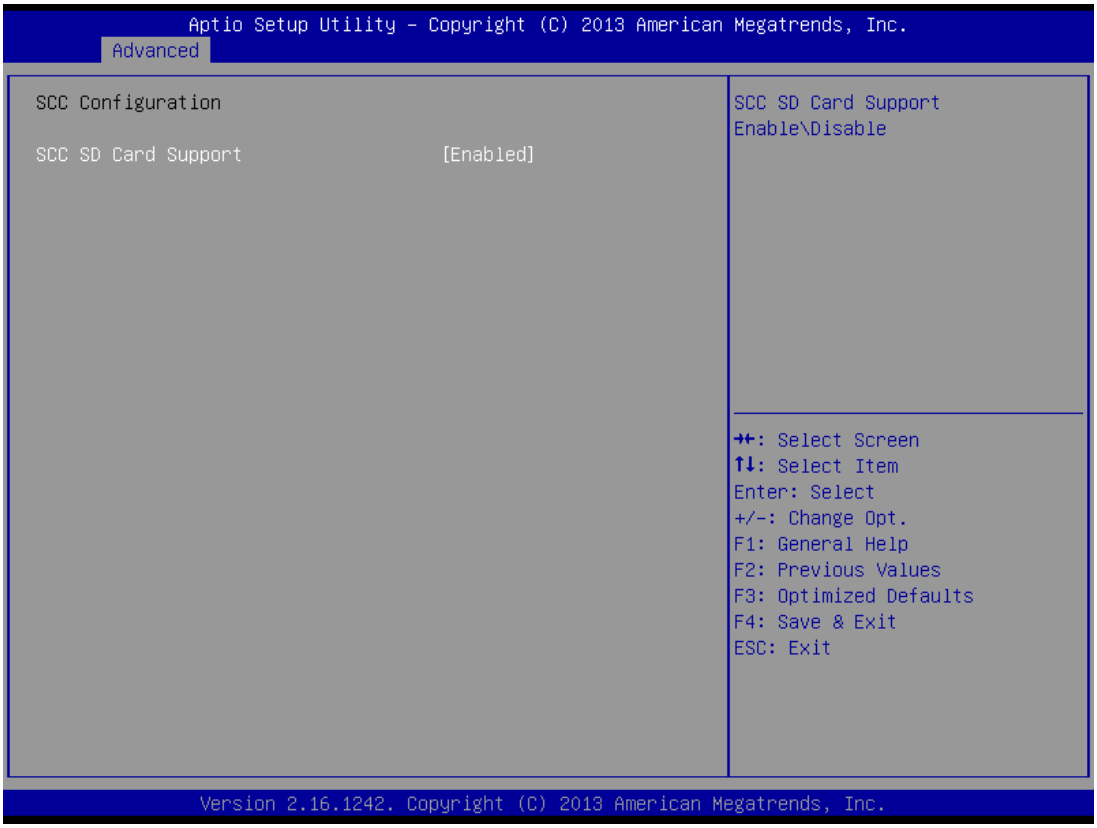
Available Options: Windows 8.X, Android, and Windows 7

Default setting: Windows 7

Note: This is impartment "OS Selection", Different OS be selected through *OS Selection". The default is Windows 7, which needs to be changed when Windows 8.X or Android OS is installed.*

❑ SCC Configuration

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



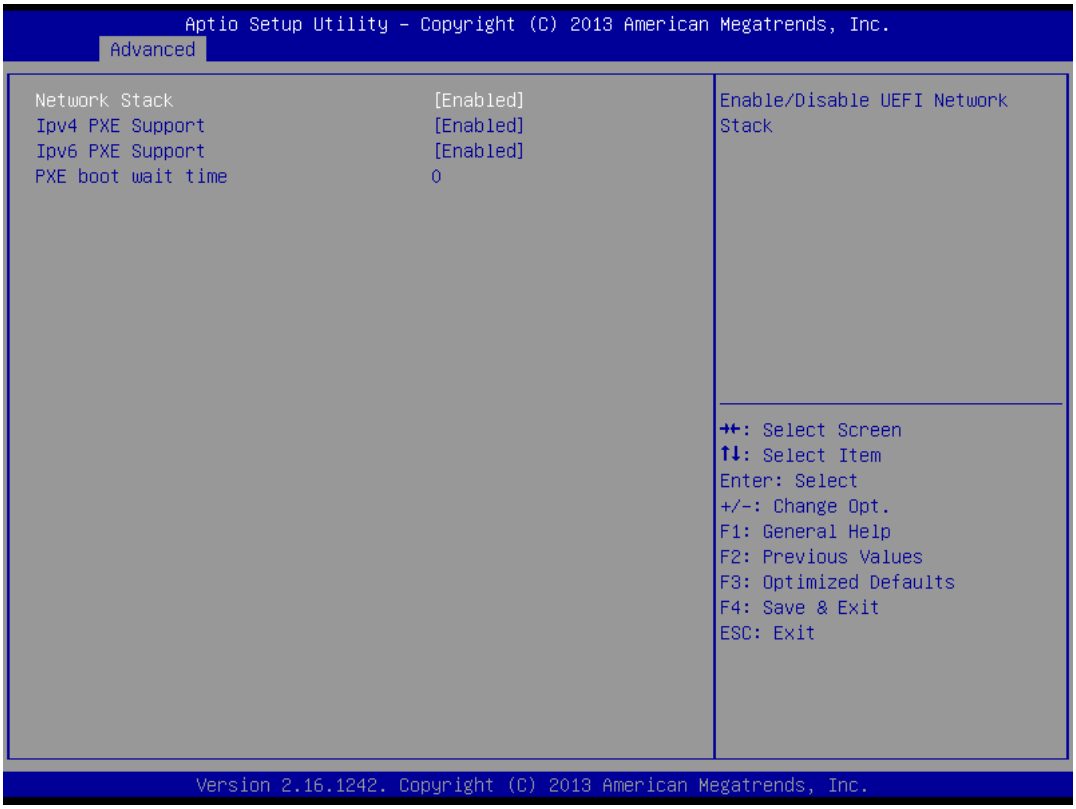
➢ SCC SD Card Support

This item allows users to enable or disable SD card control.

Available Options: Disabled, and Enabled

Default setting: Enabled

❑ 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/IPV6 Support

This field specifies the Enable Ipv4 or Ipv6 PXE Boot Support.

