

MS-99A1

Qseven Carrier Board



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Trademarks

All trademarks are the properties of their respective owners.

Revision History

Revision	Date
V1.0	2015/11

Technical Support

If a problem arises with your system and no solution can be obtained from the user's manual, please contact your place of purchase or local distributor. Alternatively, please try the following help resources for further guidance.

Visit the MSI website for technical guide, BIOS updates, driver updates and other information, or contact our technical staff via <http://www.msi.com/support/>

Safety Instructions

- Always read the safety instructions carefully.
- Keep this User's Manual for future reference.
- Keep this equipment away from humidity.
- Lay this equipment on a reliable flat surface before setting it up.
- The openings on the enclosure are for air convection hence protects the equipment from overheating. **DO NOT COVER THE OPENINGS.**
- Make sure the voltage of the power source and adjust properly 110/220V before connecting the equipment to the power inlet.
- Place the power cord such a way that people can not step on it. Do not place anything over the power cord.
- Always Unplug the Power Cord before inserting any add-on card or module.
- All cautions and warnings on the equipment should be noted.
- Never pour any liquid into the opening that could damage or cause electrical shock.
- If any of the following situations arises, get the equipment checked by service personnel:
 - The power cord or plug is damaged.
 - Liquid has penetrated into the equipment.
 - The equipment has been exposed to moisture.
 - The equipment does not work well or you can not get it work according to User's Manual.
 - The equipment has dropped and damaged.
 - The equipment has obvious sign of breakage.
- **DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT UNCONDITIONED, STORAGE TEMPERATURE ABOVE 60°C (140°F), IT MAY DAMAGE THE EQUIPMENT.**

Chemical Substances Information

In compliance with chemical substances regulations, such as the EU REACH Regulation (Regulation EC No. 1907/2006 of the European Parliament and the Council), MSI provides the information of chemical substances in products at:

http://www.msi.com/html/popup/csr/evmtprrt_pcm.html

Battery Information



European Union:

Batteries, battery packs, and accumulators should not be disposed of as unsorted household waste. Please use the public collection system to return, recycle, or treat them in compliance with the local regulations.



廢電池請回收

Taiwan:

For better environmental protection, waste batteries should be collected separately for recycling or special disposal.



California, USA:

The button cell battery may contain perchlorate material and requires special handling when recycled or disposed of in California.

For further information please visit:

<http://www.dtsc.ca.gov/hazardouswaste/perchlorate/>

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.

CE Conformity

Hereby, Micro-Star International CO., LTD declares that this device is in compliance with the essential safety requirements and other relevant provisions set out in the European Directive.



FCC-A Radio Frequency Interference Statement



This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Notice 1

The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Notice 2

Shielded interface cables and AC power cord, if any, must be used in order to comply with the emission limits.

VOIR LA NOTICE D'INSTALLATION AVANT DE RACCORDER AU RESEAU.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- 1) this device may not cause harmful interference, and
- 2) this device must accept any interference received, including interference that may cause undesired operation.

WEEE Statement

Under the European Union ("EU") Directive on Waste Electrical and Electronic Equipment, Directive 2002/96/EC, which takes effect on August 13, 2005, products of "electrical and electronic equipment" cannot be discarded as municipal waste anymore and manufacturers of covered electronic equipment will be obligated to take back such products at the end of their useful life. MSI will comply with the product take back requirements at the end of life of MSI-branded products that are sold into the EU. You can return these products to local collection points.



Japan JIS C 0950 Material Declaration

A Japanese regulatory requirement, defined by specification JIS C 0950, mandates that manufacturers provide material declarations for certain categories of electronic products offered for sale after July 1, 2006.

http://www.msi.com/html/popup/csr/cemm_jp.html

http://tw.msi.com/html/popup/csr_tw/cemm_jp.html

日本JIS C 0950材質宣言

日本工業規格JIS C 0950により、2006年7月1日以降に販売される特定分野の電気および電子機器について、製造者による含有物質の表示が義務付けられます。

http://www.msi.com/html/popup/csr/cemm_jp.html

http://tw.msi.com/html/popup/csr_tw/cemm_jp.html

India RoHS

This product complies with the "India E-waste (Management and Handling) Rule 2011" and prohibits use of lead, mercury, hexavalent chromium, polybrominated biphenyls or polybrominated diphenyl ethers in concentrations exceeding 0.1 weight % and 0.01 weight % for cadmium, except for the exemptions set in Schedule 2 of the Rule.

Turkey EEE Regulation

Conforms to the EEE Regulations of the Republic Of Turkey

Türkiye EEE yönetmeliği

Türkiye Cumhuriyeti: EEE Yönetmeliğine Uygundur

Ukraine Restriction of Hazardous Substances

The equipment complies with requirements of the Technical Regulation, approved by the Resolution of Cabinet of Ministry of Ukraine as of December 3, 2008 № 1057, in terms of restrictions for the use of certain dangerous substances in electrical and electronic equipment.

Україна обмеження на наявність небезпечних речовин

Обладнання відповідає вимогам Технічного регламенту щодо обмеження використання деяких небезпечних речовин в електричному та електронному обладнанні, затвердженого постановою Кабінету Міністрів України від 3 грудня 2008 № 1057.

Vietnam RoHS

As from December 1, 2012, all products manufactured by MSI comply with Circular 30/2011/TT-BCT temporarily regulating the permitted limits for a number of hazardous substances in electronic and electric products.

Việt Nam RoHS

Kể từ ngày 01/12/2012, tất cả các sản phẩm do công ty MSI sản xuất tuân thủ Thông tư số 30/2011/TT-BCT quy định tạm thời về giới hạn hàm lượng cho phép của một số hóa chất độc hại có trong các sản phẩm điện, điện tử"

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1 Overview

Thank you for choosing the MS-99A1, an excellent Qseven Carrier Board. It is a highly advanced, feature-rich carrier that offers PCIe and Mini-PCIe expansion. This carrier board also features USB 3.0/USB 2.0 ports, an HDMI port, a DisplayPort, LVDS interface, serial port connectors, audio connectors, a SATA port, Gigabit LAN jacks, etc.

Board Specifications

Storage

- 1 x SATA 6Gb/s Port
- 1 x SD Card Slot

Network

- LAN1: Based on CPU Module Board
- LAN2 ~ LAN6: Intel I211-AT GbE LAN

Audio

- Realtek ALC887 Audio Codec
- 1 x Front Audio Connector
- 1 x Amplifier Connector

Graphics

- HDMI, DisplayPort, LVDS Interfaces

Onboard Headers/ Connectors/ Jumpers

- 1 x 4-pin DC Power Connector
- 1 x 4-pin SATA Power Connector
- 1 x System FAN Connector
- 1 x CPU FAN Connector
- 1 x SATA 6Gb/s Port
- 1 x Front Panel Connector
- 1 x Front Audio Connector
- 1 x Amplifier Connector
- 4 x RS232 Serial Port Connectors
- 1 x UART Connector
- 1 x GPIO Connector
- 1 x SMBus Connector
- 1 x CAN Bus Connector (Depending on CPU Module Board)
- 1 x USB 2.0 Connector (1 port)
- 1 x LVDS Connector
- 1 x Inverter Connector
- 1 x Keyboard/Mouse Connector
- 1 x Chassis Intrusion Header
- 1 x BIOS Select Jumper
- 1 x Inverter Power Jumper
- 1 x LVDS Power Jumper
- 1 x I2C Power Jumper
- 1 x AT/ATX Select Jumper
- 3 x COM Port Power Jumpers
- 5 x LAN NVM Jumpers

