# MXE-1500 Series

Intel® Celeron® N3160/N3060 Fanless
Embedded Computer with Integrated I/O




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**Revision Date:** January 27, 2021

**Part No:** 50-1Z247-1010

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# Revision History

| Revision | Release Date | Description of Change(s) |
|---|---|---|
| 1.0 | 2018-04-03 | Initial Release |
| 1.1 | 2021-01-27 | Update RS-422 pinouts |


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# Preface

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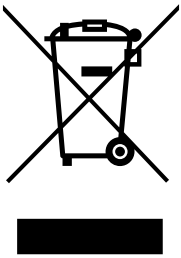
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Take note of the following conventions used throughout this manual to make sure that users perform certain tasks and instructions properly.

NOTE: Additional information, aids, and tips that help users perform tasks.

CAUTION: Information to prevent ***minor*** physical injury, component damage, data loss, and/or program corruption when trying to complete a task.

WARNING: Information to prevent ***serious*** physical injury, component damage, data loss, and/or program corruption when trying to complete a specific task.

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# 1 Introduction

## 1.1 Overview

The Matrix MXE-1500 is powered by the quad-core Intel® Celeron® Processor N3160 and dual-core N3060, supports Windows 7, and is also the first entry level platform to support independent 3-display interface, with improved graphics performance over previous generation systems.

The MXE-1500's rich I/O provides three Intel® Ethernet Controller I211, up to six serial ports, six external USB, one internal USB dongle, and optional features including amplifier, TPM 2.0 and either LVDS or 2nd DisplayPort for the flexibility to fulfill the demands of a wide array of applications.

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## 1.2 Specifications

| | MXE-1501 | MXE-1502 |
|---|---|---|
| **System Core** | | |
| **Processor** | Intel® Celeron® N3160 | Intel® Celeron® N3060 |
| **Cores** | 4 | 2 |
| **Threads** | 4 | 2 |
| **CPU Base Frequency** | 1.6 GHz | 1.6 GHz |
| **CPU Burst Frequency** | 2.24 GHz | 2.48 GHz |
| **L2 Cache** | 2 MB | |
| **TDP** | 6 W | |
| **Memory** | 2x DDR3L SODIMM up to 8GB<br>(memory frequency supports up to 1600MHz) | |
| **External I/O** | | |
| **Display** | 3 independent displays supported<br>▶ 1x VGA, up to 1920x1200 @60Hz<br>▶ 1x DisplayPort 1.1a, up to 2560x1600 @60Hz<br>▶ Optional LVDS or DisplayPort<br>▶ LVDS: converted by PTN3460, 18/24-bit single CH, 6/8-bit panel switch by jumper, LVDS power 3.3/5/12 V by jumper, backlight power 5/12 V by jumper<br>▶ DisplayPort, up to 2560x1600 @60Hz, shared location with optional COM5/6 | |
| **Ethernet** | 3 GbE (Intel I211AT) | |
| **Serial Port** | COM1/2: RS-232, COM1 supports console redirection<br>COM3/4: RS-232/422/485, switched by BIOS<br>Optional COM5/6: RS-232/422/485, switched by BIOS (shared location with optional DisplayPort) | |
| **USB 3.0** | 2 ports (shared 1.8A) | |

**Table 1-1: MXE-1500 Specifications**

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| | MXE-1501 | MXE-1502 |
|---|---|---|
| **USB 2.0** | 4 ports (500mA/port, 2 by USB hub located along with Ethernet 3, 2 by native USB located with Ethernet 2) | |
| **DI/O** | 4 DI + 4 DO (TTL type, controlled by SoC) | |
| **CFast** | 1 (supports hot plug) | |
| **USIM** | 1 | |
| **Audio** | ALC269Q, Line-out/Mic-in (optional amplifier) | |
| **Internal I/O** | | |
| **USB2.0** | 1 dongle (500mA, by USB hub) | |
| **$I^2C$** | 1 (with 3.3V power) | |
| **TPM** | TPM 2.0 | |
| **Expansion** | ▶ 1x full size Mini PCIe socket with PCIe and USB interface (PCIe signal supports gen 2, USB signal by USB hub)<br>▶ 3.3/5 V wafer for GPS Mini PCIe module power input | |
| **2.5" SATA storage** | Supports 1x SATA 3.0 drive | |
| **Manageability** | | |
| **Watchdog Timer** | Yes, programmable | |
| **SEMA** | SEMA3.5 | |
| **Power Supply** | | |
| **DC Input** | Built-in 6-36VDC wide range power input, 3-pin pluggable Phoenix connector with latch (V-, GND, V+) | |
| **AC Input** | Optional 90W industrial grade AC/DC adapter | |
| **Physical** | | |
| **Dimensions** | 210 (W) x 170 (D) x 53 (H) mm (8.3 x 6.75 x 2.1 in.) | |
| **Weight** | 1.5 kg (3.31 lb.) | |
| **Mounting** | VESA 100 | |

**Table 1-1: MXE-1500 Specifications**

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| | MXE-1501 | MXE-1502 |
|---|---|---|
| **Environmental** | | |
| **Operating Temperature** | ▶ Standard: 0 to 50°C (32 to 122□) (w/ HDD)<br>▶ Extended: -20 to 70°C (-4 to 158°F (w/ industrial SSD/CFast) | |
| **Storage Temperature** | -40 to 85°C (-40 to 185°F) | |
| **Humidity** | Approx. 95% @4°C (non-condensing) | |
| **Vibration** | w/ CFast/SSD: operating, 5Grms, 5-500Hz, 3 axes, 60min/axis | |
| | w/ HDD: operating, 0.3Grms, 5-500Hz, 3 axes, 60min/axis | |
| **Shock** | w/ CFast/SSD: operating, 100Grms | |
| **ESD** | Contact ±4 KV, Air ±8 KV | |
| **EMC** | CE, FCC Class A (EN61000-6-4/-2) | |
| **Safety** | UL by CB | |
| **Power Consumption** | | |
| **Power Off** | 3.9W | 3.5W |
| **System Idle** | 7.9W | 9.1W |
| **Processor Full Load** | 11.3W | 11.2W |
| **System Full Load** | 17.7W | 15.3W |

**Table 1-1: MXE-1500 Specifications**

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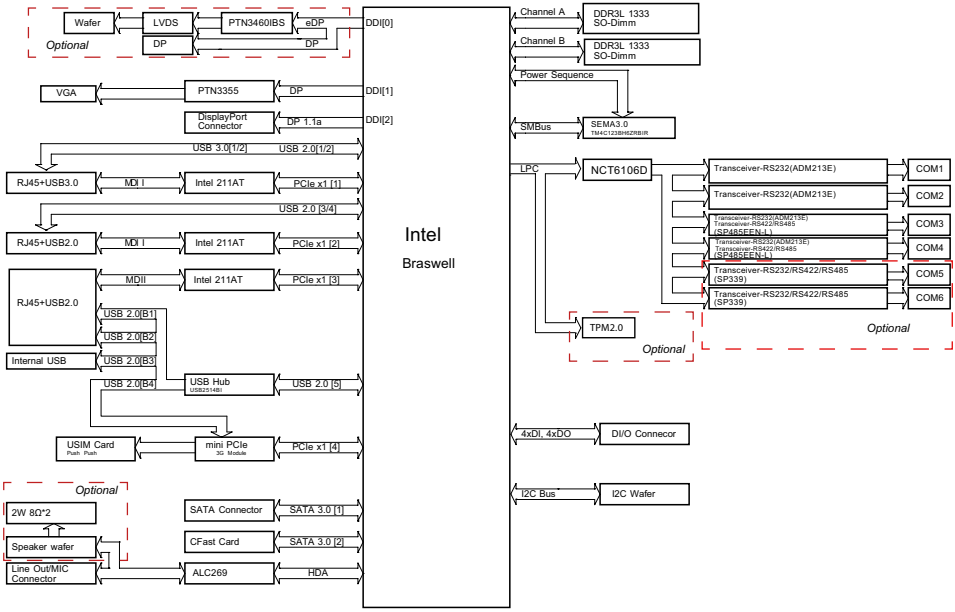



**Figure 1-1: MXE-1500 Functional Block Diagram**

## 1.3 Unpacking Checklist

Before unpacking, check the shipping carton for any damage. If the shipping carton and/or contents are damaged, inform your dealer immediately. Retain the shipping carton and packing materials for inspection. Obtain authorization from your dealer before returning any product to ADLINK. Ensure that the following items are included in the package.

- MXE-1500
- Screw pack for VESA 100 wall-mounting and 2.5" SSD/HDD installation

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## 1.4 Mechanical Drawings

NOTE:

All dimensions shown are in millimeters (mm) unless otherwise stated.

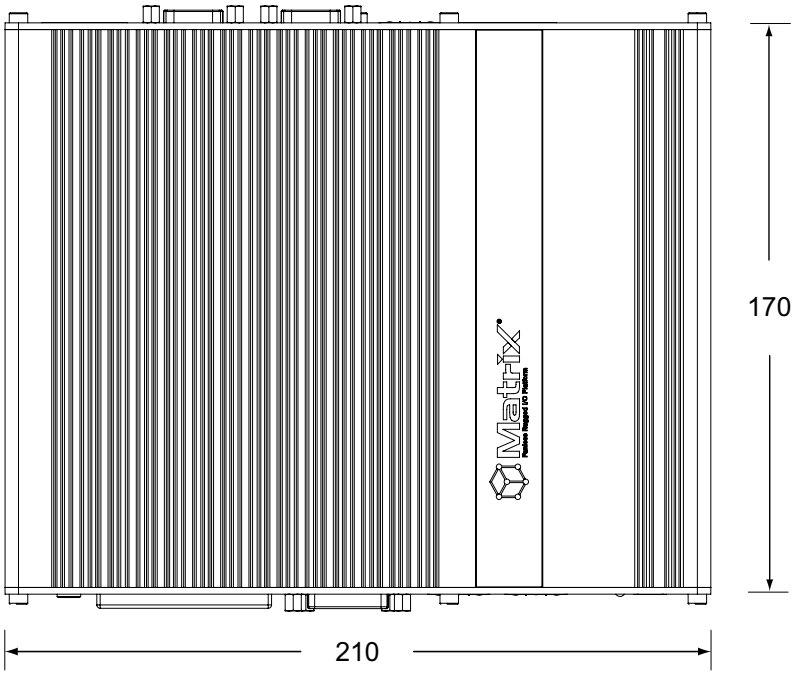



**Figure 1-2: Top View**

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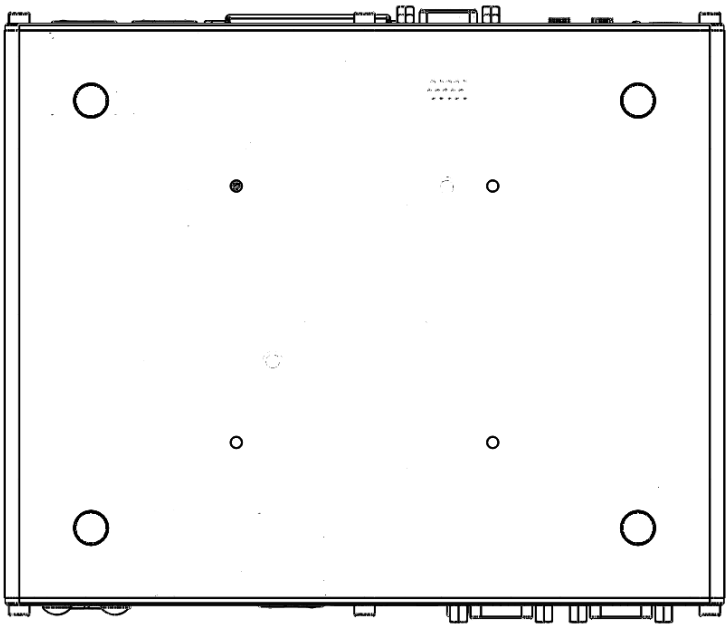


**Figure 1-3: Underside View**

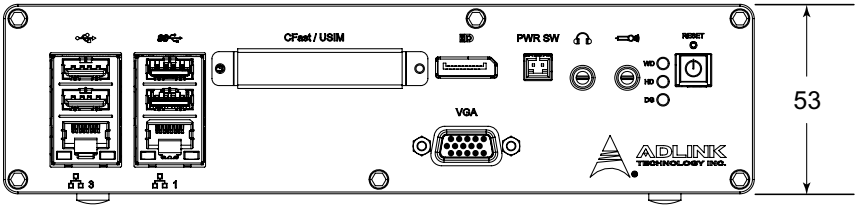



**Figure 1-4: Front View**

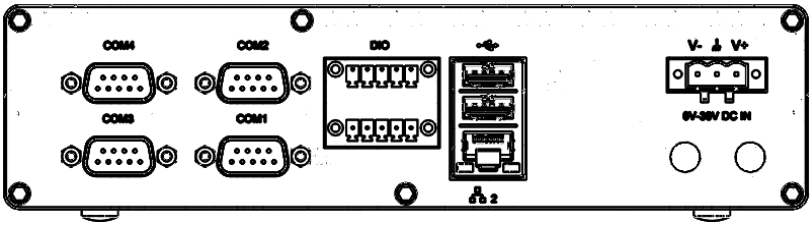



**Figure 1-5: Rear View**

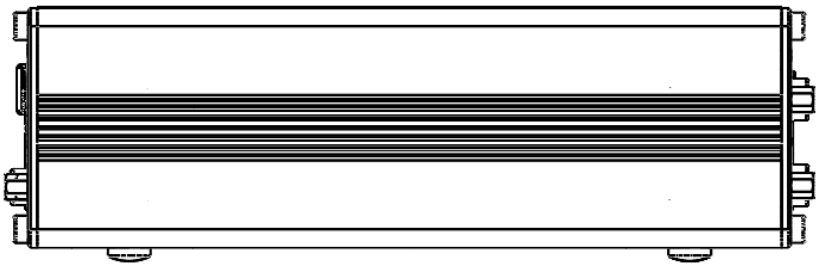


**Figure 1-6: Side View**

## 1.5 Front Panel I/O Connectors

The front panel of the MXE-1500 provides the following I/O connections, as labeled.