Available Options: Disabled, and Enabled

Default setting: Enabled

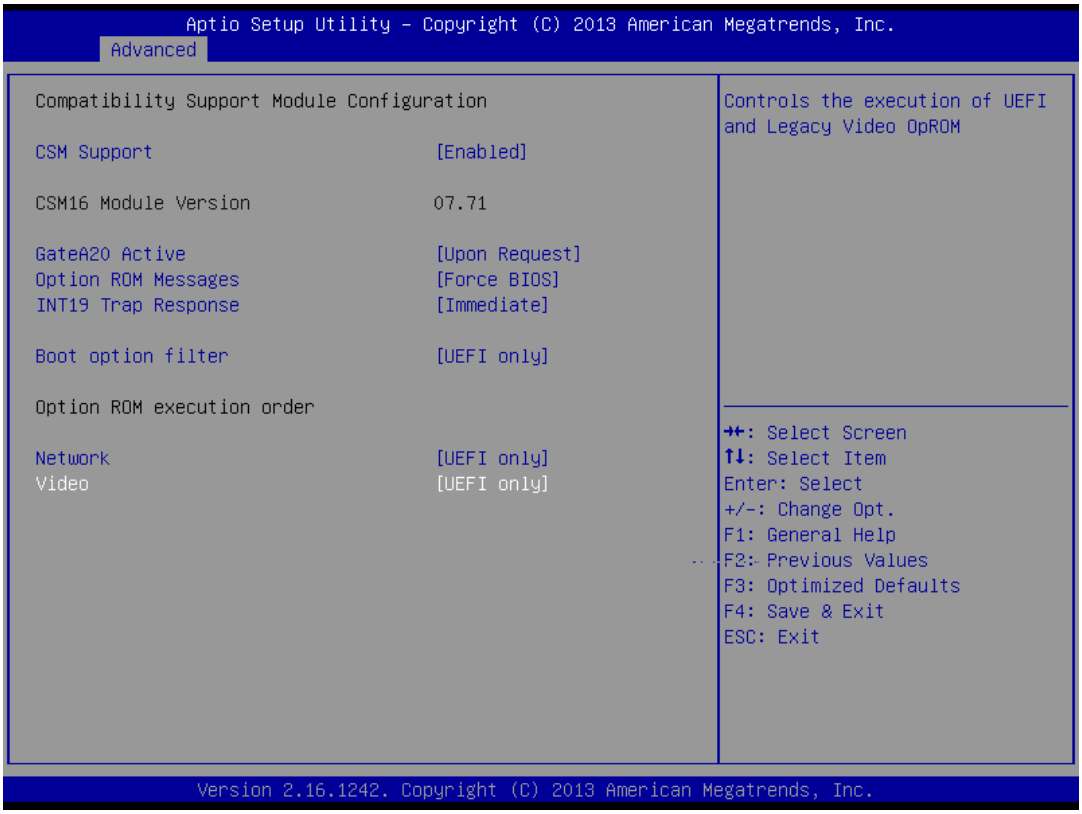
➢ PXE boot wait time

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

Default setting: 0

❑ 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

➢ 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**

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

- **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

- **Network**

Controls the execution of UEFI and Legacy PXE OpROM

Available Options: Do not Launch, Legacy only, and UEFI only

Default setting: UEFI only

- **Video**

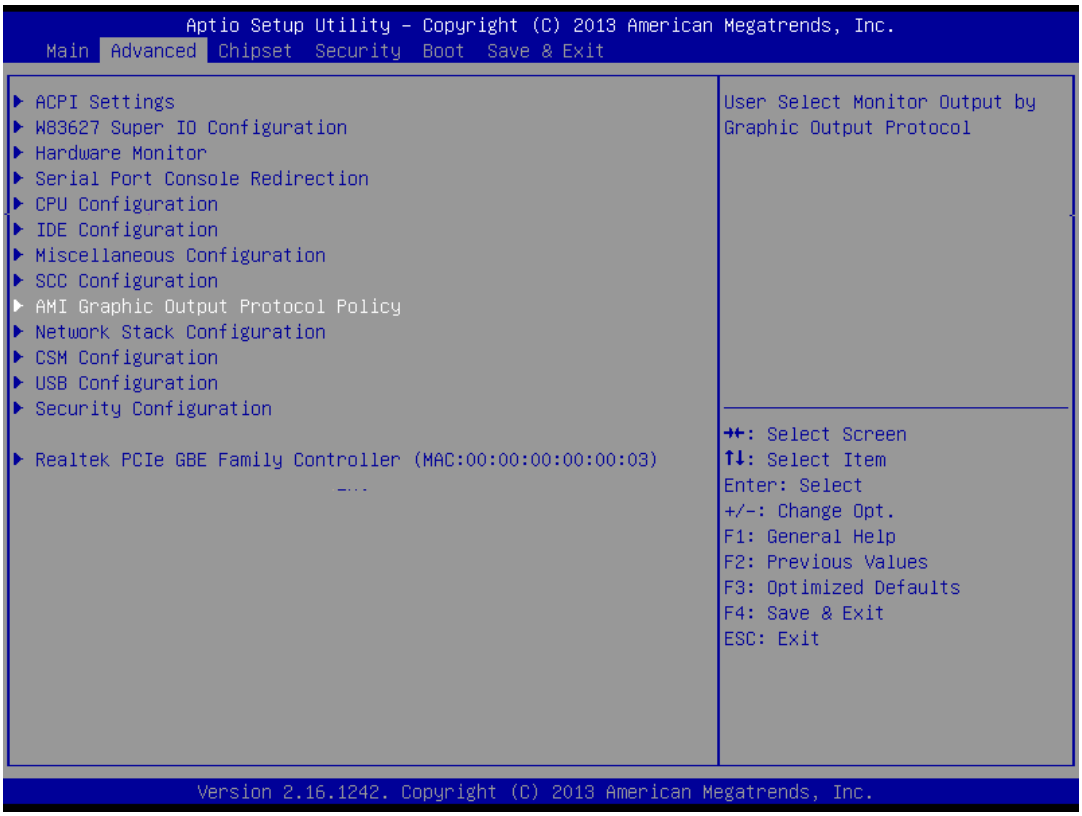
Controls the execution of UEFI and Legacy Video opROM

Available Options: Do not Launch, Legacy only, and UEFI only

Default setting: Legacy only

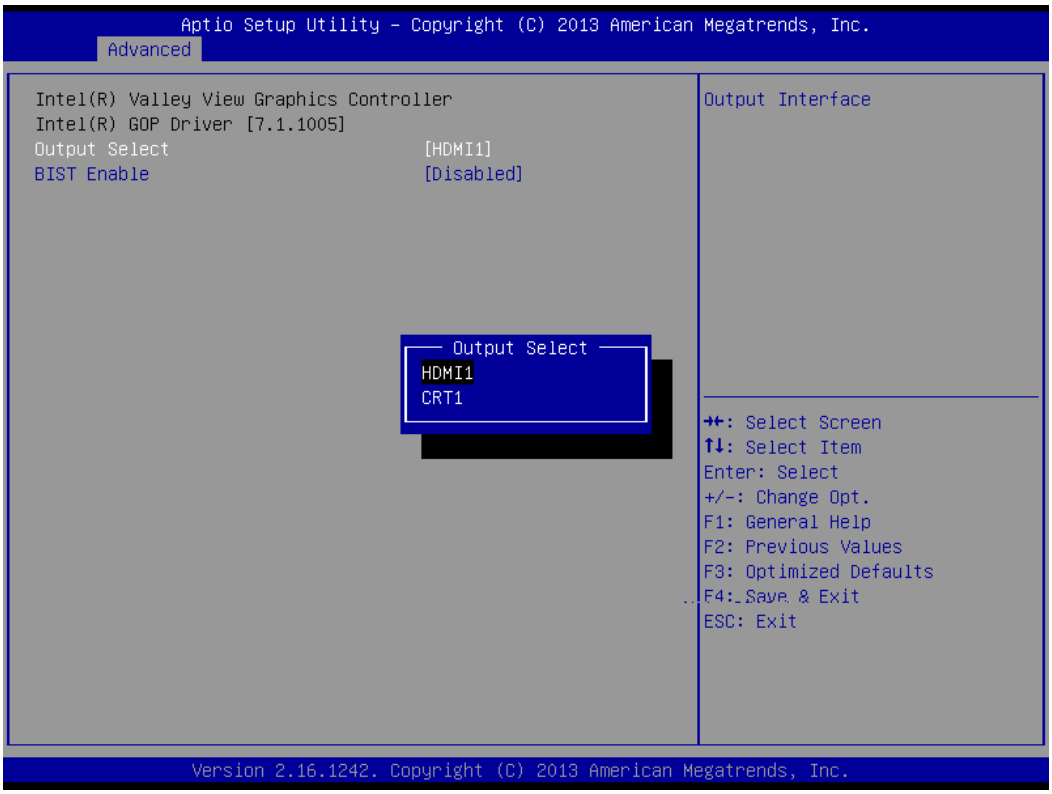
➢ **Video > Select "UEFI Only"**

Controls the execution of UEFI only, you can use this screen "AMI Graphic Output Protocol Policy" to select Monitor Output Configuration.



✧ ***AMI Graphic Output Protocol Policy***

The User can select monitor output by graphic output protocol.



Output Select

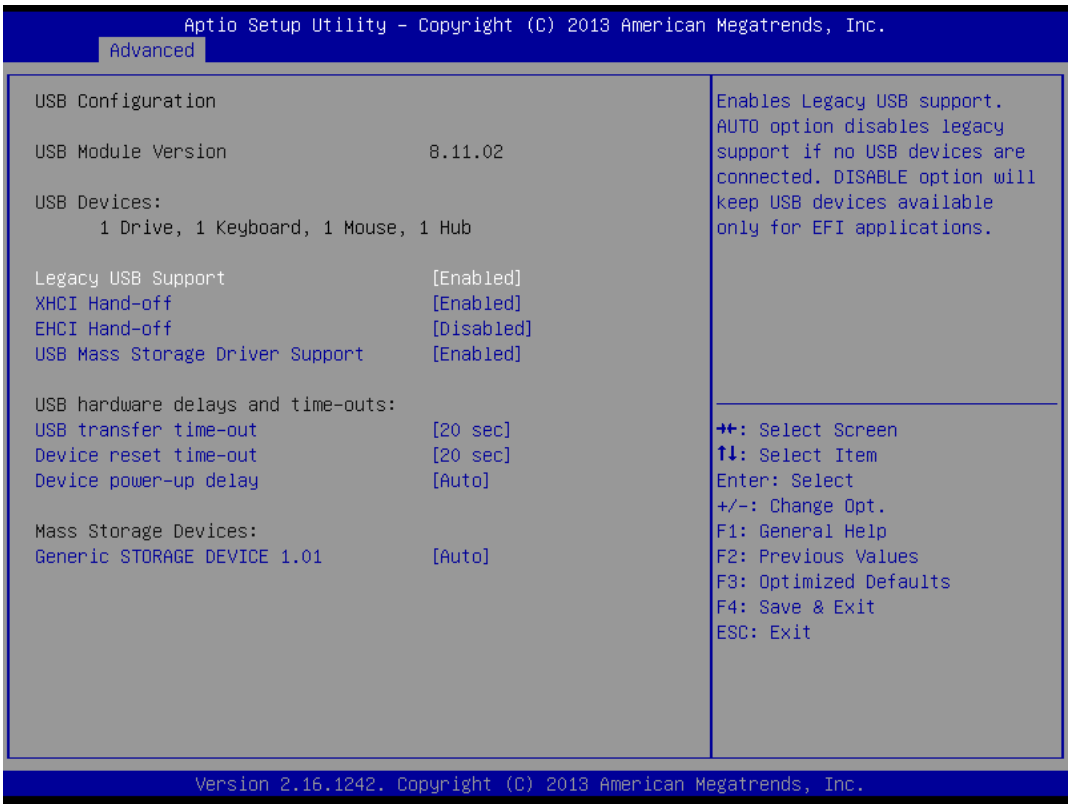
This field specifies allows you to select the Graphics Controller Intel® GDP driver which will be activated during POST.

Available Options: HD1 (DISPLAY-3), and CRT1 (Display-1)

Default setting: HD1 (DISPLAY-3)

