MS-9A59

Industrial Data Machine

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Trademarks

All trademarks are the properties of their respective owners.

Revision

Revision	Date
V1.1	2017/8

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:
http://www.msi.com/service/download/

■ Contact our technical staff at: *http://support.msi.com/*

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℃ (140℉), IT MAY DAMAGE THE EQUIPMENT.

警告使用者:

這是甲類資訊產品，在居住的環境中使用時，可能會造成無線電干擾，在這種情況下，使用者會被要求採取某些適當的對策。

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/evmtprtt_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.

Taiwan:

廢電池請回收

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 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.

CONTENTS

Chapter 1
Overview

Thank you for choosing the 9A59, an excellent industrial data machine from MSI.

The MS-9A59 eliminates the noise and the risk of fan's failure by wide heatsink as fanless solution. Furthermore, it supports VESA wall-mount interface for various scenarios like digital signage, kiosk, industrial control, and POS with affordable expenditure, which not only meets the demand of Industrial applications but also fulfills the needs of companies, governments, and institutes for general applications.

Packing Contents
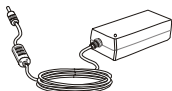
MS-9A59 Industrial Data Machine	**Power Adapter**
	Power Cord
Wall Mounting Brackets	**SATA Power & Signal Cable**
Driver/Utility Disc	**Phoenix Terminal Plugged**

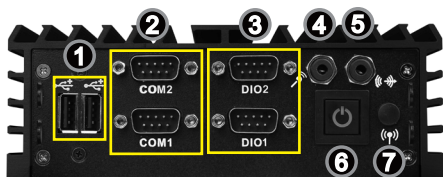- Please contact us immediately if any of the item is damaged or missing.
- The picture is for your reference only and your packing contents may slightly vary depending on the model you purchased.

System Overview

> **Top View**

> **Front View**

① USB 2.0 Port

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

② **RS232/422/485 Serial Port: COM1~COM2**

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.
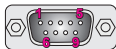
	Mode	Pin	Signal
	RS422	1	TXD-
		2	TXD+
		3	RXD-
		4	RXD+
	RS485	1	TXD-
		2	TXD+

❸ **DIO Port 1**

This port is provided for the General-Purpose Input/Output (GPIO) peripheral module.
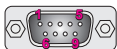
PIN	SIGNAL
1	GPI0
2	GPO0
3	GPI1
4	GPO1
5	GPI2
6	GPO2
7	GPI3
8	GPO3
9	VCC5
Shell	GND

DIO Port 2

This port is provided for the General-Purpose Input/Output (GPIO) peripheral module.
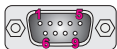
PIN	SIGNAL
1	GPI4
2	GPO4
3	GPI5
4	GPO5
5	GPI6
6	GPO6
7	GPI7
8	GPO7
9	VCC5
Shell	GND

❹ **Microphone**

This connector is provided for for microphones.

5	**Line-Out Jack** This connector is provided for headphones or speakers.
6	**Power Button** Press the power button to turn the system on or off.
7	**WLAN Antenna Connector (Optional)** This connector allows you to connect an external antenna for wireless LAN.

➤ Rear View

1	**WLAN Antenna Connector (Optional)** This connector allows you to connect an external antenna for wireless LAN.
2	**HDMI Port** HDMI™ 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.
3	**DisplayPort** DisplayPort is a digital display interface standard. This connector is used to connect a monitor with DisplayPort inputs.

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

❺	**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).

❻	**LVDS (Optional)**
	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.
	DVI (Optional)
	Digital Visual Interface (DVI) is a video display interface developed by the Digital Display Working Group (DDWG). The digital interface is used to connect a video source, such as a video display controller to a display device, such as a computer monitor.

❼	**12V Phoenix DC Power Connector**
	The system is designed with a Phoenix connector that carries 12V DC input and features reverse wiring protection.

❽	**Power Jack**
	The power adapter converts AC power to DC power for this jack.Power supplied through this jack supplies power to the system.To prevent damage to the system, always use the supplied power adapter.

