MS-9A85

Industrial Data Machine

Copyright and Trademarks Notice

Revision History

Revision	Date
V1.0	2020/05

Technical Support

If a problem arises with your product and no solution can be obtained from the user's manual, please contact your place of purchase or local distributor. Alternatively, please visit https://www.msi.com/support/ for further guidance.

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.
- When re-plug the DC-in cable, the interval time should be longer than 5 seconds.

警告使用者:
此為甲類資訊技術設備,於居住環境中使用時,可能會造成射頻擾動,在此種情況下,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:

https://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.
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: https://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.

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.

CONTENTS

1 Overview

Thank you for choosing the MS-9A85, an excellent industrial data machine from MSI.

The MS-9A85's wide heatsink fanless solution eliminates the noise and the risk of fan failure. 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.
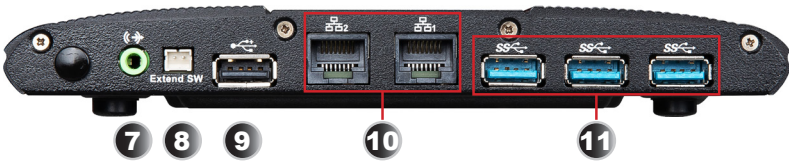
System Overview

➤ System I/O & Controls - Left

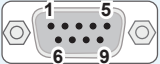

➤ System I/O & Controls - Right

1 **DisplayPort**

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

2 **HDMI 2.0 Port** HƎMI™ 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.

3 **RS232/422/485 Serial Port**

The serial port is a 16550A high speed communications port that sends/receives 16 bytes FIFOs. It supports barcode scanners, barcode printers, bill printers, credit card machine, etc.

RS232		RS422		RS485	
1	DCD	1	TXD-	1	D-
2	RXD	2	TXD+	2	D+
3	TXD	3	RXD+	3	NC
4	DTR	4	RXD-	4	NC
5	GND	5	GND	5	NC
6	DSR	6	NC	6	NC
7	RTS	7	NC	7	NC
8	CTS	8	NC	8	NC
9	POWER	9	NC	9	NC

4 **Hard Disk Drive LED**

This indicator shows the activity status of the HDD. It flashes when the system is accessing data on the HDD and remains off when no disk activity is detected.

5 **Power Button**

Press the button to turn the system on or off.

6 **DC Power Jack**

Power supplied through this jack supplies power to the system.

7 **Line-Out Jack**
This connector is provided for headphones or speakers.

8 **Extend Switch Connector**
This connector is provided for remote power button control.

9 **USB 2.0 Port**
The USB (Universal Serial Bus) port is for attaching USB devices such as keyboard, mouse, or other USB-compatible devices. It supports up to 480Mbit/s (Hi-Speed) data transfer rate.

10 **RJ45 LAN Jack**
The standard RJ-45 LAN jack is provided for connection to the Local Area Network (LAN). You can connect a network cable to it.

11 **USB 3.2 Gen 1 Port**
USB 3.2 Gen 1, the SuperSpeed USB, delivers up to 5Gbps high-speed data transfer for various devices, such as storage devices, hard drives, video cameras, etc.

System Specifications

Processor

■ Intel® Apollo lake Celeron® Processor J3455 (QC, 10W, 2M Cache, 1.5 GHz up to 2.3 GHz)

Memory

■ 1 x DDR3L 1866/1600 MHz, Up to 8 GB

Network

■ 2 x Intel® I211-AT GbE LAN

Storage

■ 1 x SATA 6Gb/s, 2.5" HDD/SSD (7mm)
■ 1 x M.2 M Key 2280, SATA only

Expansion Slot

■ 1 x Mini-PCIe Full-size, w/SIM slot (PCIe, USB interface)
■ 1 x M.2 E Key 2230 (PCIe, USB interface, for WiFi + BT) (WiFi , 4G LTE ether one)