Rear Panel I/O

- 2 x RS232/422/485 Serial Ports
- 1 x HDMI Port
- 1 x DisplayPort
- 6 x Gigabit LAN Jacks
- 2 x USB 3.0 Ports
- 2 x USB 2.0 Ports

Expansion Slots

- 1 x MXM Slot
- 1 x PCIe x1 Slot
- 2 x Mini-PCIE Slots
 - MINI_PCIE1 supports full-size mSATA, WiFi and Bluetooth modules with USB 2.0 signal.
 - MINI_PCIE2 supports full-size WiFi/Bluetooth/3G modules with USB 2.0 signal. (Optional by SKU)
- 1 x SIM Card Slot (Optional by SKU)

Form Factor

- Mini-ITX: 170mm x 170mm

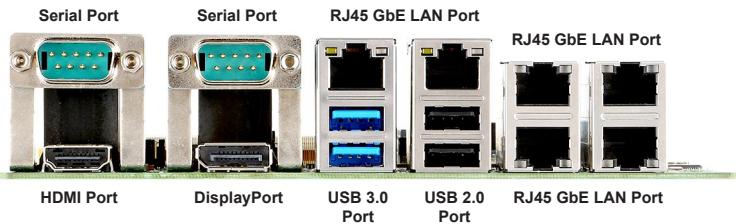
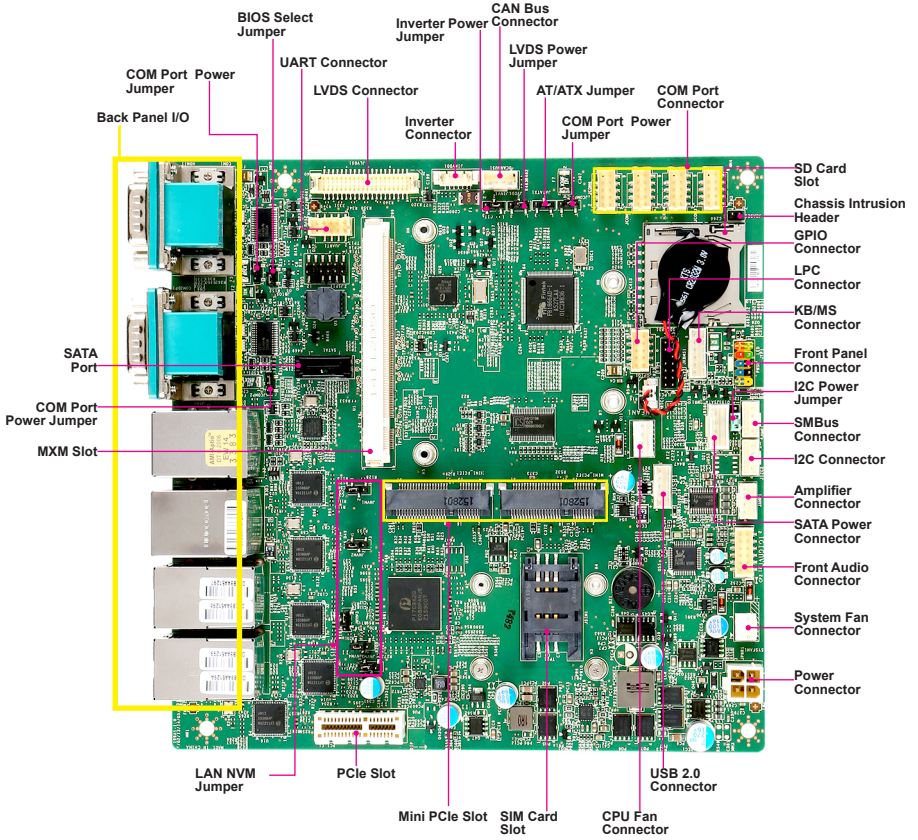
Environmental

- Operating Temperature: -10 ~ 60°C
- Storage Temperature: -20 ~ 80°C
- Humidity: 10 ~ 90% RH, non-condensing

Regulatory Compliance

- EMC: CE, FCC, BSMI, RCM, VCCI
- RoHS compliant

Board Layout



2 Hardware Setup



This chapter provides you with the information about hardware setup procedures. While doing the installation, be careful in holding the components and follow the installation procedures. For some components, if you install in the wrong orientation, the components will not work properly.

Use a grounded wrist strap before handling computer components. Static electricity may damage the components.

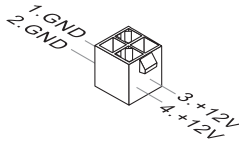
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Power Supply

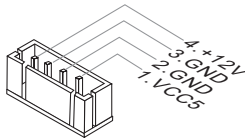
DC-In Power Connector: JPWR1

This connector is used to provide power to the motherboard.



SATA Power Connector: JSATA_PWR1

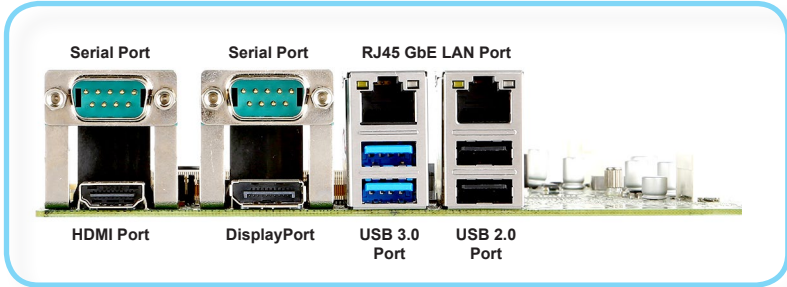
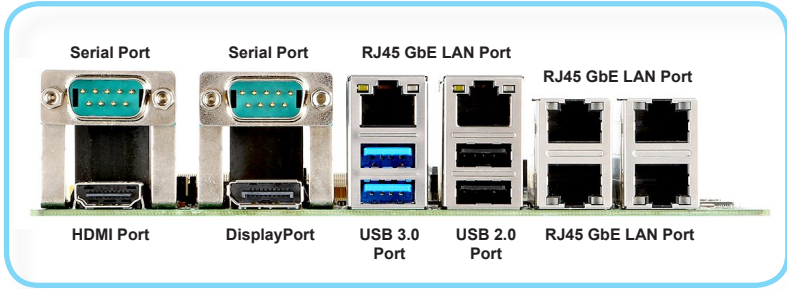
This connector is used to provide power to SATA devices.



Important

Make sure that all power connectors are connected to the power supply to ensure stable operation of the motherboard.

Rear Panel I/O



➤ RS232/422/485 Serial Port

The serial port is a 16550A high speed communications port that sends/ receives 16 bytes FIFOs. You can attach a serial mouse or other serial devices directly to the connector.