❾	**Grounding Point**
	The connector is provided for connecting a grounding wire.

System Specifications

CPU	■ Braswell N3160 QC-1.6GHz (2.24GHz for Burst)
Memory	■ Single-channel DDR3L 1600MHz ■ Onboard 2GB
LAN	■ 1 Gigabit Fast Ethernet by Intel I211-ATcontroller
Storage	■ 1 SATA 6Gb/s port ■ 1 mSATA slot (Supported up to 64GB)
Audio	■ HDA Codec by ALC887-VD2-CG / ALC888S ■ Compliant with Azalia 1.0 specs

Graphics	■ Integrated in CPU
	   - LVDS 18/24-bit Dual Channel, resolution up to
	     1920 x 1200
	   - DisplayPort, resolution up to 2560 x 1600 @
	     60 Hz, 3840 x 2160 @ 30 Hz
	   - HDMI port, resolution up to 2560 x 1600 @ 60
	     Hz, 3840 x 2160 @ 30 Hz

Front Panel Input/Output	■ 2 USB 2.0 ports ■ 2 Serial ports ■ 2 DIO ports ■ 1 Microphone jack ■ 1 Line-Out audio jack ■ 1 Power button ■ 1 Wireless LAN antenna connector (Optional)
Rear Panel Input/Output	■ 2 Wireless LAN antenna connectors (Optional) ■ 1 HDMI port ■ 1 DisplayPort ■ 1 Gigabit LAN jack ■ 2 USB 3.0 ports ■ 1 LVDS / DVI (Optional) ■ 1 DC power jack ■ 1 12V Phoenix DC Power Connector ■ 1 Gournding point

Power Supply	■ 36 watt switching power adapter ■ Input: 100~240Vac, 1.2A, 50~60Hz ■ Output: 12Vdc, 3.0A ■ COM 1 (RS-232/422/485, 0V/5V/12V) ■ COM 2 (RS-232/422/485, 0V/5V/12V) *Important* *- Before powering on the system, recheck the adapter to ensure safety*
Dimension & Weight	■ 155mm x 105mm x 55mm ■ 0.95Kg
Regulatory Compliance	■ Safety: BSMI ■ EMI: FCC Class A, CE, RCM, BSMI, VCCI ■ RoHS Compliant

Environmental	■ Operating Temperature:
	  - 10 ~ 45°C (HDD)
	  - 10 ~ 55°C (SSD or mSATA)
	■ Storage Temperature: -20°C to 80°C
	■ Humidity: 10% ~ 90% RH, non-condensing

Motherboard Jumper

Important

Avoid adjusting jumpers when the system is on; it will damage the motherboard.
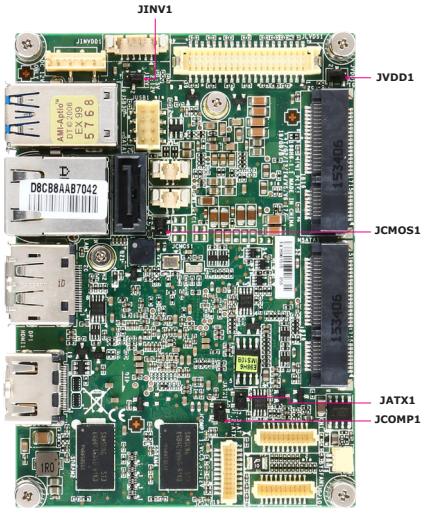
Clear CMOS Jumper: JCMOS1

There is a CMOS RAM onboard that has a power supply from an external battery to keep the data of system configuration. With the CMOS RAM, the system can automatically boot OS every time it is turned on. If you want to clear the system configuration, set the jumper to clear data.

Normal   Clear CMOS

Important

You can clear CMOS by shorting 2-3 pin while the system is off. Then return to 1-2 pin position. Avoid clearing the CMOS while the system is on; it will damage the motherboard.

AT/ATX Select Jumper: JATX1

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

ATX   AT

Serial Port Power Jumper: JCOMP1

This jumper specifies the operation voltage of the COM serial port.