**Figure 1-7: Front Panel I/O**

- Power Button
- Reset Button
- LED Indicators
- Mic in
- Speaker/headphone out
- Remote Power On/Off
- DisplayPort
- CFast/USIM port
- USB 3.0 A type
- USB 2.0 A type
- 10/100/1000 Ethernet
- VGA out

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### 1.5.1 Power Button

The power button is a non-latched push button with blue LED indicator. The system is turned on when the button is pressed, and the power LED lights. To shut down, the OS can be issued a shutdown command can be issued or the power button used. If the system hangs, pressing and holding the button for 5 seconds manually turns the system off.

### 1.5.2 Reset Button

The reset button is used to perform hard reset for the MXE-1500.

### 1.5.3 LED indicators

In addition to the power button, three LED indicators on the front panel as follows.

| Indicator | Color | Description |
|---|---|---|
| Watchdog (WDT) | Yellow | When Watchdog Timer is started, flashes and lights when timer is expired. |
| Hard disk drive | Red | When the SATA interface device is active, blinks. |
| Diagnostic | Green | ▶ If no physical storage device is connected to the system, remains lit<br>▶ If no memory is installed in the SO-DIMM sockets, blinks. |

**Table 1-2: LED Indicators**

### 1.5.4 Mic & Headphone Jacks

The MXE-1500 implements Intel High Definition audio on the REALTEK ALC269Q chip, with support up to 24-bit, 192 KHz sample rate high quality headphone output and microphone input.

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### 1.5.5 Remote Power On/Off

The remote Power ON/OFF connector on the panel is reserved for connection of an external power On/Off signal. The function shorts pins 1 and 2 to send the power ON/OFF signal to the system, with behavior the same as the onboard power button.

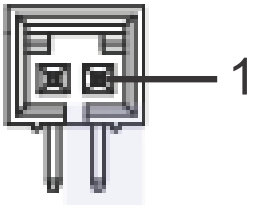



**Figure 1-8: Remote Power ON/OFF Connector**

| Pin | Signal |
|---|---|
| 1 | PWRBTN#_CN |
| 2 | GND |

**Table 1-3: Remote Power ON/OFF Pin Assignment**

### 1.5.6 DisplayPort

The DisplayPort v1.1 connection supports up to 2560x1600 32bit (60, 75Hz).

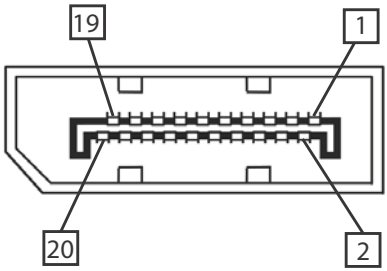



**Figure 1-9: DisplayPort Connector**

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| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | CN_DP0_P | 2 | GND |
| 3 | CN_DP0_N | 4 | CN_DP1_P |
| 5 | GND | 6 | CN_DP1_N |
| 7 | CN_DP2_P | 8 | GND |
| 9 | CN_DP2_N | 10 | CN_DP3_P |
| 11 | GND | 12 | CN_DP3_N |
| 13 | CN_CAD-L | 14 | CN_CEC |
| 15 | CN_AUX_P | 16 | GND |
| 17 | CN_AUX_N | 18 | DDP_HPD |
| 19 | GND | 20 | P3V3 |

**Table 1-4: DisplayPort Pin Assignment**

### 1.5.7 CFast/USIM Slot

A Type-II push–push CFast slot, connecting to the host controller by SATA interface, provides transfer rates up to 3.0Gb/s (300MB/s)/1.5Gb/s(150MB/s). The host SATA controller provides a legacy operating mode using I/O space, and an AHCI operating mode using memory space. The CFast card can function as a storage device for system installation.

The slot supports USIM cards and push-push insertion.

### 1.5.8 USB 3.0 Connectors

USB 3.0 supporting Type A connection is compatible with Super-Speed, Hi-Speed, full-speed and low-speed USB devices, with support for multiple boot devices, including USB flash, USB external HDD, and USB CD-ROM drivers, with priority and device configuration in BIOS.




When using USB CD-ROM via USB 3.0 port to re-install or repair the OS, cold boot should be utilized.

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### 1.5.9 USB 2.0 Connectors

The MXE-1500 provides a total of two USB 3.0 ports and five USB 2.0 ports using Type A USB connectors. All are compatible with Hi-Speed, full-speed, and low-speed USB devices. The MXE-1500 supports multiple boot devices, including USB flash drive, USB external hard drive, USB floppy, USB CD-ROM and etc. The boot priority and boot device can be configured in BIOS setting.

### 1.5.10 Gigabit Ethernet (Intel® i211-AT)

3 Gigabit Ethernet ports on the front panel, supporting the Intel i211-AT GbE controller, provide

- IEEE 802.3az Energy Efficient Ethernet
- IEEE 1588/802.1AS precision time synchronization
- IEEE 802.3Qav traffic shaper
- Interrupt moderation, VLAN support, IP checksum offload
- PCIe OBFF (Optimized Buffer Flush/Fill) for improved system power management
- Four transmit and four receive queues
- RSS and MSI-X to lower CPU utilization in multi-core systems
- ECC - error correcting memory in packet buffers
- Wake-on-LAN
- NC-SI for increased bandwidth passthrough
- Preboot eXecution Environment (PXE) flash interface
- Jumbo frame support

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### 1.5.11 Active/Link & Speed LEDs




**Figure 1-10: Active/Link & Speed LEDs**

| Color | Status | Description |
|---|---|---|
| Yellow | OFF | Ethernet port is disconnected |
| | ON | Ethernet port is connected and no data transmission is underway |
| | Flashing | Ethernet port is connected and transmitting/receiving data. |

**Table 1-5: Active/Link LED Legend**

| Color | Status | Description |
|---|---|---|
| Green/Orange | OFF | 10 Mbps |
| | Green | 100 Mbps |
| | Orange | 1000 Mbps |

**Table 1-6: Speed LED Legend**

### 1.5.12 VGA Out

Supports VGA display resolutions up to 1920 x 1200 at 60Hz 24bpp.

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## 1.6 Rear Panel I/O Connectors

The rear panel of the MXE-1500 provides the following I/O connections, as labeled.

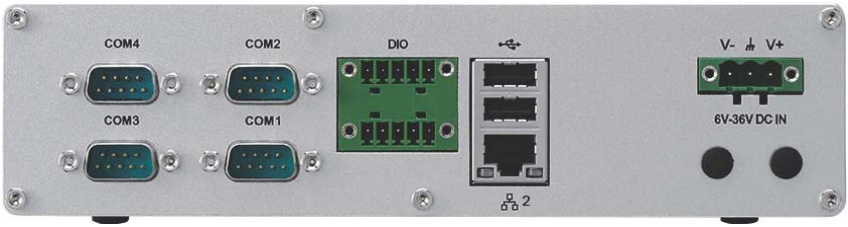



**Figure 1-11: Rear Panel I/O**

- DC power supply connector
- Antenna plugs
- USB2.0 A type
- 10/100/1000 Ethernet
- DI/O connector (4CH in/4CH out)
- COM ports

### 1.6.1 DC Power Supply Connector

The DC power supply connector consists of three pins, V+, chassis ground, and V- from right to left respectively. V+ and V- pins are for DC power input and chassis ground pin grounds the chassis for better EMC compatibility. DC power input of the MXE-1500 allows a voltage input range from DC 6 to 36V, with UVP (under voltage protect of 6V), OVP (over voltage protect of 36V), and reversed polarity protection.

WARNING:

Please ensure that DC power supply is within the input voltage range defined in the specification, stable and low-noise, and provides sufficient operating current.
Over- or under-voltage, unstable, or insufficiently powered DC power supply may cause system instability and physical damage.

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### 1.6.2 Antenna Connector

The MXE-1500 provides two SMA type antenna connectors suitable for Wireless LAN and Wireless WAN modules of an internal Mini PCI Express card.

### 1.6.3 USB 2.0 Connectors

The MXE-1500 provides a total of six USB 2.0 ports using Type A USB connectors, with two ports on the front and two on the rear panel. All are compatible with Hi-Speed, full-speed, and low-speed USB devices. The MXE-1500 supports multiple boot devices, including USB flash drive, USB external hard drive, USB floppy, USB CD-ROM and etc. The boot priority and boot device can be configured in BIOS setting.

### 1.6.4 Gigabit Ethernet (Intel i211-AT)

The Gigabit Ethernet port on the rear panel, supporting the Intel i211-AT GbE controller, provides

- IEEE 802.3az Energy Efficient Ethernet
- IEEE 1588/802.1AS precision time synchronization
- IEEE 802.3Qav traffic shaper
- Interrupt moderation, VLAN support, IP checksum offload
- PCIe OBFF (Optimized Buffer Flush/Fill) for improved system power management
- Four transmit and four receive queues
- RSS and MSI-X to lower CPU utilization in multi-core systems
- ECC - error correcting memory in packet buffers
- Wake-on-LAN
- NC-SI for increased bandwidth passthrough
- Preboot eXecution Environment (PXE) flash interface
- Jumbo frame support

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### 1.6.5 Active/Link & Speed LEDs




**Figure 1-12: Active/Link & Speed LEDs**

| Color | Status | Description |
|---|---|---|
| Yellow | OFF | Ethernet port is disconnected |
| | ON | Ethernet port is connected and no data transmission is underway |
| | Flashing | Ethernet port is connected and transmitting/receiving data. |

**Table 1-7: Active/Link LED Legend**

| Color | Status | Description |
|---|---|---|
| Green/Orange | OFF | 10 Mbps |
| | Green | 100 Mbps |
| | Orange | 1000 Mbps |

**Table 1-8: Speed LED Legend**

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### 1.6.6 Digital I/O Connector

The MXE-1500 provides four channel non-isolation digital input circuits and four digital non-isolation output circuits through a terminal slot of pitch 3.81mm. Spec and connector pin numbering and definitions are as follows.

| 4-Channel Digital Input | 4-Channel Digital Output |
|---|---|
| Logic high: 2 to 5.25 V | Output type: Open drain N-channel MOSFET driver with internal pull high of 200 Ω resistance |
| | Output high: 2.4 to 5 V |
| Logic low: 0 to 0.8 V | Output low: 0 to 0.5 V |
| | Source/Sink current for all channels: 24 mA |

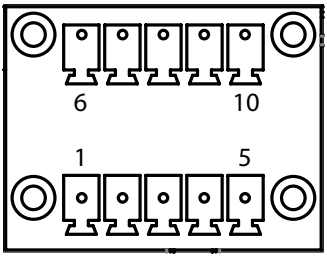



**Figure 1-13: DI/O Connector Pin Numbering**

| Pin | Description | Pin | Description |
|---|---|---|---|
| 1 | DI 0 | 6 | DO 0 |
| 2 | DI 1 | 7 | DO 1 |
| 3 | DI 2 | 8 | DO 2 |
| 4 | DI 3 | 9 | DO 3 |
| 5 | GND | 10 | GND |

**Table 1-9: DI/O Connector Pin Definition**

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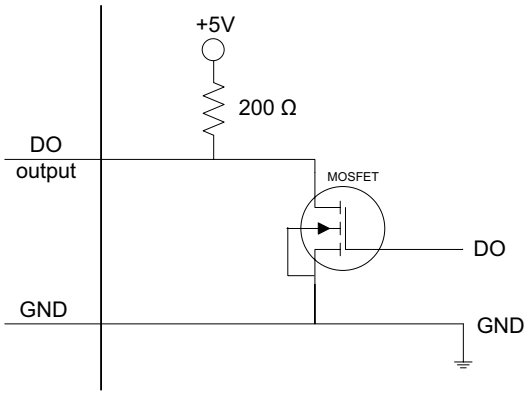



**Figure 1-14: DO Schematic**

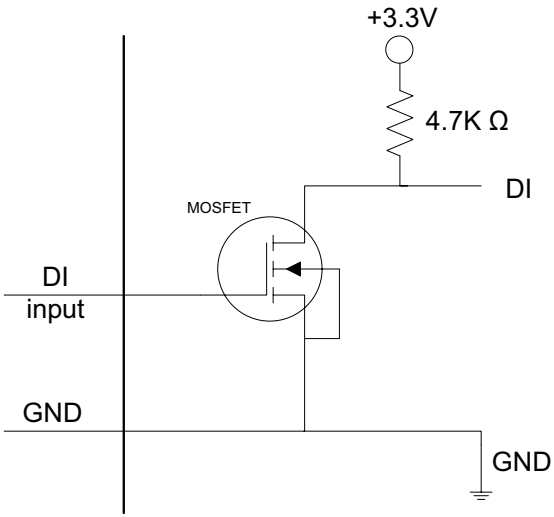
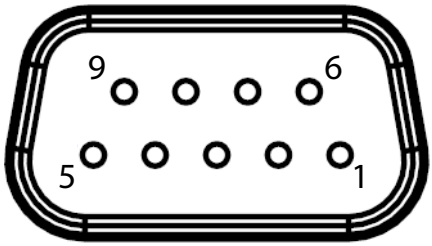



**Figure 1-15: DI Schematic**

### 1.6.7 COM Ports

The MXE-1500 provides 4 COM ports on the rear panel in the form of D-sub 9P connectors, configured as follows. COM3 & COM4 ports can support RS232/RS422/RS485 mode as set in BIOS. See “Serial Port 1 to 4 Configuration” on page 56.