RS232

PIN	SIGNAL	DESCRIPTION
1	DCD	Data Carrier Detect
2	RXD	Receive Data
3	TXD	Transmit Data
4	DTR	Data Terminal Ready
5	GND	Signal Ground
6	DSR	Data Set Ready
7	RTS	Request To Send
8	CTS	Clear To Send
9	VCC_COM1	Voltage select setting by jumper

RS422

PIN	SIGNAL	DESCRIPTION
1	422 TXD-	Transmit Data, Negative
2	422 RXD+	Receive Data, Positive
3	422 TXD+	Transmit Data, Positive
4	422 RXD-	Receive Data, Negative
5	GND	Signal Ground
6	NC	No Connection
7	NC	No Connection
8	NC	No Connection
9	NC	No Connection

RS485

PIN	SIGNAL	DESCRIPTION
1	485 TXD-	Transmit Data, Negative
2	NC	No Connection
3	485 TXD+	Transmit Data, Positive
4	NC	No Connection
5	GND	Signal Ground
6	NC	No Connection
7	NC	No Connection
8	NC	No Connection
9	NC	No Connection

➤ **HDMI Port**  **HDMI**[™]
HIGH-DEFINITION MULTIMEDIA INTERFACE

The High-Definition Multimedia Interface (HDMI) is an all-digital audio/video interface capable of transmitting uncompressed streams. HDMI supports all TV format, including standard, enhanced, or high-definition video, plus multi-channel digital audio on a single cable.

➤ **DisplayPort**

DisplayPort is a digital display interface standard. This connector is used to connect a monitor with DisplayPort inputs.

➤ **USB 3.0 Port**

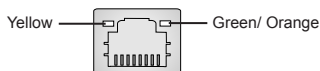
The USB 3.0 port is backward-compatible with USB 2.0 devices and supports data transfer rate up to 5 Gbit/s (SuperSpeed).

➤ **USB 2.0 Port**

The USB (Universal Serial Bus) port is for attaching USB devices such as keyboard, mouse, or other USB-compatible devices.

► RJ45 GbE LAN Port

The standard RJ-45 LAN jack is for connection to the Local Area Network (LAN). You can connect a network cable to it.

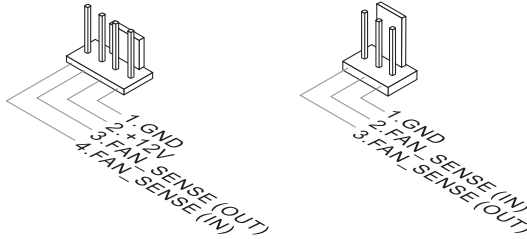


LED	Color	LED State	Condition
Left	Yellow	Off	LAN link is not established.
		On (steady state)	LAN link is established.
		On (blinking)	The computer is communicating with another computer on the LAN.
Right	Green	Off	10 Mbit/sec data rate is selected.
		On	100 Mbit/sec data rate is selected.
	Orange	On	1000 Mbit/sec data rate is selected.

Connector

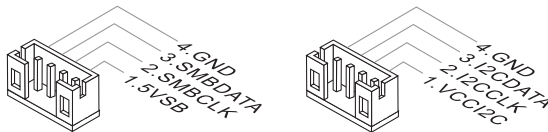
Fan Power Connector: CPUFAN1, SYSFAN1

The fan power connectors support system cooling fan with +12V. When connecting the wire to the connectors, always note that the red wire is the positive and should be connected to the +12V; the black wire is Ground and should be connected to GND.



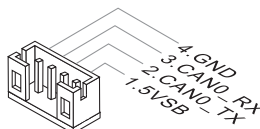
SMBus/I2C Bus Connector: JSMB1, JI2C2 (This function depends on CPU module board)

This connector, known as I2C, is for users to connect System Management Bus (SMBus) interface.



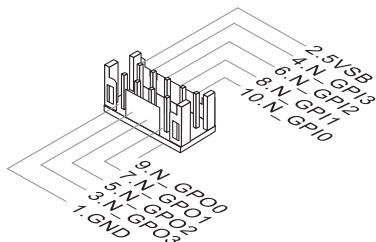
CAN Bus Connector: JCANBUS1 (This function depends on CPU module board)

Controller Area Network (CAN or CAN-bus) is a message based protocol designed specifically for automotive applications but now is also used in other areas such as industrial automation and medical equipment. The bus connector for the CAN Bus is used to connect a CAN Bus participant to the CAN Bus line.



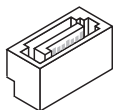
GPIO Pin Header: JGPIO1

This connector is provided for the General-Purpose Input/Output (GPIO) peripheral module.



Serial ATA Connector: SATA1

This connector is a high-speed Serial ATA Gen3 interface port. Each connector can connect to one Serial ATA device.

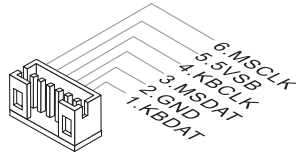


Important

Please do not fold the SATA cable into a 90-degree angle. Otherwise, data loss may occur during transmission.

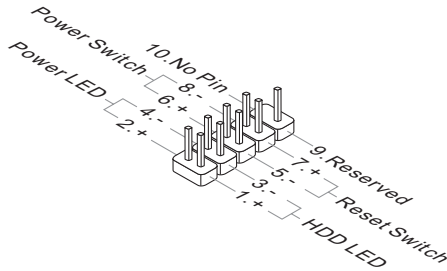
Keyboard/Mouse Connector: JKBMS1

This connector is provided to connect a keyboard and a mouse.



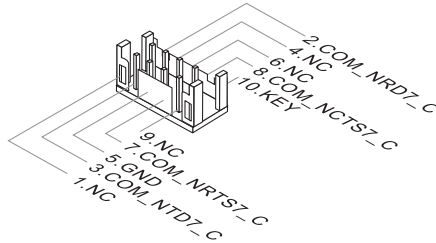
Front Panel Connector: JFP1

This front panel connector is provided for electrical connection to the front panel switches & LEDs and is compliant with Intel Front Panel I/O Connectivity Design Guide.



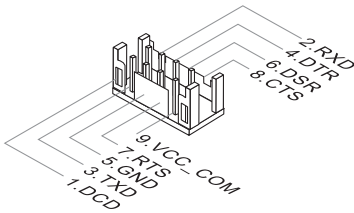
UART Connector: JUART1 (This function depends on CPU module board)

Universal Asynchronous Receiver-Transmitter (UART) is responsible for asynchronous communications on the system and manages the system's serial communication (COM) ports.



Serial Port Connector: JCOM3, JCOM4, JCOM5, JCOM6

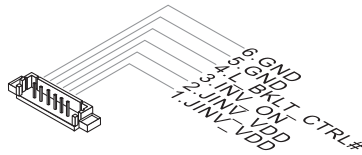
This connector is a 16550A high speed communications port that sends/receives 16 bytes FIFOs. You can attach a serial device to it.