+5V   +12V

LVDS Power Jumper: JVDD1

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

1

3V

1

5V

LVDS Inverter Power Jumper: JINV1

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

1

5V

1

12V

Chapter 2
System Setup

This chapter provides you with the information on 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 data machine components. Static electricity may damage the components.

Important

- *Always unplug the power cord before installing any components.*

- *When the operating temperature reaches 45°C or higher, please replace your HDD with SSD (Solid-State Drive) or other types of heat-resistant HDD to protect your HDD from being damaged by high temperature.*

Installation Tools

	A Phillips (crosshead) screwdriver and a flathead screwdriver, can be used to do most of the installation. Choose one with a magnetic head would be better.
	Pliers, can be used as an auxiliary tool to connect some connectors or cables.
	Forceps, can be used to pick up tiny screws or set up the jumpers.
	Rubber gloves, can prevent yourself from being incised and suffering the static charge.

Removing the Cover

1. Place the system horizontally on a flat and steady surface. Locate and remove the screws that secure the system cover.

2. Slide the cover carefully sidewards and remove it from the system.

Installing TPM Module

1. Locate and remove the screws that secure the front cover.

2. Move the front cover aside.
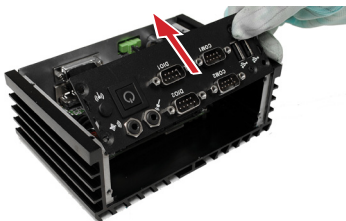
3. Find the TPM module and stick its back with the double-sided tape.

14 GND
15 N/A
12 GND
10 VCC3
9 VCC3
8 VCC5
6 SERIRQ
5 PIRST~_TPM#
4 PLTRST~_R
3 LPC_LDRQ0#
2 LPC_CLK
31 LPC_ADD0
1 LPC_ADD3
LPC_FRAME#
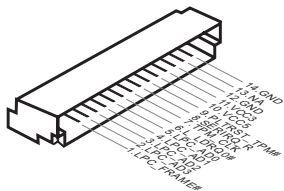
4. Connect the TPM module.
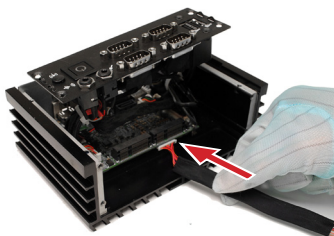
5. Fix the TPM module to the inner side of the chassis.
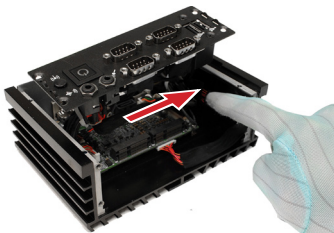
Installing the WLAN Card (Optional)

1. Remove the wireless LAN antenna rubber plugs from the system.
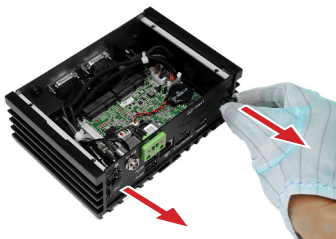
2. Find the antenna cable modules in the accessory box.

3. Assemble the antenna cables to the system.
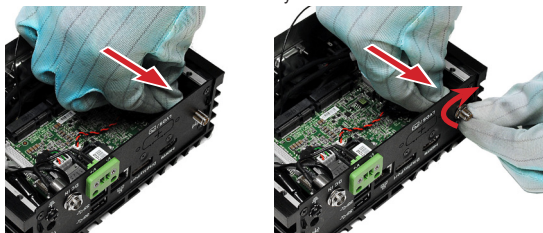
4. Locate the Mini PCIe slot. Remove the Mini PCIe card screw preinstalled on the motherboard. Insert the wireless LAN card into the slot at a 45-degree angle.

