# MXC-6600 Series

High Performance
9th Generation Intel® Xeon®/Core™ i7/i3 &
8th Gen Intel® Core™ i5 Processor-Based
Fanless Expandable Computer

**MXC-6620/MXC-6640**

**User's Manual**

**Manual Rev.:** 1.0

**Revision Date:** Sept. 14, 2020

**Part No:** 50-1Z330-1000

Leading **EDGE COMPUTING**

# Revision History

| Revision | Release Date | Description of Change(s) |
|---|---|---|
| 1.0 | 2020-09-14 | Initial release |

# Preface

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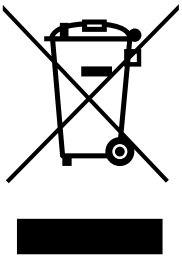

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Take note of the following conventions used throughout this manual to make sure that users perform certain tasks and instructions properly.

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

Information to prevent ***minor*** physical injury, component damage, data loss, and/or program corruption when trying to complete a task.
*ATTENTION: Informations destinées à prévenir les blessures corporelles mineures, les dommages aux composants, la perte de données et/ou la corruption de programme lors de l'exécution d'une tâche.*

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*AVERTISSEMENT: Informations destinées à prévenir les blessures corporelles graves, les dommages aux composants, la perte de données et/ou la corruption de programme lors de l'exécution d'une tâche spécifique.*

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# 1 Introduction

## 1.1 Overview

The MXC-6600 Series provides powerful, fanless, expandable embedded computing using the new 9th Gen Intel® Xeon®, Core™ i7/i3 and 8th Gen Intel® Core™ i5 processors with improved computing performance. The MXC-6600 continues the exceptional fanless design from the existing Matrix C series and offers a rich I/O experience with dual DisplayPorts, and an HDMI port supporting three independent displays, two USB3.1 Gen2 ports, two USB 3.1 Gen1, six USB 2.0 and two GbE LAN ports with adapter teaming support. The built-in 16-channel DI/O enables general industrial control, while PCI & PCI express (Gen3) expansion slots accept a variety of PCI, PCIe x8, and PCIe x16 add-on cards for platform development operations. Compared to other industrial PCs, the MXC-6600 Series is more compact and reliable with superior dependability in harsh environments where severe temperature variation and vibration may occur. The MXC-6600 Series provides an optional hot-pluggable fan module to dissipate heat from the system when high power consumption PCI/PCIe cards are installed. Additional function boards can be customized according to customer I/O needs. The Matrix MXC-6600 Series provides a more robust mechanical design, easy installation, and supports a greater variety of I/O options.

## 1.2 Features

- 9th Gen Intel® Xeon®, Core™ i7/i3 and 8th Gen Intel® Core™ i5 Processor-Based Embedded Fanless Computer
- Dual DDR4 SODIMMs up to 32GB
- Rich I/O: 2x DP++, 1x HDMI, 2x GbE, 6x COM, 8-ch DI, 8-ch DO, TPM 2.0
- 2x USB 3.1 Gen 2, 2x USB 3.1 Gen1 , 4x USB 2.0
- Rich storage: up to 4 internal 2.5" SATA 6 Gb/s ports with RAID 0/1/5/10 support, CFast, M.2 2280
- Embedded expansion: 1x Mini PCIe, 1x M.2 3042, 2x USIM

- Front accessible I/O and adaptive function module v.2 (optional)
- 5x user-defined LEDs
- Flexible modular expansion with 2 or 4 slots

## 1.3 Packing List

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.

- MXC-6600 Series Fanless Embedded Computer
- Accessory Box
  - DC power jack
  - Wall-mount brackets
  - Screw pack

## 1.4 Optional Accessories

- AC/DC Adapter
  - 220W (P/N: 31-62149-0000)
  - 280W (P/N: 91-95263-0010)

# 2 Specifications

## 2.1 MXC-662X/MXC-664X/MXC-6621/MXC-6641

| | MXC-662X | MXC-664X | MXC-6621 | MXC-6641 |
|---|---|---|---|---|
| **System Core** | | | | |
| Processor | Intel® Xeon® E-2276ME 45W | | Intel® Core™ i7-9850HE 45W | |
| Chipset | Mobile Intel® CM246 | | | |
| Memory | 4GB DDR4 2400MHz, dual SODIMMs, up to 32GB | | | |
| **I/O Interface** | | | | |
| Display | 2x DP++, 1x HDMI | | | |
| Expansion Slots | PCIe x16 + PCIe x4 | PCIe x16 + 2 PCIe x4 + PCI | PCIe x16 + PCIe x4 | PCIe x16 + 2 PCIe x4 + PCI |
| Ethernet | 2x Intel GbE: 1x i211AT + 1x i219 iAMT support | | | |
| Serial Ports | COM1/2: RS-232/422/485<br>COM3/4/5/6: RS-232 | | | |
| USB | 2x USB 3.1 Gen 2, 2x USB 3.1 Gen 1, 4x USB 2.0, 1x internal USB 2.0 dongle | | | |
| Audio | Line-out, Mic-in (optional: speaker-out) | | | |
| Mini PCIe | 1x Full size (USB 2.0 + PCIe) | | | |
| M.2 | 1x socket 2, key B+M or B, 2280/3042: USB 3.1 Gen 1, SATA 6 Gb/s and PCIe x2 supporting NVMe | | | |
| USIM | 2x (1x for Mini PCIe and 1x for M.2) | | | |
| DI/O | 8-ch DI and 8-ch DO | | | |
| $I^2C$ | 2x (3.3V/5V) | | | |
| TPM 2.0 | Supported | | | |
| **Storage** | | | | |
| 2.5" SATA | 2x internal (extra 2 w/ optional kit, supports RAID 0/1/5/10) | | | |
| CFast | 1x Type II | | | |
| **Physical** | | | | |
| Dimensions | 165 (W) x 240 (D) x 210 (H) mm (6.5" x 9.45" x 8.27") | 206 (W) x 240 (D) x 210 (H) mm (8.11" x 9.45" x 8.27") | 165 (W) x 240 (D) x 210 (H) mm (6.5" x 9.45" x 8.27") | 206 (W) x 240 (D) x 210 (H) mm (8.11" x 9.45" x 8.27") |
| Weight | 4.6 kg (10.2 lb.) | 4.9 kg (10.8 lb.) | 4.6 kg (10.2 lb.) | 4.9 kg (10.8 lb.) |

| | MXC-662X | MXC-664X | MXC-6621 | MXC-6641 |
|---|---|---|---|---|
| Mounting | Wall mount | | | |
| **Power Supply** | | | | |
| DC Input | 9-32V DC (± 10% tolerance) | | | |
| AC Input | Optional: 220W/280W AC/DC adapter | | | |
| **Environmental** | | | | |
| Operating Temperature | Standard: 0°C to 50°C (32°F to 122°F) w/ airflow | | | |
| | Extended: (w/ ind. storage, airflow)<br>-20°C to 70°C (-4°F to 158°F) (w/ single SODIMM)<br>-20°C to 60°C (-4°F to 140°F) (w/ dual SODIMMs) | | | |
| Storage Temperature | -40°C to 85°C (-40°F to 185°F) excluding storage | | | |
| Humidity | approx. 95% @ 40°C (104°F) non-condensing | | | |
| Vibration | Operating: 5 Grms, 5-500 Hz, 3 axes (w/ SSD/CFast)<br>Operating: 0.5 Grms, 5-500 Hz, 3 axes (w/ HDD) | | | |
| Shock | Operating: 100 G, half sine 11ms duration (w/ SSD/CFast) | | | |
| ESD | Contact +/-8kV, Air +/-15kV | | | |
| EMC | EN61000-6-4/-2, CE & FCC Class B with validated AC/DC adapter | | | |
| Safety | UL/cUL, CB | | | |

## 2.2 MXC-6622/MXC-6642/MXC-6623/MXC-6643

| | MXC-6622 | MXC-6642 | MXC-6623 | MXC-6643 |
|---|---|---|---|---|
| **System Core** | | | | |
| Processor | Intel® Core™ i5-8400H 45W | | Intel® Core™ i3-9100HL 25W | |
| Chipset | Mobile Intel® CM246 | | | |
| Memory | 4GB DDR4 2400MHz, dual SODIMMs, up to 32GB | | | |
| **I/O Interface** | | | | |
| Display | 2x DP++, 1x HDMI | | | |
| Expansion Slots | PCIe x16 + PCIe x4 | PCIe x16 + 2 PCIe x4 + PCI | PCIe x16 + PCIe x4 | PCIe x16 + 2 PCIe x4 + PCI |
| Ethernet | 2x Intel GbE: 1x i211AT + 1x i219 iAMT support | | | |
| Serial Ports | COM1/2: RS-232/422/485<br>COM3/4/5/6: RS-232 | | | |
| USB | 2x USB 3.1 Gen 2, 2x USB 3.1 Gen 1, 4x USB 2.0, 1x internal USB 2.0 dongle | | | |
| Audio | Line-out, Mic-in (optional: speaker-out) | | | |
| Mini PCIe | 1x Full size (USB 2.0 + PCIe) | | | |
| M.2 | 1x socket 2, key B+M or B, 2280/3042: USB 3.1 Gen 1, SATA 6 Gb/s, and PCIe x2 supporting NVMe | | | |
| USIM | 2x (1x for Mini PCIe and 1x for M.2) | | | |
| DI/O | 8-ch DI and 8-ch DO | | | |
| $I^2C$ | 2x (3.3V/5V) | | | |
| TPM 2.0 | Supported | | | |
| **Storage** | | | | |
| 2.5" SATA | 2x internal (extra 2 w/ optional kit, supports RAID 0/1/5/10) | | | |
| CFast | 1x Type II | | | |
| **Physical** | | | | |
| Dimensions | 165 (W) x 240 (D) x 210 (H) mm (6.5" x 9.45" x 8.27") | 206 (W) x 240 (D) x 210 (H) mm (8.11" x 9.45" x 8.27") | 165 (W) x 240 (D) x 210 (H) mm (6.5" x 9.45" x 8.27") | 206 (W) x 240 (D) x 210 (H) mm (8.11" x 9.45" x 8.27") |
| Weight | 4.6 kg (10.2 lb.) | 4.9 kg (10.8 lb.) | 4.6 kg (10.2 lb.) | 4.9 kg (10.8 lb.) |
| Mounting | Wall mount | | | |
| **Power Supply** | | | | |
| DC Input | 9-32V DC (± 10% tolerance) | | | |

| | MXC-6622 | MXC-6642 | MXC-6623 | MXC-6643 |
|---|---|---|---|---|
| AC Input | Optional: 220W/280W AC/DC adapter | | | |
| **Environmental** | | | | |
| Operating Temperature | Standard: 0°C to 50°C (32°F to 122°F) w/ airflow | | | |
| | Extended: (w/ ind. storage, airflow)<br>-20°C to 70°C (-4°F to 158°F) (w/ single SODIMM)<br>-20°C to 60°C (-4°F to 140°F) (w/ dual SODIMMs) | | | |
| Storage Temperature | -40°C to 85°C (-40°F to 185°F) excluding storage | | | |
| Humidity | approx. 95% @ 40°C (104°F) non-condensing | | | |
| Vibration | Operating: 5 Grms, 5-500 Hz, 3 axes (w/ SSD/CFast)<br>Operating: 0.5 Grms, 5-500 Hz, 3 axes (w/ HDD) | | | |
| Shock | Operating: 100 G, half sine 11ms duration (w/ SSD/CFast) | | | |
| ESD | Contact +/-8kV, Air +/-15kV | | | |
| EMC | EN61000-6-4/-2, CE & FCC Class B with validated AC/DC adapter | | | |
| Safety | UL/cUL, CB | | | |

## 2.3 MXC-6600 Series Functional Block Diagram

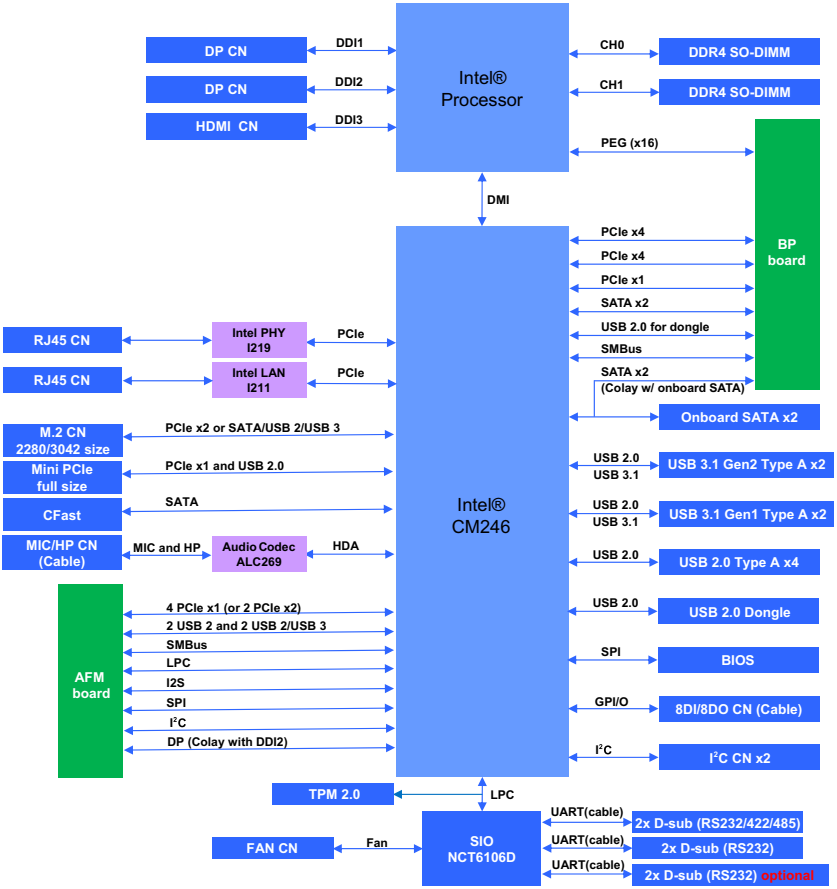



**Figure 2-1: MXC-6600 Series Functional Block Diagram**

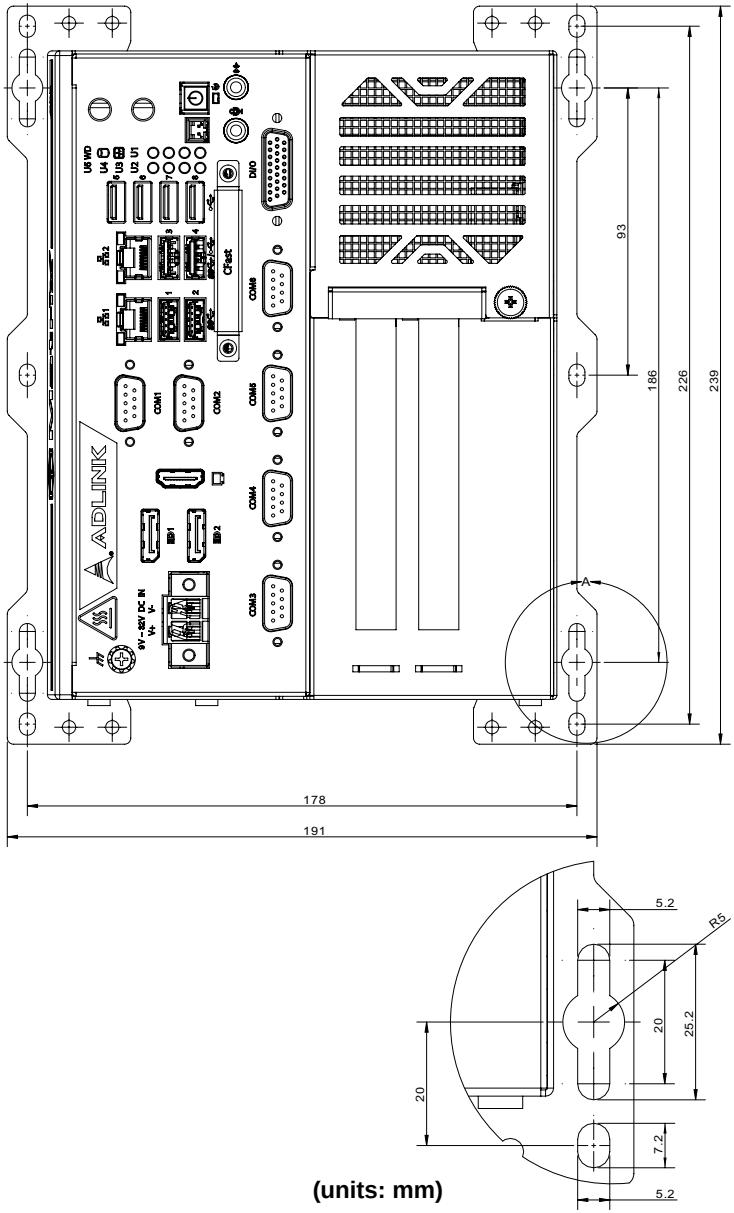
## 2.4 Display Options

With computing and graphic performance enhancement from its 8th & 9th Generation Intel processors, the MXC-6600 Series controller can support three independent displays, with configurations as follows.