PIN	SIGNAL	DESCRIPTION
1	DCD	Data Carrier Detect
2	RXD	Receive Data
3	TXD	Transmit Data
4	DTR	Data Terminal Ready
5	GND	Signal Ground
6	DSR	Data Set Ready
7	RTS	Request To Send
8	CTS	Clear To Send
9	VCC_COM	12V or 5V power output, selected by jumper

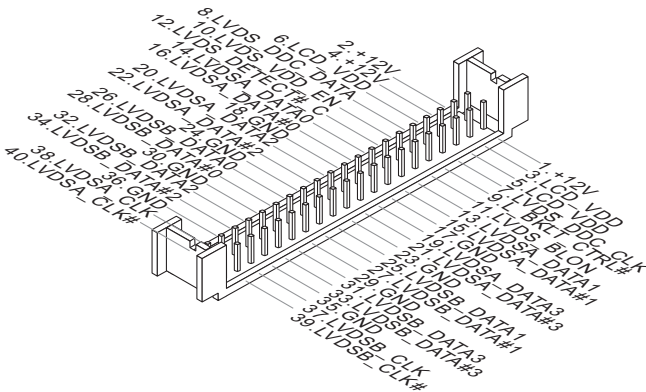
LVDS Inverter Connector: JINVDD1

The connector is provided for LCD backlight options.



LVDS Connector: JLVDS1

The LVDS (Low Voltage Differential Signal) connector provides a digital interface typically used with flat panels. After connecting an LVDS interface flat panel to the JLVDS1, be sure to check the panel datasheet and set the LVDS jumper to proper power voltage.

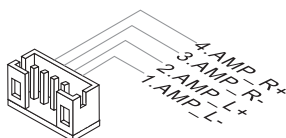


Important

Pin 12 is a detect pin. When using a customized LVDS cable, pin 12 should be a signal ground with a low impedance. Otherwise, LVDS will not function.

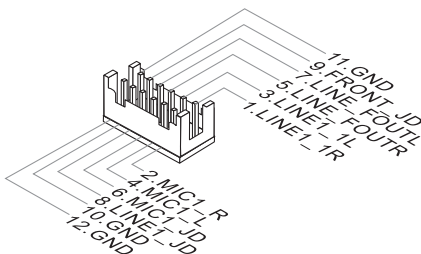
Audio Amplifier Header: JAMP1

The connector is used to connect audio amplifiers to enhance audio performance.



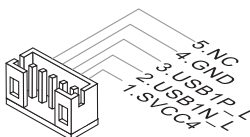
Front Audio Connector: JAUDIO1

This connector allows you to connect the front panel audio and is compliant with Intel Front Panel I/O Connectivity Design Guide.



USB 2.0 Connector: JUSB1

This connector, compliant with Intel I/O Connectivity Design Guide, is ideal for connecting high-speed USB interface peripherals such as USB HDD, digital cameras, MP3 players, printers, modems and the like.

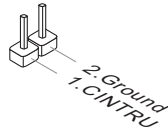


Important

Note that the pins of VCC and GND must be connected correctly to avoid possible damage.

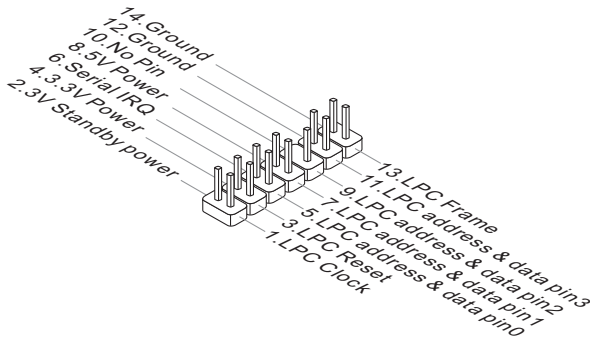
Chassis Intrusion Header: JCASE1

This connector connects to the chassis intrusion switch cable. If the computer case is opened, the chassis intrusion mechanism will be activated. The system will record this intrusion and a warning message will flash on screen. To clear the warning, you must enter the BIOS utility and clear the record.



LPC Debug Port Connector: JLPC1

This connector is LPC debug port.



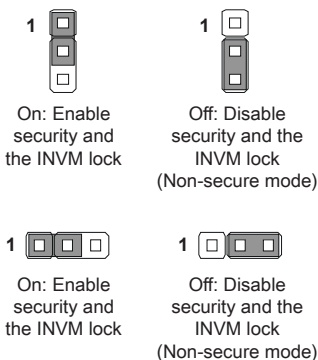
Jumper

Important

Avoid adjusting jumpers when the system is on; it will damage the motherboard.

NVM LAN Jumper: JNVM1, JNVM2, JNVM3, JNVM4, JNVM5

Use this jumper to specify the operation of LAN.



AT/ATX Select Jumper: JATATX1

This jumper allows users to select between AT and ATX power.



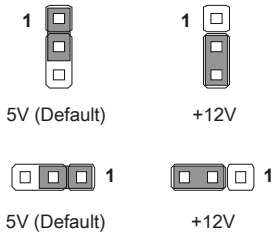
I2C Power Jumper: JI2C1

This jumper allows users to specify the operation voltage of the I2C Bus.



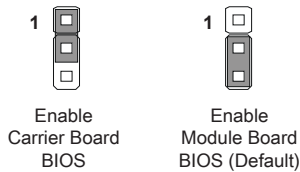
COM Port Power Jumper: JCOMP1, JCOMP2, JCOMP3

These jumpers specify the operation voltage of the onboard serial ports.



BIOS Select Jumper: JBIOS1

This jumper is used to enable/disable the BIOS flash. When you intend to update the BIOS code, short connect pin#2-3 first. Under normal operation, we suggest that you enable the BIOS flash protection by short connecting pin#1-2 to protect the system BIOS from virus infection.



LVDS Power Jumper: JVDD1

Use this jumper to specify the operation voltage of the LVDS interface flat panel.



Inverter Power Jumper: JINV1

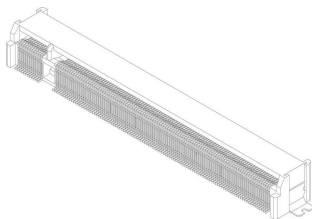
Use this jumper to specify the operation voltage of the inverter module.



Slot

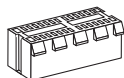
Qseven Connector Slot

There are 115 edge fingers on the top and bottom side of the Qseven® module that mate with the MXM connector.



PCIe (Peripheral Component Interconnect Express) Slot

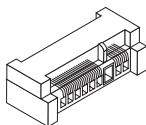
The PCI Express slot supports PCIe interface expansion cards.



PCIe x1 slot

Mini-PCIe (Peripheral Component Interconnect Express) Slot

The Mini-PCIe slot is provided for wireless LAN cards, TV tuner cards, Robson NAND Flash cards and other Mini-PCIe cards.



Important

When adding or removing expansion cards, make sure that you unplug the power supply first. Meanwhile, read the documentation for the expansion card to configure any necessary hardware or software settings for the expansion card, such as jumpers, switches or BIOS configuration.

3 BIOS Setup

This chapter provides information on the BIOS Setup program and allows users to configure the system for optimal use.

Users may need to run the Setup program when:

- An error message appears on the screen at system startup and requests users to run SETUP.
- Users want to change the default settings for customized features.

Important

- *Please note that BIOS update assumes technician-level experience.*
- *As the system BIOS is under continuous update for better system performance, the illustrations in this chapter should be held for reference only.*

Entering Setup

Power on the computer and the system will start POST (Power On Self Test) process. When the message below appears on the screen, press or <F2> key to enter Setup.