- 2x Software-programmable RS-232/422/485 (COM3 & COM4) by DB9 connectors
- 2x RS-232 (COM1 & COM2) by DB9 connectors

| PIN | Signal name | | |
|---|---|---|---|
| | RS-232 | RS-422 | RS-485 |
| 1 | DCD# | TXD422n | 485n |
| 2 | RXD | TXD422p | 485p |
| 3 | TXD | RXD422p | N/S |
| 4 | DTR# | RXD422n | N/S |
| 5 | GND | N/S | N/S |
| 6 | DSR# | N/S | N/S |
| 7 | RTS# | N/S | N/S |
| 8 | CTS# | N/S | N/S |
| 9 | RI# | N/S | N/S |

**Table 1-10: COM 3/4 Ports Pin Assignments**

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## 1.7 Internal I/O Connectors

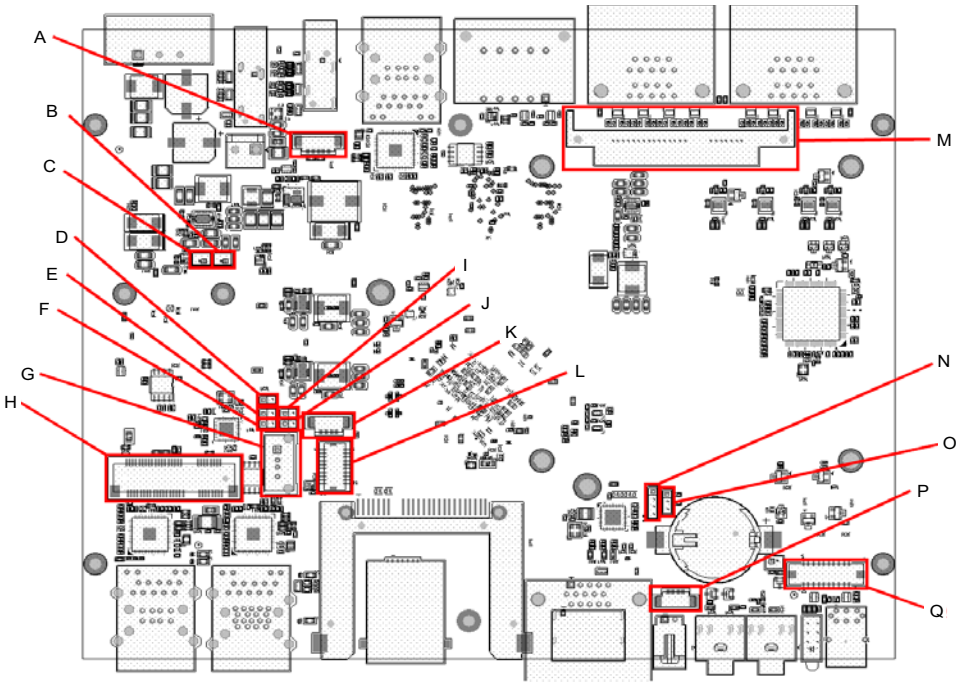



**Figure 1-16: Internal I/O**

| | |
|---|---|
| **A** | Internal $I^2C$ interface |
| **B** | 3.3V GPS |
| **C** | 5V GPS |
| **D** | LVDS +12V Power Jumper |
| **E** | LVDS +5V Power Jumper |
| **F** | LVDS +3.3V Power Jumper |
| **G** | Internal USB2.0 interface |
| **H** | Mini PCIE slot (full size) |
| **I** | Jump select for LVDS inverter 12V power |
| **J** | Jump select for LVDS Inverter 5V power |

**Table 1-11: MXE-1500 Internal I/O Legend**

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| | |
|---|---|
| **K** | LVDS backlight control |
| **L** | LVDS |
| **M** | SATA |
| **N** | Clear CMOS jumper |
| **O** | LVDS 18/24-bit select jumper |
| **P** | Speaker |
| **Q** | COM port (COM 5/6) |

**Table 1-11: MXE-1500 Internal I/O Legend**

### 1.7.1 Internal I²C interface

I²C and +3.3/5v power are provided with cable.

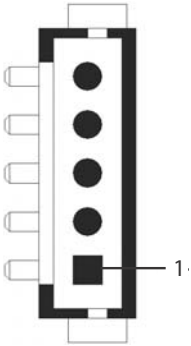



**Figure 1-17: Internal I²C Connector**

| Pin | Signal |
|---|---|
| 1 | GND |
| 2 | SOC_I2C_PWR |
| 3 | SOC_INTERRUPT_3V3 |
| 4 | SOC_I2C0_SCL_3V3 |
| 5 | SOC_I2C0_SDA_3V3 |

**Table 1-12: Internal I²C Connector Pin Assignment**

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### 1.7.2 3.3V/5V GPS

Internal +3.3V and +5V connectors support up to 1A current of +3.3V and +5V to the Mini PCI Express card via cable, if needed, such as for wireless WAN or GPS card.

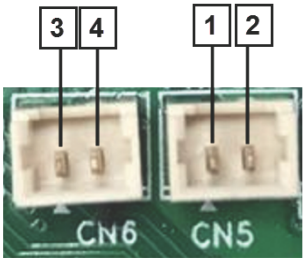



**Figure 1-18: +3.3V and +5V GPS Connectors**

| Pin | Description |
|---|---|
| 1 | +5V |
| 2 | GND |
| 3 | +3.3V |
| 4 | GND |

**Table 1-13: +3.3V and +5V GPS Pin Assignments**

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### 1.7.3 LVDS Voltage Selection Jumpers

The MXE-1500 provides power to the LVDS interface (+LVDS_VCC) selected by internal jumper, from among +3.3V, +5V, and +12V, as follows.

| | |
|---|---|
| **CN17** | +12V |
| **CN41** | +5V |
| **CN40** | +3.3V |

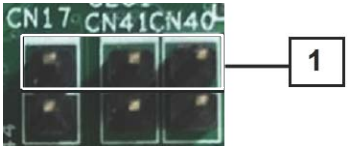



**Figure 1-19: LVDS Voltage Selection Jumpers**

### 1.7.4 Internal USB2.0 Interface

Supports a USB2.0 type-A device.

### 1.7.5 Mini PCIE Slot (full size)

The MXE-1500 features a Mini PCI Express slot providing functional expansion to, for example, wireless LAN module, wireless WAN module, GPS module, and others, conforming to PCI Express Mini Card Electromechanical Specification Rev. 1.2.

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### 1.7.6 LVDS Inverter 5V/12V Power Jumpers

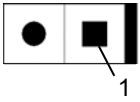



**Figure 1-20: 5V/12V Power Jumpers**

| | Pin | Signal |
|---|---|---|
| 5V | 1 | P_+5V0_S0 |
| | 2 | P_+INVER_PWR |
| 12V | 1 | P_+12V0_S0 |
| | 2 | P_+INVER_PWR |

**Table 1-14: 5V/12V Power Jumpers Pin Assignments**

### 1.7.7 LVDS Backlight Power Connector (optional)

The MXE-1500 internal LVDS backlight power connector supports +3.3V.

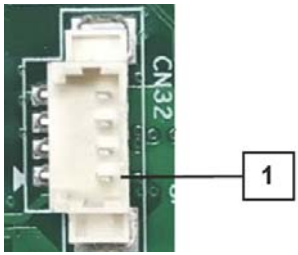



**Figure 1-21: LVDS Backlight Power Connector**

| Pin | Description |
|---|---|
| 1 | LVDS_BKTEN_3V3 |
| 2 | LVDS_BKLTCTL_3V3 |
| 3 | P_+INVER_PWR |
| 4 | GND |

**Table 1-15: LVDS Backlight Power Connector Pin Definition**

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### 1.7.8 LVDS Connector

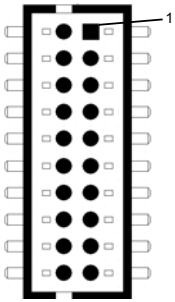



**Figure 1-22: LVDS Connector**

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | CON_LVDS_A_TX3_N | 11 | GND |
| 2 | CON_LVDS_A_TX0_N | 12 | GND |
| 3 | CON_LVDS_A_TX3_P | 13 | CON_LVDS_I2C_DAT |
| 4 | CON_LVDS_A_TX0_P | 14 | CON_LVDS_A_TX2_N |
| 5 | GND | 15 | CON_LVDS_I2C_CLK |
| 6 | GND | 16 | CON_LVDS_A_TX2_P |
| 7 | CON_LVDS_A_CLK_P | 17 | P_CON_+LVDS_PWR |
| 8 | CON_LVDS_A_TX1_N | 18 | GND |
| 9 | CON_LVDS_A_CLK_N | 19 | P_CON_+LVDS_PWR |
| 10 | CON_LVDS_A_TX1_P | 20 | P_CON_+LVDS_PWR |

**Table 1-16: LVDS Connector Pin Assignment**

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### 1.7.9 SATA Connector

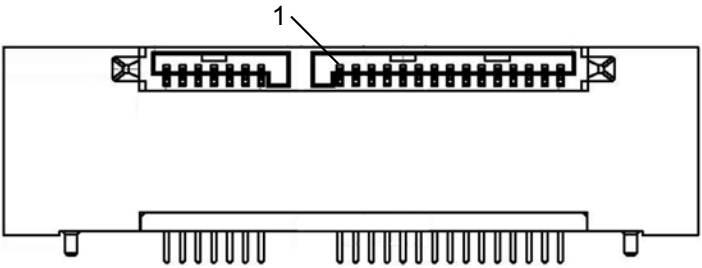



**Figure 1-23: SATA Connector Pin Assignment**

### 1.7.10 Clear CMOS Jumper

Upon encountering an abnormal condition preventing the MXE-1500 from booting, the jumper can clear the BIOS content stored in CMOS and restore default settings. To clear CMOS, short pin #1 to pin #2 of CN20 and then return to normal mode (short pin #3 to pin #2).

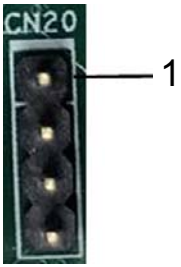



**Figure 1-24: Clear CMOS Jumper**

| Pin | Signal |
|---|---|
| 1 | SOC_RTEST-L |
| 2 | GND |
| 3 | GND |
| 4 | SOC_SRTCRST-L |

**Table 1-17: Clear CMOS Pin Assignment**

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### 1.7.11 LVDS 18/24-bit Select Jumper

| | |
|---|---|
| **18-bit LVDS** | Short pins 1 and 2 |
| **24-bit LVDS** | Short pins 2 and 3 |

**Table 1-18: LVDS 18/24-bit Jumper Settings**

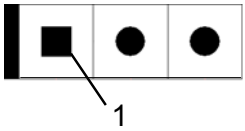



**Figure 1-25: LVDS 18/24-bit Select Jumper**

| Pin | Signal |
|---|---|
| 1 | GND |
| 2 | PTN3460_CFG2 |
| 3 | P_+3V3_3460 |

**Table 1-19: LVDS 18/24-bit Select Jumper Pin Assignments**

### 1.7.12 Speaker Connector

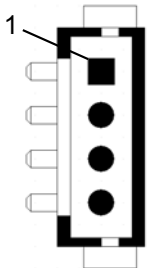



**Figure 1-26: Speaker Connector**

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| Pin | Signal |
|---|---|
| 1 | ALC269_SPK_L_P |
| 2 | ALC269_SPK_L_N |
| 3 | ALC269_SPK_R_P |
| 4 | ALC269_SPK_R_N |

**Table 1-20: Speaker Connector Pin Assignment**

### 1.7.13 COM Port (COM 5/6)

COM port mode is switchable in BIOS.

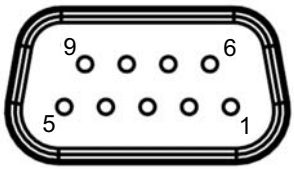



**Figure 1-27: COM Port**

| PIN | Signal | | |
|---|---|---|---|
| | RS-232 | RS-422 | RS-485 |
| 1 | DCD# | TXD422n | 485n |
| 2 | RXD | TXD422p | 485p |
| 3 | TXD | RXD422p | N/S |
| 4 | DTR# | RXD422n | N/S |
| 5 | GND | N/S | N/S |
| 6 | DSR# | N/S | N/S |
| 7 | RTS# | N/S | N/S |
| 8 | CTS# | N/S | N/S |
| 9 | RI# | N/S | N/S |

**Table 1-21: COM 5/6 Port Pin Assignment**

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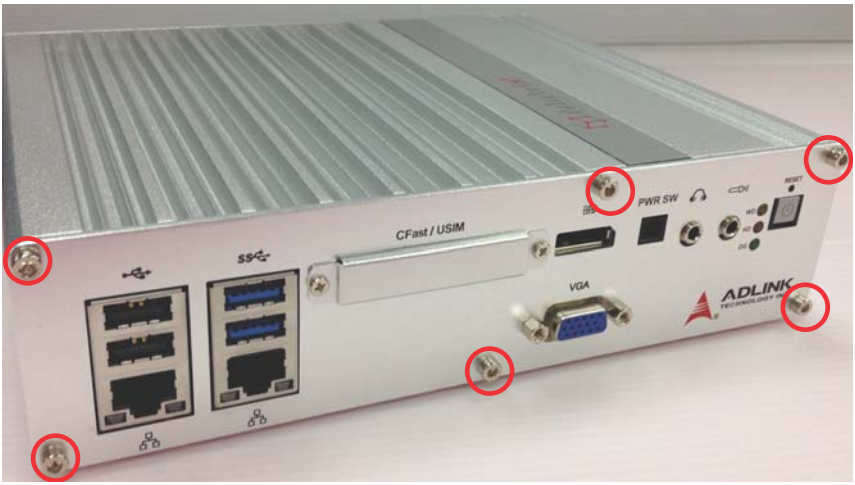
# 2 Getting Started

This chapter demonstrates installation of a hard disk drive and CFast card. In addition to connection and use of DI/O, wall-mounting instruction is also provided.

