MVP-5100 Series

Value Line
9th Gen Intel® Core™ i7/i5/i3 &
8th Gen Celeron® Processor
Embedded Fanless Computer

MVP-510A/5101/5102/5103/5104

User's Manual



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Leading EDGE COMPUTING

Revision History

Revision	Release Date	Description of Change(s)
1.0	2020-02-20	Initial release

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Preface

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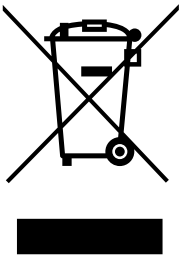
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Conventions

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.
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.

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

ADLINK's MVP-5100 Series of value line fanless embedded computing platforms, incorporating Intel® Core™ & Celeron® processors, 2 internal SATA trays, 1 M.2 2280 drive, 1 Mini PCIe slot and single-side access for I/O ports, optimizing easy maintenance in industrial automation environments. The series retains the robust design of all ADLINK MXC/MXE lines, at a new extremely cost-effective price point. The MVP-5100 series supports DDR4 memory for more powerful computing and the Intel® HD Graphics 630 speeds graphics performance. Fanless construction not only overcomes contaminant and noise challenges presented by harsh IA environments, the elimination of problematic structural elements that negatively affect MTBF greatly increases lifecycle expectations for the platform.

1.2 Features

- 9th Generation Intel® Core™ i7/i5/i3 FCLGA1151 processor and H310 chipset (C246 optional)
- 2 x DDR4 SO-DIMM socket, supporting up to 32GB DDR4 2400 SO-DIMM Module
- 2x DisplayPort, 1x DVI-D and 1x VGA, supporting 2 independent displays w/ H310 (3 independent displays w/ optional C246)
- 6 External USB ports (3x USB 3.0, 3x USB 2.0), 1 internal USB 2.0 port
- 3 Intel GbE LAN ports with teaming function
- Built-in 8CH DI and 8CH DO, 2 software-programmable RS-232/422/485 + 2 RS-232 ports
- CFast socket, onboard SATA 6Gb/s port for 2.5" HDD/SSD installation, and SATA 6Gb/s
- Built-in wide-range 12V DC to 24V DC power input

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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.

- MVP-5100 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)
  - 160W (P/N: 31-62120-0010)

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2 Specifications

2.1 MVP-510A, MVP-5101

	MVP-510A	MVP-5101
System Core		
Processor	Intel® Core™ i7-9700E (8-cores, 65W, 2.6/4.4 GHz)	Intel® Core™ i7-9700TE (8-cores, 35W, 1.8/3.8 GHz)
Chipset	H310 (C246 optional)	
Memory	4GB DDR4 2400MHz, dual SODIMMs, up to 32GB	
I/O Interface		
Display	2x DP++, DVI-D, VGA (3 displays) (2 independent displays w/ H310, 3 independent displays w/ C246)	
Ethernet	3x Intel GbE, 2x i211AT + i219 (supports Intel® AMT/vPro™ w/ C246)	
Serial Ports	COM1/2: RS-232/422/485 COM3/4: RS-232 Optional: COM5/6 RS-232 (shared w/ DI/O)	
DI/O	8-ch DI and 8-ch DO	
USB	3x USB 3.1 Gen 1 + 3x USB 2.0, 1x internal USB 2.0 dongle (2x USB 3.1 up to Gen 2 w/ C246)	
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 (USB3.1 + SATA 6Gb/s + PCIe x1; up to PCIe x2 w/ C246)	
USIM	2	
I^2C	2 (3.3V/5V)	
TPM	TPM 2.0	
Storage		
2.5" SATA	2x internal (RAID support w/ C246)	
CFast	1 Type II	
Physical		
Dimensions	210 (W) x 240 (D) x 86 (H) mm (8.27" x 9.45" x 3.39")	
Weight	4.1 kg (9.0 lbs)	
Mounting	Wall mount	