5. Push the card gently downwards and fasten it with a screw.
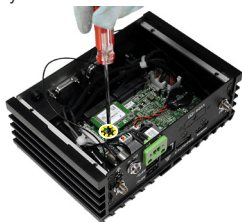
6. Connect the wireless LAN cable. Follow the steps above to finish the other.
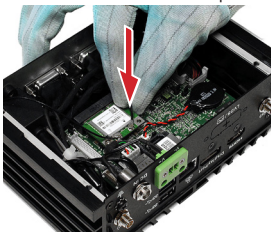
Installing the mSATA Card

1. Locate the Mini PCIe slot. Insert the mSATA card into the slot at a 45-degree angle.
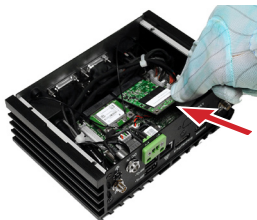
2. Push the card gently downwards and fasten it with a screw.

Installing the LVDS Cable (Optional)

1. Remove the screw and LVDS brackets with a pliers.
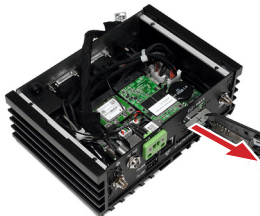
2. Connect the LVDS cable to LVDS connector on the motherboard. Please insert the LVDS cable with the right direction. Do not insert the cable with force.
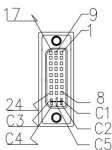
Pin	Signal	Pin	Signal	Pin	Signal
1	L_BKLT_CTRL#	13	LCD_VDD	C1	+12V
2	LVDS_BLON	14	LCD_VDD	C2	LVDS_DETECT#_C
3	LVDSA_DATA0	15	LVDSB_DATA0	C3	+12V
4	LVDSA_DATA#0	16	LVDSB_DATA#0	C4	GND
5	LVDSA_DATA1	17	LVDSB_DATA1	C5	GND
6	LVDSA_DATA#1	18	LVDSB_DATA#1		
7	LVDSA_DATA2	19	LVDSB_DATA2		
8	LVDSA_DATA#2	20	LVDSB_DATA#2		
9	LVDSA_DATA3	21	LVDSB_DATA3		
10	LVDSA_DATA#3	22	LVDSB_DATA#3		
11	LVDSA_CLK	23	LVDSB_CLK		
12	LVDSA_CLK#	24	LVDSB_CLK#		
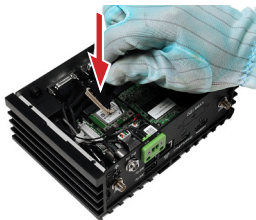
3. Install the LVDS cable.

4. Fix the LVDS connector with two hexagonal screws attached.

Installing the 2.5" SSD / HHD

1. Find the SATA cable module in the accessory box. Connect the power cable to the motherboard.

2. Connect the signal cable to the motherboard.
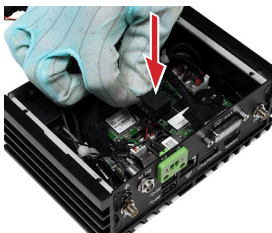
3. Turn the cover upside down; and then, remove the sticker film to uncover the thermal paste.
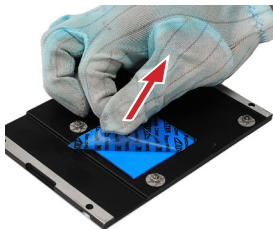
4. Loosen and remove the nuts.
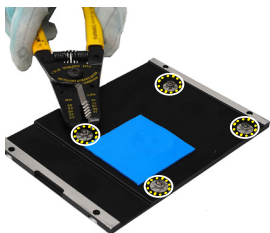
5. Put the 2.5" SSD / HDD on the cover with the screw wholes aligned and right direction.

Cover Notch

SATA connectors
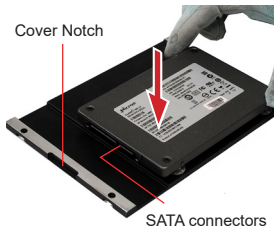
6. Turn the cover upside down; and then, lock the screws.
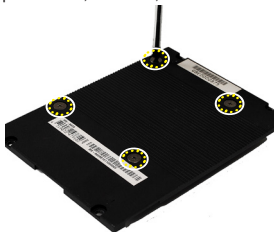
7. Connect the SATA cable module to the 2.5" SSD / HDD.