## 2.1 Installing a Hard Disk Drive

Before installing a hard disk drive, remove the bottom cover of the chassis as follows.

1. Use a #3 hex wrench to unscrew all 6 screws (M3 hex bolts) from the front panel.

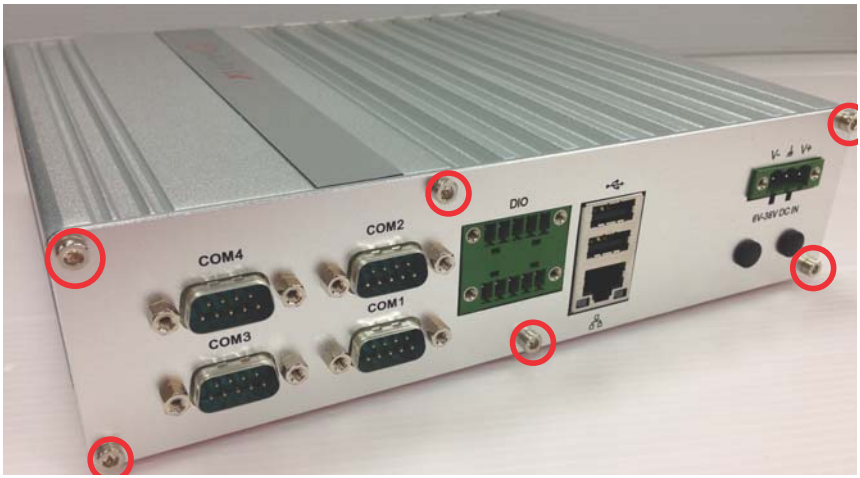



2. Remove the 2 fixing members from the front panel and remove the panel.

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3. Remove the 6 screws from the rear panel.

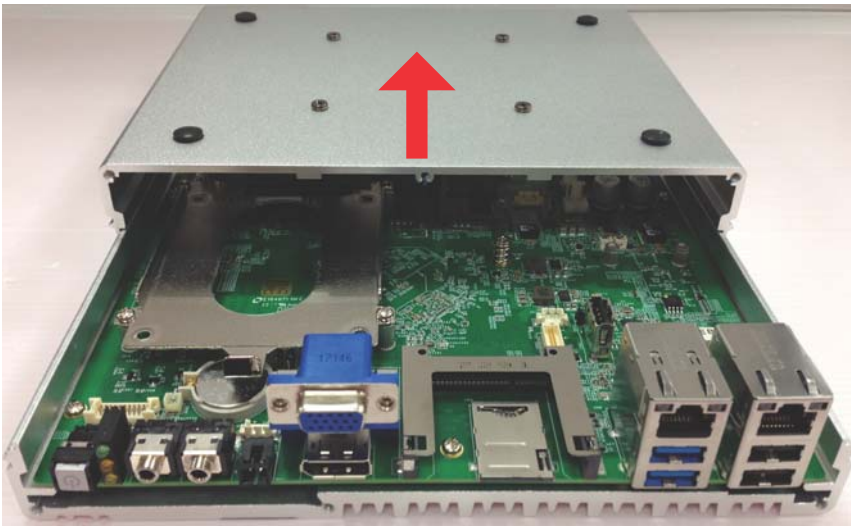



4. Remove the 8 fixing members from the rear panel and remove the panel.

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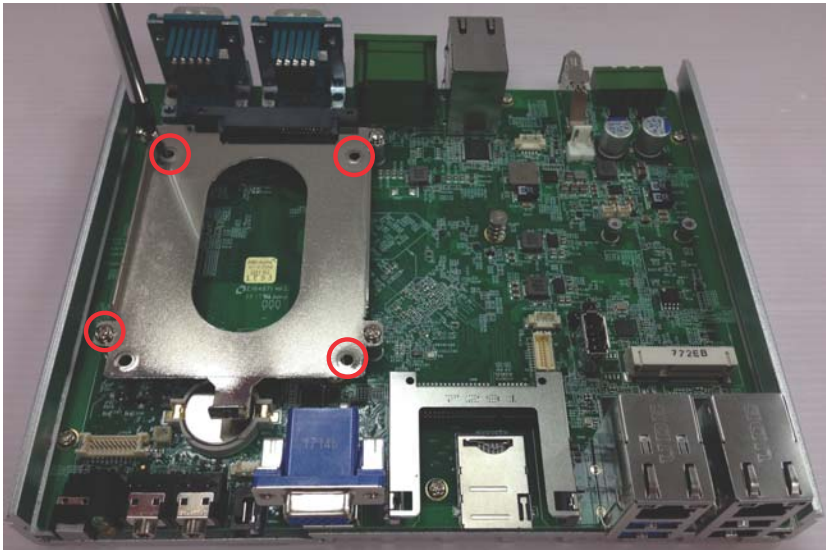



5. Remove the bottom chassis by sliding it off the top chassis.



6. The MXE-1500 ships with an attached empty HDD bracket. Unscrew the 4 screws and remove the HDD bracket.

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7. Secure the 2.5" HDD or SSD to the bracket using the four supplied M3-F screws and four anti-vibration jacks.

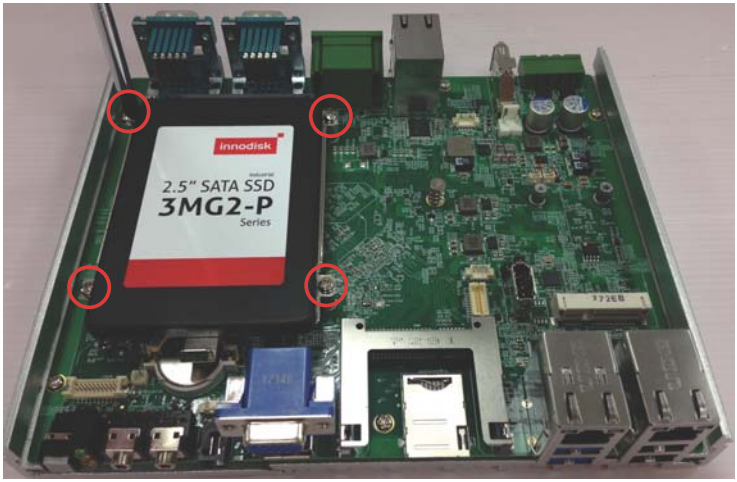



8. Connect the drive to the SATA connector.

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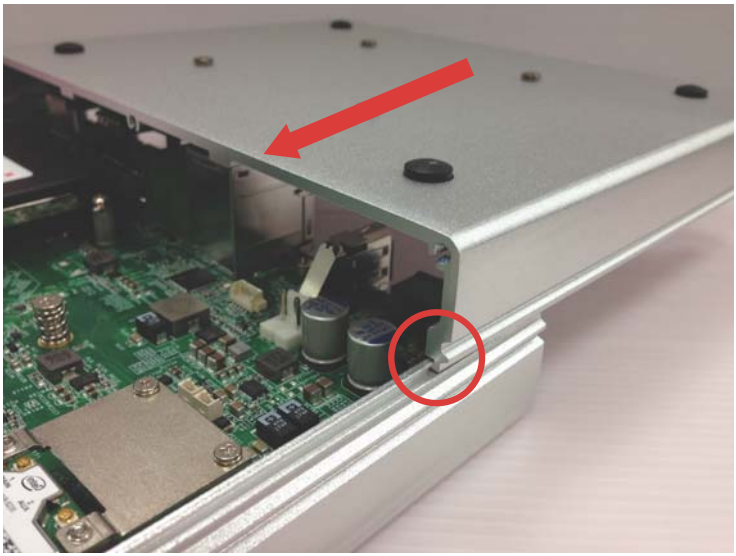


9. Fasten the 4 screws to fix the HDD bracket to the fixing members.




10. Align the sliding parts as shown and reassemble the bottom chassis to the top chassis.

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11. Reinstall the front and rear panels and fasten 10 screws (M3 hex bolts) and 12 fixing members into the front and rear panels.

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## 2.2 Installing a CFast/USIM Card

The external CFast/USIM slot accommodates one CFast/USIM card for additional storage. To install the card:

1. Remove the 2 screws from the CFast/USIM cover and remove the cover.




2. Gently insert the CFast/USIM card until it is firmly seated in the slot.



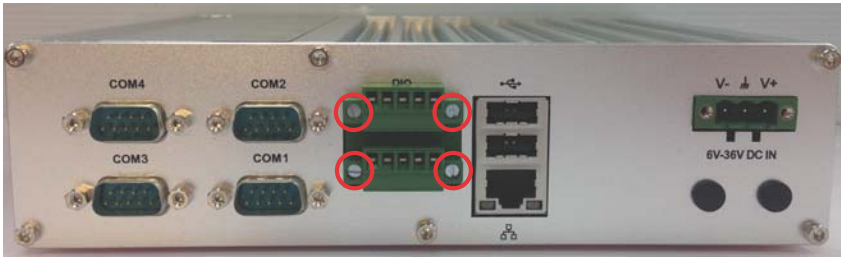

3. Replace the CFast/USIM cover and refasten the screws.

## 2.3 Connecting a DI/O Device

The MXE-1500 series controller provides 4 digital input and 4 digital output ports. The two pluggable terminals provided enable connection to the DI/O device.

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Connect the two pluggable terminals to the DI/O connector on the rear panel. Fix the pluggable terminal using the 2 screws.




For DI/O pin definitions, see “Internal I/O Connectors” on page 21.

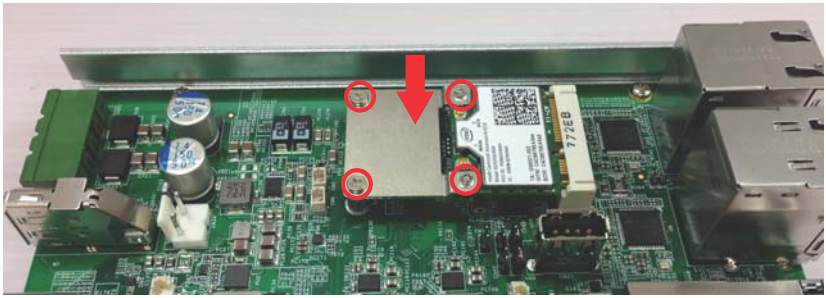
## 2.4 Installing a Mini-PCI-E Device

1. Remove the front and rear panels and slide the bottom chassis off the top chassis.
2. Insert the mini-PCI-E wireless module into the bracket at an angle.



3. Depress the module into place and fix with the 4 M2.5-P-head-L5 screws.

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4. Rejoin the chassis and replace the front and rear panels, with all screws and fixing members in place.

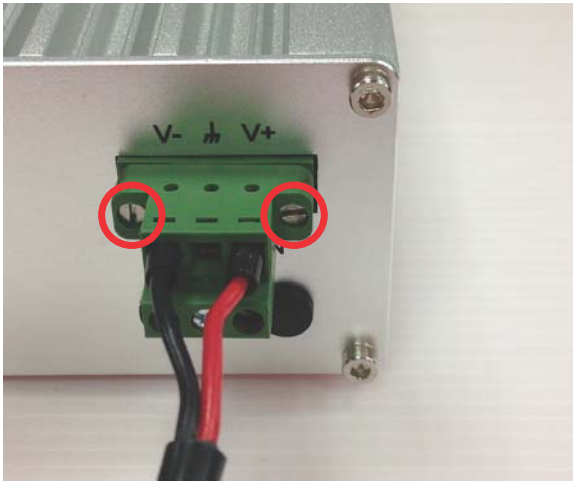
## 2.5 Connecting DC power

WARNING:

Before providing DC power to the MXE-1500, ensure voltage and polarity provided are compatible with the DC input. Improper input voltage and/or polarity can be responsible for system damage.

The MXE-1500 DC power input connector utilizes V+, V-, and chassis ground pins, and accepts input voltage as discussed.

Connect the DC power connector and fix using the 2 screws.