❑ 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

- **EHCI Hand-Off**

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

Available Options: Disabled, and Enabled

Default setting: Disabled

- **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

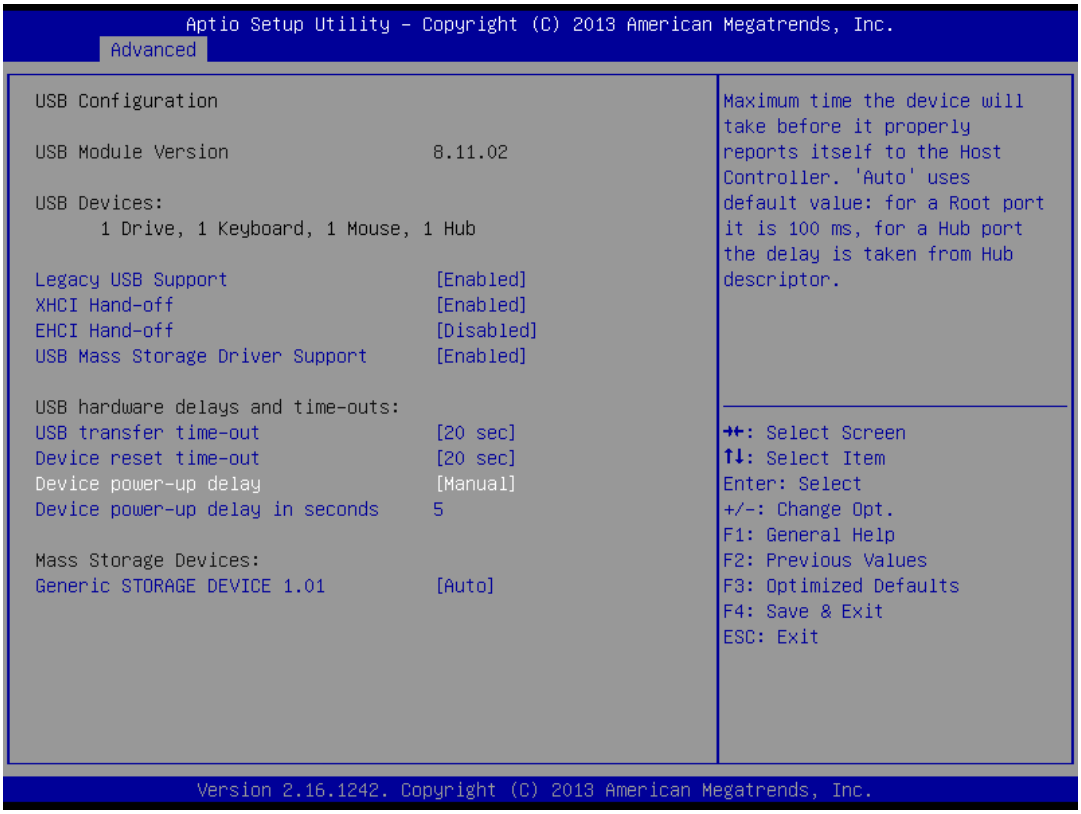
- **Device power-up delay**

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

➢ **Generic Storage Device 1.01**

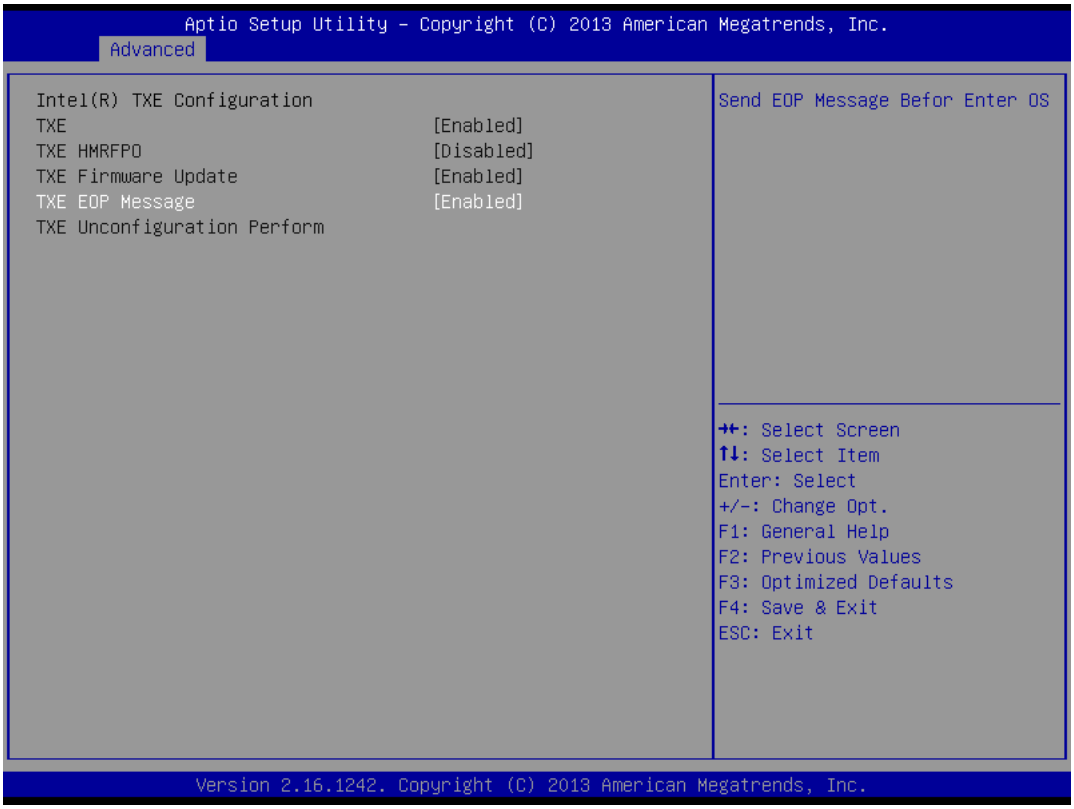
Mass storage device emulation type. 'AUTO' enumerates devices according to their media format. Optical drives are emulated as 'CDROM'; drives with no media will be emulated according to a drive type.

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

Default setting: Auto

❑ Security Configuration

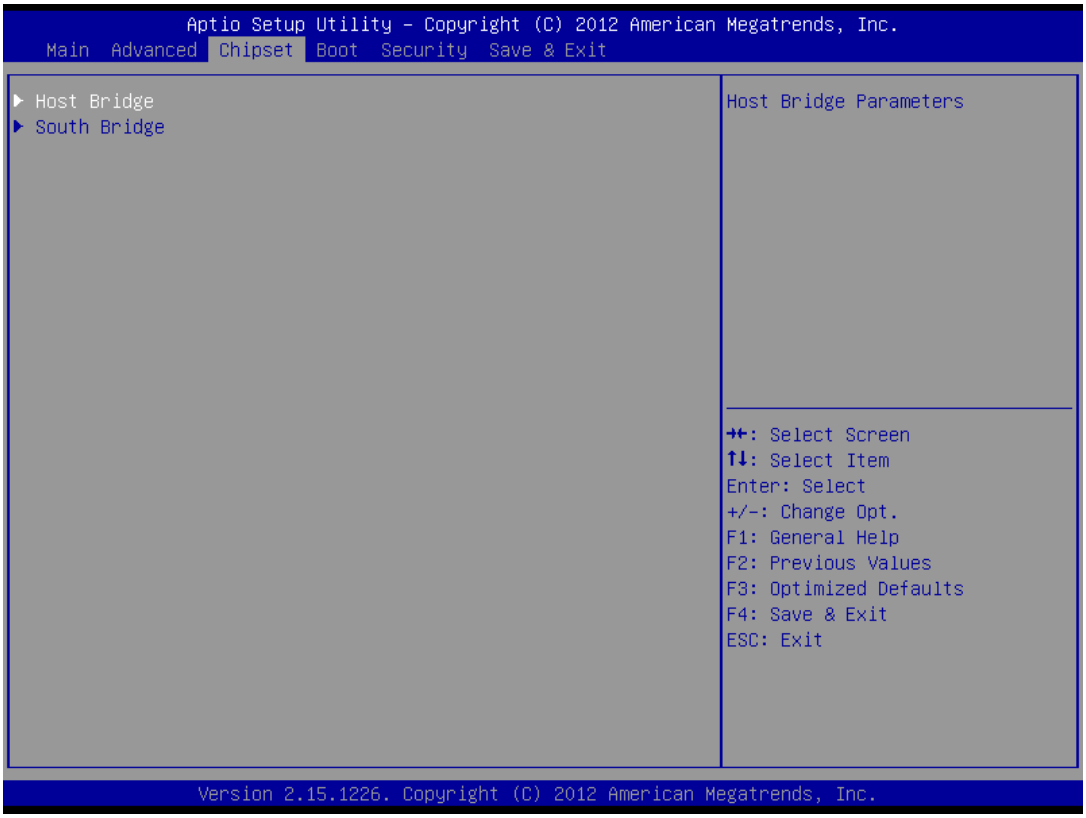
You can use this screen to select TXE Configuration.



Chipset

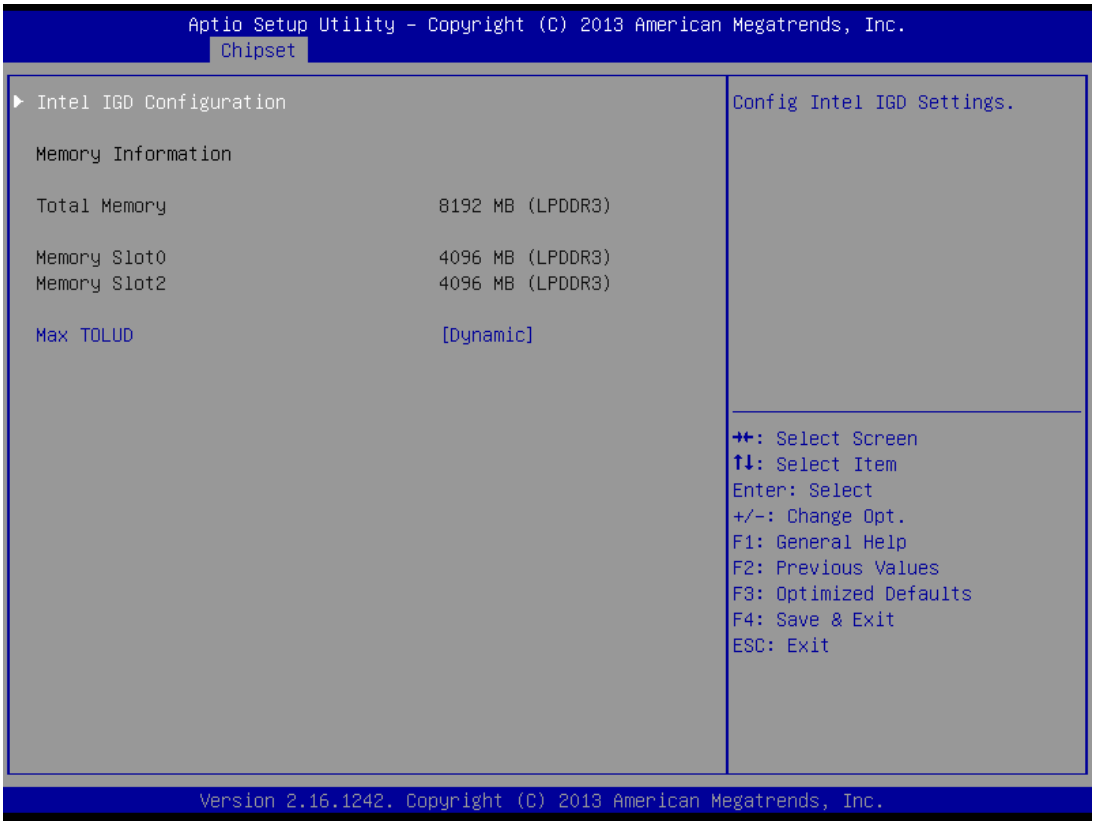
This section describes the configuration of the board's chipset features.