Audio

■ Realtek® ALC887/888S HD Audio Codec

Graphics

■ Intel® UHD Graphics 500
■ Shared system memory depends on CPU
■ 1 x HDMI 2.0 up to 3840 x 2160@60Hz, not support hot plug
■ 2 x DP 1.2 up to 4096 x 2160@60Hz
■ 3 independent displays
  » Triple display support up to 3 * 1920 x 1080 @ 60Hz
  » Dual display support up to DP : 4096 x 2160 @ 60Hz
  »   HDMI: 3840 x 2160 @60Hz

Important

• **HDMI 2.0 port does not support audio and hot plug**. *To ensure proper operation of the HDMI 2.0 display, follow the instructions:*

  1. *Connect the HDMI cable from the display to the HDMI 2.0 port on the system left panel. Connect the display power cord.*

  2. *Disconnect the system power cord to ensure a complete system shutdown.*

  3. *Reconnect the system power cord and power on the system.*

  4. *Power on the display. The display should be able to work properly.*

• **HDMI resolution for 30Hz or 60Hz depends on monitor.**

Left Panel Input/Output

- 2 x DisplayPorts 1.2
- 1 x HDMI 2.0 Port
- 1 x RS232/422/485 Serial Port
- 1 x Hard Disk Drive LED
- 1 x Power Button
- 1 x DC Power Jack
- 1 x WiFi Antenna Connector (Optional)

Right Panel Input/Output

- 1 x WiFi Antenna Connector (Optional)
- 1 x Line-Out Jack
- 1 x Extend Switch Connector
- 1 x USB 2.0 Port
- 2 x GbE RJ45 Ports
- 3 x USB 3.2 Gen 1 Ports

Power Supply

- DC-in 19V with Lockable DC Jack

Dimension & Weight

- 180 x 255 x 19mm
- 1.13 kg

OS Support

- Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5)
- Linux Ubuntu/ Linux Fedora (by request)

Regulatory Compliance

- EMC: FCC Class A, CE, RCM, VCCI, BSMI
- Safety: BSMI, CE

Environment

- Operating Temperature:
  - » 0 ~ 40°C (HDD/WT M.2 M key)
  - » -10 ~ 50°C (SSD)
- Storage Temperature: -20 ~ 80ºC
- Humidity: 10 ~ 90% RH, non-condensing

2 Getting Started

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 computer components. Static electricity may damage the components.

Important

Always unplug the power cord before installing any components.

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.

System Cover

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

2. Lift the cover carefully upwards and remove it from the system.

Memory (Optional)

1. Locate the memory slot. Remove both side of the sticker films from the thermal paste; and then, paste it to the position as shown.

*   *The size of thermal pad in accessory is designed and tested base on MSI AVL list.*
*   *Customer should evaluate and test according to the specification of customer equipment.*
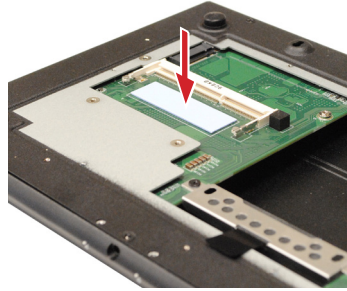
2. Align the notch on the memory with the key on the slot and insert the memory into the slot at a 45-degree angle.
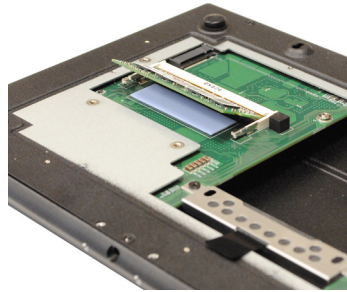
3. Push the memory gently downwards until the slot clips click and lock the memory in place.
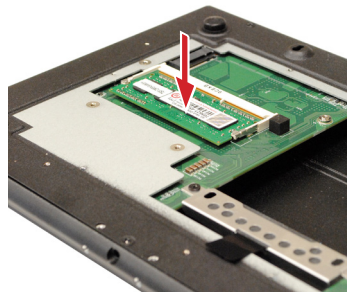
Important

*   *You can barely see the golden finger if the DIMM is properly inserted in the DIMM slot.*
*   *To uninstall the DIMM, flip the slot clips outwards and the DIMM will be released instantly.*

M.2 Card (Optional)

1. Locate the M.2 slot. Remove the screw preinstalled on the motherboard.
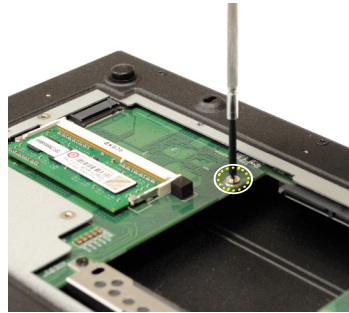
2. Insert the M.2 card into the slot.