Press or <F2> to enter SETUP

If the message disappears before you respond and you still wish to enter Setup, restart the system by turning it OFF and On or pressing the RESET button. You may also restart the system by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys.

Important

The items under each BIOS category described in this chapter are under continuous update for better system performance. Therefore, the description may be slightly different from the latest BIOS and should be held for reference only.

Control Keys

← →	Select Screen
↑ ↓	Select Item
Enter	Select
+ -	Change Option
F1	General Help
F7	Previous Values
F9	Optimized Defaults
F10	Save & Exit
Esc	Exit

Getting Help

After entering the Setup menu, the first menu you will see is the Main Menu.

Main Menu

The main menu lists the setup functions you can make changes to. You can use the arrow keys (↑ ↓) to select the item. The on-line description of the highlighted setup function is displayed at the bottom of the screen.

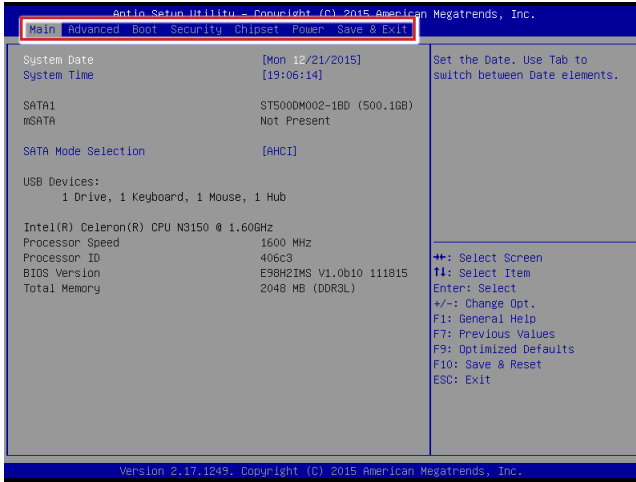
Sub-Menu

If you find a right pointer symbol appears to the left of certain fields that means a sub-menu can be launched from this field. A sub-menu contains additional options for a field parameter. You can use arrow keys (↑ ↓) to highlight the field and press <Enter> to call up the sub-menu. Then you can use the control keys to enter values and move from field to field within a sub-menu. If you want to return to the main menu, just press the <Esc >.

General Help <F1>

The BIOS setup program provides a General Help screen. You can call up this screen from any menu by simply pressing <F1>. The Help screen lists the appropriate keys to use and the possible selections for the highlighted item. Press <Esc> to exit the Help screen.

The Menu Bar



► Main

Use this menu for basic system configurations, such as time, date, etc.

► Advanced

Use this menu to set up the items of special enhanced features.

► Boot

Use this menu to specify the priority of boot devices.

► Security

Use this menu to set supervisor and user passwords.

► Chipset

This menu controls the advanced features of the onboard chipsets.

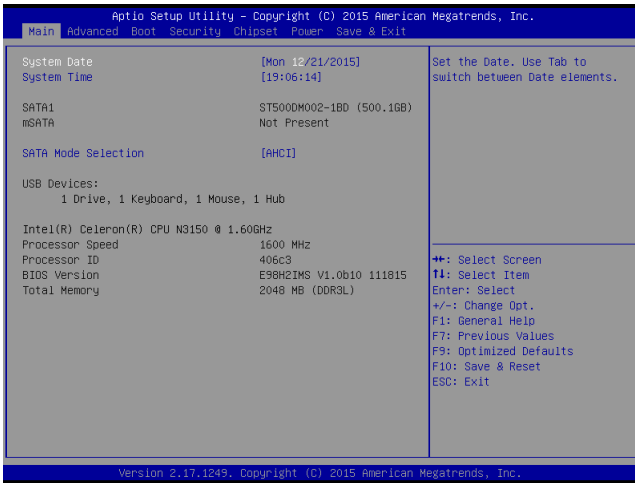
► Power

Use this menu to specify your settings for power management.

► Save & Exit

This menu allows you to load the BIOS default values or factory default settings into the BIOS and exit the BIOS setup utility with or without changes.

Main



► System Date

This setting allows you to set the system date. The date format is <Day>, <Month> <Date> <Year>.

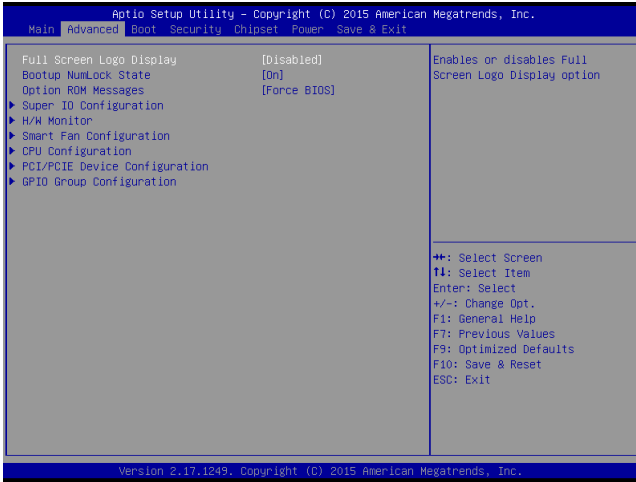
► System Time

This setting allows you to set the system time. The time format is <Hour> <Minute> <Second>.

► SATA Mode Selection

This setting specifies the SATA controller mode.

Advanced



► Full Screen Logo Display

This BIOS feature determines if the BIOS should hide the normal POST messages with the motherboard or system manufacturer's full-screen logo.

When it is enabled, the BIOS will display the full-screen logo during the boot-up sequence, hiding normal POST messages.

When it is disabled, the BIOS will display the normal POST messages, instead of the full-screen logo.

Please note that enabling this BIOS feature often adds 2-3 seconds of delay to the booting sequence. This delay ensures that the logo is displayed for a sufficient amount of time. Therefore, it is recommended that you disable this BIOS feature for a faster boot-up time.

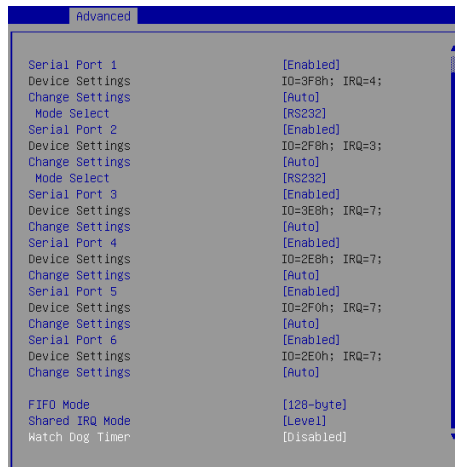
► Bootup NumLock State

This setting is to set the Num Lock status when the system is powered on. Setting to [On] will turn on the Num Lock key when the system is powered on. Setting to [Off] will allow users to use the arrow keys on the numeric keypad.

► Option ROM Messages

This item is used to determine the display mode when an optional ROM is initialized during POST. When set to [Force BIOS], the display mode used by AMI BIOS is used. Select [Keep Current] if you want to use the display mode of optional ROM.

► Super IO Configuration



► Serial Port 1/ 2/ 3/ 4/ 5/ 6

This setting enables/disables the specified serial port.