- Host Bridge
- South Bridge



❑ Host Bridge

You can use this screen to select options for the Host 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.



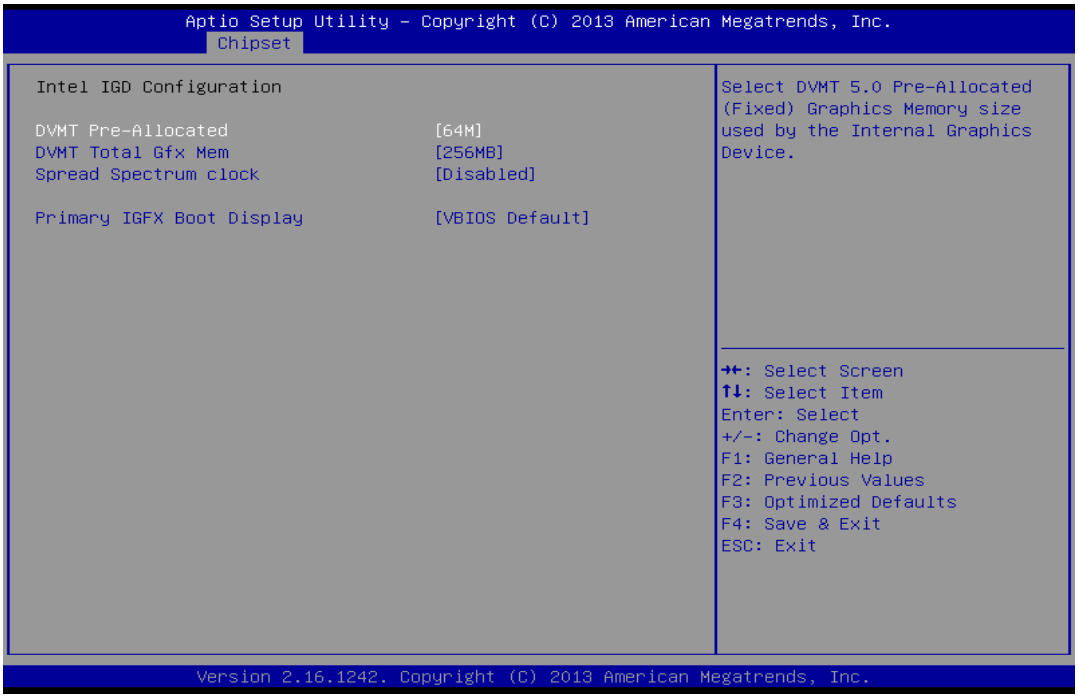
➢ Max TOLUD

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 3GB

Default setting: Dynamic

➢ Intel IGD Configuration



✧ *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: 64 MB

✧ *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

✧ *Primary IGFX Boot Display*

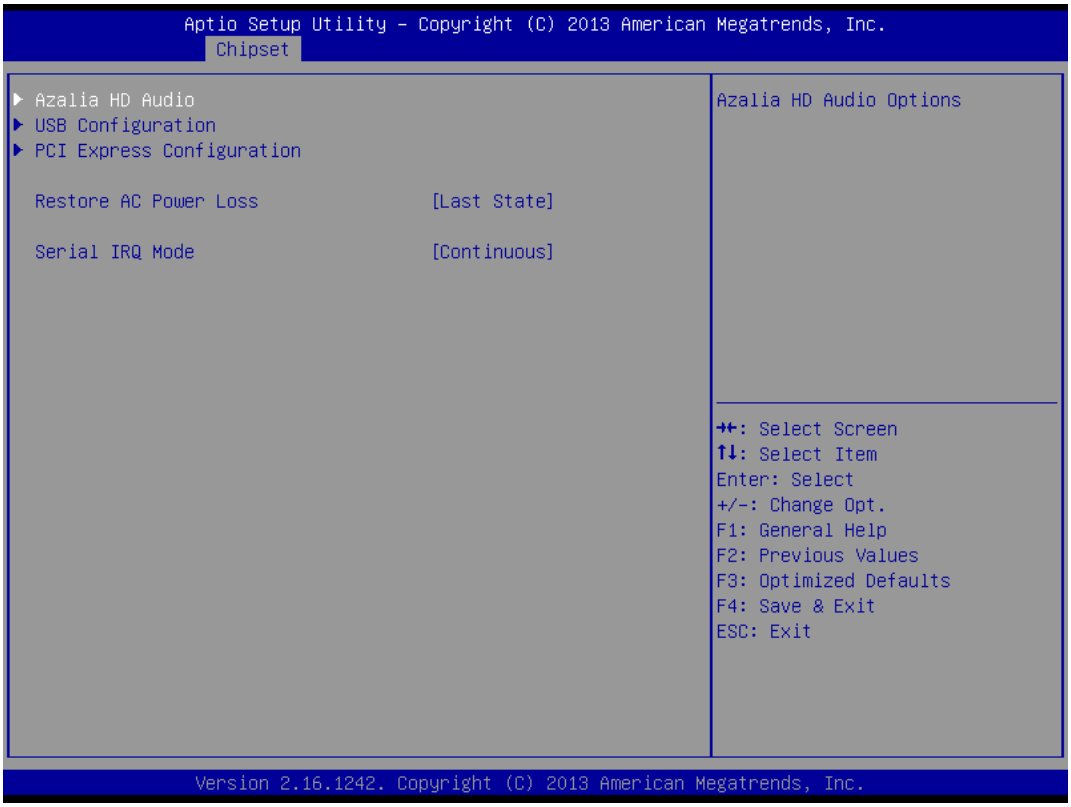
This field specifies allows you to select the Video Device which will be activated during POST.

Available Options: CRT, EFP/HD1, EFP2/HD2, and VBIOS Default.

Default setting: VBIOS Default

❑ 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.



➢ Restore On AC Power Lose

This field specifies the option controls how the PC will behave once power is restored following a power outage (or other unexpected or ungraceful shutdown). The "Last State" option returns the PC to the state in effect at the time the power outage or shutdown occurred. Assign this option the "Power On" value to reboot automatically; assign the "Power Off" value to leave the machine powered down.

Available Options: Power Off, Power On, and Last State

Default setting: Last State

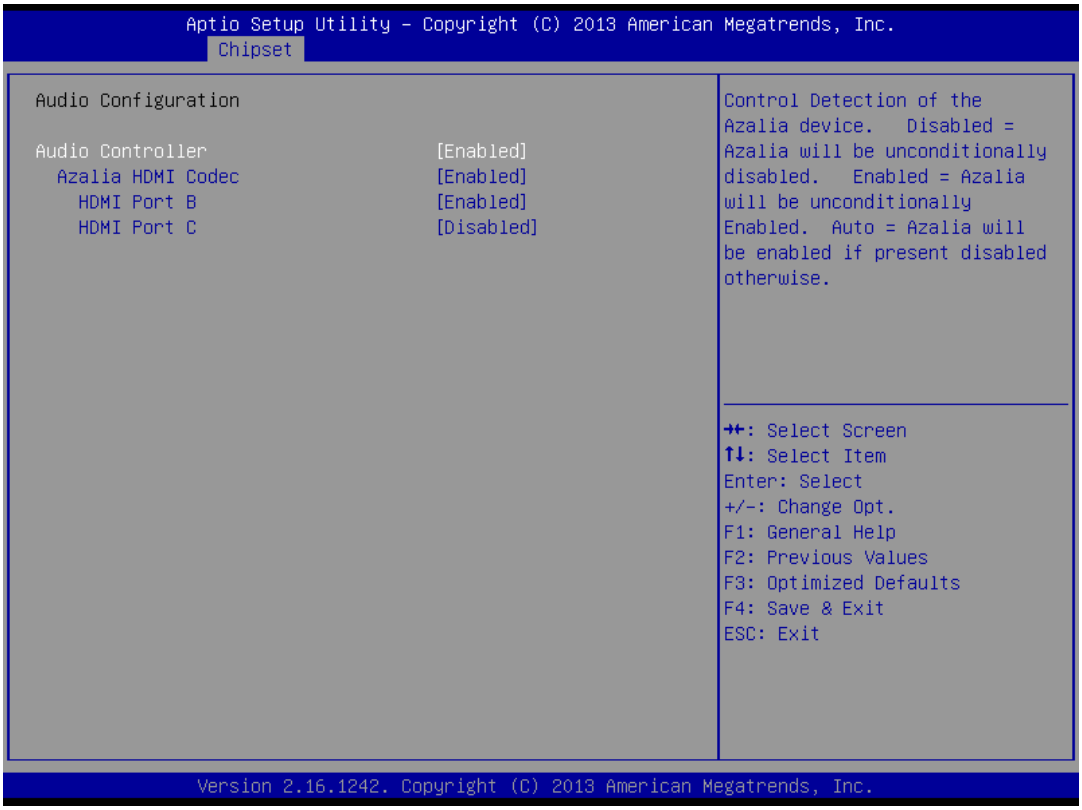
➢ Serial IRQ Mode

This item is Configure Serial IRQ Mode.

Available Options: Continuous, and Quiet

Default setting: Continuous

➢ **Azalia HD Audio**



✧ ***Audio Controller***

This item allows users to enable or disable Azalia Controller.

Available Options: Disabled, and Enabled

Default setting: Enabled

✧ ***Azalia HD Codec***

This item allows users to enable or disable internal HD codec for Azalia.