| | |
|---|---|
| **Display Option 1** | DisplayPort1<br>4096x2304@60Hz |
| **Display Option 2** | DisplayPort2<br>4096x2304@60Hz |
| **Display Option 3** | HDMI 1.4 (Native)<br>4096x2160@30Hz |

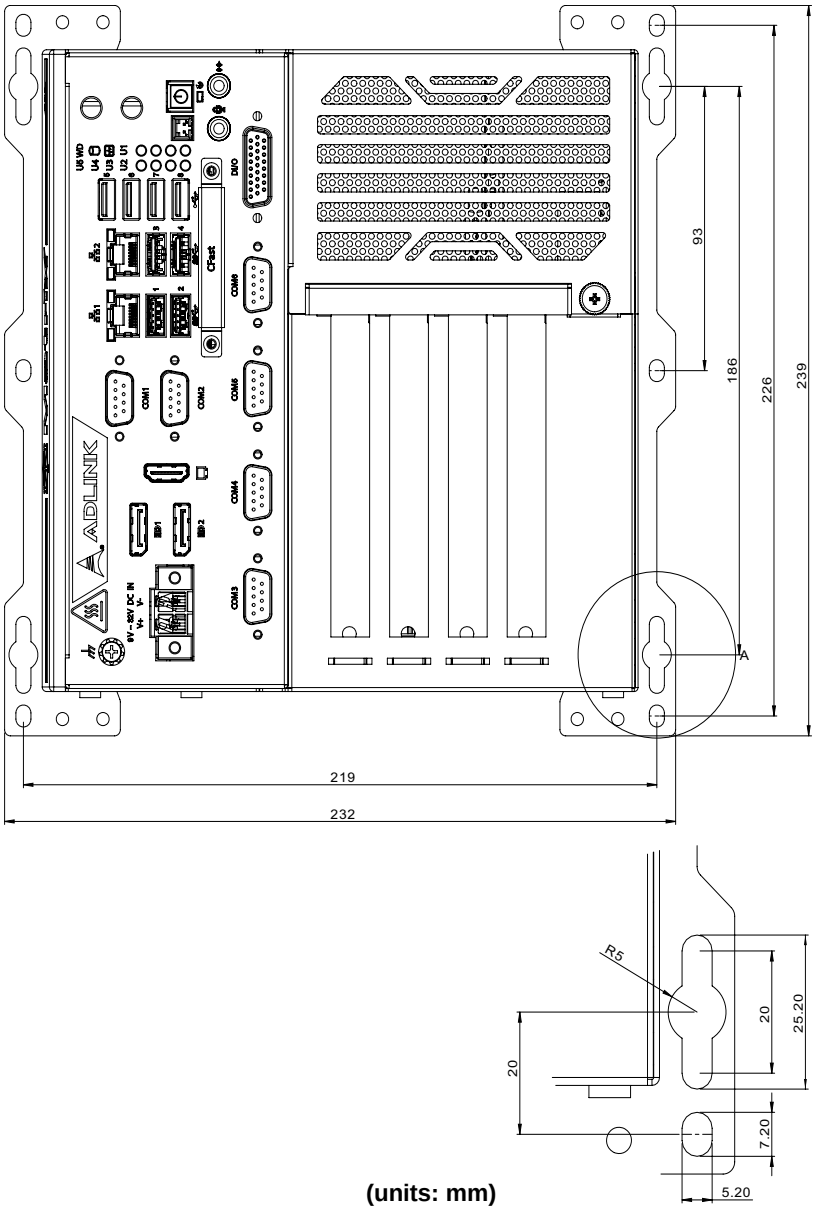
**Table 2-1: Maximum Display Resolution Configurations**

## 2.5 Mechanical Dimensions



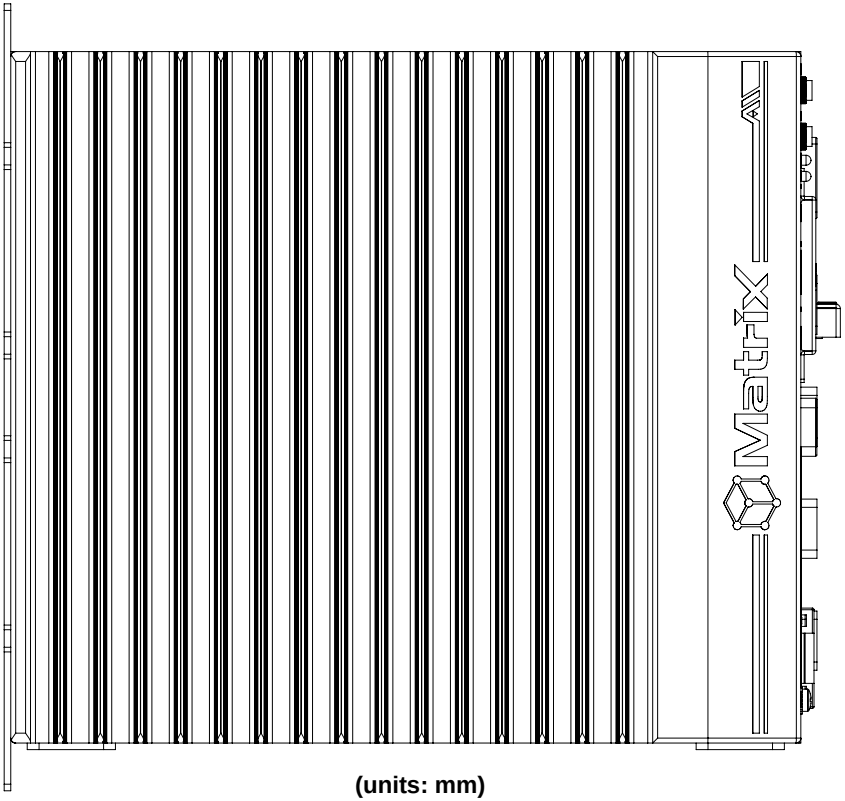

**(units: mm)**

**Figure 2-2: MXC-6620 Front View**



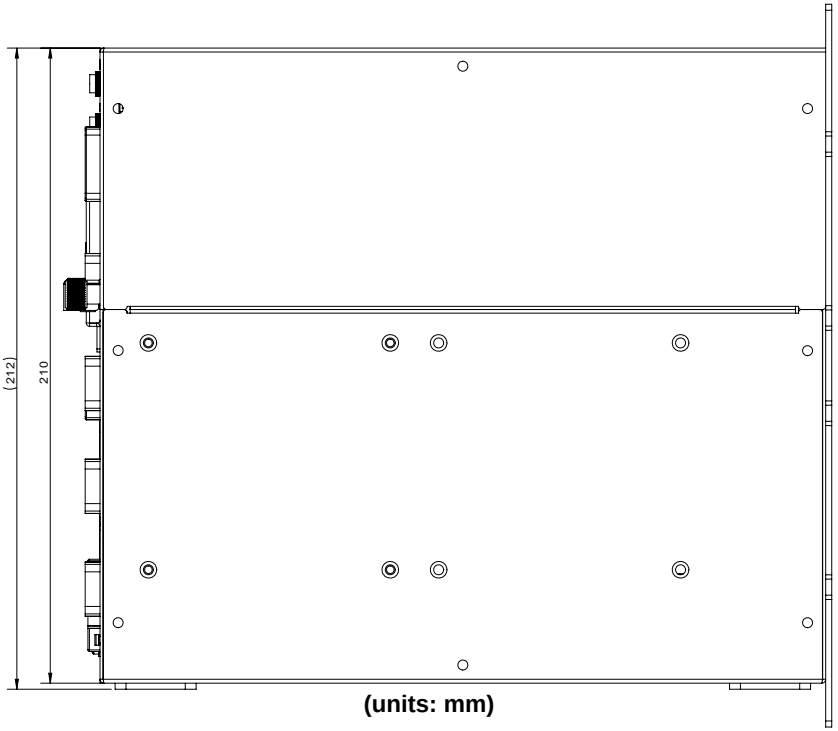

(units: mm)

**Figure 2-3: MXC-6640 Front View**



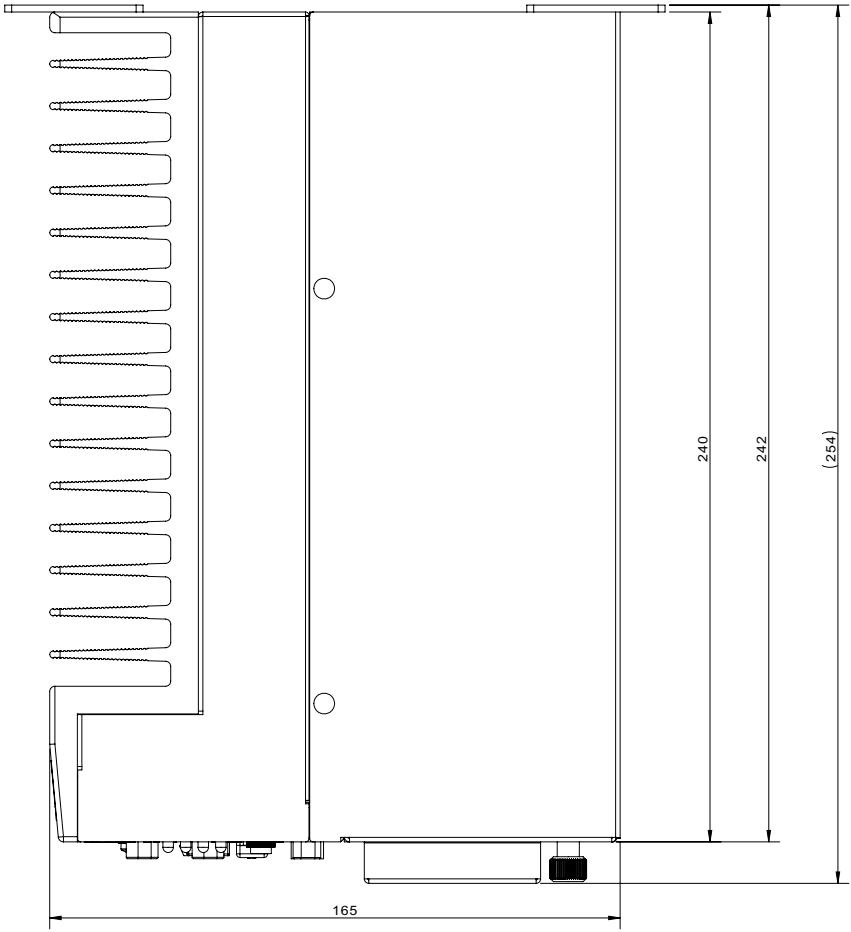

**(units: mm)**

**Figure 2-4: MXC-6620/6640 Left Side View**




**(units: mm)**

**Figure 2-5: MXC-6620/6640 Right Side View**




**(units: mm)**

**Figure 2-6: MXC-6620/6640 Top View (with wall-mount brackets)**

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# 3 System Layout

## 3.1 Front Panel

The MXC-6600 Series provides the following front panel access features.

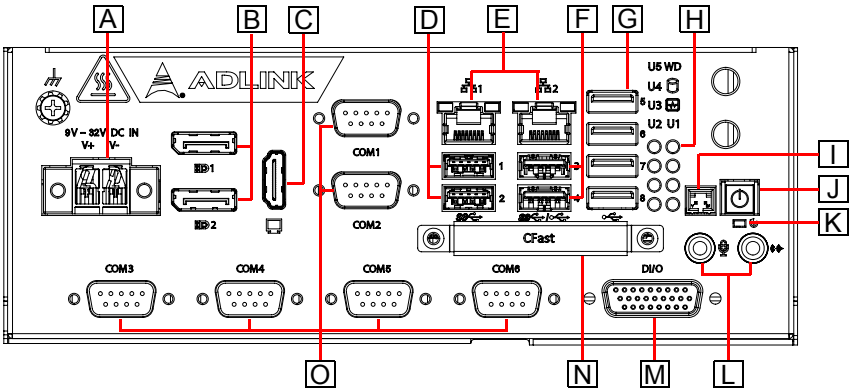



**Figure 3-1: Front Panel I/O**

| | | | |
|---|---|---|---|
| **A** | DC Power Input | **I** | Extend Power Button |
| **B** | DisplayPort x2 | **J** | Power |
| **C** | HDMI | **K** | Reset |
| **D** | USB 3.1 Gen 2 (Type-A) x2 | **L** | Audio (Mic, Phones/Speaker) |
| **E** | Gigabit Ethernet x2 | **M** | Digital Input/Output |
| **F** | USB 3.1 Gen 1 (Type-A) x2 | **N** | CFast |
| **G** | USB 2.0 (Type-A) x4 | **O** | COM Port x6 |
| **H** | LED Indicators | | |

**Table 3-1: Front Panel I/O Legend**

### 3.1.1 Power Button

The power button is a non-latched push button with a blue LED indicator. System is turned on when the button is depressed, and the power LED lights. If the system hangs, depress the button for 5 seconds to turn off the system completely.

### 3.1.2 LED Indicators

In addition to the LED of the power button, three LEDs on the front panel indicate the following.

| LED Indicator | Color | Description |
|---|---|---|
| Watchdog (WD) | Yellow | Indicates watchdog timer status. When watchdog timer starts, the LED flashes. When the timer is expired, the system will auto reboot. |
| Hard disk drive (HD) | Orange | Indicates the HDD operating state. When the SATA hard drive or CFast card is active, the LED indicator flashes. |
| Diagnostic (DG) | Green | When lit continuously, indicates no physical storage is connected, and if blinking, indicates no memory is installed on either SODIMM socket. |
| User defined (U1) | Red | User defined LED |
| User defined (U2) | Green | User defined LED |
| User defined (U3) | Green | User defined LED |
| User defined (U4) | Green | User defined LED |
| User defined (U5) | Green | User defined LED |

**Table 3-2: LED Indicators**

### 3.1.3 PCI Slot

The MXC-6640 provides one PCI slot for expansion on the back-plane board. Based on the ITE IT8892E PCIe to PCI bridge, connection to the host system is achieved through a PCIe x1 Gen3 interface, supporting universal or 5V PCI 32-bit cards operating at 33MHz clocks.

### 3.1.4 PCI Express x16 Slot

One PCI Express x16 slot supports expansion with standard PCIe Gen3 cards and full PCI express x16 signals.

### 3.1.5 PCI Express x4 Slot

Two PCI Express x4 slots support expansion with standard PCIe Gen3 cards and full PCI express x4 signals.

### 3.1.6 Reset Button

The reset button executes a hard reset for the MXC-6600 Series.