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## 2.6 Wall-mounting the MXE-1500

The MXE-1500 is shipped with a VESA 100 wall-mount brackets and accessory screws. The bracket has four M4 mounting holes with a pitch of 100 mm, allowing fixture to any VESA 100 compatible mounting mechanism. The mounting bracket enables the MXE-1500 series controller to be mounted on a wall or the back of a monitor. To wall-mount the MXE-1500:

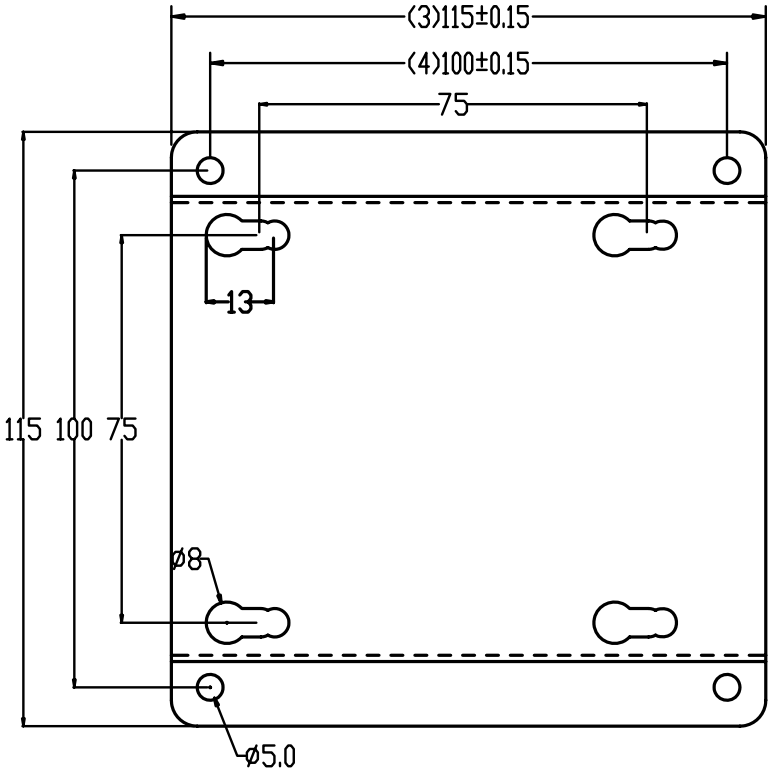
1. Remove the four M4 screws on the bottom cover.

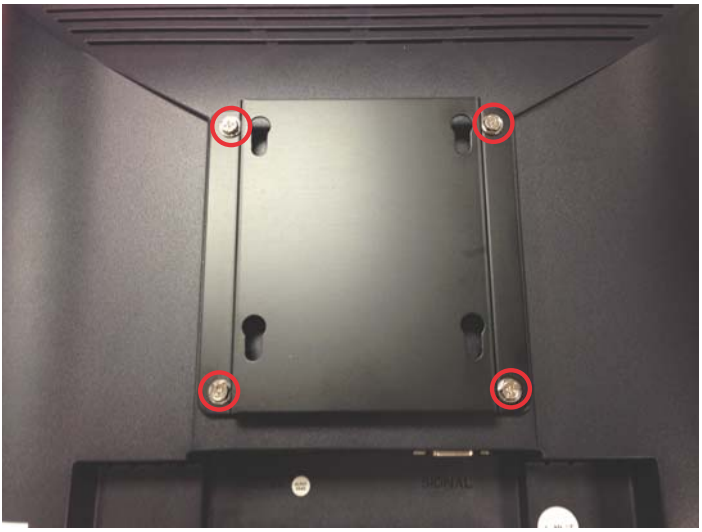


2. Replace with the 4M4.0,l-head screws.
3. Prepare the wall-mount brackets and 4 M4 screws provided.

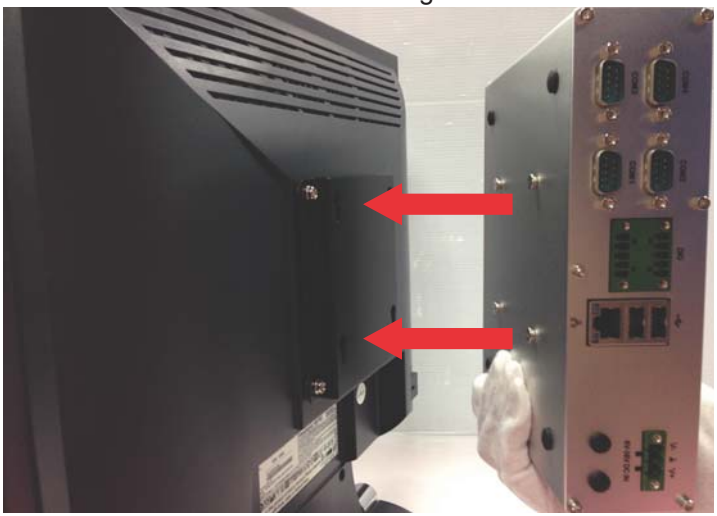
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4. Fasten the 4 screws to fix the bracket to the desired mounting surface (wall or monitor) as shown.





5. Depress the MXE-1500 until a click is heard. The chassis is now locked to the mounting bracket.



## 2.7 Cooling Configuration

Heat-generating components of the MXE-1500 (such as CPU and PCH) are all situated on the left side of the system. These components directly contact the heat sink via thermal pads and dissipate heat generated by the components. To maximize efficiency of heat dissipation, maintain a minimum of 2 inches (5 cm) clearance on the top of the MXE-1500.

## 2.8 Driver Installation

Download requisite drivers for your system from http://www.adlinktech.com and install.

The following drivers must be installed:

- Chipset
- Graphic
- Audio
- Intel TXE
- Intel Serial I/O
- Intel USB3.0 (Windows 7 only)
- LAN
- TPM (Optional)

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# Appendix A DI/O with API/Windows

Matrix DI/O API library files and a demo program (incl. source code) are located on the included driver CD or downloaded from http://www.adlinktech.com.

To use the DI/O function library for MXE-1500, include the header file matrix_dio.h and linkage library matrix_dio.lib in the C++ project.

DI/O functions are as follows.

### GPIO_Init

Reserves system resources for digital input/output API service.It is necessary to call this function before using other MXE-1500 DI/O functions.

**@ Syntax**

C/C++

```
I16 GPIO_Init(void)
```

**@ Parameters**

None

**@ Return code**

```
NoError
ErrorOpenDriverFailed
ErrorDeviceIoctl
```

### GPI_Read()

Reads the digital logic state of the digital input line.

**@ Syntax**

C/C++

```
I16 GPI_Read(U16 *pwState)
```

**@ Parameters**

*pwState*

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Returns the digital logic state of MXE-1500 digital input channels 1~4 (bit 0~3)

@ **Return code**

```
NoError
ErrorOpenDriverFailed
ErrorDeviceIoctl
```

### GPO_Write()

Sets the digital logic state of the digital output line.

@ **Syntax**

C/C++

```
I16 GPO_Write(U16 wState)
```

@ **Parameters**

*State*

Sets the digital logic state of MXE-1500 digital output channels 1~4 (bit 0~3) to 0 or 1.

@ **Return code**

```
NoError
ErrorOpenDriverFailed
ErrorDeviceIoctl
```

### GPO_Read()

Reads the digital logic state of the digital output line.

@ **Syntax**

C/C++

```
I16 GPO_Read(U16 *pwState)
```

@ **Parameters**

*pwState*

Returns the digital logic state of MXE-1500 digital output channels 1~4 (bit 0~3).