3. Fasten it with a screw.
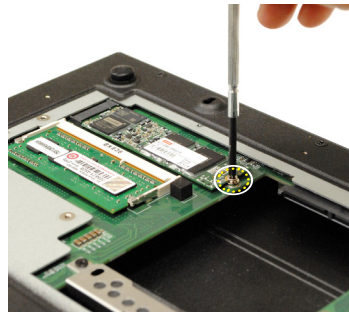
2.5" SSD / HHD (Optional)

1. Loosen the screws of the bracket.
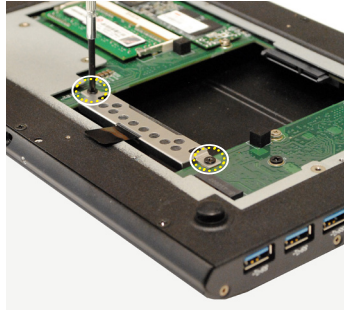
2. Assmeble the SSD/HDD to the bracket with 2 screws.

Bracket Strip

3. Remove both side of the sticker films from the thermal paste, and then, paste it to the position as shown.

*   *The size of thermal pad in accessory is designed and tested base on MSI AVL list.*

*   *Customer should evaluate and test according to the specification of customer equipment.*

4. Align the STAT and power connectors to Install the SSD/ HDD module.

5. Lock the bracket to the chassis with 2 screws.

6. Put the bracket strip into the chassis.

M.2 Card (Optional)

1. Locate the M.2 slot. Remove the screw preinstalled on the motherboard.

2. Insert the M.2 card into the slot.

3. Fasten it with a screw.

WiFi Card (Optional)

Important

For Mini PCIe cards that draw power from the motherboard, make sure they operate at exactly the same voltage as the system power source.

1. Locate the Mini PCIe slot. Remove the Mini PCIe card screw preinstalled on the motherboard.

2. Insert the WiFi card into the slot at a 45-degree angle.

3. Push the card gently downwards and fasten it with a screw.

VESA Mount (Optional)

1. Align the VESA mount bracket to the bottom of the system; and then, lock it to the system with 4 screws.
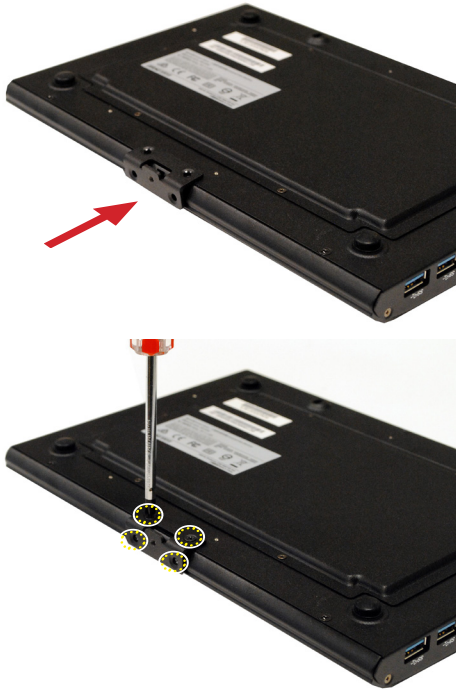
2. Locate the VESA mount screw holes on the intended device. Fasten the VESA mount plate to the device with the supplied screws.

3. Mount the system onto the VESA mount plate.
4. Tighten the thumbscrew at the bottom of the VESA mount plate to secure the system.

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 <DEL> or <F2> key to enter Setup.