### 3.1.7 DisplayPort Connectors

Two DisplayPort connectors on the front panel can connect to VGA, DVI, HDMI and DisplayPort monitors via DisplayPort to VGA adapter cable, DisplayPort to DVI adapter cable, or DisplayPort to HDMI adapter cable and DisplayPort cable.

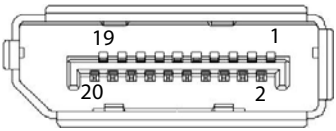



**Figure 3-2: DisplayPort Connector Pin Definition**

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | CN_DDPx0+ | 11 | GND |
| 2 | GND | 12 | CN_DDPx3- |
| 3 | CN_DDPx0- | 13 | CN_DDPx_AUX_SEL |
| 4 | CN_DDPx1+ | 14 | CN_DDPx_CONFIG2 |
| 5 | GND | 15 | CN_DDPx_AUX+ |
| 6 | CN_DDPx1- | 16 | GND |
| 7 | CN_DDPx2+ | 17 | CN_DDPx_AUX- |
| 8 | GND | 18 | CN_DDPx_HPD |
| 9 | CN_DDPx2- | 19 | GND |
| 10 | CN_DDPx3+ | 20 | +V3.3_DDPx_PWR_CN |

**Table 3-3: DisplayPort Pin Definition**

| P/N | Description |
|---|---|
| 30-01119-0020 | Passive DisplayPort to HDMI adapter cable |
| 30-01120-0020 | Passive DisplayPort to DVI adapter cable |
| 30-01121-0020 | Passive DisplayPort to VGA adapter cable |
| 30-01157-0020 | Active DisplayPort to DVI adapter cable |

**Table 3-4: Applicable Cable Types**

### 3.1.8 Digital I/O Connector

The MXC-6600 Series provides 8 channels of non-isolation digital input and 8 channels of non-isolation digital output circuits, with the following specifications.

**8-channel Digital Input**

- VIH: 2 to 5.25V
- VIL: 0 to 0.8V

**8-channel Digital Output**

- Output type: Open drain N-channel
- MOSFET driver with internal pull high of 200Ω resistance
- Source/Sink current for all channels: 24mA
- VOH: 2.4 to 5V
- VOL: 0 to 0.5V

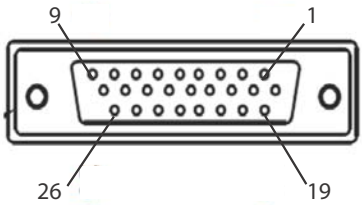



**Figure 3-3: Digital I/O Connector Pin Definition**

| Pin | Signal | Pin | Signal | Pin | Signal | Pin | Signal |
|---|---|---|---|---|---|---|---|
| 1 | DI0 | 8 | DI7 | 15 | N/C | 22 | DO3 |
| 2 | DI1 | 9 | GND | 16 | N/C | 23 | DO4 |
| 3 | DI2 | 10 | N/C | 17 | N/C | 24 | DO5 |
| 4 | DI3 | 11 | N/C | 18 | GND | 25 | DO6 |
| 5 | DI4 | 12 | N/C | 19 | DO0 | 26 | DO7 |
| 6 | DI5 | 13 | N/C | 20 | DO1 | | |
| 7 | DI6 | 14 | N/C | 21 | DO2 | | |

**Table 3-5: Digital Input/Output Connector Pin Definition**

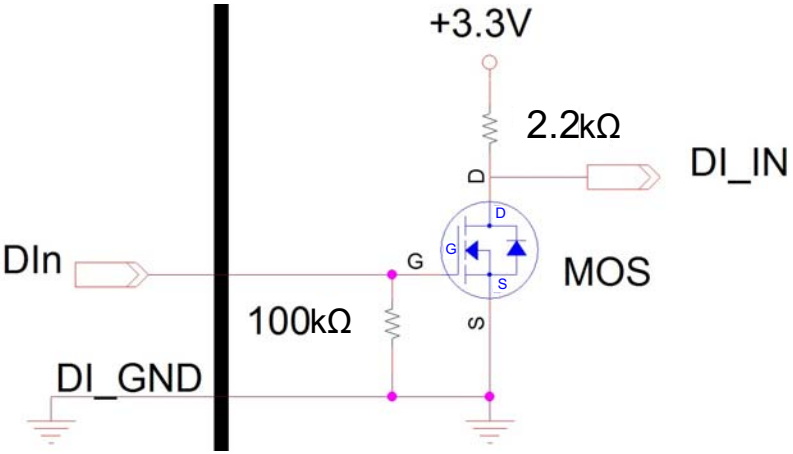



**Figure 3-4: Digital Input Circuit**

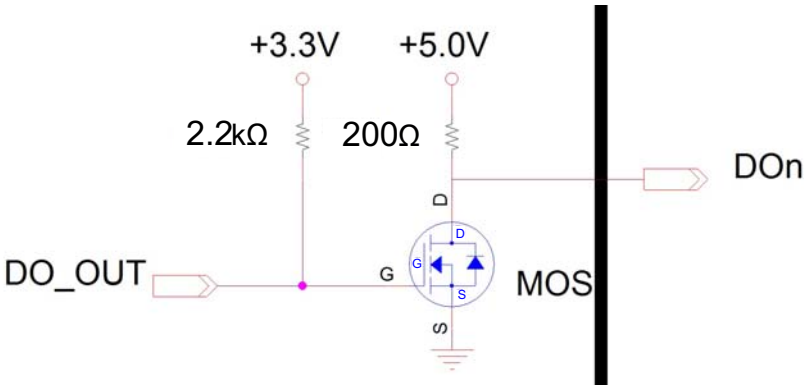
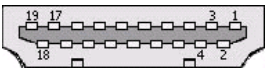



**Figure 3-5: Digital Output Circuit**

### 3.1.9 HDMI Connector

The MXC-6600 Series provides one HDMI connector for connection to an external monitor.




| Pin # | Signal | Pin # | Signal |
|---|---|---|---|
| 1 | CON_HDMI_TX2_P | 2 | GND |
| 3 | CON_HDMI_TX2_N | 4 | CON_HDMI_TX1_P |
| 5 | GND | 6 | CON_HDMI_TX1_N |
| 7 | CON_HDMI_TX0_P | 8 | GND |
| 9 | CON_HDMI_TX0_N | 10 | CON_HDMI_CLK_P |
| 11 | GND | 12 | CON_HDMI_CLK_N |
| 13 | N/C | 14 | N/C |
| 15 | DVI_SCL_SINK | 16 | DVI_SDA_SINK |
| 17 | GND | 18 | P_+5V0_HDMI_CN |
| 19 | CON_HDMI_HPD_5V0 | | |

**Table 3-6: HDMI Connector Pin Definition**

### 3.1.10 USB 2.0 Ports

The MXC-6600 Series provides four front panel USB 2.0 Type-A ports. All USB ports are compatible with high-speed, full-speed and low-speed USB devices. The MXC-6600 Series supports multiple boot devices, including USB flash drive, USB external hard drive, USB floppy, USB CD-ROM and others. The boot priority and boot device can be configured in the BIOS.

### 3.1.11 USB 3.1 Ports

The MXC-6600 Series provides two USB 3.1 Gen 2 and two USB 3.1 Gen 1 ports supporting Type-A USB 3.1 connection on the front panel. All USB 3.1 ports are compatible with super-speed Gen 1, high-speed, full-speed and low-speed USB devices, except USB 3.1 port #1 & #2, which support only USB 3.1 Gen 2 devices.

### 3.1.12 Gigabit Ethernet Ports

Two Gigabit Ethernet ports on the front panel support Intel WGI211AT and WGI219LM Gigabit Ethernet PHY controller and connection, providing

- 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
- RSS and MSI-X to lower CPU utilization in multi-core systems
- ECC - error correcting memory in packet buffers
- Wake-On-LAN
- Preboot eXecution Environment (PXE) flash interface
- Jumbo frame support

| Speed LED<br>Green/Orange | Active/Link<br>Yellow |
|---|---|

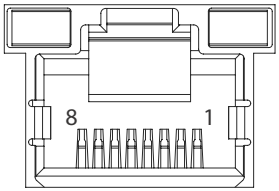



**Figure 3-6: Ethernet Port and LEDs**

| Pin # | 10BASE-T/<br>100BASE-TX | 1000BASE-T |
|---|---|---|
| 1 | TX+ | LAN_TX0+ |
| 2 | TX- | LAN_TX0- |
| 3 | RX+ | LAN_TX1+ |
| 4 | — | LAN_TX2+ |
| 5 | — | LAN_TX2- |
| 6 | RX- | LAN_TX1- |
| 7 | — | LAN_TX3+ |
| 8 | — | LAN_TX3- |

**Table 3-7: Ethernet Port Pin Definition**

| LED Color | Status | Description |
|---|---|---|
| Yellow | OFF | Ethernet port is disconnected. |
| | ON | Ethernet port is connected with no activity. |
| | Flashing | Ethernet port is connected and active. |

**Table 3-8: Active/Link LED Indicators**

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

**Table 3-9: Speed LED Indicators**

### 3.1.13 DC Power Input

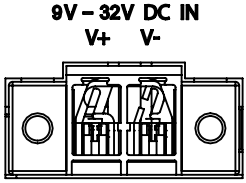



**Figure 3-7: DC Power Input**

| Pin | Signal |
|---|---|
| 1 | V+ (DC_IN) |
| 2 | V- (DGND) |

**Table 3-10: DC Power Input Pin Definition**

Refer to Section 4.1: Attach DC Power Connector on page 33 to install the DC Power Connector to the DC Power Input.

Please use an approved power source as certified by IEC or UL. The maximum ambient operating temperature (Tma) is described in “Important Safety Instructions”. Altitude during operation is up to 2000 m where output meets LPS and SELV circuit requirements.

**Power Source Rating**

| | Voltage | Current |
|---|---|---|
| DC Power Source | 9 to 32V DC | 29A to 8.75A min. |
| AC-to-DC Adapter | 24VDC | 11.6A min. |

WARNING:

Before providing DC power, ensure the voltage and polarity provided are compatible with the DC input. Improper input voltage and/or polarity can be responsible for system damage.
*AVERTISSEMENT: Avant de fournir une alimentation CC, assurez-vous que la tension et la polarité fournies sont compatibles avec l'entrée CC. Une tension d'entrée et / ou une polarité incorrectes peuvent être responsables de dommages au système.*

### 3.1.14 COM Port Connectors

The MXC-6600 Series provides six COM ports through D-sub 9-pin connectors. The COM1 & COM2 ports support RS-232/422/485 modes by BIOS setting, while COM3 through COM6 support only RS-232.

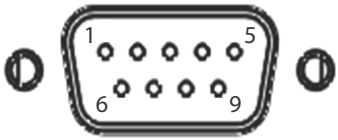



**Figure 3-8: COM Port Pin Definition**

| Pin | Signal Name | | |
|---|---|---|---|
| | RS-232 | RS-422 | RS-485 |
| 1 | DCD# | TXD422- | 485DATA- |
| 2 | RXD | TXD422+ | 485DATA+ |
| 3 | TXD | RXD422+ | N/S |
| 4 | DTR# | RXD422- | 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 3-11: D-Sub 9-pin Signal Function of COM Ports**

### 3.1.15 CFast Host Slot

The MXC-6600 Series is equipped with a Type II Push-Push CFast host slot on the front panel, by SATA interface. Data transfer rates up to 3.0Gb/s (300MB/s) are supported. 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.

To install a CFast card, remove the 2 screws securing the cover to the chassis and remove the cover. Install the card and replace the cover using the 2 screws

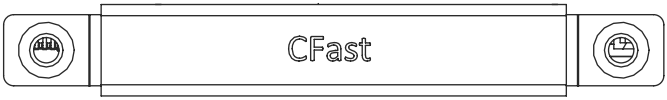



**Figure 3-9: CFast Host Slot**

## 3.2 Internal I/O Connectors

### 3.2.1 Mainboard Connector Locations

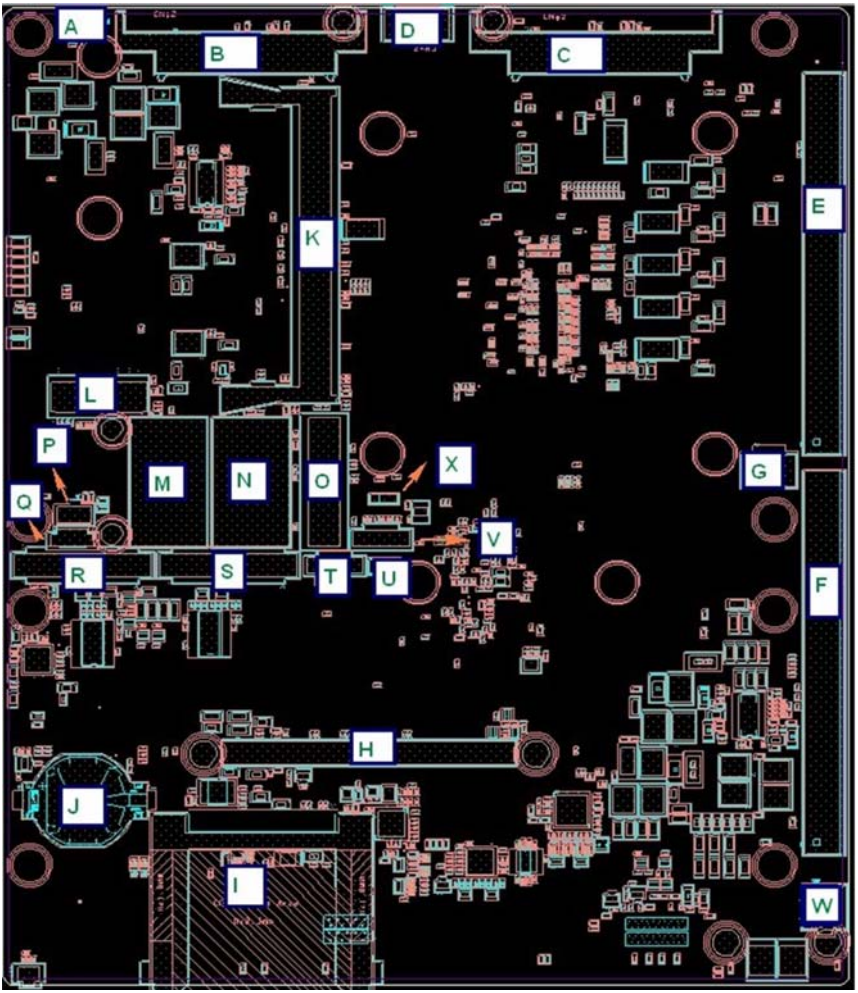



**Figure 3-10: Mainboard Connectors**

| | |
|---|---|
| **A** | Fan connector |
| **B** | SATA connector1 |
| **C** | SATA connector2 |
| **D** | USB 2.0 dongle |
| **E** | BP slot |
| **F** | BP slot |
| **G** | For MXM card power wafer |
| **H** | FM board to board connector |
| **I** | CFast connector |
| **J** | Battery socket |
| **K** | DDR4 slot |
| **L** | M.2 connector |
| **M** | Sim card socket by M.2 |
| **N** | Sim card socket by Mini PCIe |
| **O** | Mini PCIe socket |
| **P** | GPS wafer |
| **Q** | Speaker wafer |
| **R** | DIO and COM port 5 and 6 and audio wafer |
| **S** | COM port 3 and 4 wafer |
| **T** | $I^2C0$ wafer |
| **U** | Power and Reset wafer |
| **V** | $I^2C1$ wafer |
| **W** | 4-pin DC_input |
| **X** | Clear CMOS connector |