► Change Settings

This setting is used to change the address & IRQ settings of the specified serial port.

► Mode Select

Select an operation mode for the serial port 1 and 2.

► FIFO Mode

This setting controls the FIFO data transfer mode.

► Shared IRQ Mode

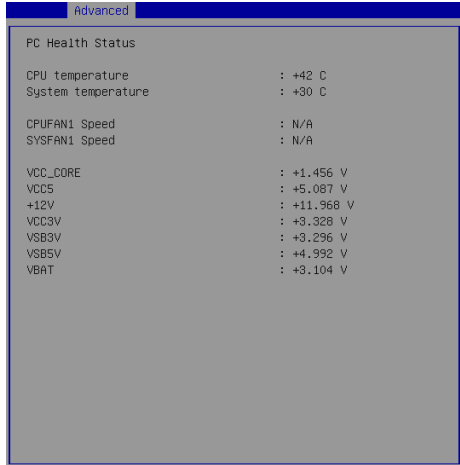
This setting provides the system with the ability to share interrupts among its serial ports.

► Watch Dog Timer

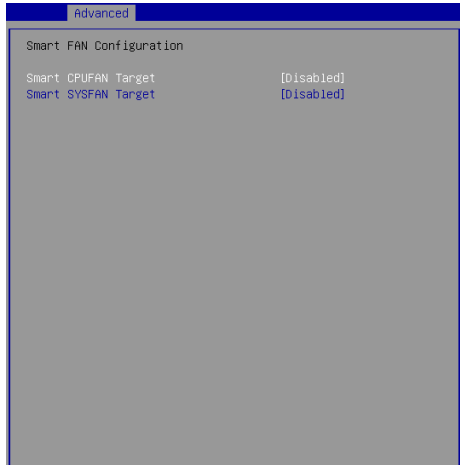
You can enable the system watch-dog timer, a hardware timer that generates a reset when the software that it monitors does not respond as expected each time the watch dog polls it.

► **H/W Monitor**

These items display the current status of all monitored hardware devices/ components such as voltages, temperatures and all fans' speeds.



► **Smart Fan Configuration**



► **Smart CPUFAN/SYSFAN Target**

These setting enables/disables the Smart Fan function. Smart Fan is an excellent feature which will adjust the CPU/system fan speed automatically depending on the current CPU/system temperature, avoiding the overheating to damage your system.

► CPU Configuration

Advanced	
CPU Configuration	
Intel(R) Celeron(R) CPU N3150 @ 1.60GHz	
Processor ID	406c3
Microcode Patch	353
Max CPU Speed	1600 MHz
Processor Cores	4
64-bit	Supported
L2 Cache	1024 KB x 2
L3 Cache	Not Present
Intel Virtualization Technology	[Enabled]

► Intel Virtualization Technology

Virtualization enhanced by Intel Virtualization Technology will allow a platform to run multiple operating systems and applications in independent partitions. With virtualization, one computer system can function as multiple “Virtual” systems.

► PCI/PCIE Device Configuration

Advanced	
PCI Latency Timer	[32 PCI Bus Clocks]
Legacy USB Support	[Enabled]
Audio Controller	[Enabled]
Launch OnBoard Lan OpRom	[Disabled]
Launch OnBoard Lan OpRom	[Disabled]
Launch OnBoard Lan OpRom	[Disabled]
Launch OnBoard Lan OpRom	[Disabled]
Launch OnBoard Lan OpRom	[Disabled]
Launch OnBoard Lan OpRom	[Disabled]

► PCI Latency Timer

This item controls how long each PCI device can hold the bus before another

takes over. When set to higher values, every PCI device can conduct transactions for a longer time and thus improve the effective PCI bandwidth. For better PCI performance, you should set the item to higher values.

► **Legacy USB Support**

Set to [Enabled] if you need to use any USB 1.1/2.0 device in the operating system that does not support or have any USB 1.1/2.0 driver installed, such as DOS and SCO Unix.

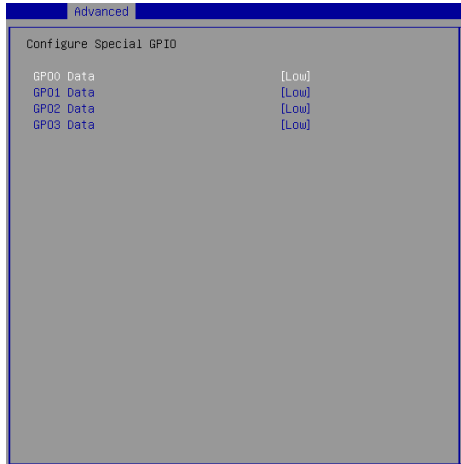
► **Audio Controller**

This setting enables/disables the onboard audio controller.

► **Launch OnBoard LAN OpROM**

These settings enable/disable the initialization of the onboard/onchip LAN Boot ROM during bootup. Selecting [Disabled] will speed up the boot process.

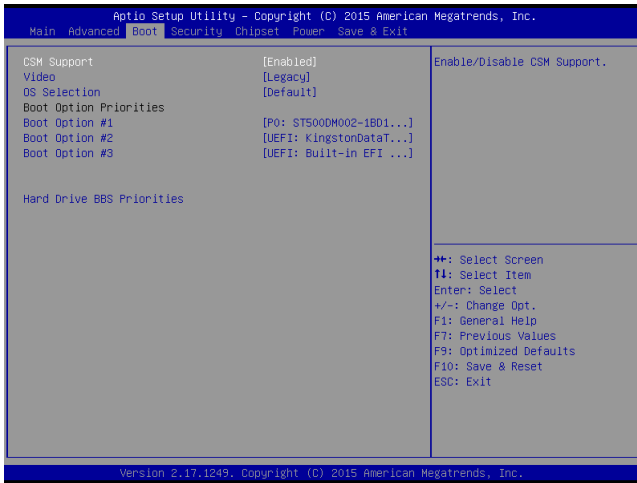
► **GPIO Group Configuration**



► **GP00 ~ GP03 Data**

These settings control the operation mode of the specified GPIO.

Boot



► CSM Support

This setting enables/disables the support for Compatibility Support Module, a part of the Intel Platform Innovation Framework for EFI providing the capability to support legacy BIOS interfaces.

► Video

This setting selects the video mode.

► OS Selection

This setting allows users to select the Operating System.

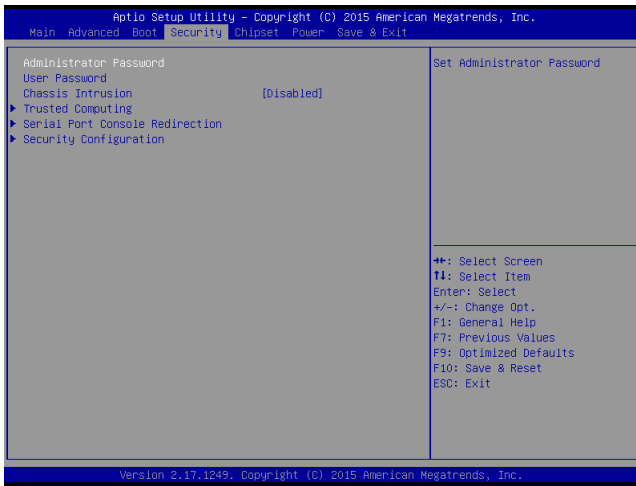
► Boot Option Priorities

This setting allows users to set the sequence of boot devices where BIOS attempts to load the disk operating system.