<div align="center">Press <DEL> or <F2> to enter SETUP</div>

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
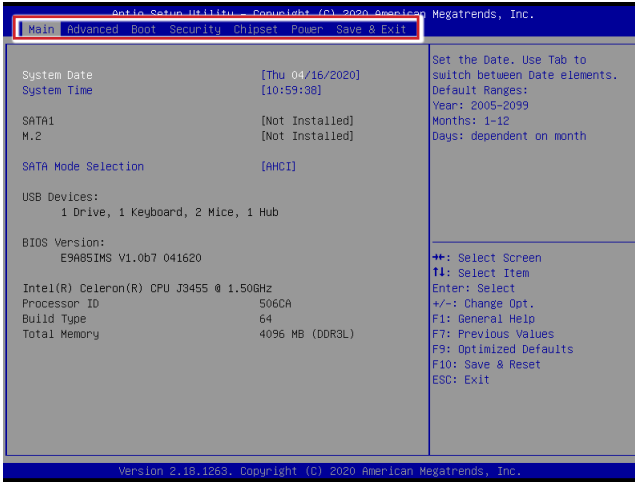
▸ **Main**

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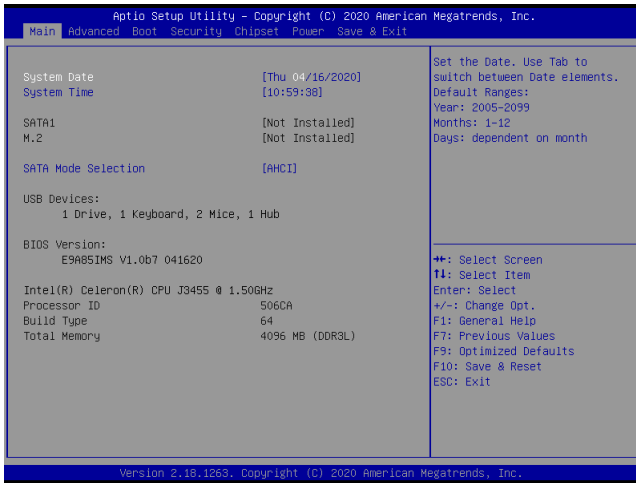
▶ **System Date**
This setting allows you to set the system date. The date format is <Day>, <Month> <Date> <Year>.

▶ **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
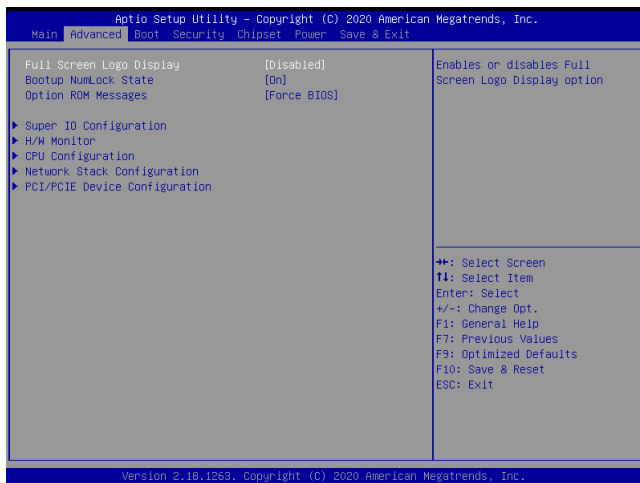
▸ **Full Screen Logo Display**

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**

```
        Advanced

Super IO Configuration

Serial Port 1                    [Enabled]
  Device Settings                IO=3F8h; IRQ=4;
  Change Settings                [Auto]
  Mode Select                    [RS232]
  Voltage Select                 [ 0 V]

FIFO Mode                        [128-byte]
Shared IRQ Mode                  [Edge/Low Active]
Watch Dog Timer                  [Disabled]
```

▸ **Serial Port 1**

This setting enables/disables the specified serial port.

▸ **Device Settings**

This item shows the address & IRQ settings of the 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.

▸ **Voltage Select**

Set voltage for the serial port 1.