**Table 3-12: Mainboard Connector Legend**

### 3.2.2 2-slot Backplane Connector Locations

MXC-662X, MXC-6621, MXC6622, MXC-6623

**Figure 3-11: 2-slot Backplane Board Connectors**

| | |
|---|---|
| **A** | USB 2.0 dongle connector |
| **B** | SATA power connector |
| **C** | SATA signal connector |
| **D** | PCI Express x4 slot |
| **E** | PCI Express x16 slot |
| **F** | Additional power for PCIe x16 slot (12V and 5V) |
| **G** | Direct SATA connector |

**Table 3-13: 2-slot Backplane Board Connector Legend**

### 3.2.3 4-slot Backplane Connector Locations

MXC-664X, MXC-6641, MXC-6642, MXC-6643

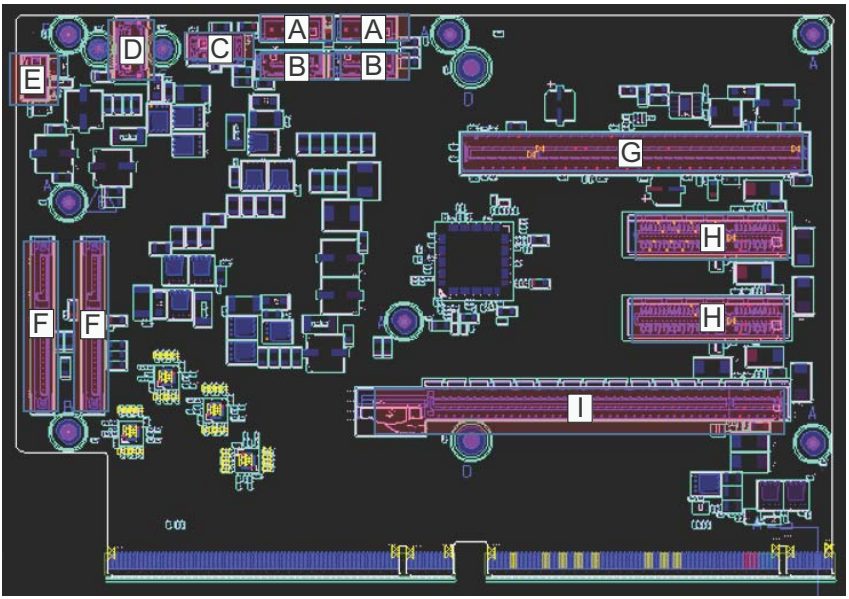



**Figure 3-12: 4-slot Backplane Board Connectors**

| | |
|---|---|
| **A** | SATA power |
| **B** | SATA signal |
| **C** | Additional power for PCIe slot (12V) |
| **D** | USB 2.0 dongle |
| **E** | Fan |
| **F** | Direct SATA |
| **G** | PCI slot |
| **H** | PCIe x4 slot |
| **I** | PCIe x16 slot |

**Table 3-14: 4-slot Backplane Board Connector Legend**

### 3.2.4 GPS Module Power Headers

Power supply via cable for Mini PCIe GPS module cards (5V).

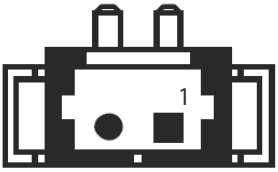



**Figure 3-13: GPS Module Power Header Pin Definition**

| Pin | Signal |
|---|---|
| 1 | +5V_GPS |
| 2 | GND |

**Table 3-15: GPS Module Power Header Pin Definition**

### 3.2.5 USB 2.0 Connector

One USB 2.0 Type-A connector is provided on the mainboard for internal USB dongle, with another on the backplane board.

### 3.2.6 Mini PCIe Connector

The internal Mini PCIe connector (Rev. 1.2) supports full size Mini PCIe cards.

### 3.2.7 SATA Connector

The SATA connector supports transfer up to 6.0Gb/s (600MB/s).

### 3.2.8 12V Fan Connector

DC 12V fan module power supply is provided through the connector, to which the optional fan module connects when installed in the chassis.

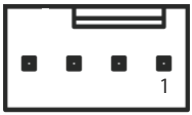



**Figure 3-14: 12V Fan Connector Pin Definition**

| Pin | Signal |
|---|---|
| 1 | FAN_GND |
| 2 | P_+12V_FAN |
| 3 | SIO_FAN_IN |
| 4 | SIO_FAN_OUT |

**Table 3-16: 12V Fan Connector Pin Definition**

### 3.2.9 Clear CMOS Jumper

Upon encountering an abnormal condition preventing the MVP-6100 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 for a minimum of 3 seconds, and then remove the jumper to return to normal mode (replace to pins #2 and #3, default).

**Figure 3-15: Clear CMOS Jumper Setting**

### 3.2.10 Extended PWR/RESET Header

An internal header is provided for the Power and Reset buttons, with pin definition as shown.

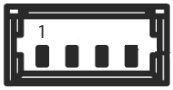



**Figure 3-16: PWR/RESET Header Pin Definition**

| Pin | Signal |
|---|---|
| 1 | PWR_BTN-L |
| 2 | GND |
| 3 | GND |
| 4 | RESET_BTN-L |

**Table 3-17: PWR/RESET Header Pin Definition**

### 3.2.11 USIM Slot

The USIM slot connects to the Mini PCIe and M.2 slots.

### 3.2.12 12V Power for Additional AFM MXM Carrier Board

One 12V power pin header provides additional AFM MXM carrier board power for an MXM card, if used.

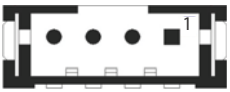



**Figure 3-17: 12V Power Pin Definition**

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | P_+12V_B | 3 | GND |
| 2 | P_+12V_B | 4 | GND |

**Table 3-18: 12V Power Pin Definition**

NOTE:

For additional information regarding the AFM MXM Carrier Board, please contact your ADLINK representative.

# 4 Getting Started

## 4.1 Attach DC Power Connector

Locate the DC power connector shown below that is included in the Accessory Box. Insert it into the DC Power Input “A” shown in **Figure 3-1** on page 15 and secure it to the chassis using the captive screws.

Connect a DC power source as described in **Section 3.1.13: DC Power Input on page 23** to the inputs of the DC power connector, making sure to use the correct input voltage andpolarity.

---

Before providing DC power, ensure the voltage and polarity provided are compatible with the DC input. Improper input voltage and/or polarity can be responsible for system damage.
*AVERTISSEMENT: Avant de connecter à une source de courant continu, veuillez vous assurer de la polarité de la tension conformément à l'entrée CC du PC. Une tension et/ou une polarité incorrectes peuvent causer des dommages irréversibles sur le système.*

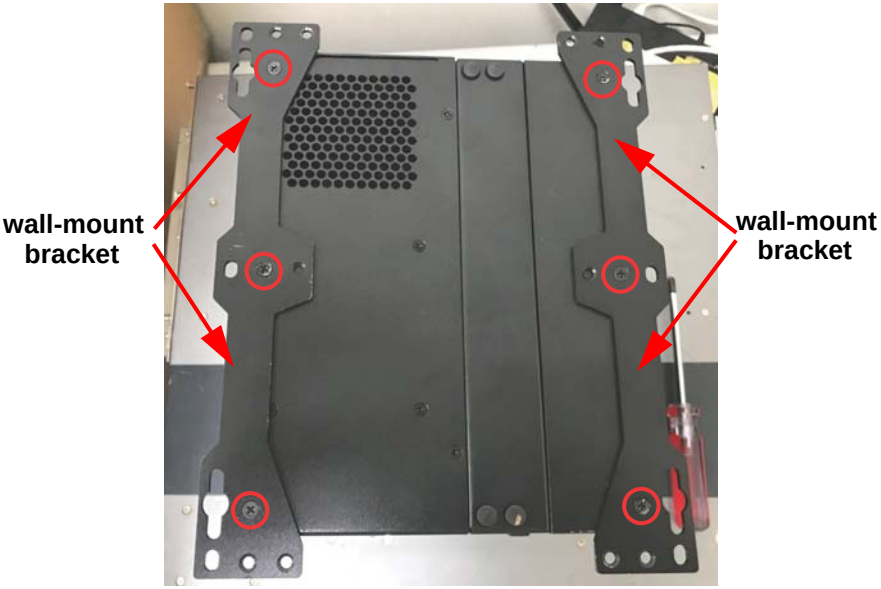
---

## 4.2 Mounting the MXC-6600 Series

### 4.2.1 Install the Wall-mount Brackets

Use the 6 M4 6mm screws included in the Accessory Box to attach the 2 included wall-mount brackets to the chassis as indicated by the red circles below.

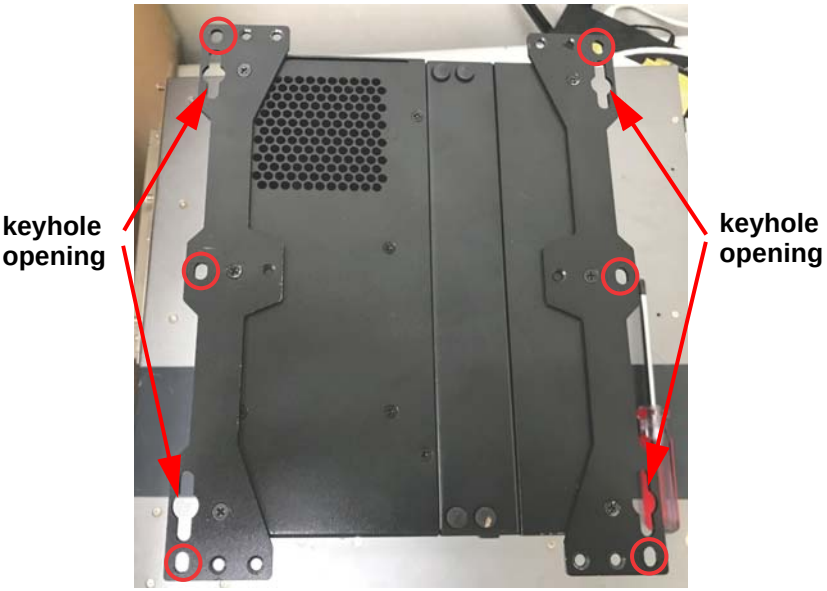
*Utilisez les 6 vis M4 6 mm incluses dans la boîte d'accessoires pour fixer les 2 supports de montage mural inclus au châssis, comme indiqué par les cercles rouges ci-dessous.*



## Mounting the Device / Montage de l'Appareil

Mount the device to a wall using the 4 keyhole openings indicated or the 6 mounting holes circled in red, according to the spacing dimensions of the holes in the bracket as shown in Figure 2-2 MXC-6620 Front View and Figure 2-3 MXC-6640 Front View.

*Montez l'appareil sur un mur à l'aide des 4 ouvertures de trou de serrure en fonction des dimensions d'espacement des trous dans le support, comme indiqué dans Figure 2-2 MXC-6620 Front View et Figure 2-3 MXC-6640 Front View.*



## 4.3 Driver Installation

Download the Windows 10 drivers for your system from the product page at https://www.adlinktech.com/Products/Industrial_PCs_Fanless_Embedded_PCs/IntegratedFanlessEmbeddedComputers/MXC-6600_Series and install.

The following drivers must be installed:

- Chipset
- Graphics
- Audio
- Ethernet
- Intel ME
- DI/O

# Appendix A Power Consumption

NOTE:

Information in this Appendix is for power budget planning and design purposes only. Actual power consumption may differ based on final application.

## A.1 Power Consumption Reference

Power consumption as follows is based on lab data in which 24V DC is applied and current is measured by the DC power supply. The power consumption (W) is calculated as the product of applied voltage (V) and the current (A).

Platforms tested for this data have available external I/O interfaces, and are attached to supported devices such as VGA and DVI monitors, CFast card, USB dummy load, COM loopback, and audio loopback, and an internal hard disk driver is installed.

Information is presented for reference only. Actual power consumption will vary with different attached devices and operating system.

| System | Power Off | System Idle | Processor Full Load | System Full Load | Recommended Power Supply |
|---|---|---|---|---|---|
| MXC-660X<br>Intel® Xeon® | 6.8W | 23W | 78W | 118W | 220 or 280W |
| MXC-6601<br>Intel® Core™ i7 | 6.7W | 23W | 78W | 117W | 220 or 280W |
| MXC-6602<br>Intel® Core™ i5 | 6.8W | 23W | 77W | 117W | 220 or 280W |
| MXC-6603<br>Intel® Core™ i3 | 6.8W | 22W | 55W | 93W | 220 or 280W |

**Table A-1: Power Consumption**

NOTE:

- Sufficient power supply for the entire system is required to meet these specifications. At least 100W at 24V input is recommended.
- Heat generated by add-on PCI/PCIe adapters affects thermal stability. Additional heat dissipation is required when the system operates at high temperatures or in harsh environments with add-on adapters.

# Appendix B BIOS Setup

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 MXC-6600 Series. The BIOS setup program includes menus for configuring settings and enabling features of the MXC-6600 Series. Most users do not need to use the BIOS setup program, as the MXC-6600 Series ships with default settings that work well for most configurations.

Enter BIOS setup by pressing <DEL> when the system is powered on and the POST (power-on self-test) message is displayed. The MXC-6600 Series controller supports one-time Boot Menu allowing selection of the boot device. Enter the Boot Menu by pressing <F7> during POST.

NOTE:

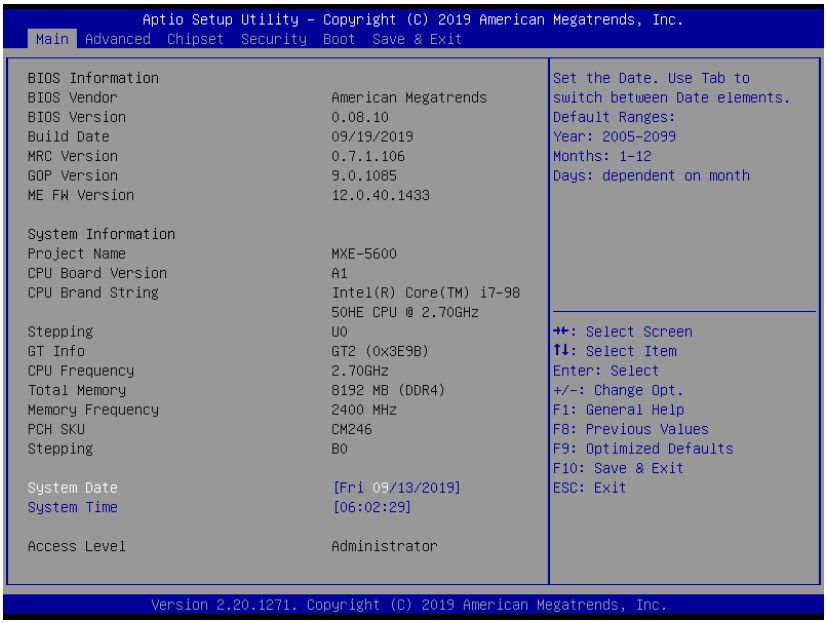
- BIOS options listed are for reference only.
- Different configurations can affect BIOS behavior.
- Displayed material may reflect only the BIOS version corresponding to initial release and may differ from that of the purchased motherboard.
- Users can download the latest BIOS version from the ADLINK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

## B.1 Main

Contains basic system information for the MXC-6600 Series.

WARNING:

Changing BIOS settings may lead to incorrect controller behavior and possible inability to boot. In such a case, Section 3.2.9:Clear CMOS Jumper provides instruction on clearing the CMOS and restoring default settings




### BIOS Information

Shows current system BIOS Vendor, BIOS Version, Build Date, MRC Version, GOP Version and ME FW Version.

### System Information

Shows current system Project Name, CPU Board Version, CPU Branding String, CPU Stepping, GT Info, CPU Frequency, Total Memory, Memory Frequency, PCH SKU and Stepping.