Available Options: Disabled, and Enabled

Default setting: Enabled

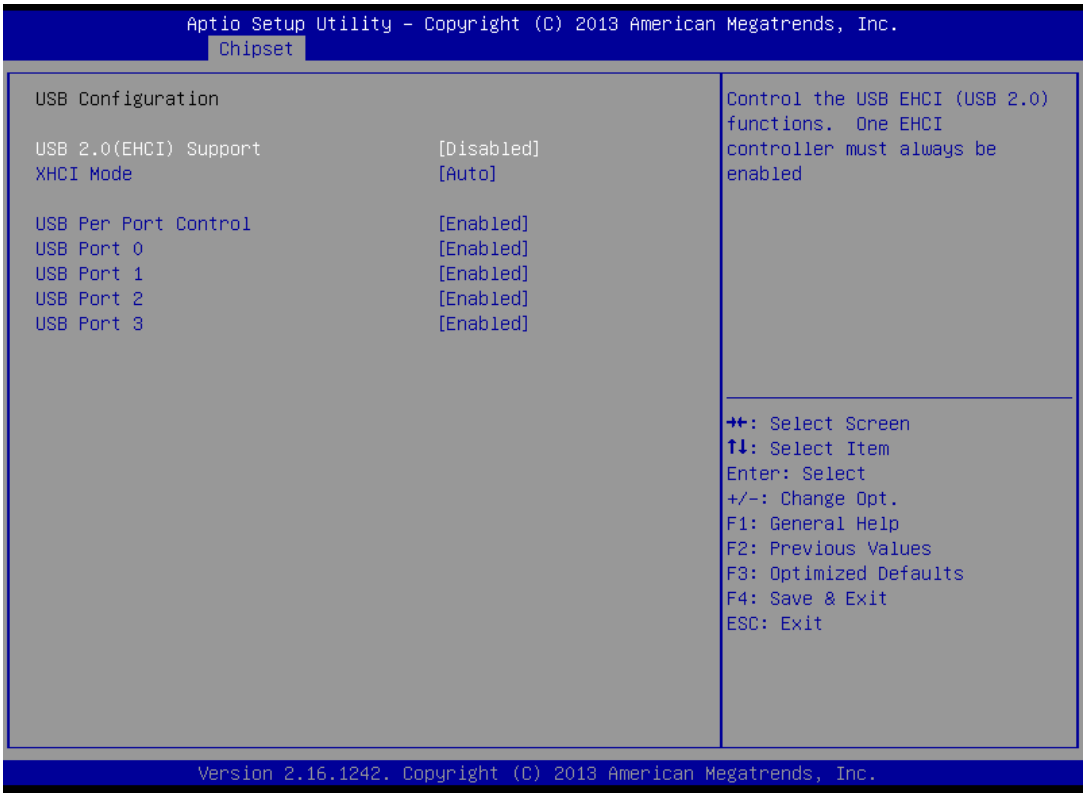
HD Port B (Display-3)

This item allows users to enable or disable internal HD Port B. *(Display-3)*

Available Options: Disabled, and Enabled

Default setting: Enabled

➢ **USB Configuration**



✧ ***USB 2.0(EHCI) Support***

This item allows users to enable or disable USB 2.0 (EHCI) Support. If an "OS Selection" selected is windows 7, the "XHCI Mode" support would be set to Disabled. (For Windows 7)

Available Options: Disabled, and Enabled

Default setting: Enabled

✧ ***XHCI Mode***

The item XHCI (eXtensible Host Controller Interface) a workaround for specification for Universal Serial Bus 3.0 support. If an "OS Selection" selected is windows 8, the "USB.2.0 (EHCI) support would be set to Disabled. (For Windows 8.x)

Available Options: Disabled, Auto, Smart Auto, and Enabled

Default setting: Disabled

✧ ***USB Per Port Control***

The USB Control each of the USB ports (0~3). Enable: Enable USB per port; Disable: Use USB port X settings

Available Options: Disabled, and Enabled

Default setting: Enabled

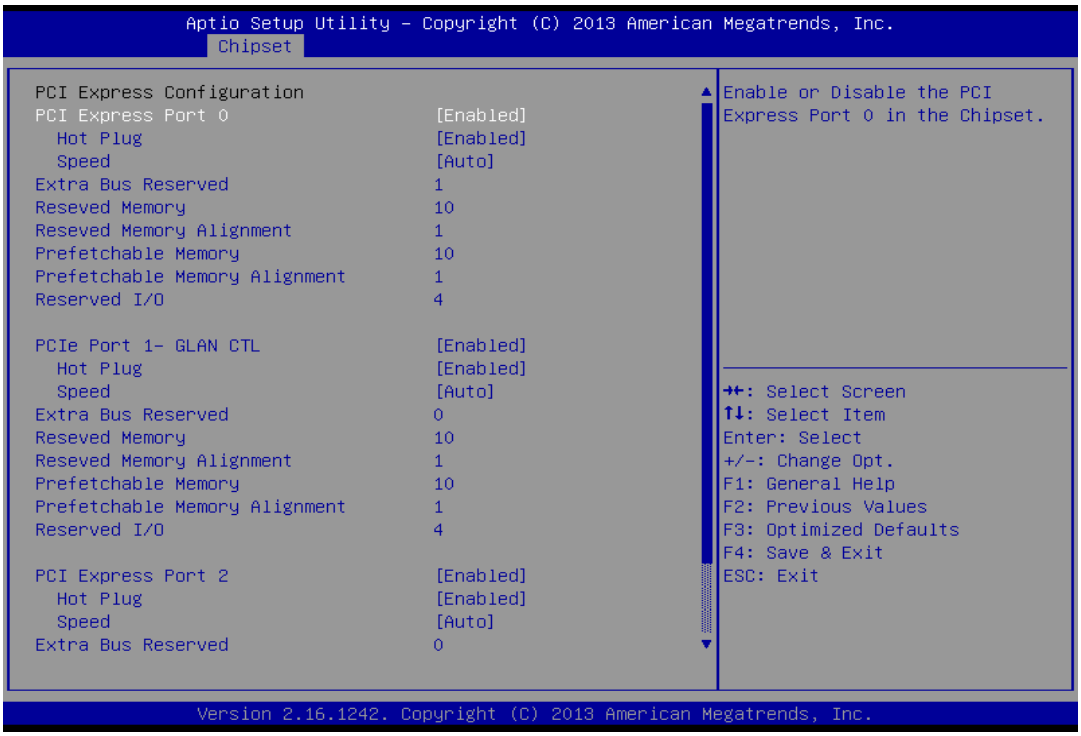
✧ ***USB Port 0/1/2/3***

The USB Control each of the USB ports (0~3).

Available Options: Disabled, and Enabled

Default setting: Enabled

➢ **PCI Express Configuration**



✧ ***PCI Express Port 0>Mini Card/1>GLAN/2> Reserved***

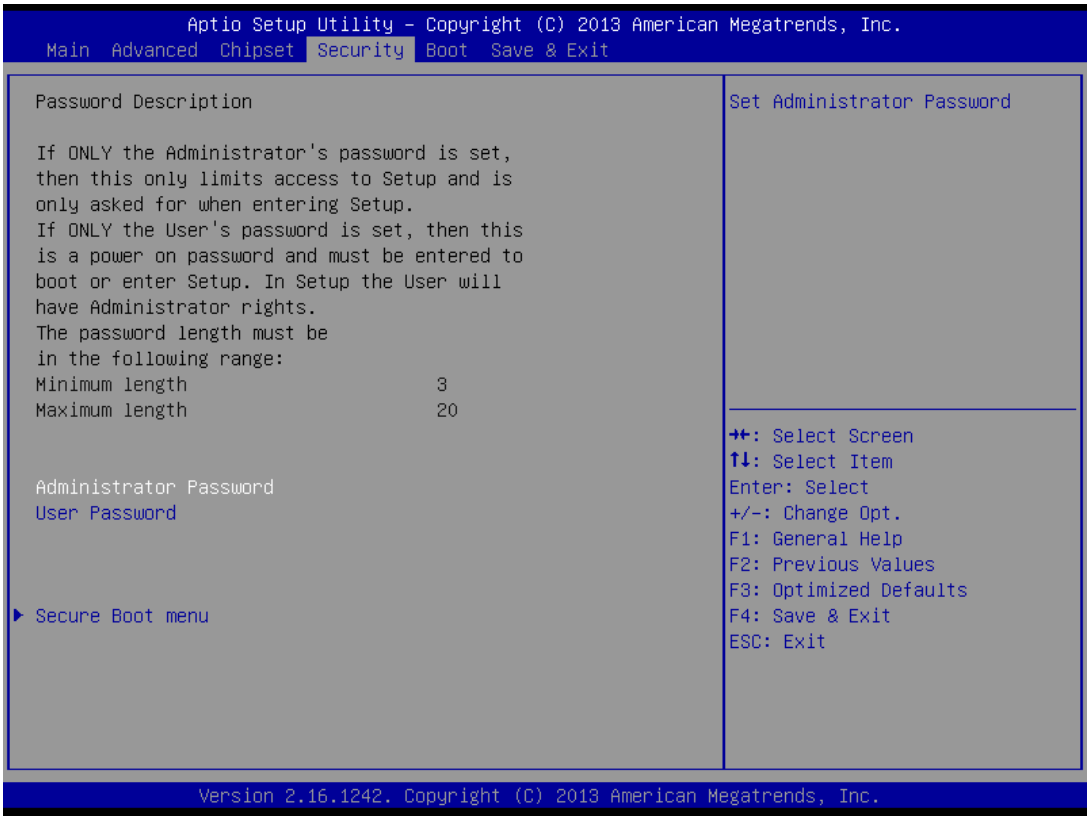
The onboard Mini card /LAN corresponding PCI Express port 0/1, the PCIe port 0/1 item allows users to enable or disable on board PCIe Mini card and LAN.