► Hard Drive BBS Priorities

This setting allows users to set the priority of the specified devices. First press <Enter> to enter the sub-menu. Then you may use the arrow keys (↑ ↓) to select the desired device, then press <+>, <-> or <PageUp>, <PageDown> key to move it up/down in the priority list.

Security



▶ Administrator Password

Administrator Password controls access to the BIOS Setup utility.

▶ User Password

User Password controls access to the system at boot and to the BIOS Setup utility.

▶ Chassis Intrusion

The field enables or disables the feature of recording the chassis intrusion status and issuing a warning message if the chassis is once opened.

► Trusted Computing



► Security Device Support

This setting enables/disables BIOS support for security device. When set to [Disable], the OS will not show security device. TCG EFI protocol and INT1A interface will not be available.

► Serial Port Console Redirection

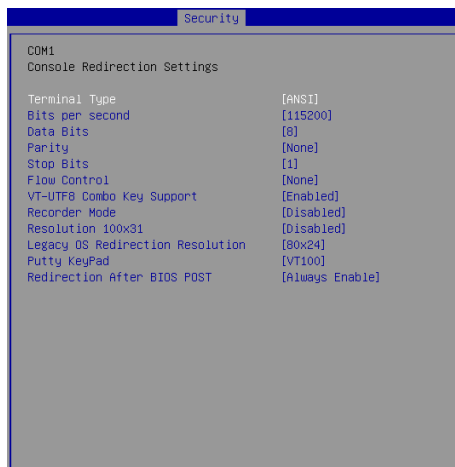


► Console Redirection

Console Redirection operates in host systems that do not have a monitor and keyboard attached. This setting enables/disables the operation of console redirection. When set to [Enabled], BIOS redirects and sends all contents that

should be displayed on the screen to the serial COM port for display on the terminal screen. Besides, all data received from the serial port is interpreted as keystrokes from a local keyboard.

► Console Redirection Settings



► Terminal Type

To operate the system's console redirection, you need a terminal supporting ANSI terminal protocol and a RS-232 null modem cable connected between the host system and terminal(s). This setting specifies the type of terminal device for console redirection.

► Bits per second, Data Bits, Parity, Stop Bits

This setting specifies the transfer rate (bits per second, data bits, parity, stop bits) of Console Redirection.

► Flow Control

Flow control is the process of managing the rate of data transmission between two nodes. It's the process of adjusting the flow of data from one device to another to ensure that the receiving device can handle all of the incoming data. This is particularly important where the sending device is capable of sending data much faster than the receiving device can receive it.

► VT-UTF8 Combo Key Support

This setting enables/disables the VT-UTF8 combination key support for ANSI/VT100 terminals.

► Recorder Mode, Resolution 100x31

These settings enable/disable the recorder mode and the resolution 100x31.

► Legacy OS Redirection Resolution

This setting specifies the redirection resolution of legacy OS.

► Putty Keypad

PuTTY is a terminal emulator for Windows. This setting controls the numeric keypad for use in PuTTY.

► Redirection After BIOS POST

This setting determines whether or not to keep terminals' console redirection running after the BIOS POST has booted.

► Security Configuration**► TXE FW Version**

The setting shows the firmware information of the Intel Trusted Execution Engine (TXE).

► TXE HMRFP0

The setting enables/disables TXE HMRFP0 (Host ME Region Flash Protection Override).

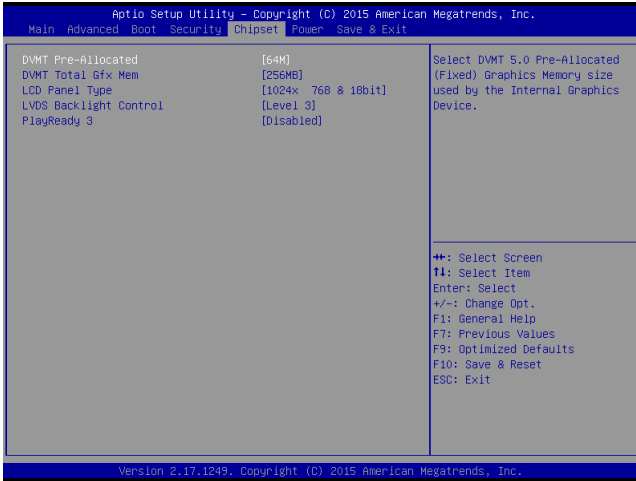
► TXE Firmware Update

This setting enables/disables TXE FW update.

► TXE EOP Message

This setting determines whether or not to send EOP (Exchange Online Protection) message before entering OS.

Chipset



► DVMT Pre-Allocated

This setting defines the DVMT pre-allocated memory. Pre-allocated memory is the small amount of system memory made available at boot time by the system BIOS for video. Pre-allocated memory is also known as locked memory. This is because it is "locked" for video use only and as such, is invisible and unable to be used by the operating system.

► DVMT Total Gfx Mem

This setting specifies the memory size for DVMT.

► LCD Panel Type

This setting specifies the LCD panel type.

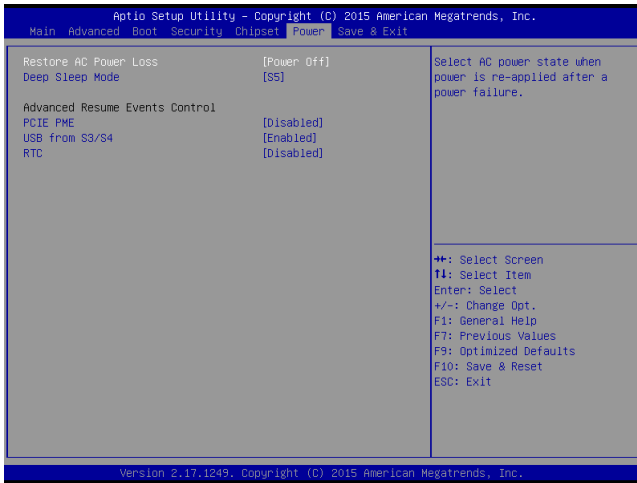
► LVDS Backlight Control

This setting controls the intensity of the LVDS backlight.

► PlayReady 3 (for Windows 10 only)

This setting enables/disables Microsoft's PlayReady 3 technology. PlayReady is a content protection technology from Microsoft that includes encryption, output protection and Digital Rights Management (DRM). Windows PlayReady 3.0 DRM can support 4K content but use more restrictive digital rights management technology to curb illegitimate streams at the same time.

Power



► Restore AC Power Loss

This setting specifies whether your system will reboot after a power failure or interrupt occurs. Available settings are:

[Power Off]	Leaves the computer in the power off state.
[Power On]	Leaves the computer in the power on state.
[Last State]	Restores the system to the previous status before power failure or interrupt occurred.