▸ **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.


```
                              Advanced

PC Health Status
Thermal Shutdown                       [Enabled]

CPU temperature                        : +29 C
System temperature                     : +23 C

VCC_CORE                               : +0.840 V
VCC5                                   : +5.003 V
+12V                                   : +12.056 V
VCC3V                                  : +3.328 V
VSB3V                                  : +3.328 V
VSB5V                                  : +4.944 V
VBAT                                   : +3.168 V
```
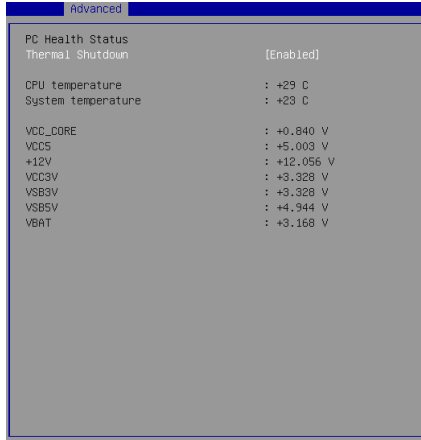
▸ **Thermal Shutdown**

This setting controls the thermal shutdown function to prevent the system from overheating.

▸ **CPU Configuration**

```
                          Advanced
     CPU Configuration

     Intel(R) Celeron(R) CPU J3455 @ 1.50GHz
     Processor ID                    506CA
     Microcode Patch                 1E
     Max CPU Speed                   1500 MHz
     Processor Cores                 4
     64-bit                          Supported
     L2 Cache                        1024 KB x 2
     L3 Cache                        Not Present

     Intel Virtualization Technology [Enabled]
     EIST                            [Enabled]
     C-States                        [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.

▸ **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.

▸ **C States**

This setting controls the C-State (CPU Power state). C-State performance indicates the ability to run the processor in lower power states when the PC is idle. This setting enables/disables the C-State Configuration for power saving purposes.

▶ **Network Stack Configuration**

This menu provides Network Stack settings for users to enable network boot (PXE) from BIOS.

Advanced
Network Stack	[Disabled]

▶ **Network Stack**

When this setting is set to [Enabled], the system will boot via the network instead of a disk drive.

▶ **PCI/PCIE Device Configuration**

Advanced
Legacy USB Support	[Enabled]
Audio Controller	[Enabled]
Launch OnBoard Lan OpRom	[Disabled]
Launch OnBoard Lan OpRom	[Disabled]
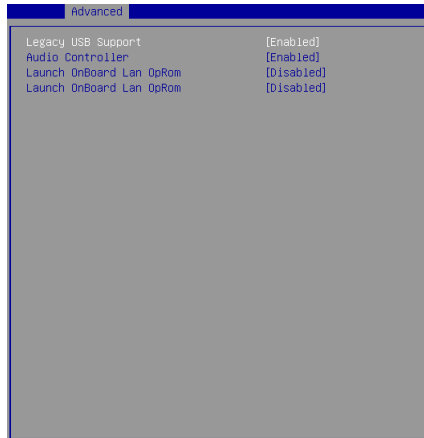
▸ **PCI Latency Timer**

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 trans- actions 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.

Boot

```
              Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
       Main  Advanced  Boot  Security  Chipset  Power  Save & Exit

 CSM Support                         [Disabled]              Enable/Disable CSM Support.
 OS Selection                        [Windows]

 Boot Option Priorities
 Boot Option #1                      [UEFI: Lexar JumpDri...]
 Boot Option #2                      [UEFI: Built-in EFI ...]