@ **Return code**

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```
NoError
ErrorOpenDriverFailed
ErrorDeviceIoctl
```

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# Appendix B BIOS Setup


NOTE:

BIOS options in the manual are for reference only, and are subject to configuration. Users are welcome to download the latest BIOS version from the ADLINK website.

The Basic Input/Output System (BIOS) is a program that provides a basic level of communication between the processor and peripherals. In addition, the BIOS also contains codes for various advanced features applied to the MXE-1500. The BIOS setup program includes menus for configuring settings and enabling features of the MXE-1500 series. Most users do not need to use the BIOS setup program, as the MXE-1500 ships with default settings that work well for most configurations.


WARNING:

Changing BIOS settings may lead to incorrect controller behavior and possible inability to boot. In such a case, Section 1.7.10 on page 27 provides instruction on clearing the CMOS and restoring default settings

Enter BIOS setup by selecting DEL when the system is powered on the POST (Power On Self Test) message is displayed.The MXE-1500 controller supports one-time Boot Menu allowing selection of boot device. Enter the Boot Menu by selecting F7 at POST.


NOTE:

- BIOS options listed are for reference only.
- Different configurations can affect BIOS behavior.
- Displayed material may reflect only the BIOS version corresponding to initial release and may differ from that of the purchased motherboard.

## B.1 Main

Contains basic system information for the MXE-1500.

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## BIOS Information

Shows vendor, version, build date, MRC Version, GOP Version, and TXE FW Version for active BIOS.

## System Information

Shows current system project name, hardware version, CPU brand string, CPU frequency, total memory, memory frequency and PCH SKU.

## System Time/System Date

Allows adjustment of system time and date, as follows.

1. Highlight System Time or System Date using the up and down <Arrow> keys
2. Enter new values using the keyboard and select <Enter>

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3. Select < Tab > to move between fields.

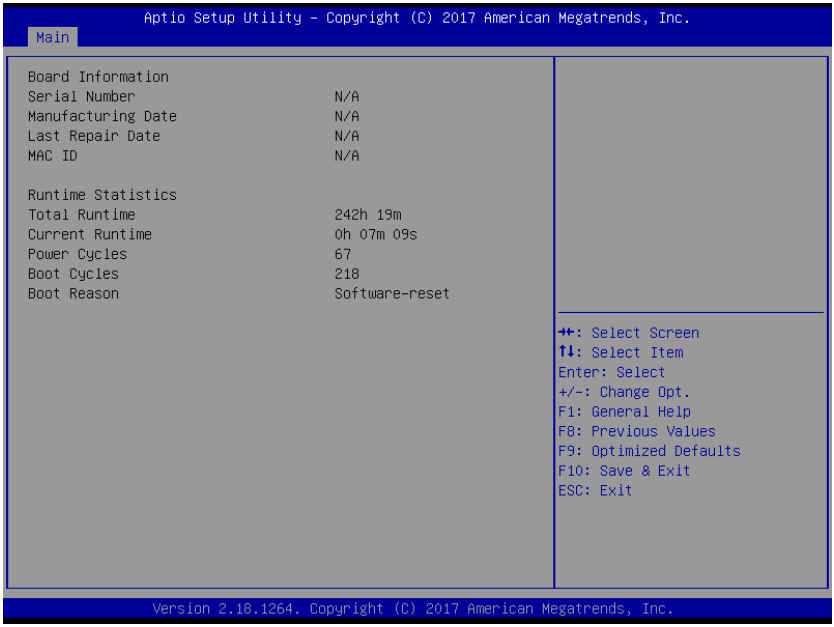
NOTE:

- The date must be entered in MM/DD/YY format, and the time in HH:MM:SS.
- The time is in 24-hour format. For example, 5:30 A.M. appears as 05:30:00, and 5:30 P.M. as 17:30:00.

### Access Level

Displays the current access level for BIOS setup.

## B.1.1 Board Information




### Board Information

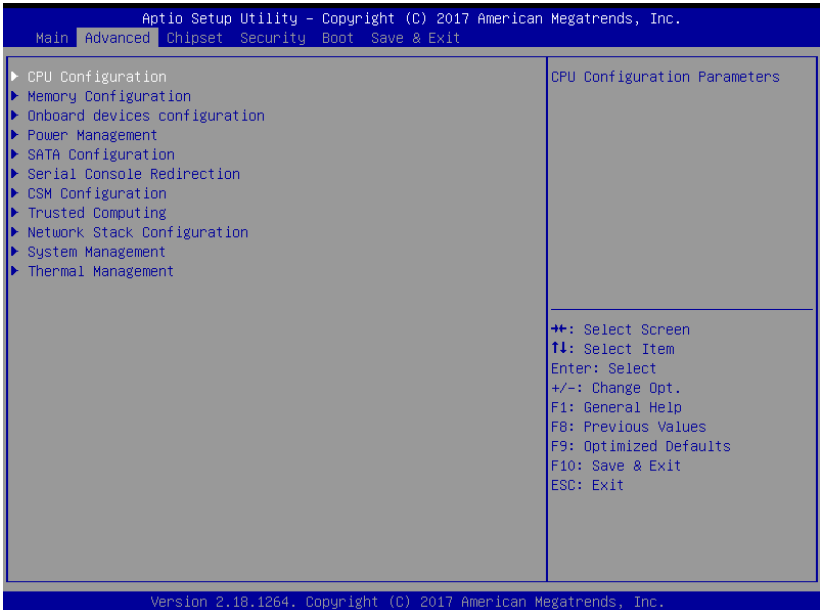
Displays Serial Number, Manufacturing Date, Last Repair Date, and MAC ID for the installed board.

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### Runtime Statistics

Displays total runtime, current runtime, power cycles, boot cycles, and boot reason for the system.

## B.2 Advanced



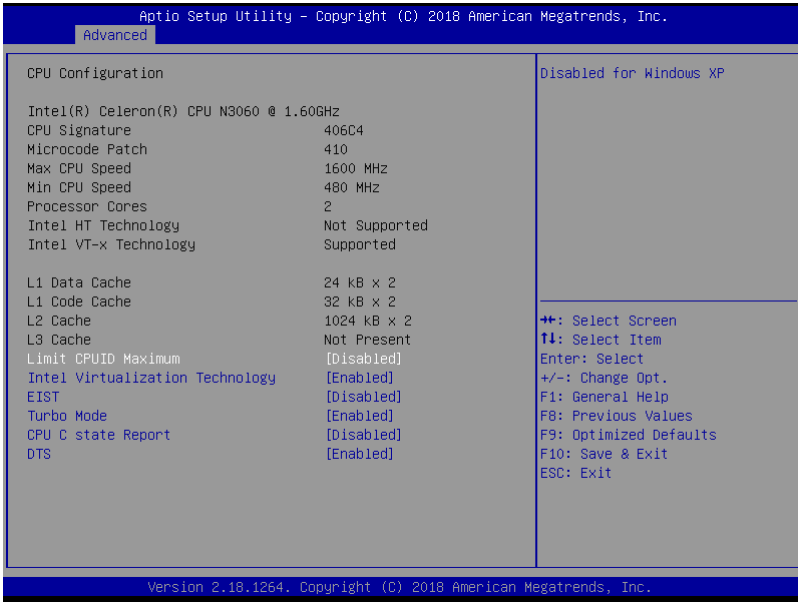

CAUTION:

Setting incorrect or conflicting values in Advanced BIOS Setup may cause system malfunction

Accesses advanced options of the MXE-1500.

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### B.2.1 CPU Configuration




#### Limit CPUID Maximum

Disabled for Windows XP.

#### Intel Virtualization Technology

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

#### Turbo Mode

Enables/disables Turbo Mode.

#### EIST

Enables/disables Intel SpeedStep.

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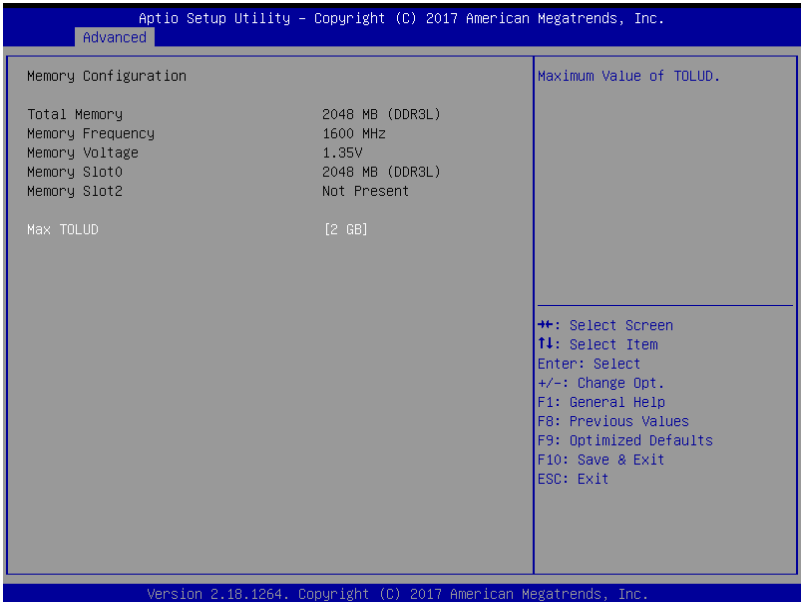
### CPU C state Report

Enables/disables CPU C state report to OS.

### DTS

Enables/disables Digital Thermal Sensor.

## B.2.2 Memory Configuration



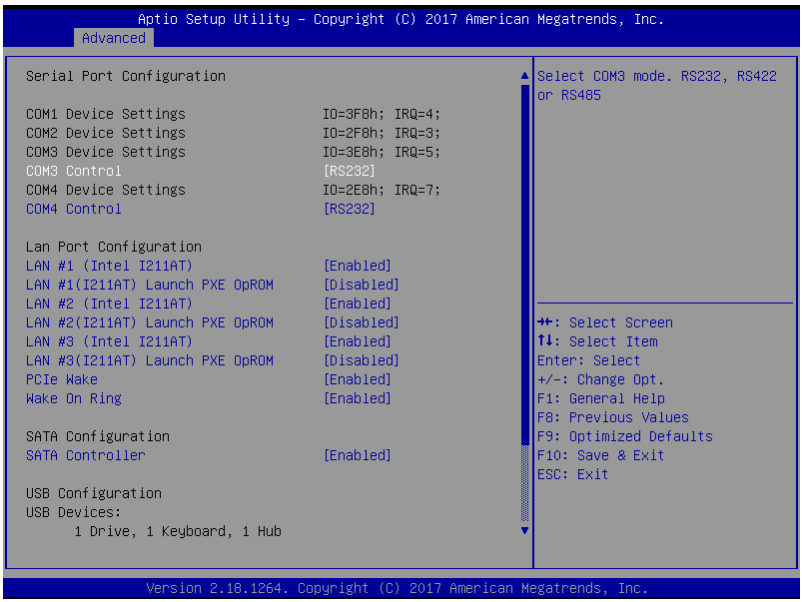

Displays total memory, memory frequency, memory voltage, memory slot0, and slot2.

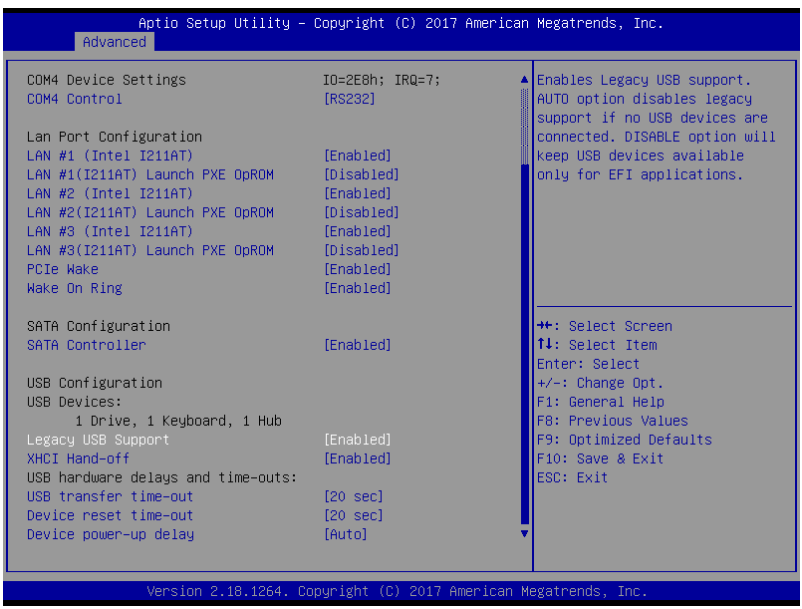
### Max TOLUD

Maximum Value of TOLUD.

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## B.2.3 Onboard Device Configuration






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### Serial Port 1 to 4 Configuration

Sets port type (RS-232/422/485) for serial ports 3 and 4.

### LAN #1 (Intel I211AT)

Enables/disables onboard Intel I211AT LAN controller.

### LAN #1(I211AT) Launch PXE OpROM

Enables/disables execution of LAN boot-rom to add boot option for legacy network devices.

### LAN #2 (Intel I211AT)

Enables/disables onboard Intel I211AT LAN controller.

### LAN #2(I211AT) Launch PXE OpROM

Enables/disables execution of LAN boot-rom to add boot option for legacy network devices.

### LAN #3 (Intel I211AT)

Enables/disables onboard Intel I211AT LAN controller.

### LAN #3(I211AT) Launch PXE OpROM

Enables/disables execution of LAN boot-rom to add boot option for legacy network devices.

### PCIe Wake

Enables/disables PCI Express Slot wake capability

### Wake On Ring

Enables/disables RI ping for Wake On Ring function

### SATA Controller

Enable/Disable SATA Device

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### Legacy USB Support

Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.

### XHCI Hand-off

A workaround for OS with no XHCI hand-off support. XHCI ownership change should be claimed by XHCI driver.