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**

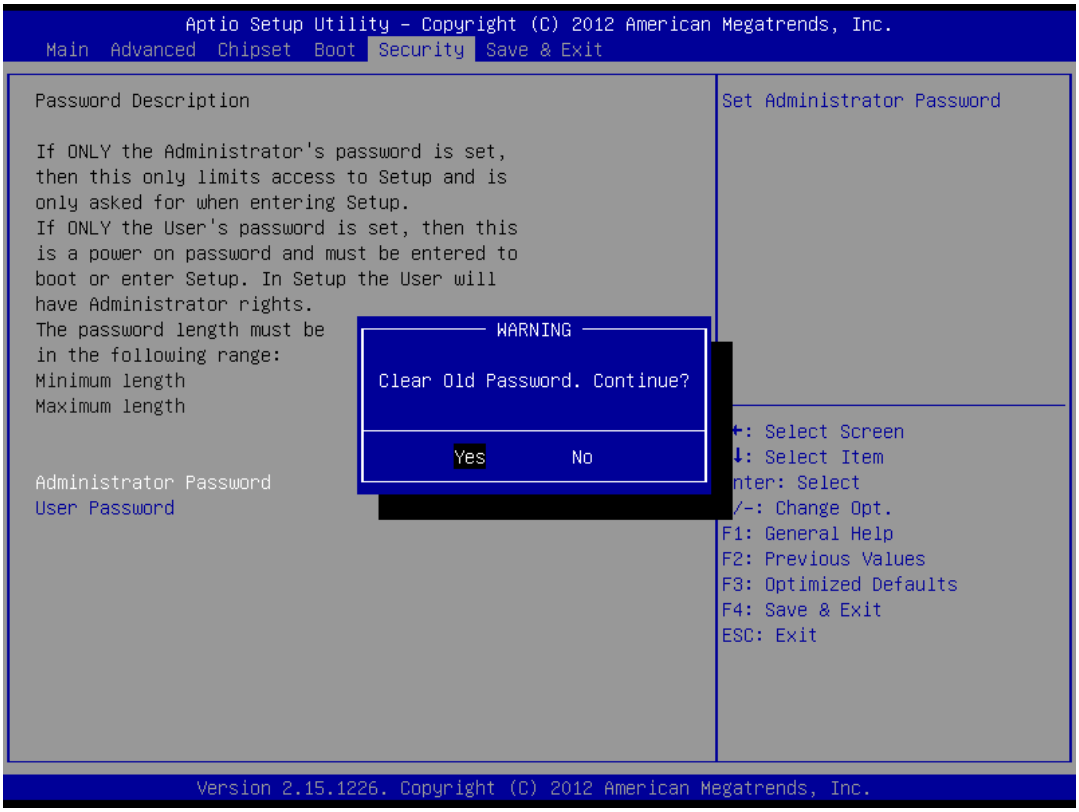
Select Administrator/User Password item, press <Enter> and type new password (up to 3 character length) and confirm new password. The screen does not display the characters entered.

✧ ***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.

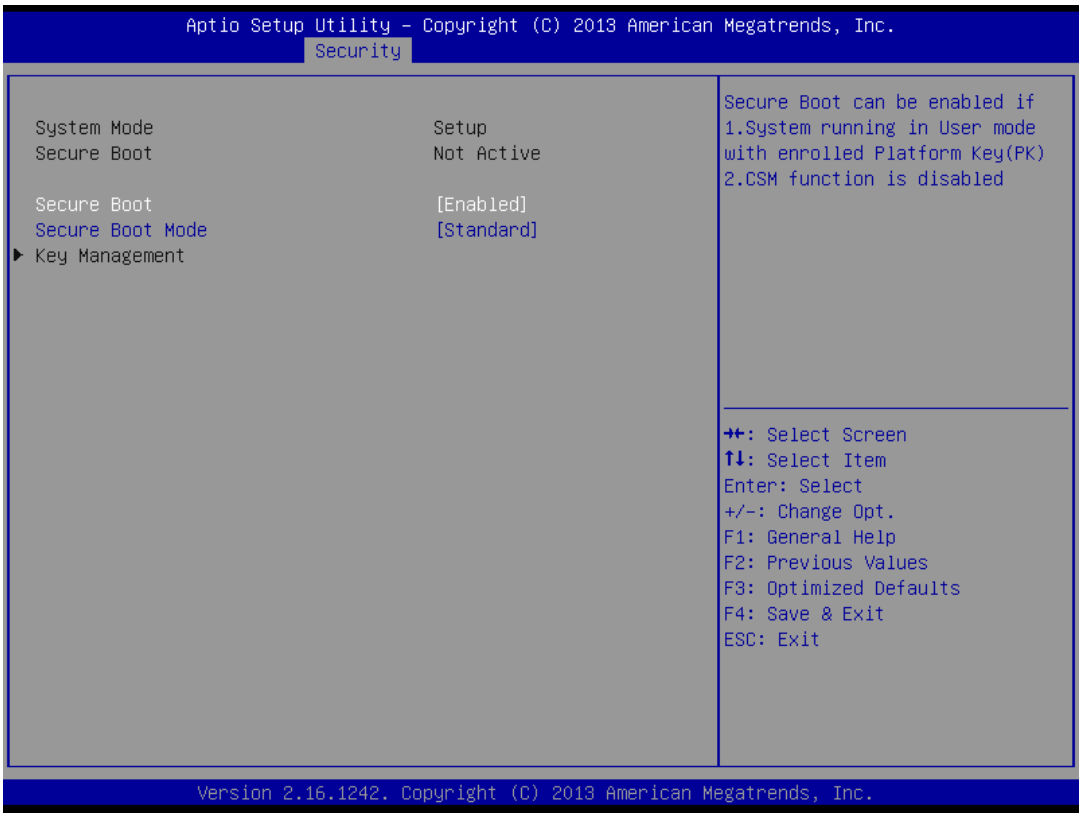
✧ ***Clear Old Password***

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: Disabled

✧ ***Secure Boot Mode***

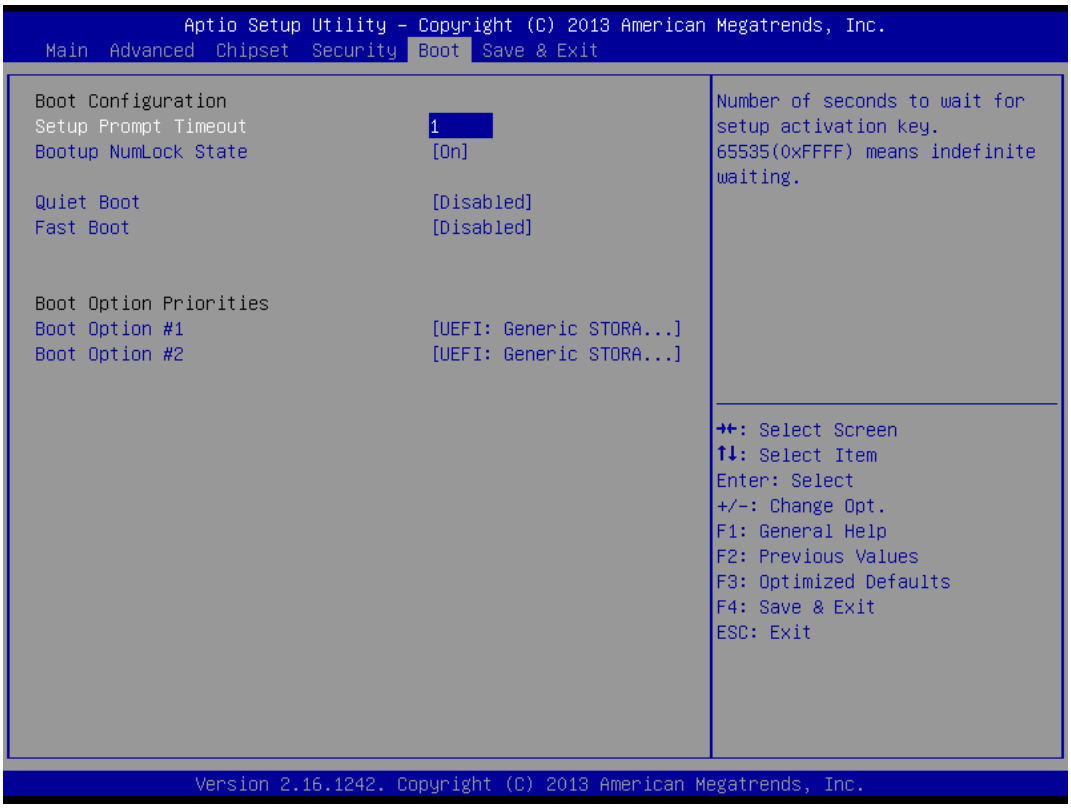
Secure Boot mode selector. 'Custom' Mode enables users to change Image Execution policy and manage Secure Boot Keys.

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

- **Fast Boot**

This field is used to activate the fast boot function of the system. When set to Enabled, boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.

Available Options: Disabled, Enabled

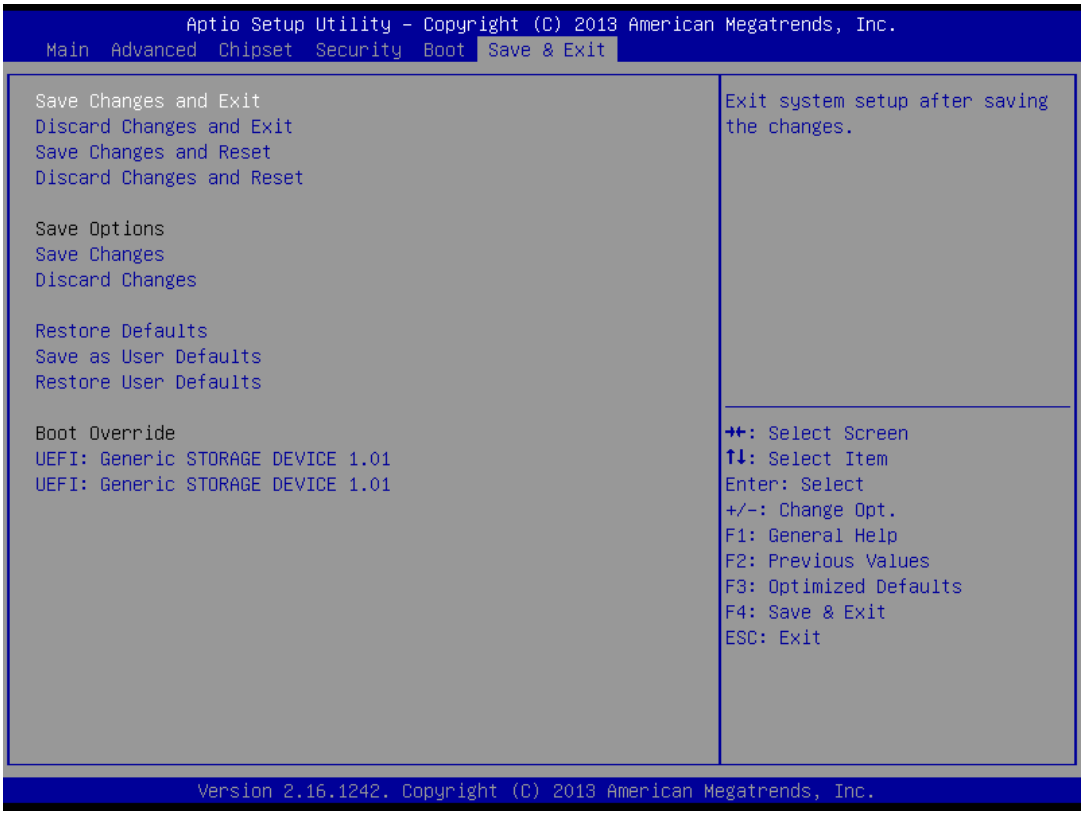
Default setting: Disabled

- **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 CD diskette includes FX5407 VGA, System, Audio, LAN and USB driver. To install and configure you FX5407 system, you need to perform the following steps.