► Deep Sleep Mode

The setting enables/disables the Deep S5 power saving mode. S5 is almost the same as G3 Mechanical Off, except that the PSU still supplies power, at a minimum, to the power button to allow return to S0. A full reboot is required. No previous content is retained. Other components may remain powered so the computer can “wake” on input from the keyboard, clock, modem, LAN, or USB device.

** Advanced Resume Events Control **

► PCIE PME

This field specifies whether the system will be awakened from power saving modes when activity or input signal of onboard PCIE PME is detected.

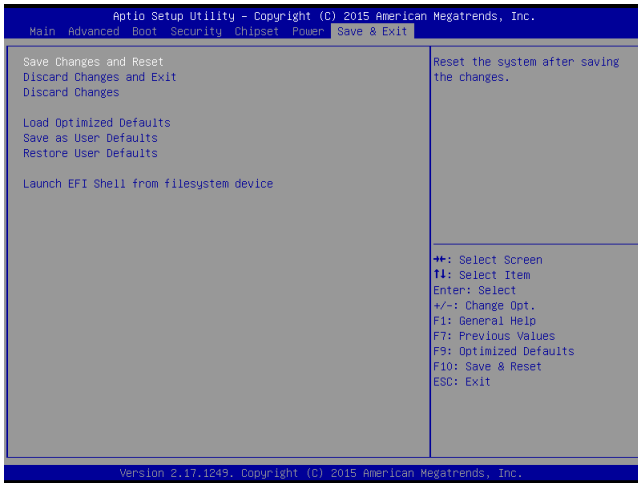
► **USB from S3/S4**

The item allows the activity of the USB device to wake up the system from S3/S4 sleep state.

► **RTC**

When [Enabled], you can set the date and time at which the RTC (real-time clock) alarm awakens the system from suspend mode.

Save & Exit



► Save Changes and Reset

Save changes to CMOS and reset the system.

► Discard Changes and Exit

Abandon all changes and exit the Setup Utility.

► Discard Changes

Abandon all changes.

► Load Optimized Defaults

Use this menu to load the default values set by the motherboard manufacturer specifically for optimal performance of the motherboard.

► Save as User Defaults

Save changes as the user's default profile.

► Restore User Defaults

Restore the user's default profile.

► Launch EFI Shell from filesystem device

This setting helps to launch the EFI Shell application from one of the available file system devices.



Appendix

WDT & GPIO



This appendix provides the sample codes of WDT (Watch Dog Timer) and GPIO (General Purpose Input/ Output).

WDT Sample Code

```

SIO_INDEX_Port    equ 04Eh
SIO_DATA_Port    equ 04Fh
SIO_UnLock_Value equ 087h
SIO_Lock_Value   equ 0AAh
WatchDog_LDN     equ 007h
WDT_UNIT         equ 60h   ;60h=second, 68h=minute, 40h=Disabled watchdog timer
WDT_Timer        equ 30   ;ex. 30 seconds

```

Sample code:

```

;Enable config mode
  mov  dx, SIO_INDEX_Port
  mov  al, SIO_UnLock_Value
  out  dx, al
  jmp  short $+2           ;Io_delay
  jmp  short $+2           ;Io_delay
  out  dx, al
;Change to WDT
  mov  dx, SIO_INDEX_Port
  mov  al, 07h
  out  dx, al
  mov  dx, SIO_DATA_Port
  mov  al, WatchDog_LDN
  out  dx, al
;Active WDT
  mov  dx, SIO_INDEX_Port
  mov  al, 30h
  out  dx, al
  mov  dx, SIO_DATA_Port
  in   al, dx
  or   al, 01h
  out  dx, al
;set timer
  mov  dx, SIO_INDEX_Port
  mov  al, 0F6h
  out  dx, al
  mov  dx, SIO_DATA_Port
  mov  al, WDT_Timer
  out  dx, al
;set UINIT
  mov  dx, SIO_INDEX_Port
  mov  al, 0F5h
  out  dx, al
  mov  dx, SIO_DATA_Port
  mov  al, WDT_UNIT
  out  dx, al
;enable reset
  mov  dx, SIO_INDEX_Port
  mov  al, 0FAh
  out  dx, al
  mov  dx, SIO_DATA_Port
  in   al, dx
  or   al, 01h
  out  dx, al
;close config mode
  mov  dx, SIO_INDEX_Port
  mov  al, SIO_Lock_Value
  out  dx, al

```

GPIO Sample Code

- GPI 0 ~ GPI 3

	GPI 0	GPI 1	GPI 2	GPI 3				
IO Address								
SIO_GPIO_Register	8Ah	8Ah	8Ah	8Ah				
Bit	0	1	2	3				
Sample code	#1	#1	#1	#1				

- GPO 0 ~ GPO 3

	GPO 0	GPO 1	GPO 2	GPO 3				
IO Address								
SIO_GPIO_Register	A2h	A2h	A2h	A2h				
Bit	4	5	6	7				
Sample code	#2	#2	#2	#2				

```

SIO_INDEX_Port      equ    04Eh
SIO_DATA_Port       equ    04Fh
SIO_UnLock_Value    equ    087h
SIO_Lock_Value      equ    0AAh
SIO_LDN_GPIO        equ    06h
SIO_GPIO_Data       equ    0A1h
SIO_GPIO_Status     equ    0A2h
GPI_0                equ    00000001b
GPO_0                equ    00010000b
GPO_2                equ    01000000b

```

Sample Code:

```

Sample Code:
#1 : Get GPI 0 status
; Enable config mode
mov dx, SIO_INDEX_Port
mov al, SIO_UnLock_Value
out dx, al
jmp short $+2 ;Io_delay
jmp short $+2 ;Io_delay
out dx, al
; Switch GPIO Configuration for SIO LDN 0x06
mov dx, SIO_INDEX_Port
mov al, 07h
out dx, al

```

```
mov dx, SIO_DATA_Port
mov al, SIO_LDN_GPIO
out dx, al
; Get GPI 0 Pin Status Register
mov dx, SIO_INDEX_Port
mov al, SIO_GPIO_Status
out dx, al
mov dx, SIO_DATA_Port
in al, dx ;al bit0 = GPI 0 status
; Exit SIO
mov al, SIO_CONFIG_MODE_EXIT_VALUE
out dx, al
```

```
#2 : Set GPO 0/GPO 2 to high status
; Enable config mode
mov dx, SIO_INDEX_Port
mov al, SIO_UnLock_Value
out dx, al
jmp short $+2 ;Io_delay
jmp short $+2 ;Io_delay
out dx, al
; Switch GPIO Configuration for SIO LDN 0x06
mov dx, SIO_INDEX_Port
mov al, 07h
out dx, al
mov dx, SIO_DATA_Port
mov al, SIO_LDN_GPIO
out dx, al
; Set GPO 0 to high
mov dx, SIO_INDEX_Port
mov al, SIO_GPIO_Data
out dx, al
mov dx, SIO_DATA_Port
in al, dx
and al, not GPO_0
or al, GPO_0
out dx, al
; Set GPO 2 to high
mov dx, SIO_INDEX_Port
mov al, SIO_GPIO_Data
out dx, al
mov dx, SIO_DATA_Port
in al, dx
and al, not GPO_2
or al, GPO_2
out dx, al
; Exit SIO
mov al, SIO_CONFIG_MODE_EXIT_VALUE
out dx, al
```