### USB transfer time-out

Time-out value for Control, Bulk, and Interrupt transfers.

### Device reset time-out

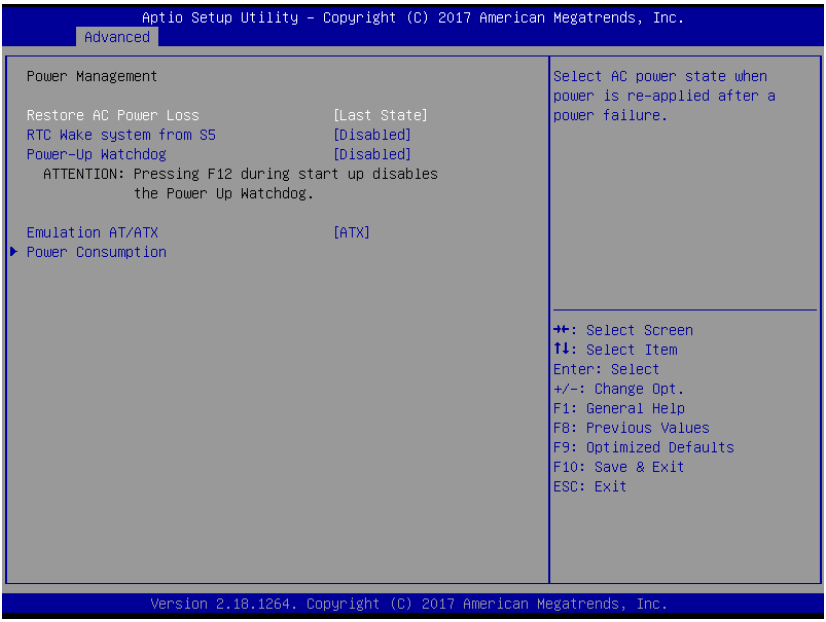
USB mass storage device Start Unit command time-out.

### Device power-up delay

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

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### B.2.4 Power Management




#### Restore AC Power Loss

Selects AC power state when power is re-applied after a power failure.

#### RTC Wake system from S5

Enables/disables System Wake on Alarm event, with Select Fixed-Time waking system on the hr/min/sec specified, and Select DynamicTime System waking on the current time + increased minute(s)

#### Power-Up Watchdog

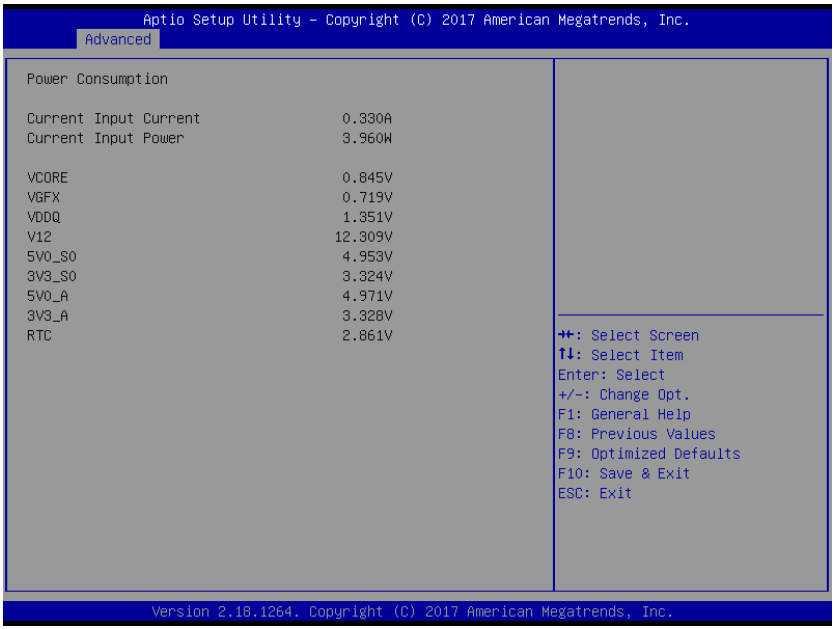
Power Up Watchdog resets the system a set amount of time after power up, disabled by pressing F12 during startup.

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## Emulation AT/ATX

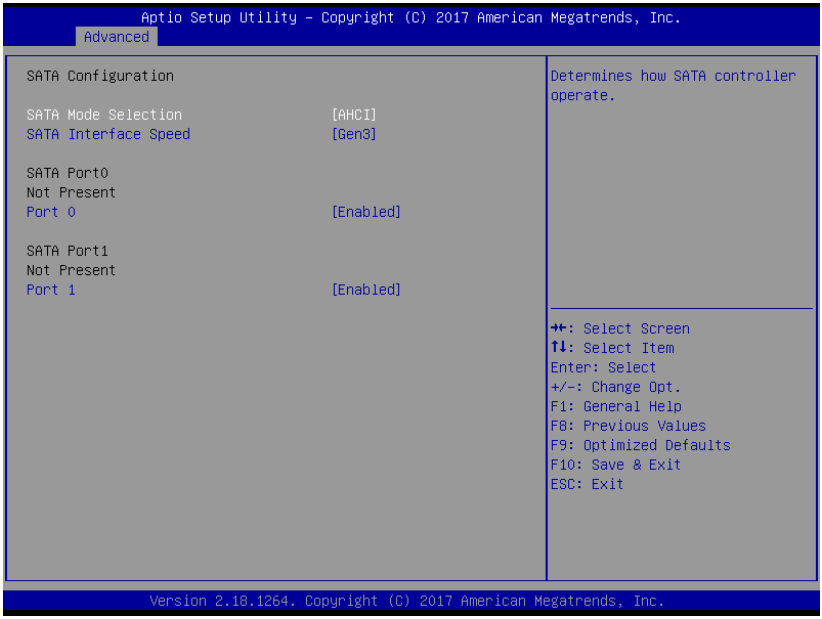
Setting to [Emulation AT] stops BIOS from reporting suspend functions to ACPI OS, and in windows XP, displays shutdown message during system shutdown.

## Power Consumption




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### B.2.5 SATA Configuration




#### SATA Mode Selection

Sets SATA controller operating mode.

#### SATA Interface Speed

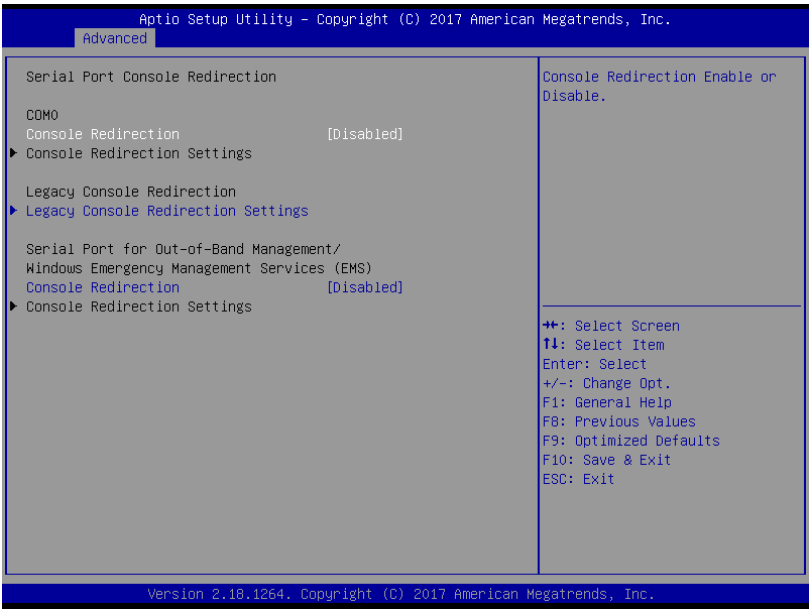
Selects SATA interface speed.

#### SATA Port 0 to 1

Enables/disables SATA ports 0 and 1.

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## B.2.6 Serial Console Redirection




### Console Redirection

Enables console redirection on COM 1, SOL, and EMS COM.

### Legacy Console Redirection Settings

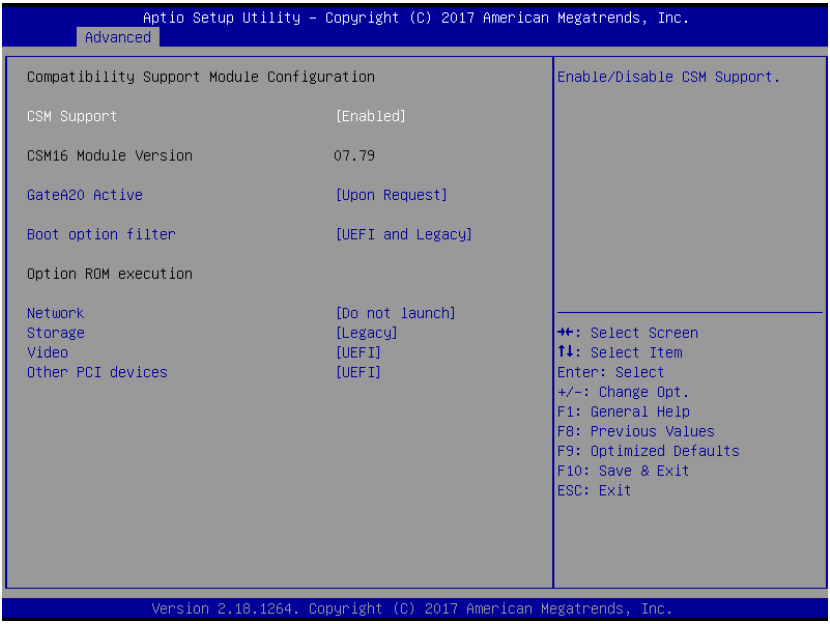
Selects a COM port on which to display redirection of Legacy OS and Legacy OPROM messages

### Console Redirection Settings

Sets miscellaneous parameters for COM Port 1, SOL, and EMS COM.

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### B.2.7 CSM Configuration




#### CSM Support

Enables/disables CSM support.

#### GateA20 Active

Setting UPON REQUEST disables GA20 while using BIOS services, and ALWAYS prevents disabling GA20, useful when any RT code is executed over 1MB.

#### Boot option filter

Controls legacy/UEFI ROM priority.

#### Network

Controls execution of UEFI and legacy PXE OpROM

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### Storage

Controls execution of UEFI and legacy Storage OpROM.

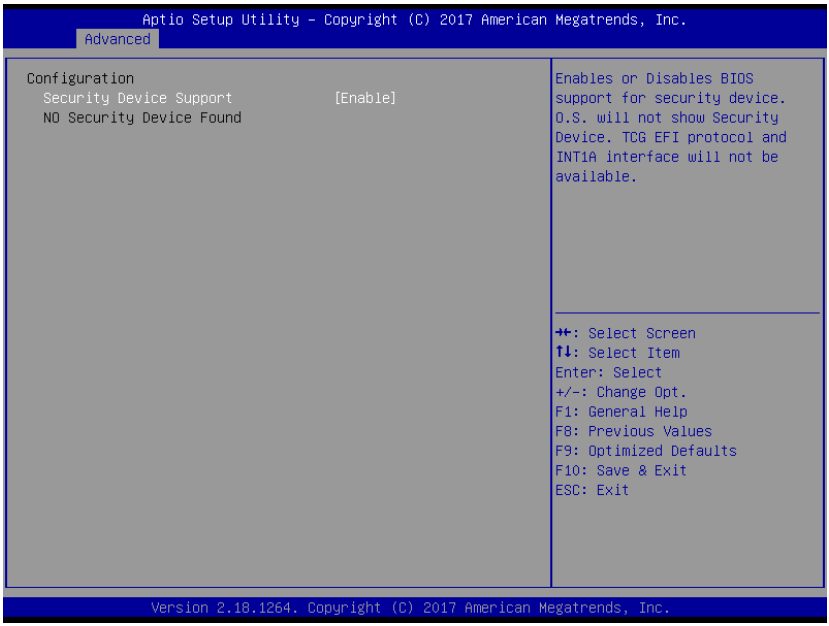
### Video

Controls execution of UEFI and legacy video OpROM.

### Other PCI devices

Determines OpROM execution policy for devices other than network, storage, or video.

## B.2.8 Trusted Computing

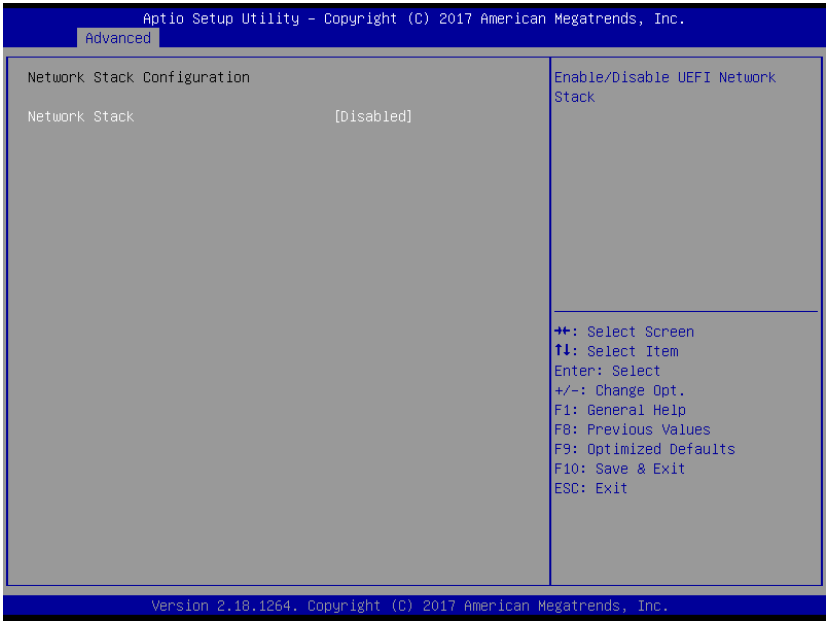



### Security Device Support

Enables/disables BIOS support for security device, where OS does not show Security Device, and TCG EFI protocol and INT1A interface are not available.

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### B.2.9 Network Stack Configuration

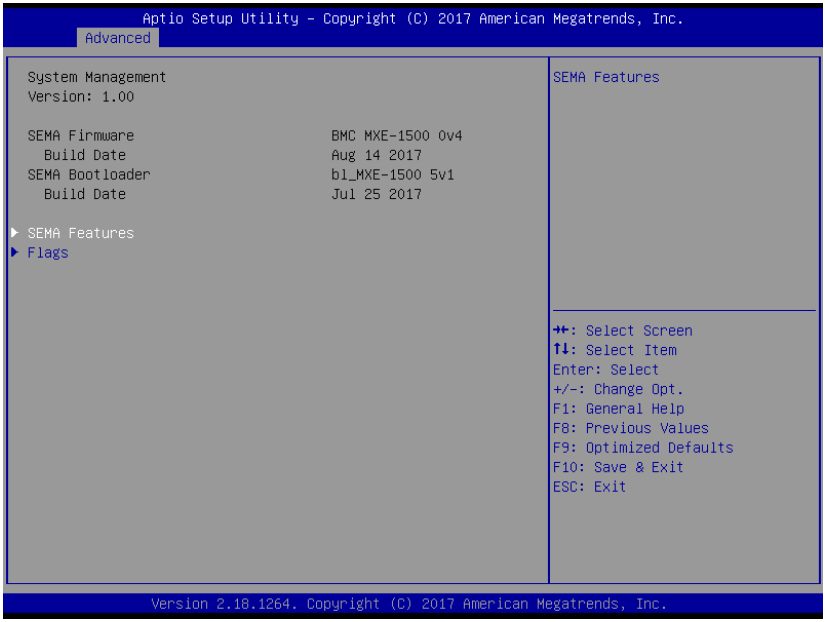



**Network Stack**

Enables/disables UEFI network stack.

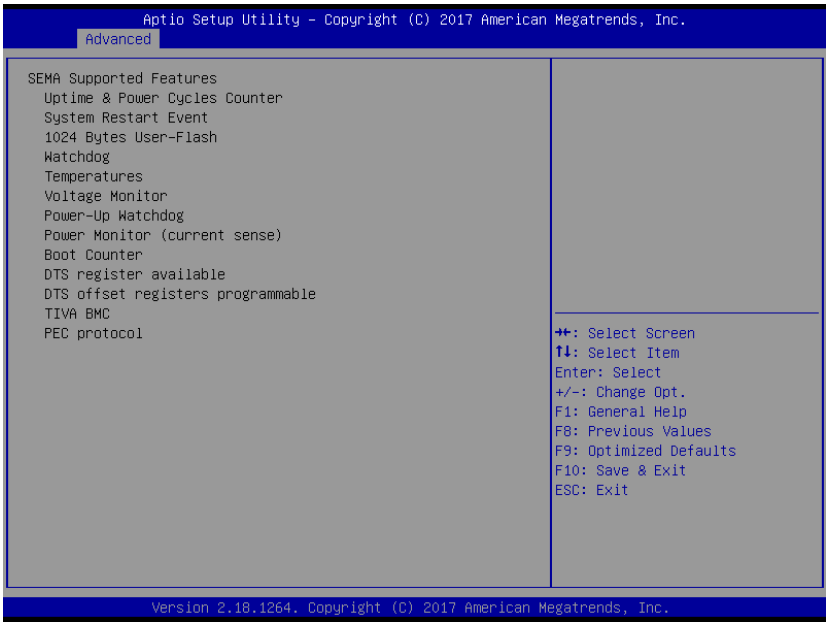
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## B.2.10 System Management



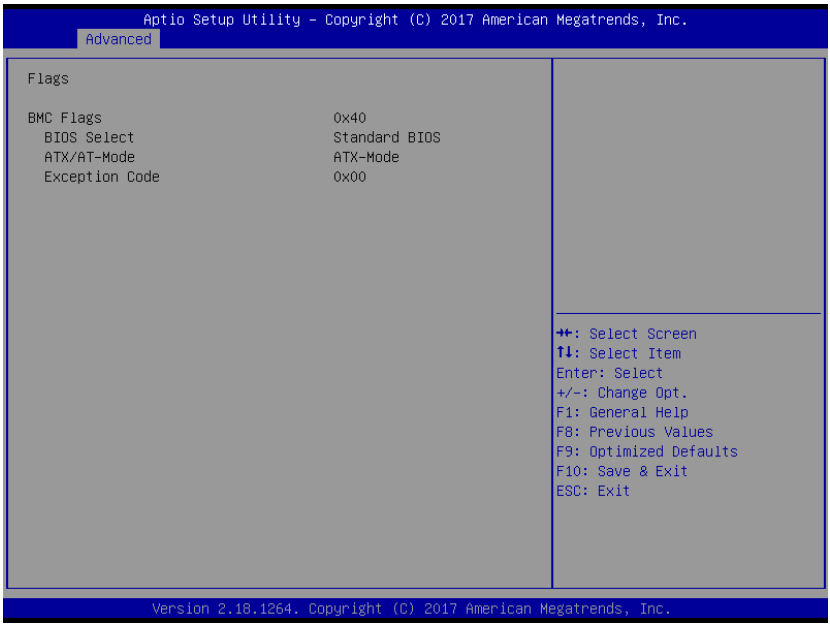

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## SEMA Supported Features



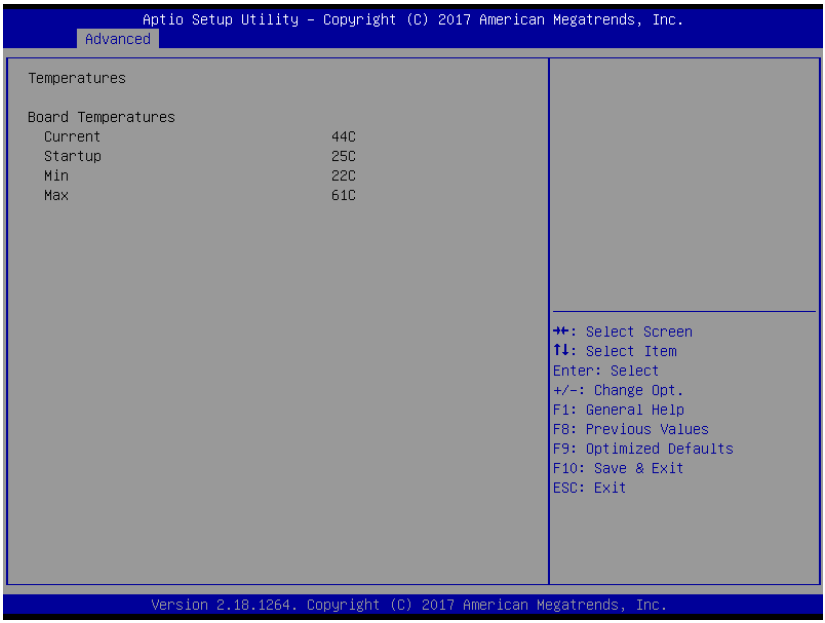

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## Flags



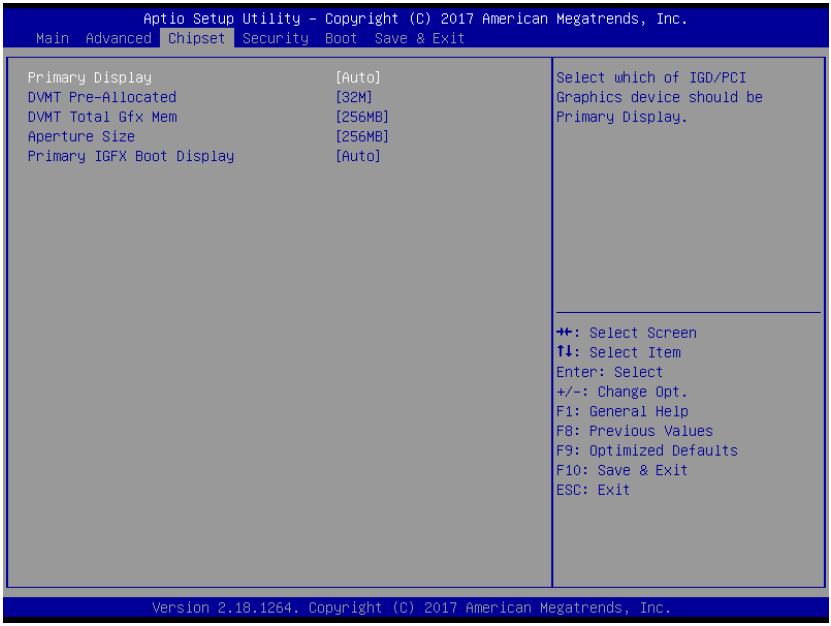

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### B.2.11 Thermal Management




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## B.3 Chipset




### Primary Display

Designates which IGD/PCI Graphics device is Primary Display.

### DVMT Pre-Allocated

Sets DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.

### DVMT Total Gfx Mem

Sets DVMT 5.0 Total Graphic Memory size used by the Internal Graphics Device.

### Aperture Size

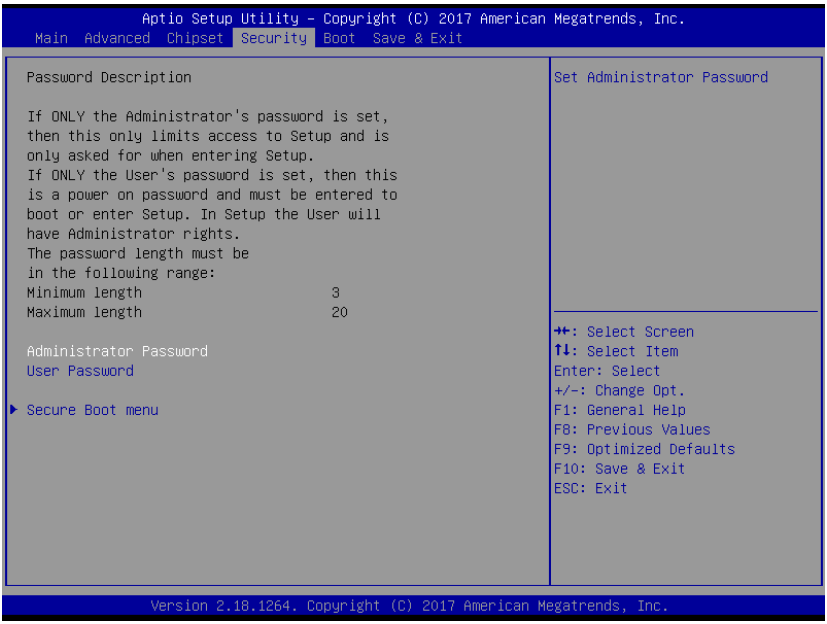
Sets Aperture Size

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### Primary IGFX Boot Display

Selects the Video Device to be activated during POST.

## B.4 Security




If only the Administrator password is set, access s limited and the password requested on Setup. If User password is set, it acts as a power-on password and must be entered to boot or enter setup. In Setup the user receives

### Administrator Password

Sets Administrator Password.

### User Password

Sets User Password.

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### B.4.1 Secure Boot Menu

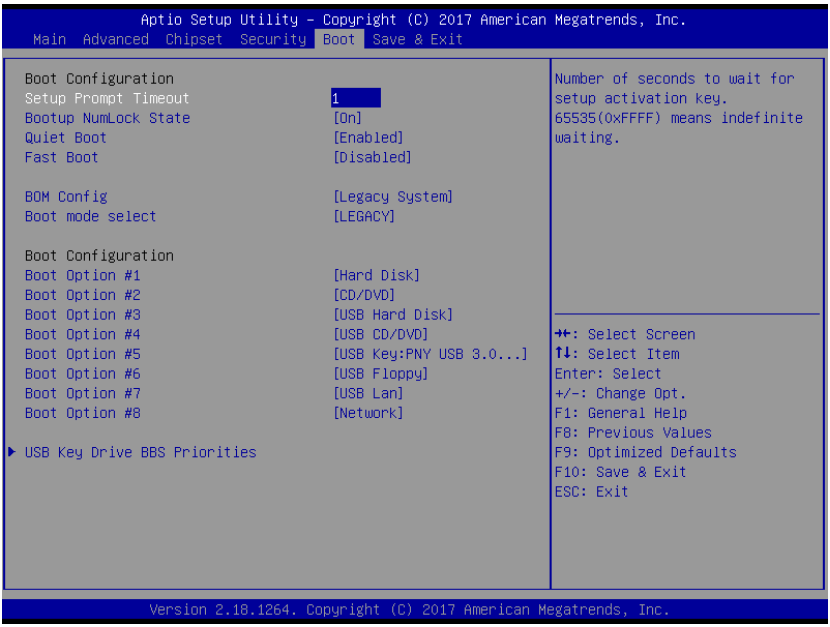



#### Secure Boot Control

Can be enabled if running in User mode with enrolled Platform Key (PK) and CSM function is disabled.

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## B.5 Boot




### Setup Prompt Timeout

Number of seconds before setup activation key is launched, with 65535(0xFFFF) setting indefinite waiting.

### Bootup Num-Lock State

Sets keypad Number Lock status following boot.

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## Quiet Boot

| Option | Description |
|---|---|
| Disabled | Directs BIOS to display POST messages |
| Enabled | Directs BIOS to display the OEM logo. |

## Fast Boot

| Option | Description |
|---|---|