### System Time/System Date

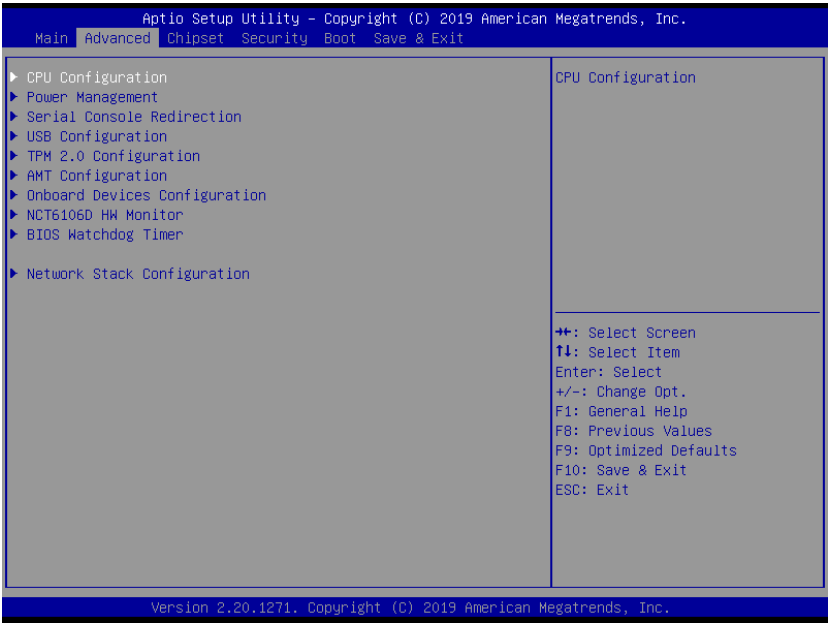
Allows adjustment of system time and date, as follows.

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

## B.2 Advanced

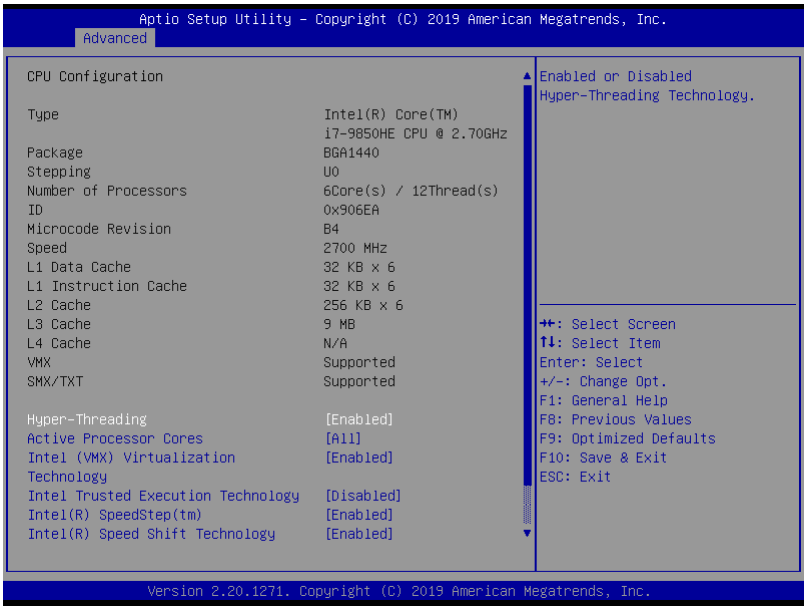


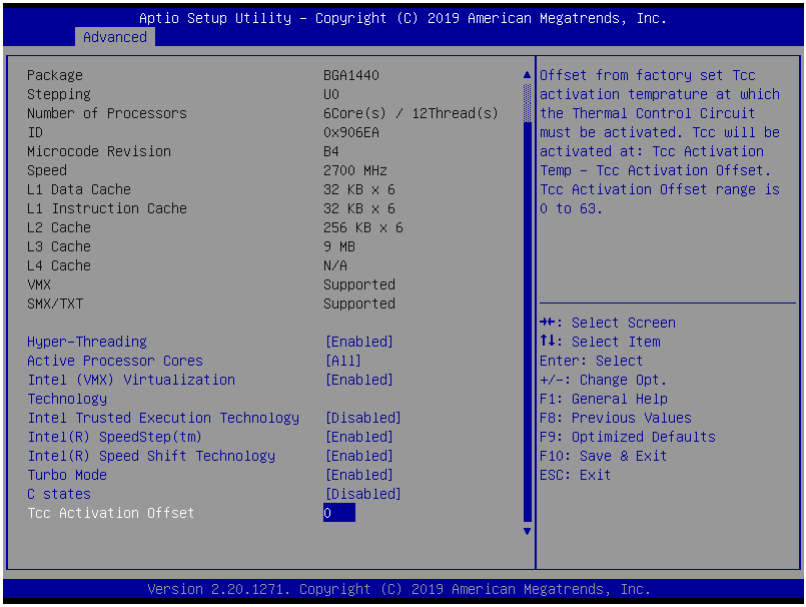

CAUTION:

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

Accesses advanced options of the MXC-6600 Series.

## B.2.1CPU Configuration



## Hyper-Threading

Enabled for Windows 7, 10 IoT Enterprise, and Linux (optimized for Hyper-Threading Technology). When Disabled only one thread per enabled core is enabled.

### Active Processor Cores

Number of cores to enable in each processor package.

### Intel (VMX) Virtualization Technology

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

### Intel Trusted Execution Technology

Enables/Disables Intel TXT feature.

### Intel(R) SpeedStep(tm)

Allows more than two frequency ranges to be supported.

### Intel(R) Speed Shift Technology

Enables/Disables Intel(R) Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.

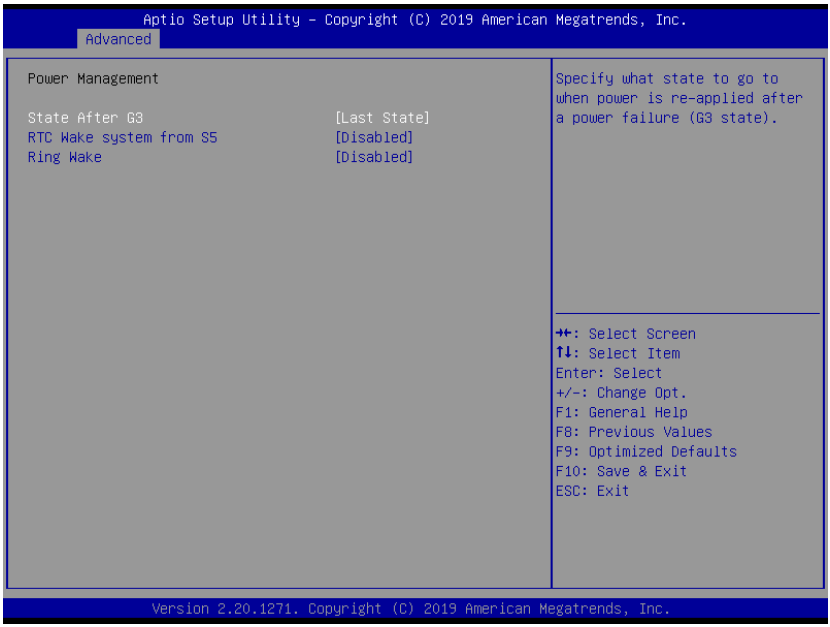
### C States

Enables/Disables CPU Power Management. Allows CPU to go to C states when it is not 100% utilized.

### TCC Activation Offset

Offset from factory set Tcc activation temprature at which the Thermal Control Circuit must be activated. Tcc will be activated at: Tcc Activation Temp - Tcc Activation Offset. The Tcc Activation Offset range is 0 to 63.

### B.2.2 Power Management




#### State After G3

Specify what state to go to when power is re-applied after a power failure (G3 state).

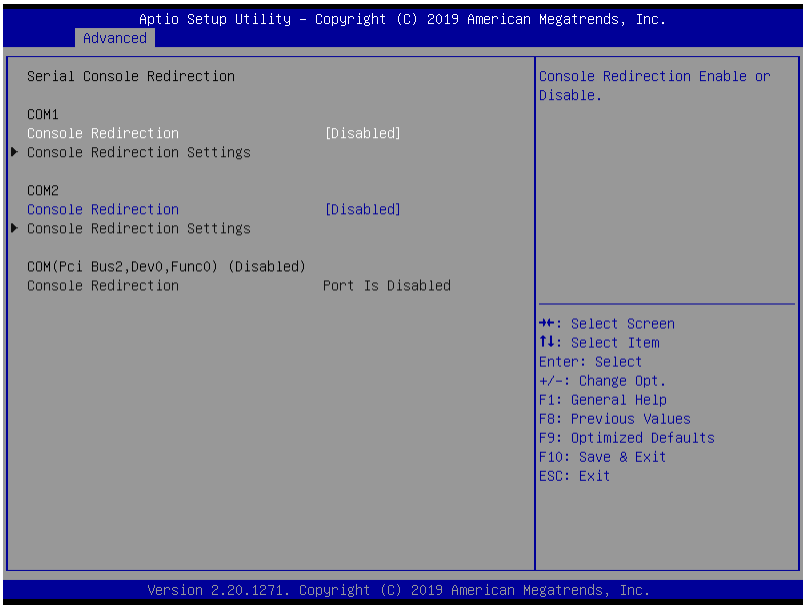
#### RTC Wake system from S5

Enables/Disables the system wake on alarm event. Select Fixed-Time, and the system will wake on the hr::min::sec specified. Select DynamicTime, the system will wake on the current time + Increase minute(s).

#### Ring Wake

Enables/Disables RI ping for Wake On Ring function (PCH PME# signal).

## B.2.3 Serial Console Configuration




### COM1

#### Console Redirection

Enables/Disables SIO COM1 Console Redirection.

#### Console Redirection Settings

The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.

### COM2

#### Console Redirection

Enables/Disables SIO COM2 Console Redirection.

### Console Redirection Settings

The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.

## COM SOL (Pci Bus0, Dev22.Fun3)

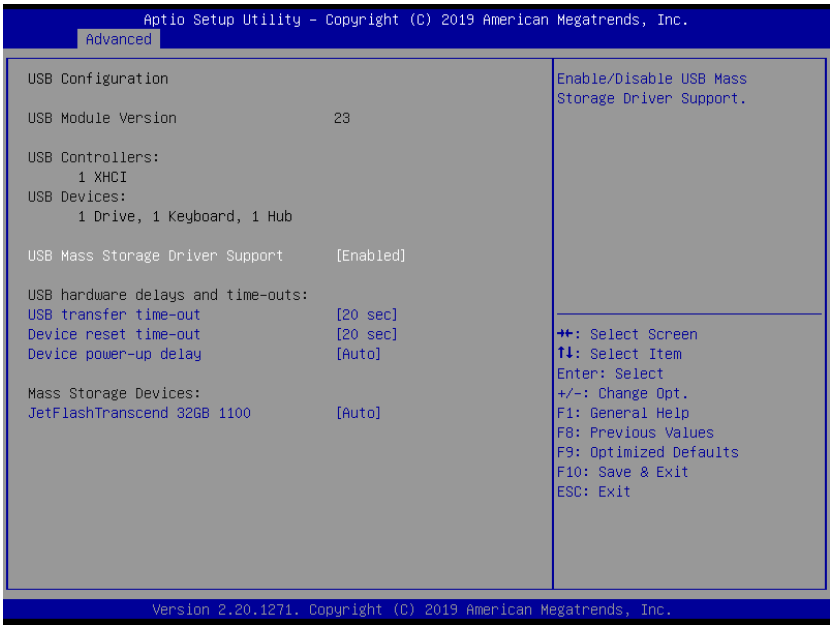
### Console Redirection

Enables/Disables AMT PCI SOL Console Redirection.

### Console Redirection Settings

The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.

### B.2.4 USB Configuration




#### USB Mass Storage Driver Support

Enables/Disables USB mass storage driver support.

#### USB transfer time-out

Timeout value for Control, Bulk, and Interrupt transfers.

#### Device reset time-out

USB mass storage device Start Unit command timeout.

#### Device power-up delay

Maximum time taken before the device reports itself to the Host Controller, with Auto using a default value of 100 ms for a Root port, and for a Hub port the delay is taken from the Hub descriptor.

### B.2.5 TPM 2.0 Configuration

#### Security Device Support

Enables/Disables BIOS support for security devices. The operating system will not show the security device. The TCG EFI protocol and INT1A interface will not be available.

#### SHA-1 PCR Bank

Enables/Disables SHA-1 PCR Bank.

#### SHA256 PCR Bank

Enables/Disables SHA256 PCR Bank.

### Pending operation

Schedule an operation for the security device.

The computer will reboot in order to change the state of the security device.

### Platform Hierarchy

Enables/Disables Platform Hierarchy.

### Storage Hierarchy

Enables/Disables Storage Hierarchy.

### Endorsement Hierarchy

Enables/Disables Endorsement Hierarchy.

### TPM2.0 UEFI Spec Version

Select the TCG2 specification support version.

### Physical Presence Spec Version

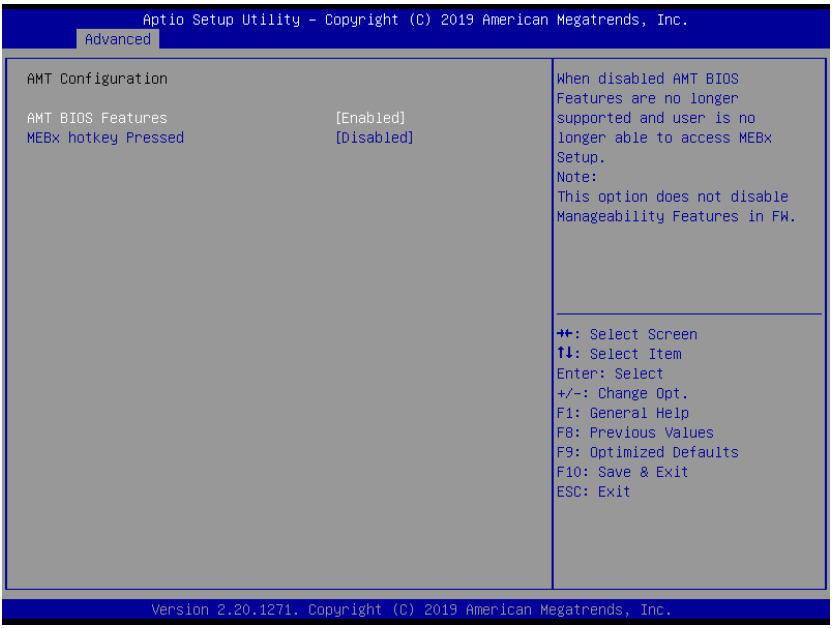
Select to specify support for PPI specification version 1.2 or 1.3.

Some HCK tests might not support version 1.3.

### Device Select

TPM 1.2 will restrict support to TPM 1.2 devices, TPM 2.0 will restrict support to TPM 2.0 devices, Auto will support both with the default set to TPM 2.0 devices if not found, and TPM 1.2 devices will be enumerated.

### B.2.6 AMT Configuration



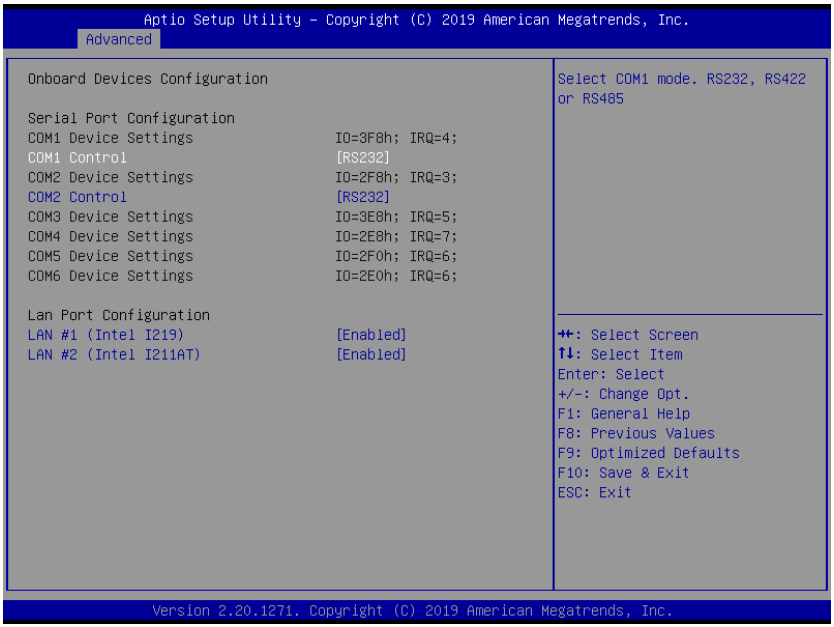

#### AMT BIOS Features

When disabled, AMT BIOS Features are no longer supported and the user is no longer able to access MEBx Setup.