8. Replace the cover and lock the screws.

Installing the WLAN Antenna (Optional)

1. Find the wireless LAN antennas in the accessory box. Turn clockwise to lock the antennas, anti-clockwise to unlock.

2. Adjust the direction of the antennas to receive better wireless LAN signal.

Installing the Wall Mount Brackets

1. Place the system horizontally on a flat and steady surface. Locate and remove the screws that secure the system cover.

2. Find the wall mount bracket modules in the accessory box.

3. Insert the rubber pad in the whole.

4. Insert the screw.

5. Put the wall mount brackets on the system and lock the screws.
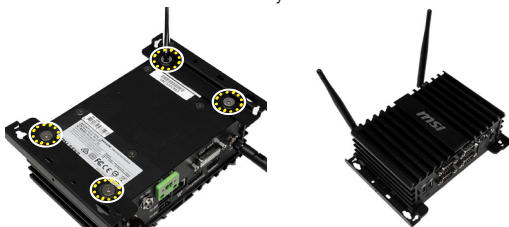
Wall Mount the PC - VESA Mound

1. Align the VESA mount holes on the rear of the monitor and lock the VESA plate.

2. Put the PC on the VEAS plate with the hooks aligned.

3. Lock the thumb screw to fix the PC.

Wall Mount the PC - Rail Mount

1. Find the DIN rails in the accessory box.

2. Put the DIN rails on the bracket with the hooks aligned.
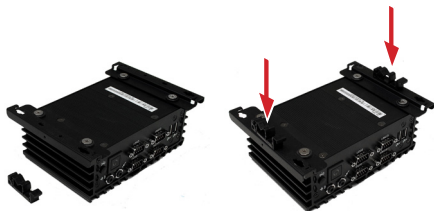
3. Lock the DIN rails with the screws attached. The PC is ready for rail mount.

Chapter 3
BIOS Setup

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

You may need to run the Setup program when:

- An error message appears on the screen during the system booting up, and requests you to run SETUP.

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

Press <DEL> 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 & Reset
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
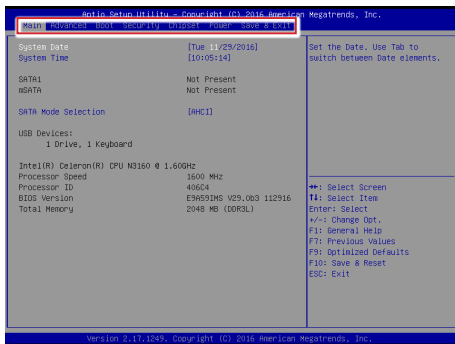
▶ **Main**

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

```
                    Aptio Setup Utility – Copyright (C) 2016 American Megatrends, Inc.
        Main  Advanced  Boot  Security  Chipset  Power  Save & Exit

    Full Screen Logo Display          [Disabled]              Enables or disables Full
    Bootup NumLock State              [On]                    Screen Logo Display option
    Option ROM Messages               [Force BIOS]
  ▶ Super IO Configuration
  ▶ H/W Monitor
  ▶ CPU Configuration
  ▶ PCI/PCIE Device Configuration
  ▶ GPIO Group Configuration




                                                              →←: Select Screen
                                                              ↑↓: Select Item
                                                              Enter: Select
                                                              +/-: Change Opt.
                                                              F1: General Help
                                                              F7: Previous Values
                                                              F9: Optimized Defaults
                                                              F10: Save & Reset
                                                              ESC: Exit



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```

▶ **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**

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 specified serial port.

▶ **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.