Select you OS configuration to BIOS, when you Install Windows 7, Windows 8 or 8.1 need select BIOS setting.

System Driver

WIN 7/8 Driver

Installs Atom E3845 Chipset, Core PCI, PCIe, SATA, USB, ISAPnP and IDE/ATA Device Drive.

Step 1: To install the Atom E3845 driver, insert the CD ROM into the CD ROM device, and enter DRIVER>SysChip>E3845>WIN7 or >WIN8.

Step 2: Execute SetupChipser.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.

VGA Driver

WIN 7/8 x86/x64 Driver

Step 1: To install the VGA driver, insert the CD ROM into the CD ROM device, and enter DRIVER>VGA>E3845 >WIN7> or >WIN8>.

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.

Note: In the DRIVER>VGA>E3845>WIN7 or >WIN8 directory, a Readme.txt file is included to provide installation information.

Audio Driver

WIN 7/8 X86/X64 Driver

Step 1: To install the AUDIO driver, insert the CD ROM into the CD 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.

LAN Driver (RTL 8111F)

WIN 7 Driver X86/X64 Driver

Step 1: To install the LAN driver, insert the CD ROM into the CD ROM device, and enter DRIVER>LAN>RTL8111F>WIN7. If your system is not equipped with a CD ROM device, copy the LAN driver from the CD ROM to CF.

Step 2: Execute setup.exe file.

USB 3.0 Driver

WIN7 X86/X64 Driver

Step 1: To install the USB 3.0 XHCI driver, insert the CD ROM into the CD ROM device, and enter DRIVER>USB>E3845>WIN7.

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.

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.

Note: In the DRIVER> USB>E3845 >WIN7 directory, a Readme.txt file is included to provide installation information.

TXE Driver

WIN7 X86/X64 Driver

Step 1: To install the TXE driver, insert the CD ROM into the CD ROM device, and enter DRIVER>TXE>E3845>WIN7 or >WIN8.

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.

Note: In the DRIVER>TXE>E3845 >WIN7 or >WIN8 directory, a Readme.txt file is included to provide installation information. For Windows 7, it is necessary to install Windows update KB2685811 before installing TXE driver.

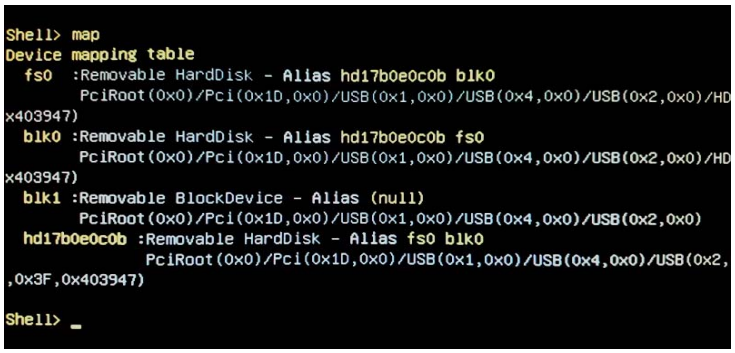
EFI BIOS Flash Utility

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

Step 1: Uncompress the fpt64.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)



Step 4: Use the "**fpt64 -f xxxxxVxx.bin"** program to update the new BIOS.

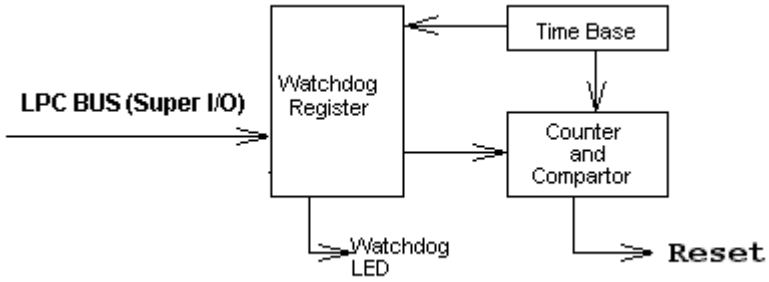
Step 5: Power off the system or use "**reset**" shell command, when BIOS update is successful the message will show "FPT Operation Passed".

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 FX5407 is equipped with a programmable time-out period watchdog timer. You can use your own program to Enabled 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 255 seconds or minutes.



The CD includes a Watch Dog demo file. In the WATCHDOG/ W83627HG /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.

Note: In the WATCHDOG/W83627HG directory, README.TXT file is included to provide demo program information.

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 FF 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
“	“	“
“	“	“
“	“	“
FF	FF	FF

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 an Assemble program, which demonstrates how to enable the watchdog timer and set the time-out period at 28 seconds.

```
;--------------------------------------------------------------------------------
; Enter the extended function mode, interruptible double-write
;--------------------------------------------------------------------------------
Mov     dx, 2eh         ; Enter to extended function mode
Mov     al, 87h
Out     dx,al
Out     dx,al
Mov     al,07h          ; Select register index 0x07
Out     dx,al
;-------------------------------------------------------------------------------------------------------------
; Logical device 8, configuration WD IO Port 308H register, CR60 Bit 1,2,CR61 Bit 0~7
;-------------------------------------------------------------------------------------------------------------
Mov     dx,2fh          ; Select LDN 8
Mov     al,08h
Out     dx,al
Mov     dX,2eh
Mov     al,60h          ; Select LDN 8 register index 0x60
Out     dx,al
Mov     dx,2fh
Mov     al,03h          ; Set Watch Dog timer base address high byte to 0x03h
Out     dx,al
Mov     dX,2eh
Mov     al,61h          ; Select LDN 8 register index 0x61
Out     dx,al
Mov     dx,2fh
Mov     al,20h          ; Set Watch Dog Timer base address low byte to 0x08h
Out     dx,al
-------------------------------------------------------------------------------------------------------------
; Logical device 8, configuration register, CR30 Bit 0, Enable Watch Dog Timer Device
;-------------------------------------------------------------------------------------------------------------
Mov     dX,2eh
Mov     al,30h          ; Select LDN 8 register index 0x30
Out     dx,al
Mov     dx,2fh
Mov     al,01h          ; Enable Watch Dog Timer Device
;Mov    al,00h          ; Disable Watch Dog Timer Device
Out     dx,al
;-----------------------------------------
; Exit extended function mode
;-----------------------------------------
Mov     dx,2eh
Mov     al,0aah
Out     dx,al
```

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.

```
;--------------------------------------------------------------------------------------------------------------
; Set Watch Dog timer to 20 second used base address 308H~309H:
; 308H- Bit 0 read state: When '0' is no time out occur, '1' is timer out occurred
; And write "1" is clear out status.
; 309H is timer unit: Bit1 is set to unit second and Bit2 is set to unit minute.
;--------------------------------------------------------------------------------------------------------------
Mov     ax,03h      ;Select unit to Second (Bit-1) and clear time out status (Bit-0)
;Mov    ax,05h      ;Select unit to Minute (Bit-2) and clear time out status (Bit-0)
Mov     dx,308h
Out     dx,ax
Mov     ax,14h      ;Set timer to 20 second and enable time
Mov     dx,309h
Out     dx,ax       ; Write the same non-zero value twice to enable the timer,
Out     dx,ax       ; otherwise will disable timer.
```

Watchdog Timer Disabled

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

```
;--------------------------------------------------------------------------------------------------------------
; Enter the extended function mode, interruptible double-write
;--------------------------------------------------------------------------------------------------------------
Mov     dx, 309h    ; Enter to extended function mode
Mov     al, 00h
Out     dx,al
Out     dx,al
```

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 ~ 70°C

Relative humidity 5 % to 95 % non-condensing

Surface Temperature of Chassis：

5°C to 45°C (W/HDD)/-20°C to 70°C (W W.T /CFAST card or SSD)

- **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)**

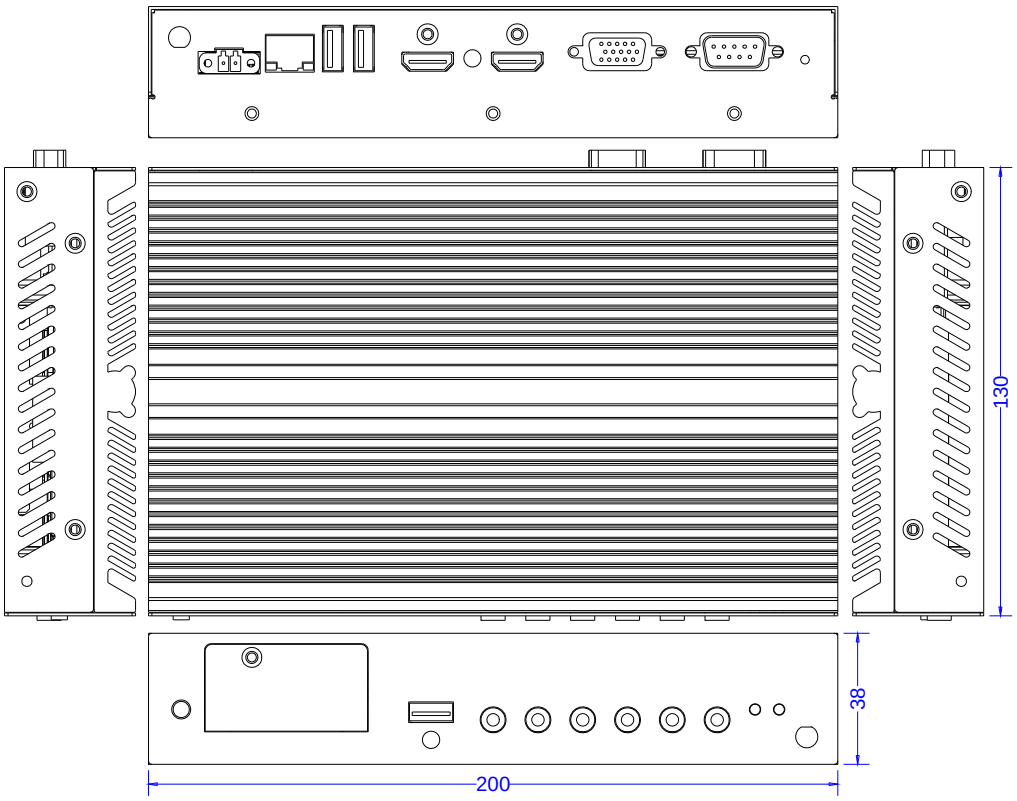
	LS	MS
Bit 0:	Bit 0	Bit 8
Bit 1:	Bit 1	Bit 9
Bit 2:	Bit 2	Bit 10
Bit 3:	Bit 3	Bit 11
Bit 4:	Bit 4	Bit 12
Bit 5:	Bit 5	Bit 13
Bit 6:	Bit 6	Bit 14
Bit 7:	Bit 7	Bit 15