#### MEBx hotkey Pressed

Enable automatic MEBx hotkey press.

## B.2.7 Onboard Devices Configuration




### COM1 Control

Sets port type (RS-232/422/485) for COM1 serial port.

### COM2 Control

Sets port type (RS-232/422/485) for COM2 serial port.

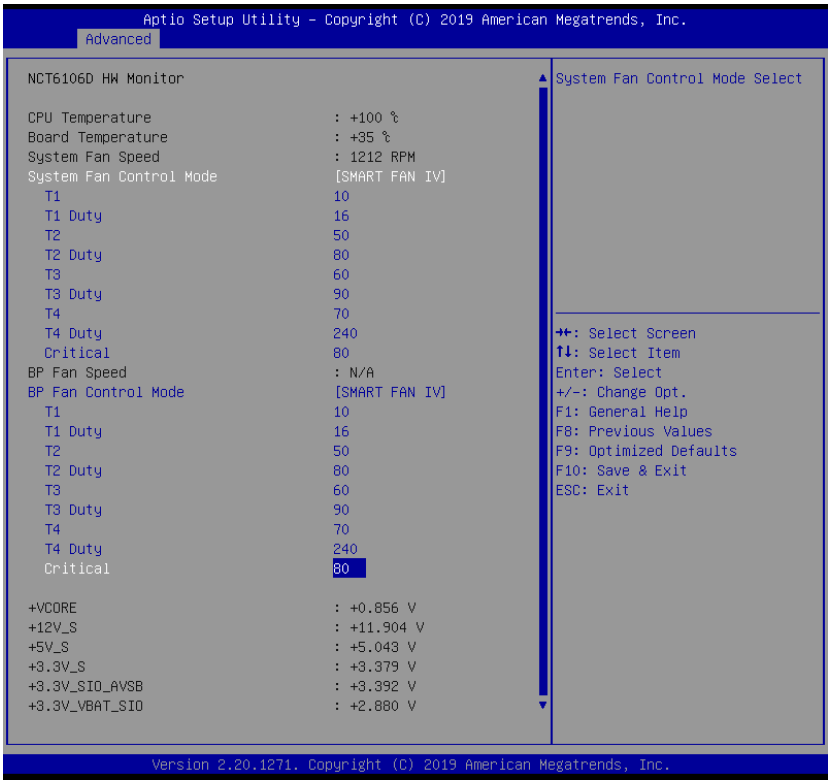
### LAN #1 (Intel I219)

Enables/Disables onboard Intel I219 LAN controller.

### LAN #2 (Intel I211AT)

Enables/Disables onboard Intel I211AT LAN controller.

### B.2.8 NCT6106D HW Monitor




#### NCT6106D HW Monitor

Displays CPU/board temperatures, system fan speed and various voltages.

#### System Fan Control Mode

Sets the system fan control mode.

##### T1

T1 (Temperature 1), Range: 1-100

##### T1 Duty

Set T1 related DC/PWM value, Range: 0-255

**T2**

T2 (Temperature 2), Range: 1-100

**T2 Duty**

Set T2 related DC/PWM value, Range: 0-255

**T3**

T3 (Temperature 3), Range: 1-100

**T3 Duty**

Set T3 related DC/PWM value, Range: 0-255

**T4**

T4 (Temperature 4), Range: 1-100

**T4 Duty**

Set T4 related DC/PWM value, Range: 0-255

### BP Fan Control Mode

Sets the BP fan control mode.

**T1**

T1 (Temperature 1), Range: 1-100

**T1 Duty**

Set T1 related DC/PWM value, Range: 0-255

**T2**

T2 (Temperature 2), Range: 1-100

**T2 Duty**

Set T2 related DC/PWM value, Range: 0-255

**T3**

T3 (Temperature 3), Range: 1-100

**T3 Duty**

Set T3 related DC/PWM value, Range: 0-255

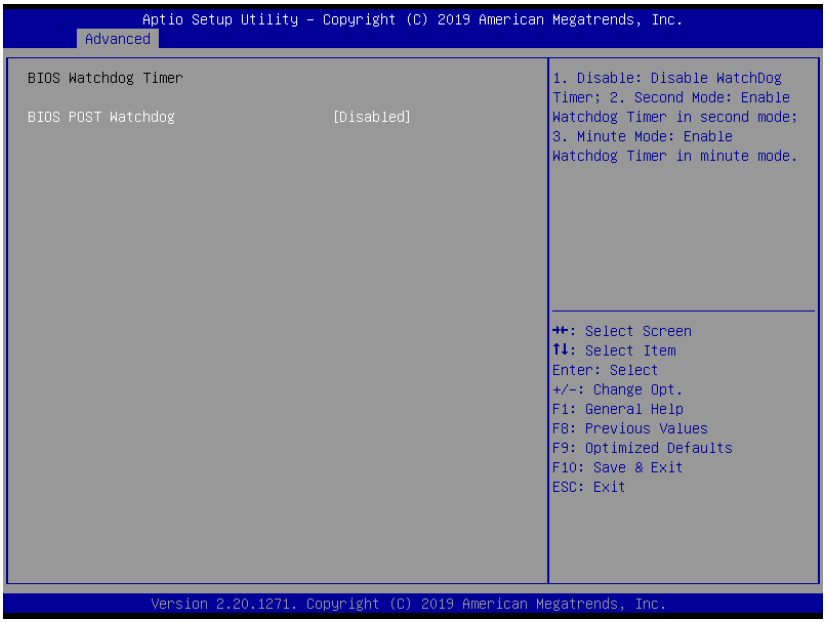
**T4**

T4 (Temperature 4), Range: 1-100

**T4 Duty**

Set T4 related DC/PWM value, Range: 0-255

### B.2.9 BIOS Watchdog Timer



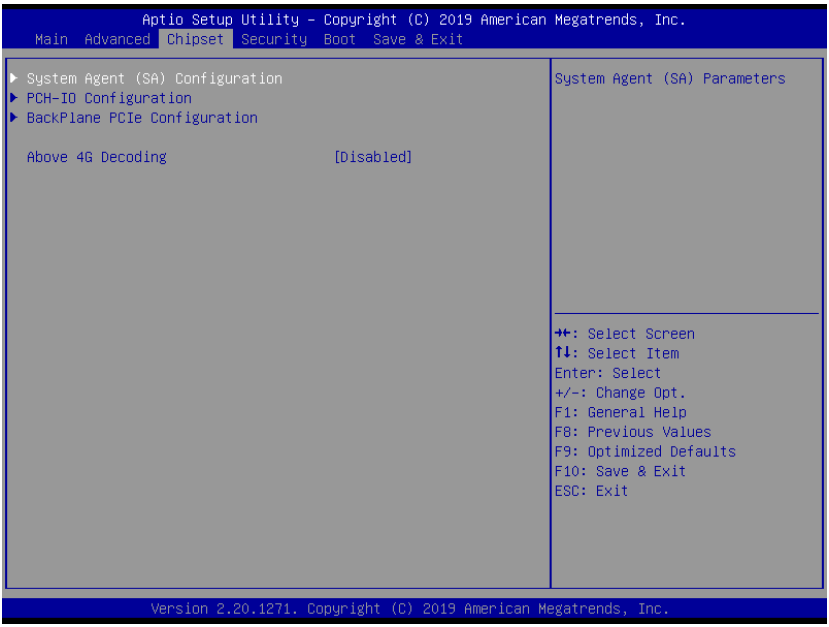

**BIOS POST Watchdog**

Disable: Disables watchdog timer.

Second Mode: Enables watchdog timer in seconds mode.

Minute Mode: Enables watchdog timer in minutes mode.

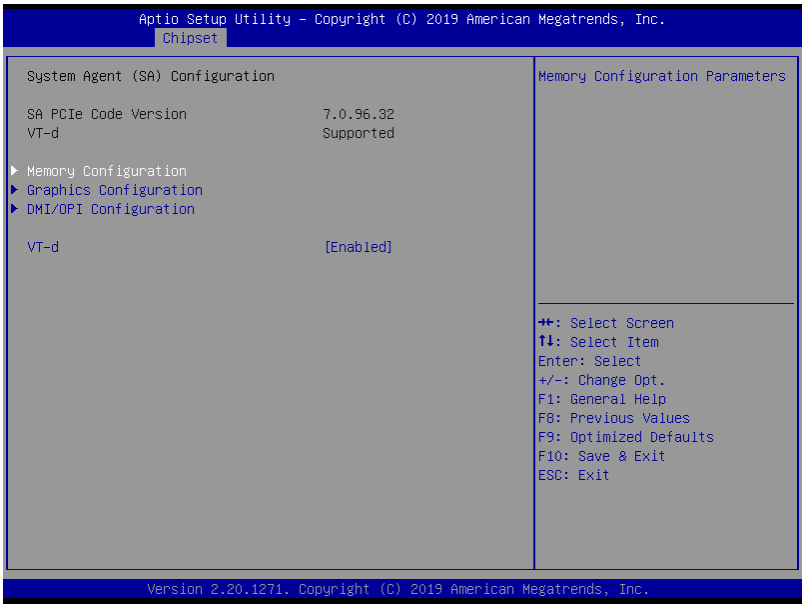
## B.3 Chipset




CAUTION:

Setting incorrect or conflicting values in Chipset BIOS Setup may cause a system malfunction.

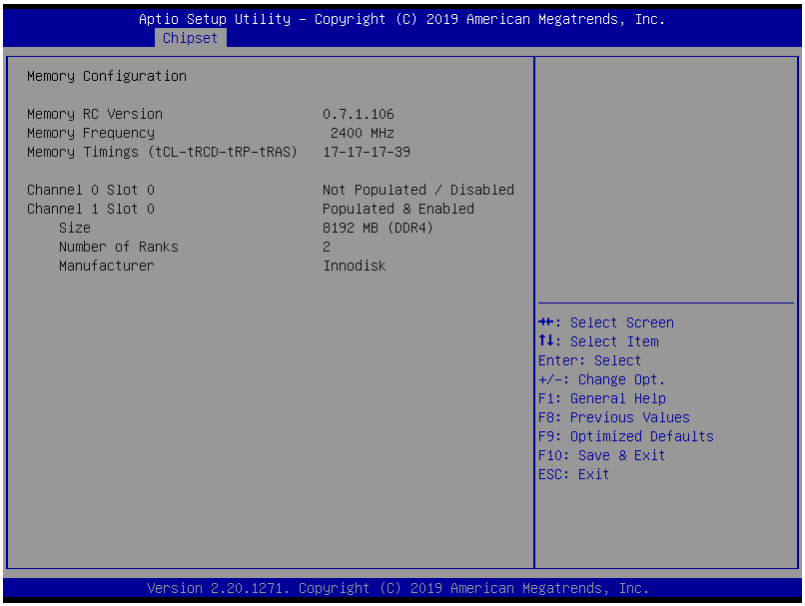
### B.3.1 System Agent (SA) Configuration




## System Agent (SA) Configuration

Display and configure VT-d's capability and provide settings for memory, graphics and DMI/OPI configuration.

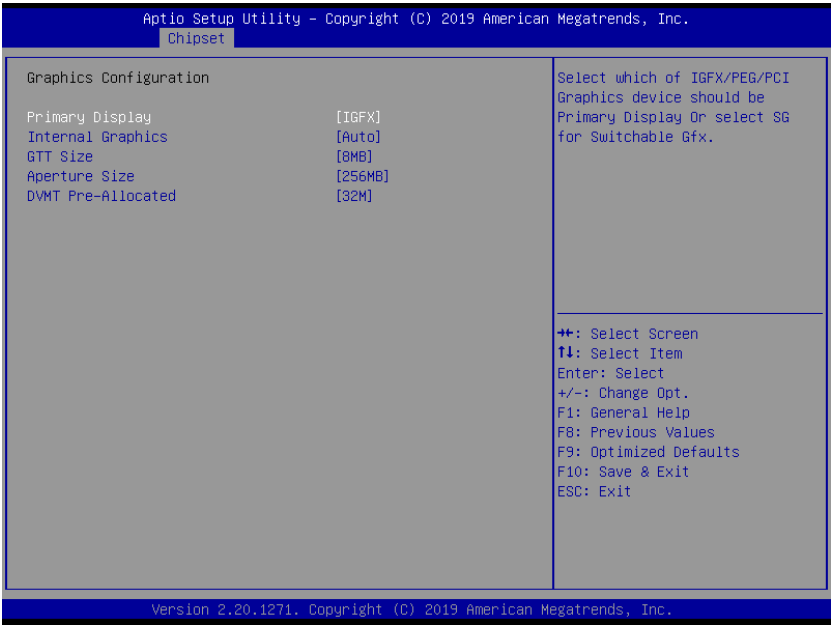
### B.3.1.1 Memory Configuration




**Memory Configuration**

Display memory speed, size, brand and configuration.

### B.3.1.2 Graphics Configuration




#### Primary Display

Selects which of the IGFX/PEG/PCH PCI(e) graphics devices should be the primary display. Select SG for Switchable Gfx.

#### Internal Graphics

Keep IGFX enabled based on the Setup options.

#### GTT Size

Sets GTT size.

#### Aperture Size

Sets aperture size.

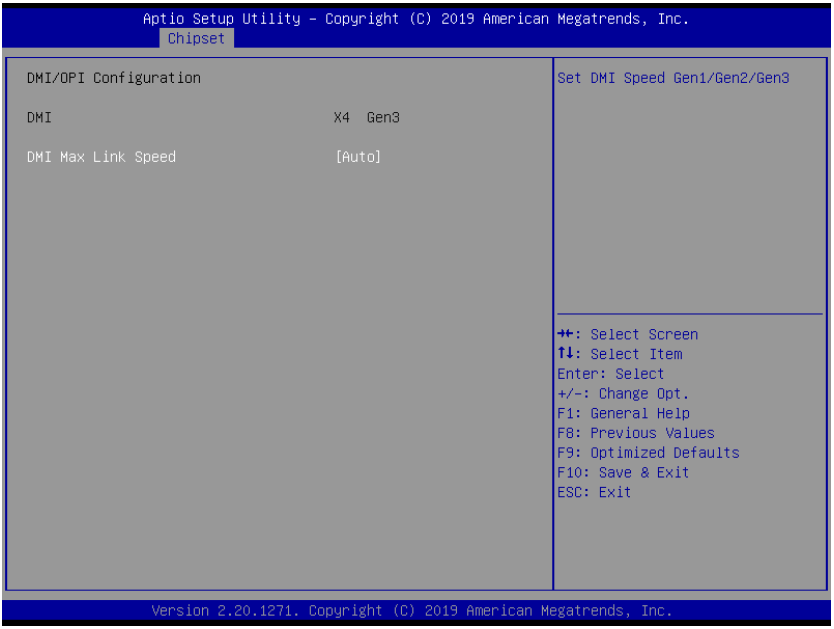
### DVMT Pre-Allocated

Sets size of DVMT 5.0 pre-allocated (fixed) graphics memory used by the internal graphics device.

### DVMT Total Gfx Mem

Sets size of DVMT5.0 total graphic memory used by the internal graphics device.