```
                    Aptio Setup Utility - Copyright (C) 2016 American
            Advanced

 PC Health Status
 Thermal Shutdown                      [Enabled]

 CPU temperature                       : +31 C
 System temperature                    : +25 C

 VCC_CORE                              : +0.888 V
 VCC5                                  : +5.003 V
 +12V                                  : +11.968 V
 VCC3V                                 : +3.296 V
 VSB3V                                 : +3.296 V
 VSB5V                                 : +4.920 V
 VBAT                                  : +3.088 V
```
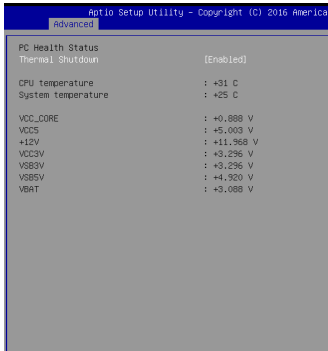
▶ **Thermal Shutdown**

This setting enables/disables the thermal shutdown function for system thermal protection.

▶ **CPU Configuration**
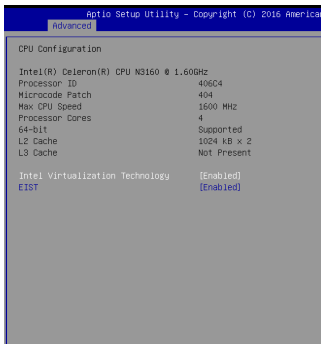
▶ **Intel Virtualization Technology**

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.

▶ **EIST**

EIST (Enhanced Intel SpeedStep Technology) allows the system to dynamically adjust processor voltage and core frequency, which can result in decreased average power consumption and decreased average heat production.

When disabled, the processor will return the actual maximum CPUID input value of the processor when queried.

▸ **PCI/PCIE Device Configuration**

▸ **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**
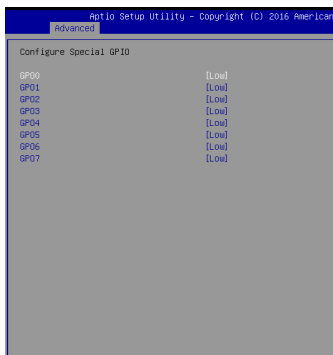
▶ **GPO0 ~ GPO7**

These settings control the operation mode of the specified GPIO.

Boot
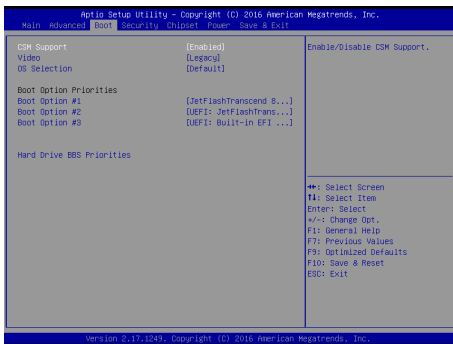
▸ **CSM Support**

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.

Important

*If the Operating System is going to boot in UEFI mode, disable **CSM Support** to speed up the boot process.*

▸ **Video**

Allows you to select the OS mode.

| [EFI Mode OS] | For UEFI mode. |
| [Legacy Mode OS] | For Legacy 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


```
                Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
      Main  Advanced  Boot  Security  Chipset  Power  Save & Exit

  Administrator Password                                        Set Administrator Password
  User Password

  ▶ Trusted Computing
  ▶ Serial Port Console Redirection
  ▶ Security Configuration



                                                               →←: Select Screen
                                                               ↑↓: Select Item
                                                               Enter: Select
                                                               +/-: Change Opt.
                                                               F1: General Help
                                                               F7: Previous Values
                                                               F9: Optimized Defaults
                                                               F10: Save & Reset
                                                               ESC: Exit

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```

▸ **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.

▶ **Serial Port Console Redirection**
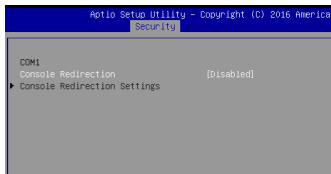
▶ **Console Redirection**

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**
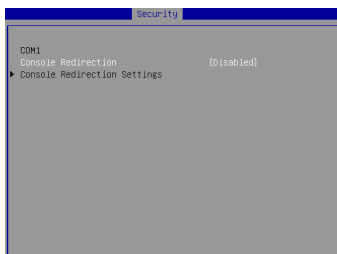
▶ **Terminal Type**