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



              Version 2.18.1263. Copyright (C) 2020 American Megatrends, Inc.
```
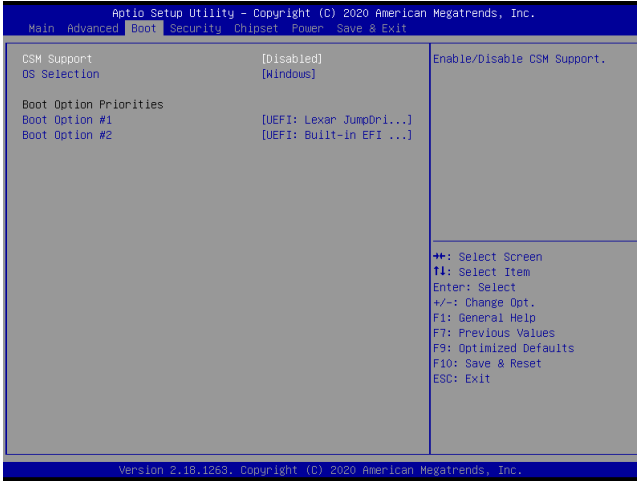
▸ **CSM Support**

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.

▸ **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.
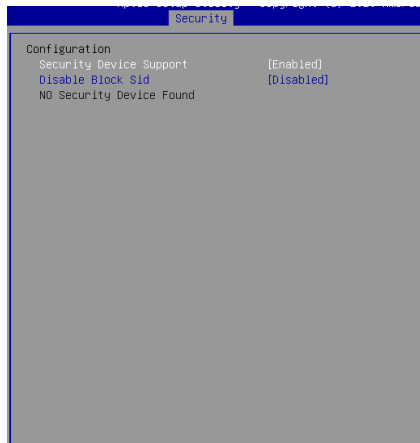
Security
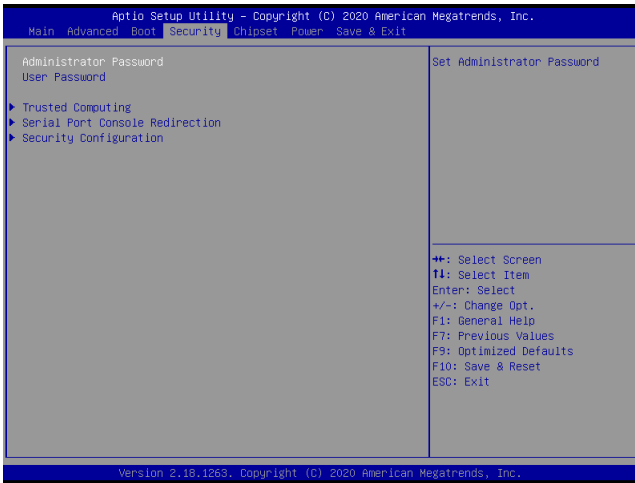
▸ **Administrator Password**

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.

▸ **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 re-direction. 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**

▶ **Security Configuration**

▶ **TXE HMRFPO**

This setting enables/disables the TXE HMRFPO (Host ME Region Flash Protection Override) function.

▶ **TXE EOP Message**

This setting enables/disables to send EOP Message Before Enter OS.

Chipset

```
                Aptio Setup Utility – Copyright (C) 2020 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                    [256M]                 (Fixed) Graphics Memory size
                                                                   used by the Internal Graphics
                                                                   Device




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


                 Version 2.18.1263. Copyright (C) 2020 American Megatrends, Inc.
```

▶ **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.

Power
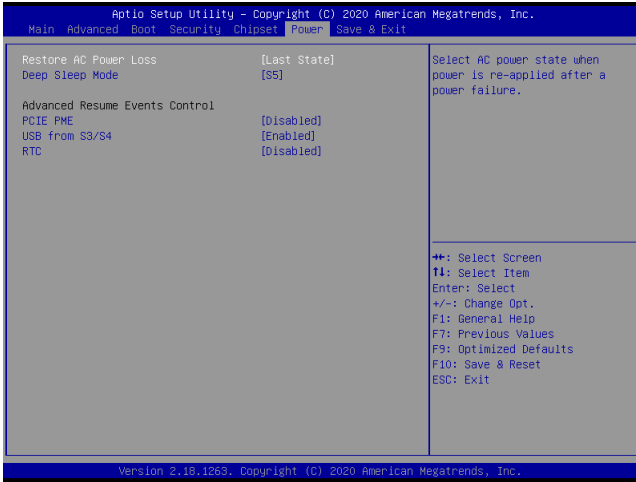
▶ **Restore AC Power Loss**

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.

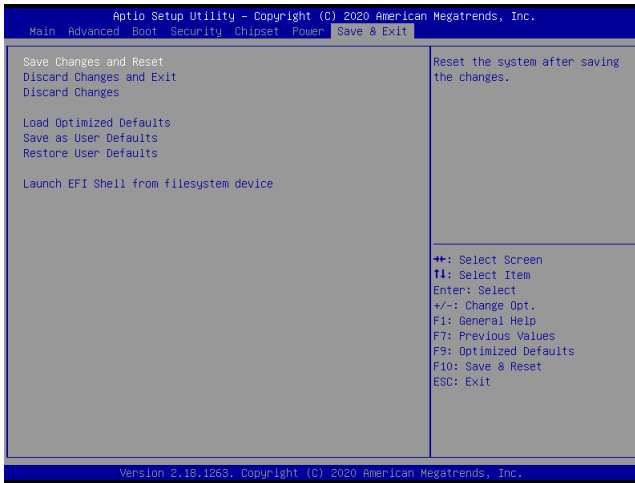▶ **USB from S3/S4**

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