## B.3.1.3 DMI/OPI Configuration



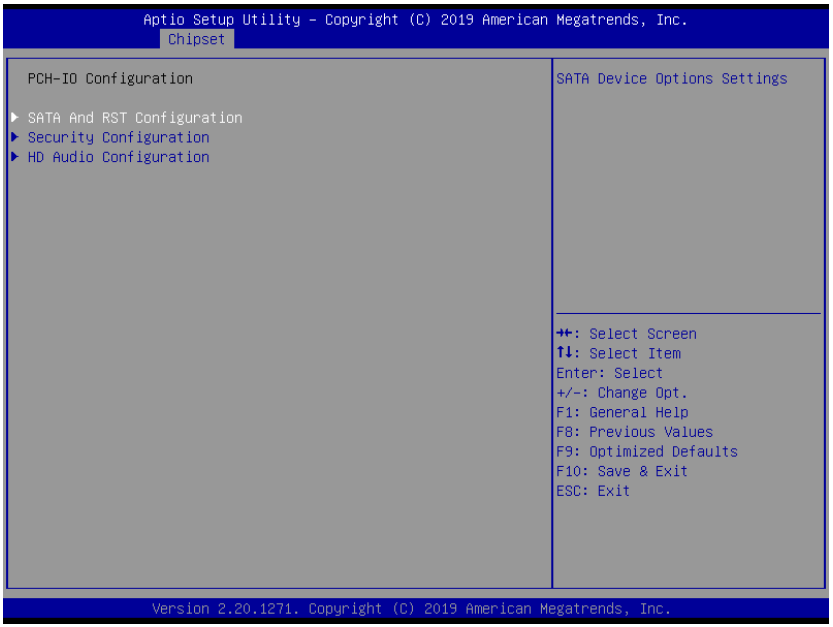

### DMI/OPI Configuration

Display DMI link speed and width.

### DMI Max Link Speed

Set sDMI speed to Gen1/Gen2/Gen3.

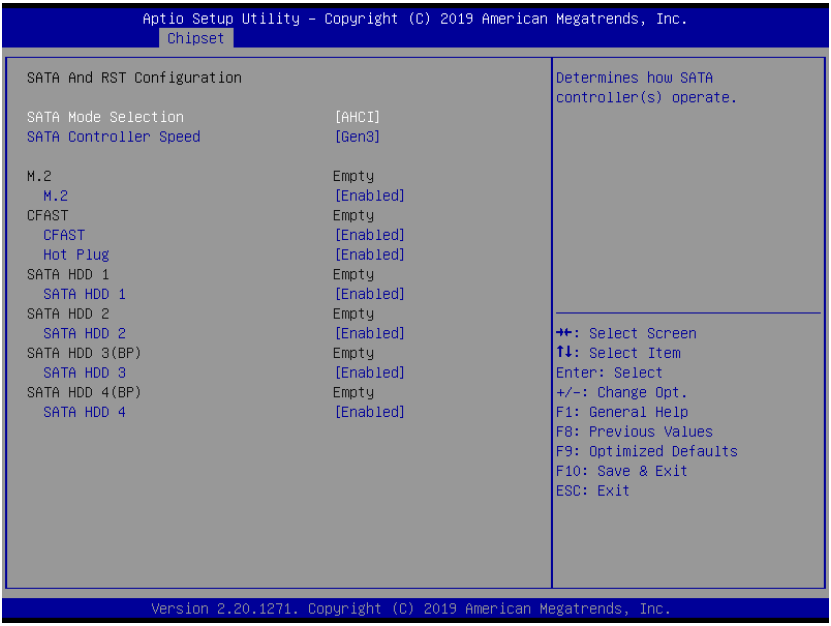
### B.3.2 PCH-IO Configuration




**PCH-IO Configuration**

Provides for SATA, Security and HD Audio configuration.

### B.3.2.1 SATA And RST Configuration




#### SATA Mode Selection

Determines how SATA controller(s) operate.

#### SATA Controller Speed

Sets the maximum speed the SATA controller can support.

#### M.2 Storage

Enables/Disables M.2 storage.

#### CFast Card

Enables/Disables CFast card.

#### Hot Plug

Designates selected port as hot pluggable.

### SATA HDD 1

Enables/Disables SATA HDD 1

### SATA HDD 2

Enables/Disables SATA HDD 2

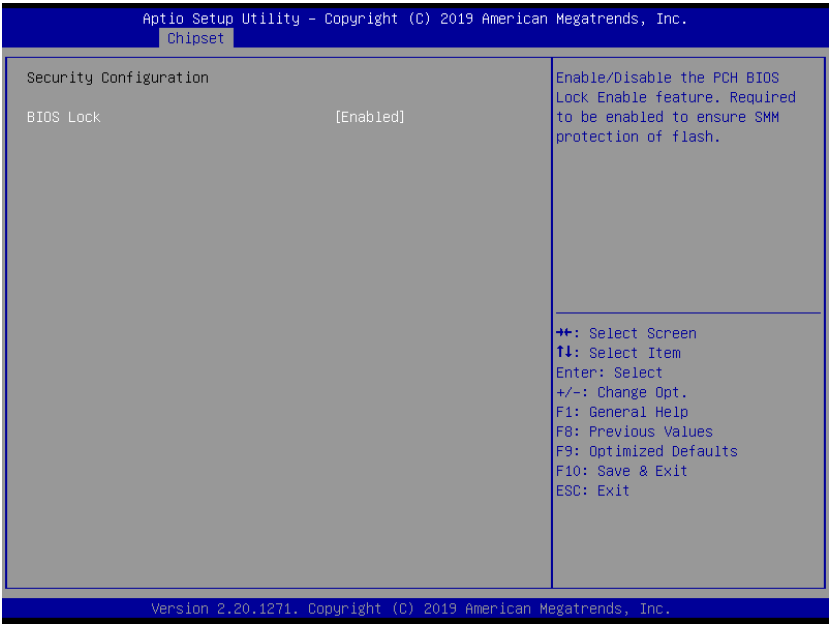
### SATA HDD 3

Enables/Disables SATA HDD 4

### SATA HDD 4

Enables/Disables SATA HDD 4

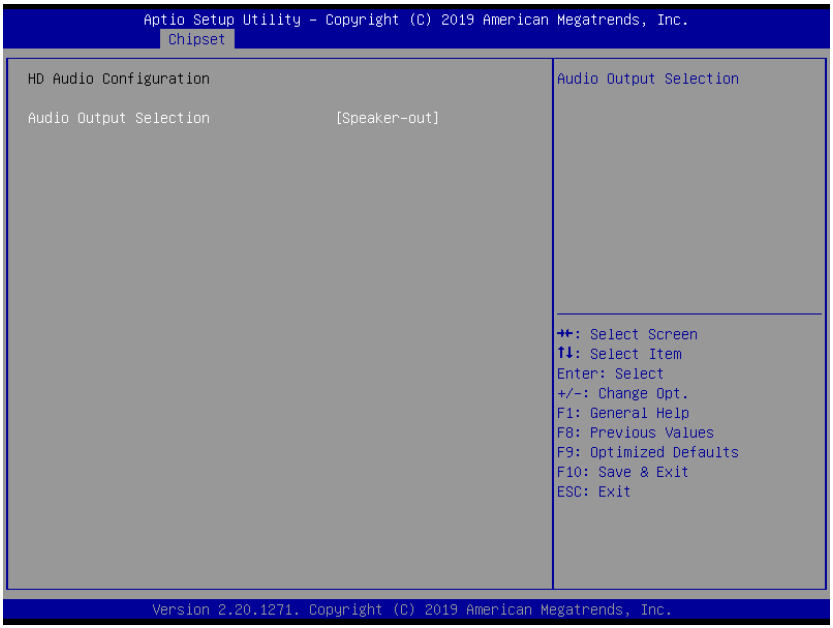
### B.3.2.2 Security Configuration




**BIOS Lock**

Enable/Disable the PCH BIOS Lock Enable feature. Required to be enabled to ensure SMM protection of flash.

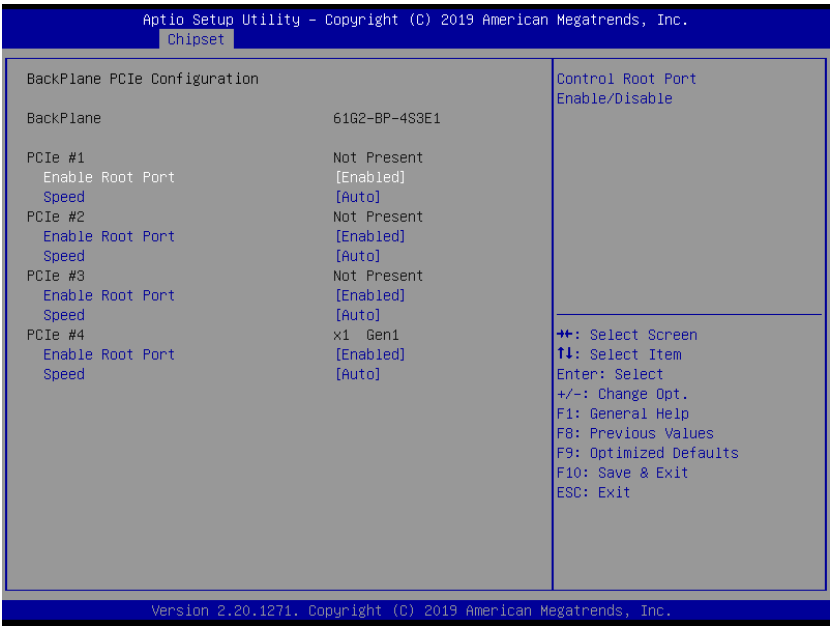
### B.3.2.3 HD Audio Configuration




#### Audio Output Selection

Selects the audio output device.

### B.3.2.4 BackPlane PCIe Configuration



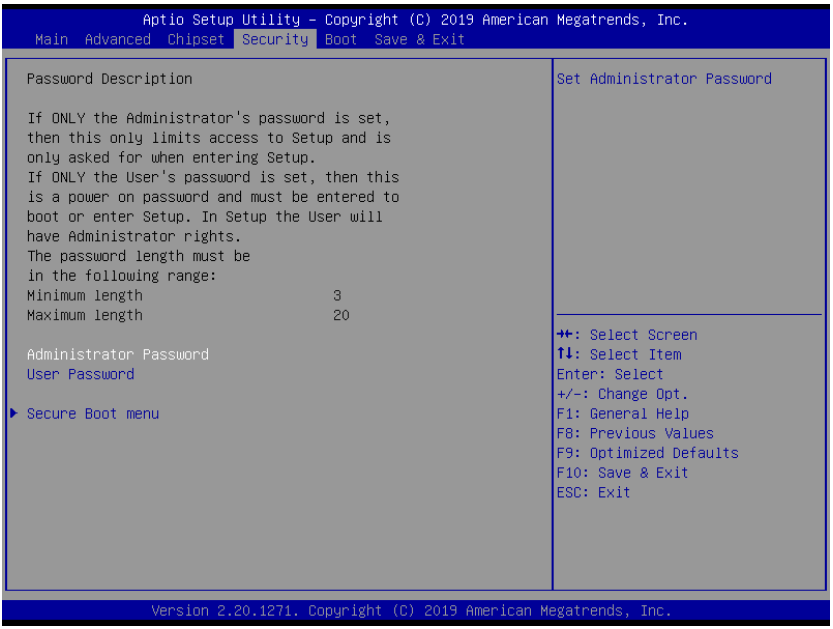

#### BackPlane PCIe Configuration

Displays the BackPlane type, link speed and width.

#### Speed

Controls the PCIe maximum speed.

## 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

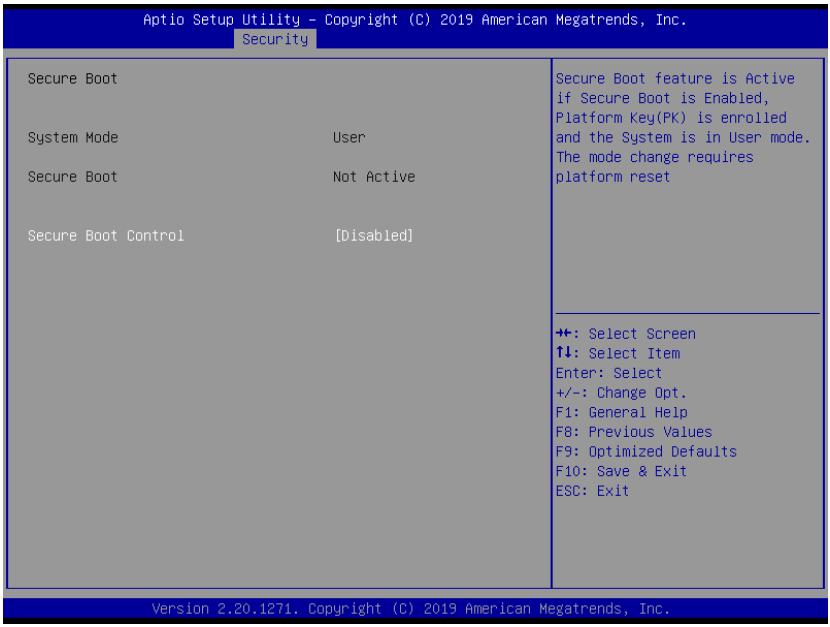
### Administrator Password

Sets Administrator Password.

### User Password

Sets User Password.

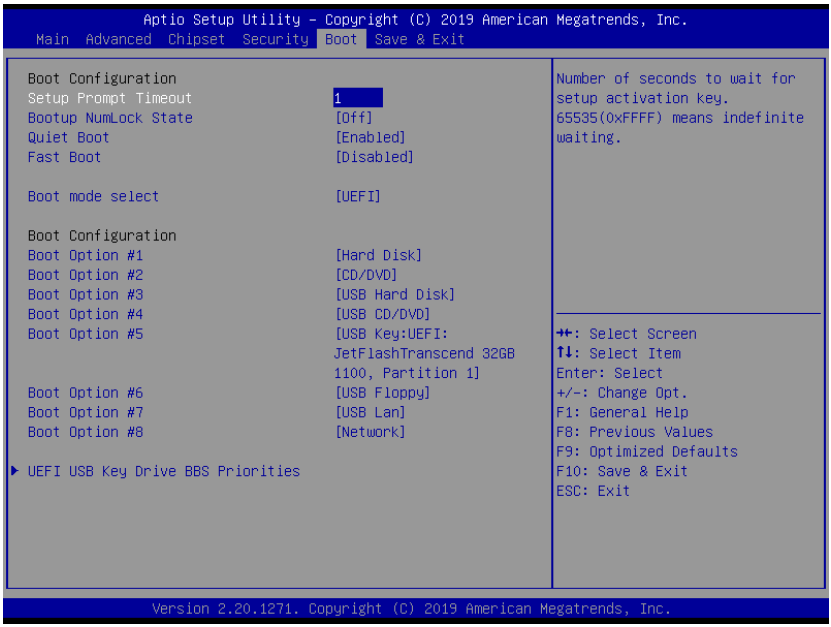
### B.4.1 Secure Boot Menu




#### Secure Boot Control

The Secure Boot feature is Active if Secure Boot is enabled, Platform Key (PK) is enrolled and the system is in User mode. Changing the system mode requires a platform reset.

## B.5 Boot




### Setup Prompt Timeout

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

### Bootup Num-Lock State

Sets keypad Number Lock status following boot.

### 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

### Boot mode select

Sets legacy or UEFI boot mode.