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

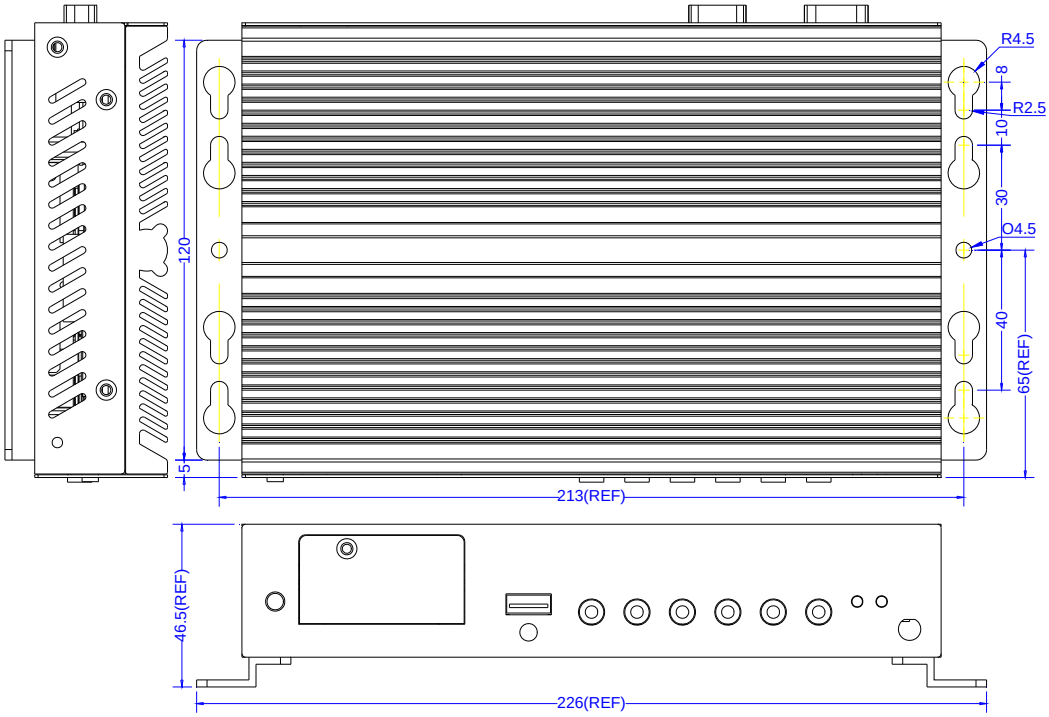
Appendix

Dimension

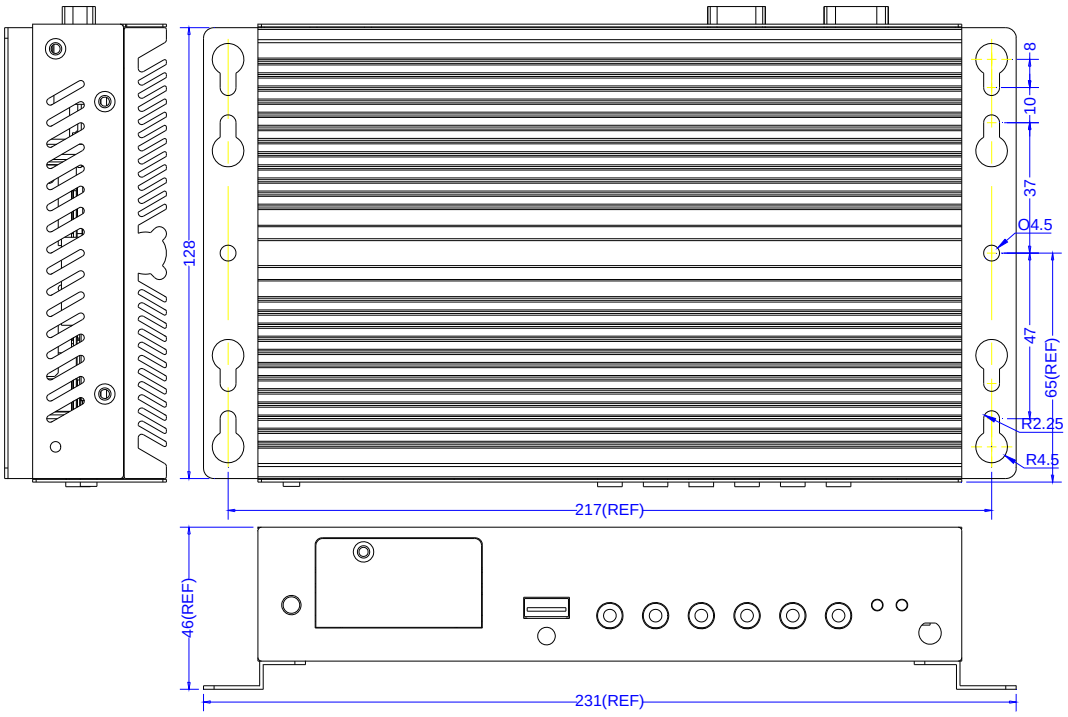
a. FX5407



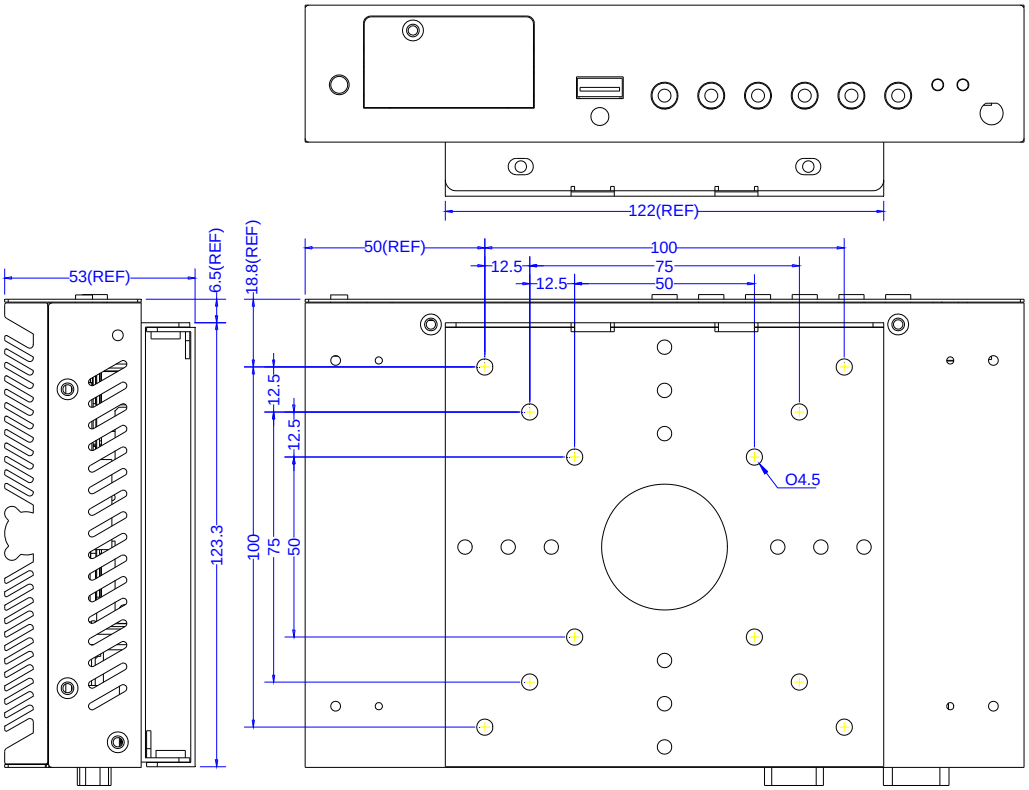
b. FX5407k1



c. FX5407k2



c. FX5407k3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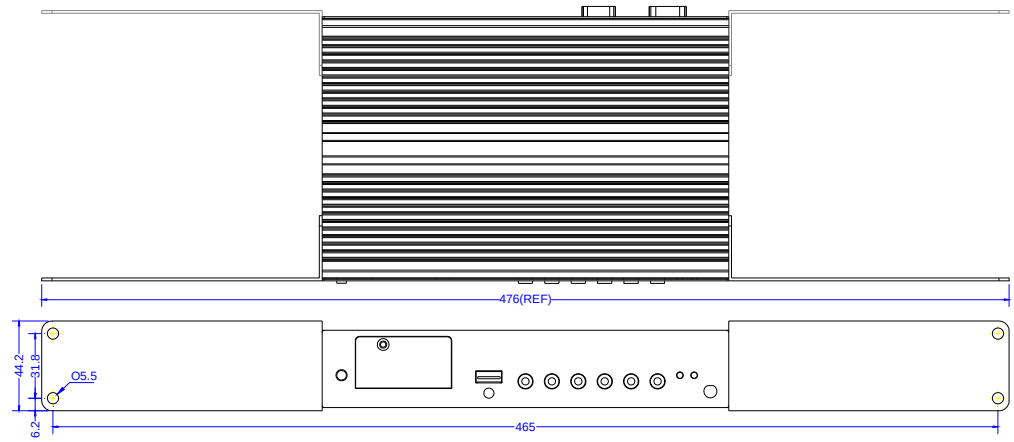

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