```
          Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
    Main  Advanced  Boot  Security  Chipset  Power   Save & Exit

  Save Changes and Reset                              Reset the system after saving
  Discard Changes and Exit                            the changes.
  Discard Changes

  Load Optimized Defaults
  Save as User Defaults
  Restore User Defaults

  Launch EFI Shell from filesystem device



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


           Version 2.18.1263. Copyright (C) 2020 American Megatrends, Inc.
```

▶ **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 Programming

This appendix provides WDT (Watch Dog Timer) programming guide.

Abstract

In this document, code examples based on C programming language provided for customer interest. **Inportb**, **Outportb**, **Inportl** and **Outportl** are basic functions used for access IO ports and defined as following.

    Inportb: Read a single 8-bit I/O port.
    Outportb: Write a single byte to an 8-bit port.
    Inportl: Reads a single 32-bit I/O port.
    Outportl: Write a single long to a 32-bit port.

Watchdog Timer

Watchdog Timer – WDT

The base address (WDT_BASE) of WDT configuration registers is 0xA10.

1. Set WDT Time Unit

```
val = Inportb (WDT_BASE + 0x05);        // Read current WDT setting
val = val | 0x08;                        // minute mode. val = val & 0xF7 if second mode
Outportb (WDT_BASE + 0x05, val);         // Write back WDT setting
```

2. Set WDT Time

```
Outportb (WDT_BASE + 0x06, Time);        // Write WDT time, value 1 to 255.
```

3. Enable WDT

```
val = Inportb (WDT_BASE + 0x0A);         // Read current WDT_PME setting
val = val | 0x01;                        // Enable WDT OUT: WDOUT_EN (bit 0) set to 1.
Outportb (WDT_BASE + 0x0A, val);         // Write back WDT setting.
val = Inportb (WDT_BASE + 0x05);         // Read current WDT setting
val = val | 0x20;                        // Enable WDT by set WD_EN (bit 5) to 1.
Outportb (WDT_BASE + 0x05, val);         // Write back WDT setting.
```

4. Disable WDT

```
val = Inportb (WDT_BASE + 0x05);         // Read current WDT setting
val = val & 0xDF;                        // Disable WDT by set WD_EN (bit 5) to 0.
Outportb (WDT_BASE + 0x05, val);         // Write back WDT setting.
```

5. Check WDT Reset Flag

If the system has been reset by WDT function, this flag will set to 1.

```
val = Inportb (WDT_BASE + 0x05);         // Read current WDT setting.
val = val & 0x40;                        // Check WDTMOUT_STS (bit 6).
if (val)    printf ("timeout event occurred");
else        printf ("timeout event not occurred");
```

6. Clear WDT Reset Flag

```
val = Inportb (WDT_BASE + 0x05);         // Read current WDT setting
val = val | 0x40;                        // Set 1 to WDTMOUT_STS (bit 6);
Outportb (WDT_BASE + 0x05, val);         // Write back WDT setting
```