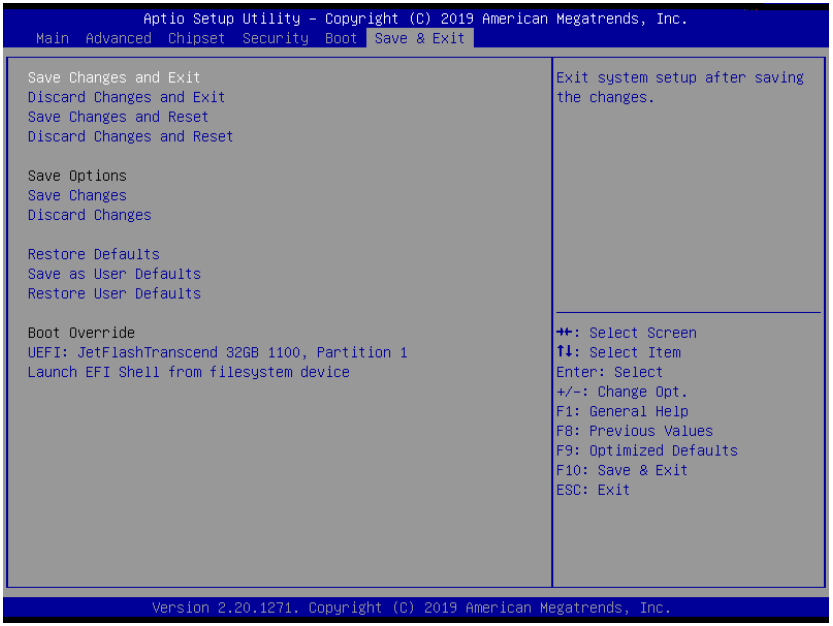
### Boot Configuration

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.

### UEFI USB Hard Drive Disk Drives BBS Priorities

Specifies the Boot Device Priority sequence from available UEFI USB drives.

## B.6 Save & Exit




### Save Changes and Exit

Saves all changes before exiting Setup.

### Discard Changes and Exit

Discards all changes and exits Setup.

### Save Changes and Reset

Saves all changes and reboots the system with the new settings.

### Discard Changes and Reset

Discards all changes and reboots the system.

### Save Changes

Saves all changes without exiting Setup.

### Discard Changes

Discards all changes without exiting Setup.

### Restore Defaults

Sets all BIOS options to default settings, designed for maximum system stability but less than maximum performance. Select Restore Defaults if the computer encounters system configuration problems.

### Save as User Defaults

Save the current changes 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 of the available filesystem devices.

# Appendix C Watchdog Timer (WDT) Function Library

This appendix describes use of the watchdog timer (WDT) function library for the MXC-6600 Series controller. The watchdog timer is a hardware mechanism provided to reset the system if the operating system or an application stalls. After starting, the watchdog timer in the application must be periodically reset before the timer expires. Once the watchdog timer expires, a hardware-generated signal is sent to reset the system.

## C.1 WDT with API/Windows

The WDT API library files and a demo program (incl. source code) can be downloaded from: https://www.adlinktech.com/Products/Industrial_PCs_Fanless_Embedded_PCs/IntegratedFanlessEmbeddedComputers/MXC-6600_Series

To use the WDT function library for the MXC-6600 Series, include the header file WDT.h and linkage library WDT.lib in the C++ project.

### InitWDT

Initializes the watchdog timer function. Must be called before the invocation of any other WDT function.

**Syntax**

C/C++

```
BOOL InitWDT()
```

**Parameters**

None

**Return codes**

**TRUE** if watchdog timer is successfully initialized.

**FALSE** if watchdog timer fails to initialize.

## SetWDT

Sets the timeout value of the watchdog timer. There are two parameters for this function to indicate the timeout ticks and unit. ResetWDT or StopWDT should be called before the expiration of watchdog timer, or the system will reset.

### Syntax

C/C++

```
BOOL SetWDT(BYTE tick, BYTE unit)
```

### Parameters

**`tick`**

Specify the number of ticks for watchdog timer. A valid value is 1 - 255.

**`unit`**

Specifies the timeout ticks of the watchdog timer.

| Value | Description |
|---|---|
| 0 | The unit for one tick is one second. For example, when one tick is specified as 100 and the unit as 0, the timeout value is 100 seconds. |
| 1 | The unit for one tick is one minute. For example, whenone tick is specified as 100 and the unit as 1, the timeout value is 100 minutes. |

### Return codes

**TRUE** if timeout value of watchdog timer is successfully set.

**FALSE** if timeout value of watchdog timer is failed to set.

## StartWDT

Start the watchdog timer function. Once the StartWDT is invoked, the watchdog timer starts. ResetWDT or StopWDT should be called before the expiration of watchdog timer, or the system will reset.

### Syntax

C/C++

```
BOOL StartWDT()
```

**Parameters**

None

**Return codes**

**TRUE** if watchdog timer is successfully started.

**FALSE** if watchdog timer is failed to start.

## ResetWDT

Reset the watchdog timer. The invocation of ResetWDT allows restoration of the watchdog timer to the initial timeout value specified in SetWDT function. ResetWDT or StopWDT should be called before the expiration of the watchdog timer, or the system will reset.

**Syntax**

C/C++

```
BOOL ResetWDT()
```

**Parameters**

None

**Return codes**

**TRUE** if watchdog timer is successfully reset.

**FALSE** if watchdog timer fails to reset.

## StopWDT

Stops the watchdog timer.

**Syntax**

C/C++

```
BOOL StopWDT()
```

**Parameters**

None

**Return codes**

**TRUE** if watchdog timer is successfully stopped.

**FALSE** if watchdog timer fails to stop.

## C.2 WDT with DOS/Linux

Under Linux, please program the WDT function using the LPC IO registers according to the sample program as follows.

```
#include <dos.h>
#include <stddef.h>
#include <stdio.h>
/* Config LPC IO NCT6102D to enter config mode */
EnterConfig(void)
{
outp(0x4E, 0x87);
outp(0x4E, 0x87);
}
/* Config LPC IO to exit config mode */
ExitConfig(void)
{ outp(0x4E, 0xAA);
 }
/* Read byte from LPC IO register */
unsigned char r_reg(unsigned char regoffset)
{ outp(0x4E, regoffset);
return inp(0x4F); }
/* Write byte to LPC IO register */
void w_reg(unsigned char regoffset, unsigned char
data)
{ outp(0x4E, regoffset); outp(0x4F, data);
}
main(void)
{
unsigned int    count;
/* print program title  */
printf("-----------------MXC-6400 WDT Demo-----------
-----\n");
printf("Init and config GPIO
ports<<<<<<<<<<<<<<<<<<<<<<<<\n");
```

```
printf("-------------------------------------------
----\n");
EnterConfig();
/* config WDT registers */
w_reg(0x07,0x08);
/* enable keyboard interrupt to reset WDT timeout
value */
w_reg(0xF2,r_reg(0xF2)|0x40);
/* set unit as second */
w_reg(0xF0,r_reg(0xF0)&~0x04);
/* start the Watchdog */
w_reg(0x30,0x01);
/* set timeout value as 30 seconds */
/* WDT start automatically while timeout value is set
*/
w_reg(0xF1,0x1E);


printf("-------------------------------------------
-----\n");
printf("WDT is set and counting down
now.<<<<<<<<<<<<<<<<<\n");
printf("-------------------------------------------
-----\n");
for(count=30;count!=0;count--)
{ printf("Countdown %2d :  .\n",count);
/* reset WDT timeout value to 10 seconds */
/* w_reg(0x73,0x0A); */
sleep(1);
}
/* disable WDT */
/* WDT stop while timeout value is set to zero */
w_reg(0x30,0x00);
printf("WDT is disable. Program is terminating.");
ExitConfig();
return 0;
}
```

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# Appendix D Digital Input/Output Function Library

DI/O provides input/output to support inter-device communications. Simple programming guides allow easy transmission of digital signals between the system and attached peripherals.

## DI/O with API/Windows

Matrix DI/O API library files and a demo program (including source code) can be downloaded from http://www.adlinktech.com.

To use the DI/O function library for the MXC-6600 Series, include the header file matrix_dio.h and linkage library matrix_dio.lib (matrix_dio64.lib for x64 operating systems) in the C++ project.

## Error Macro Definition

| | |
|---|---|
| NoError | 0 |
| ErrorOpenDriverFailed | -13 |
| ErrorDeviceIoctl | -200 |

## DI/DO Macro Definition

| | | |
|---|---|---|
| DI0 | DO0 | 0x01 |
| DI1 | DO1 | 0x02 |
| DI2 | DO2 | 0x04 |
| DI3 | DO3 | 0x08 |
| DI4 | DO4 | 0x10 |
| DI5 | DO5 | 0x20 |
| DI6 | DO6 | 0x40 |
| DI7 | DO7 | 0x80 |

## LED Macro Definition

| | |
|---|---|
| LED0 | 0x01 |
| LED1 | 0x02 |
| LED2 | 0x04 |
| LED3 | 0x08 |
| LED4 | 0x10 |

## DI/O Functions

### ADMX_DIO_Init

Initializes the DI/O function library.

#### Syntax

C/C++

```
short __stdcall ADMX_DIO_Init ()
```

#### Parameter(s)

*N/A*

#### Return codes

```
     0: NoError
   -13: ErrorOpenDriverFailed
  -200: ErrorDeviceIoctl
```

### ADMX_DIO_Close

Closes the DI/O function library.

#### Syntax

C/C++

```
short __stdcall ADMX_DIO_Close ()
```

#### Parameter(s)

*N/A*

#### Return codes

```
     0: NoError
```

### ADMX_DI_ReadPort

Reads the digital logic state of a digital input line.

#### Syntax

C/C++

```
short __stdcall ADMX_DI_ReadPort(unsigned long*
      pwState)
```

#### Parameter(s)

*pwState*

The state values of MXC-6600 Series digital input channels 1 to 8 (corresponding values 0 to 7)

```
     1: Corresponding input/output line is HIGH
     0: Corresponding input/output line is LOW
```

#### Return codes

```
     0: NoError
   -13: ErrorOpenDriverFailed
  -200: ErrorDeviceIoctl
```

### ADMX_DO_WritePort

Sets the digital logic state of a digital output line.

#### Syntax

C/C++

```
short __stdcall ADMX_DO_WritePort(unsigned long
     wState)
```

#### Parameter(s)

*wState*

Sets the state values of MXC-6600 Series digital output channels 1 to 8 (corresponding values 0 to 7)

```
1: Corresponding input/output line is HIGH
0: Corresponding input/output line is LOW
```

#### Return codes

```
  0: NoError
-13: ErrorOpenDriverFailed
-200: ErrorDeviceIoctl
```

### ADMX_DO_ReadPort

Reads the digital logic state of a digital output line.

#### Syntax

C/C++

```
short __stdcall ADMX_DO_ReadPort(unsigned long*
      pwState)
```

#### Parameter(s)

*pwState*

The state values of MXC-6600 Series digital output channels 1 to 8 (corresponding values 0 to 7)

```
1: Corresponding input/output line is HIGH
0: Corresponding input/output line is LOW
```

#### Return codes

```
  0: NoError
-13: ErrorOpenDriverFailed
-200: ErrorDeviceIoctl
```

### LED_Write

Sets the LED digital logic state of the MXC-6600 Series.

### Syntax

C/C++

```
short __stdcall LED_Write(unsigned short wState)
```

### Parameter(s)

*wState*

Sets the state values of MXC-6600 Series LED channels 1 to 5 (corresponding values 0 to 4)

```
1: Corresponding input/output line is HIGH
0: Corresponding input/output line is LOW
```

### Return codes

```
  0: NoError
-13: ErrorOpenDriverFailed
-200: ErrorDeviceIoctl
```

### LED_Read

Reads the LED digital logic state of the MXC-6600 Series.

### Syntax

C/C++

```
short __stdcall LED_Read(unsigned short wState)
```

### Parameter(s)

*wState*

The state values of MXC-6600 Series LED channels 1 to 5 (corresponding values 0 to 4)

```
1: Corresponding input/output line is HIGH
0: Corresponding input/output line is LOW
```

### Return codes

```
  0: NoError
-13: ErrorOpenDriverFailed
-200: ErrorDeviceIoctl
```

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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.

- 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 with DC input, and 35ºC with adapter input.
- It is recommended that the device be installed in Information Technology Rooms that are in accordance with Article 645 of the National Electrical Code and NFPA 75.
- 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.
  - The power cord must be connected to a socket or outlet with a ground connection.
- 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.

- This equipment is not suitable for use in locations where children are likely to be present.
- 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><br>**Hot surface! Do not touch!** Touching this surface could result in bodily injury. To reduce risk, allow the surface to cool before touching. |

# Consignes de Sécurité Importante

*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.*

- *Lisez attentivement ces consignes de sécurité.*
- *Conservez le manuel de l'utilisateur pour pouvoir le consulter ultérieurement.*
- *Lisez la section Spécifications de ce manuel pour des informations détaillées sur l'environnement d'exploitation recommandé.*
- *L'appareil peut être utilisé à une température ambiante de 50°C avec entrée CC; 35ºC avec entrée adaptateur.*
- *Il est recommandé d'installer l'appareil dans des salles de technologie de l'information conformes à l'article 645 du National Electrical Code et à la NFPA 75.*
- *Pour éviter les chocs électriques et/ou d'endommager l'appareil:*
  - *Tenez l'appareil à l'écart de toute source d'eau ou de liquide.*
  - *Tenez l'appareil à l'écart d'une forte chaleur ou d'une humidité élevée.*
  - *Maintenez l'appareil correctement ventilé (n'obstruer ou ne couvrez pas les ouvertures de ventilation).*
  - *Utilisez toujours les réglages de tension et de source d'alimentation recommandés.*
  - *Installez et utilisez toujours l'appareil près d'une prise de courant facilement accessible.*
  - *Fixez le cordon d'alimentation (ne placez aucun objet sur le cordon d'alimentation).*
  - *Installez/fixez et utilisez l'appareil uniquement sur des surfaces stables et/ou sur les fixations recommandées.*
  - *Le cordon d'alimentation doit être connecté à une prise ou à une prise de courant avec mise à la terre.*

- Si l'appareil ne doit pas être utilisé pendant de longues périodes, éteignez-le et débranchez-le de sa source d'alimentation
- *N'essayez jamais de réparer l'appareil, qui ne doit être réparé que par un personnel technique qualifié à l'aide d'outils appropriés*
- *Une batterie de type Lithium peut être fournie pour une alimentation de secours ininterrompue ou d'urgence.*

---

*ATTENTION: Risque d'explosion si la pile est remplacée par une autre de type incorrect. Veuillez jeter les piles usagées de façon appropriée.*

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- *Cet équipement ne convient pas à une utilisation dans des lieux pouvant accueillir des enfants.*
- *L'appareil doit être entretenu par des techniciens agrees lorsque:*
- *Le cordon d'alimentation ou la prise est endommagé(e)*
- *Un liquide a pénétré à l'intérieur de l'appareil.*
- *L'appareil a été exposé à une forte humidité et/ou de la buée.*
- *L'appareil ne fonctionne pas ou ne fonctionne pas selon le manuel de l'utilisateur.*
- *L'appareil est tombé et/ou a été endommagé et/ou présente des signes évidents de dommage.*
- *Débranchez le cordon d'alimentation avant de desserrer les vis à oreilles et serrez toujours les vis à oreilles avec un tournevis avant de mettre le système en marche.*
- *Il est recommandé d'installer l'appareil uniquement dans une salle de serveurs ou une salle informatique où l'accès est:*
  - *Réservé au personnel de service qualifié ou aux utilisateurs familiarisés avec les restrictions appliquées à l'emplacement, aux raisons de ces restrictions et toutes les précautions requises*
  - *Uniquement autorisé par l'utilisation d'un outil, d'une serrure et d'une clé, ou d'un autre moyen de sécurité, et contrôlé par l'autorité responsable de l'emplacement.*

| | |
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| | ***RISQUE DE BRÛLURES***<br><br>***Partie chaude!*** *Ne touchez pas cette surface, cela pourrait entraîner des blessures. Pour éviter tout danger, laissez la surface refroidir avant de la toucher.* |

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# Getting Service

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