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**
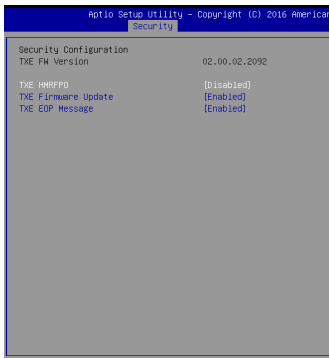
▶ **TXE FW Version**

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

▶ **TXE HMRFPO**

The setting enables/disables TXE HMRFPO (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


```
Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
  Main  Advanced  Boot  Security  Chipset  Power  Save & Exit

DVMT Pre-Allocated        [64M]              Select DVMT 5.0 Pre-Allocated
DVMT Total Gfx Mem        [256MB]            (Fixed) Graphics Memory size
LCD Panel Type            [ 800x  600 & 18bit]  used by the Internal Graphics
LVDS Backlight Control    [Level 3]          Device.
PlayReady 3               [Disabled]


                                             →←: Select Screen
                                             ↑↓: Select Item
                                             Enter: Select
                                             +/-: Change Opt.
                                             F1: General Help
                                             F7: Previous Values
                                             F9: Optimized Defaults
                                             F10: Save & Reset
                                             ESC: Exit

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```

▸ **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 allows you to set the resolution of the LCD display.

▸ **LCD Backlight Level**

This setting allows you to set the LCD backlight level.

▸ **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). Window's PlayReady 3.0 DRM can support 4K content but use more restrictive digital rights managemen technology to curb illegitimate streams at the same time.

Power
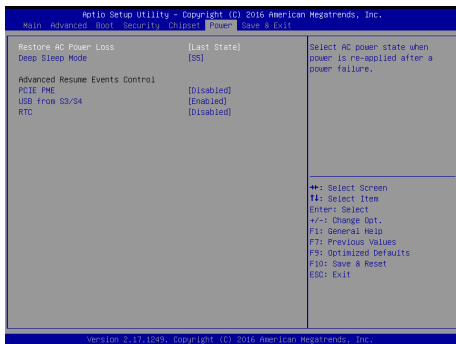
▶ **Restore AC Power Loss**

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

Save & Exit
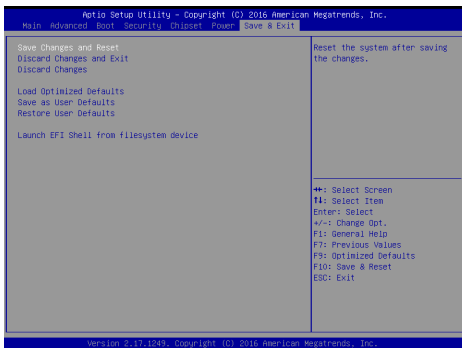
▸ **Save Changes and Reset**
Save changes to CMOS and reset the system.

▸ **Discard Changes and Exit**
Abandon all changes and exit the Setup Utility.

▸ **Discard Changes**
Abandon all changes.

▸ **Load Optimal 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
;Acive 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 UINT
    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 7

	GPI 0	GPI 1	GPI 2	GPI 3	GPI 4	GPI 5	GPI 6	GPI 7
IO Address								
SIO GPIO Register	A2h	A2h	A2h	A2h	A2h	A2h	A2h	A2h
Bit	0	1	2	3	4	5	6	7
Sample code	#1							

- GPO 0 ~ GPO 7

	GPO 0	GPO 1	GPO 2	GPO 3	GPO 4	GPO 5	GPO 6	GPO 7
IO Address								
SIO GPIO Register	89h	89h	89h	89h	89h	89h	89h	89h
Bit	0	1	2	3	4	5	6	7
Sample code	#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     089h
SIO_GPIO_Status     equ     0A2h
GPI_0               equ     00000001b
GPO_0               equ     00000001b
```

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    dx, SIO_INDEX_Port
    mov    al, SIO_Lock_Value
    out    dx, al


#2 : Set GPO 0 to high
; 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 Register
    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
; Exit SIO
    mov    dx, SIO_INDEX_Port
    mov    al, SIO_Lock_Value
    out    dx, al
```