| Disabled | Directs BIOS to perform all POST tests. |
| Enabled | Directs BIOS to skip certain POST tests to boot faster. |

While enabling Fast Boot can reduce system ready time, some prerequisites can reduce effectiveness.

## BOM Config

Sets relative parameters according to target OS.

## Boot mode select

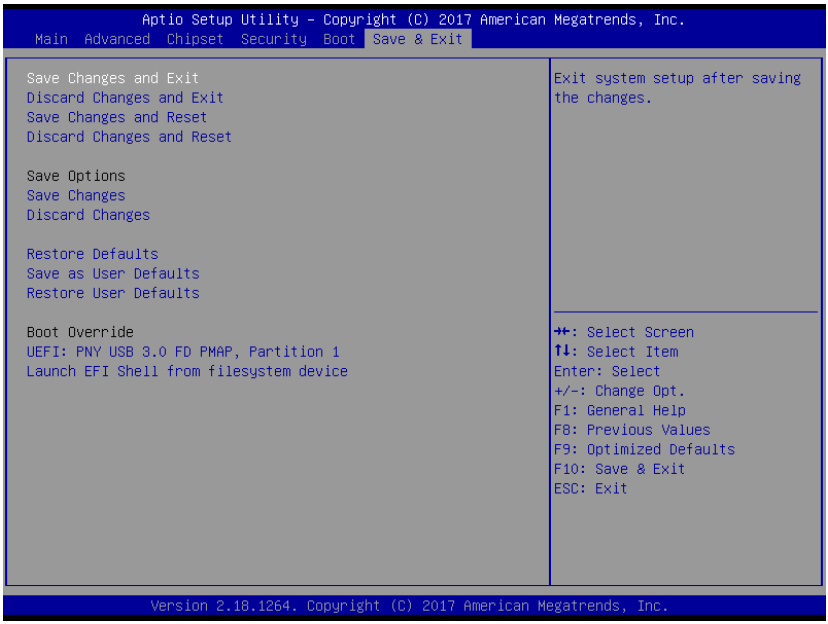
Selects boot mode from LEGACY and UEFI.

## Boot Configuration

Specifies the priority of boot devices, all of which are detected during POST and displayed. Target Boot Option # and click to select the desired device

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## B.6 Save & Exit




### Save Changes and Exit

Exits system setup after saving changes.

### Discard Changes and Exit

Discards all changes and exits BIOS setup.

### Save Changes and Reset

Saves all changes and reboots the system, with new settings taking effect.

### Discard Changes and Reset

Resets system setup without saving any changes.

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### Save Changes

Saves changes made so far to any of the setup options.

### Discard Changes

Discards changes made so far to any of the setup options.

### Restore Defaults

Returns all BIOS options to default settings, maximizing system stability at less than maximum performance. Select if the computer encounters system configuration problems.

### Save as User Defaults

Saves all changes to this point as user defaults.

### Restore User Defaults

Restores user defaults to all setup options.

### Launch EFI Shell from filesystem device

Attempts to Launch EFI Shell application (Shell.efi) from one available filesystem device.

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# Important Safety Instructions

For user safety, please read and follow all instructions, Warnings, Cautions, and Notes marked in this manual and on the associated device before handling/operating the device, to avoid injury or damage.

*S'il vous plaît prêter attention stricte à tous les avertissements et mises en garde figurant sur l'appareil , pour éviter des blessures ou des dommages.*

- Read these safety instructions carefully
- Keep the User's Manual for future reference
- Read the Specifications section of this manual for detailed information on the recommended operating environment
- The device can be operated at an ambient temperature of 50ºC (powered by DC source) or 40ºC (powered by AC-DC adapter)
- When installing/mounting or uninstalling/removing device; or when removal of a chassis cover is required for user servicing (See "Getting Started" on page 31.):
  - Turn off power and unplug any power cords/cables
  - Reinstall all chassis covers before restoring power
- To avoid electrical shock and/or damage to device:
  - Keep device away from water or liquid sources
  - Keep device away from high heat or humidity
  - Keep device properly ventilated (do not block or cover ventilation openings)
  - Always use recommended voltage and power source settings
  - Always install and operate device near an easily accessible electrical outlet
  - Secure the power cord (do not place any object on/over the power cord)
  - Only install/attach and operate device on stable surfaces and/or recommended mountings

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- If the device will not be used for long periods of time, turn off and unplug from its power source
- Never attempt to repair the device, which should only be serviced by qualified technical personnel using suitable tools
- A Lithium-type battery may be provided for uninterrupted backup or emergency power.




Risk of explosion if battery is replaced with one of an incorrect type; please dispose of used batteries appropriately.
*Risque d'explosion si la pile est remplacée par une autre de type incorrect. Veuillez jeter les piles usagées de façon appropriée.*

- The device must be serviced by authorized technicians when:
  - The power cord or plug is damaged
  - Liquid has entered the device interior
  - The device has been exposed to high humidity and/or moisture
  - The device is not functioning or does not function according to the User's Manual
  - The device has been dropped and/or damaged and/or shows obvious signs of breakage
- Disconnect the power supply cord before loosening the thumbscrews and always fasten the thumbscrews with a screwdriver before starting the system up
- It is recommended that the device be installed only in a server room or computer room where access is:
  - Restricted to qualified service personnel or users familiar with restrictions applied to the location, reasons therefor, and any precautions required
  - Only afforded by the use of a tool or lock and key, or other means of security, and controlled by the authority responsible for the location

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| | |
|---|---|
|  | **BURN HAZARD**<br>Touching this surface could result in bodily injury. To reduce risk, allow the surface to cool before touching.<br>***RISQUE DE BRÛLURES***<br>*Ne touchez pas cette surface, cela pourrait entraîner des blessures.*<br>*Pour éviter tout danger, laissez la surface refroidir avant de la toucher.* |

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# Getting Service

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