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	MVP-510A	MVP-5101
Power Supply		
DC Input	12-24VDC (± 10% tolerance)	
AC Input	Optional: 160W/220W AC/DC adapter	
Environmental		
Standard Operating Temperature	0°C to 50°C, w/ airflow 0.6 m/s	
Extended Operating Temperature	-20°C to 50°C, w/ airflow 0.6 m/s (w/ industrial storage)	-20°C to 60°C, w/ airflow 0.6 m/s (w/ industrial storage)
Storage Temperature	-40°C to 85°C (excluding storage devices)	
Humidity	approx. 95% @ 40°C (non-condensing)	
Vibration	Operating: 5 Grms, 5-500 Hz, 3 axes (w/2.5" SSD/CFast) Operating: 0.5 Grms, 5-500 Hz, 3 axes (w/ HDD)	
Shock	Operating: 100 Grms, half sine 11ms duration (w/ 2.5" SSD/CFast)	
ESD	Contact +/-4kV, Air +/-8kV	
EMC	EN61000-6-4/-2, CE & FCC Class A	
Safety	UL/cUL, CB, CCC	

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2.2 MVP-5102, MVP-5103, MVP-5104

	MVP-5102	MVP-5103	MVP-5104
System Core			
Processor	Intel® Core™ i5-9500TE (6-cores, 35W, 2.2/3.6 GHz)	Intel® Core™ i3-9100TE (4-cores, 35W, 2.2/3.2 GHz)	Intel® Celeron® G4900T (2-cores, 35W, 2.9 GHz)
Chipset	H310 (C246 optional)		
Memory	4GB DDR4 2400MHz, dual SODIMMs, up to 32GB		
I/O Interface			
Display	2x DP++, DVI-D, VGA (3 displays) (2 independent displays w/ H310, 3 independent displays w/ C246)		
Ethernet	3x Intel GbE, 2x i211AT + i219 (supports Intel® AMT/vPro™ w/ C246)		
Serial Ports	COM1/2: RS-232/422/485 COM3/4: RS-232 Optional: COM5/6 RS-232 (shared w/ DI/O)		
DI/O	8-ch DI and 8-ch DO		
USB	3x USB 3.1 Gen 1 + 3x USB 2.0, 1x internal USB 2.0 dongle (2x USB 3.1 up to Gen 2 w/ C246)		
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 (USB3.1 + SATA 6Gb/s + PCIe x1; up to PCIe x2 w/ C246)		
USIM	2		
I^2C	2 (3.3V/5V)		
TPM	TPM 2.0		
Storage			
2.5" SATA	2x internal (RAID support w/ C246)		
CFast	1 Type II		
Physical			
Dimensions	210 (W) x 240 (D) x 86 (H) mm (8.27" x 9.45" x 3.39")		
Weight	4.1 kg (9.0 lbs)		
Mounting	Wall mount		

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	MVP-5102	MVP-5103	MVP-5104
Power Supply			
DC Input	12-24VDC (± 10% tolerance)		
AC Input	Optional: 160W/220W AC/DC adapter		
Environmental			
Standard Operating Temperature	0°C to 50°C, w/ airflow 0.6 m/s		
Extended Operating Temperature	-20°C to 60°C, w/ airflow 0.6 m/s (w/ industrial storage)		
Storage Temperature	-40°C to 85°C (excluding storage devices)		
Humidity	approx. 95% @ 40°C (non-condensing)		
Vibration	Operating: 5 Grms, 5-500 Hz, 3 axes (w/2.5" SSD/CFast) Operating: 0.5 Grms, 5-500 Hz, 3 axes (w/ HDD)		
Shock	Operating: 100 Grms, half sine 11ms duration (w/ 2.5" SSD/CFast)		
ESD	Contact +/-4kV, Air +/-8kV		
EMC	EN61000-6-4/-2, CE & FCC Class A		
Safety	UL/cUL, CB, CCC		

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2.3 MVP-5100 Functional Block Diagram

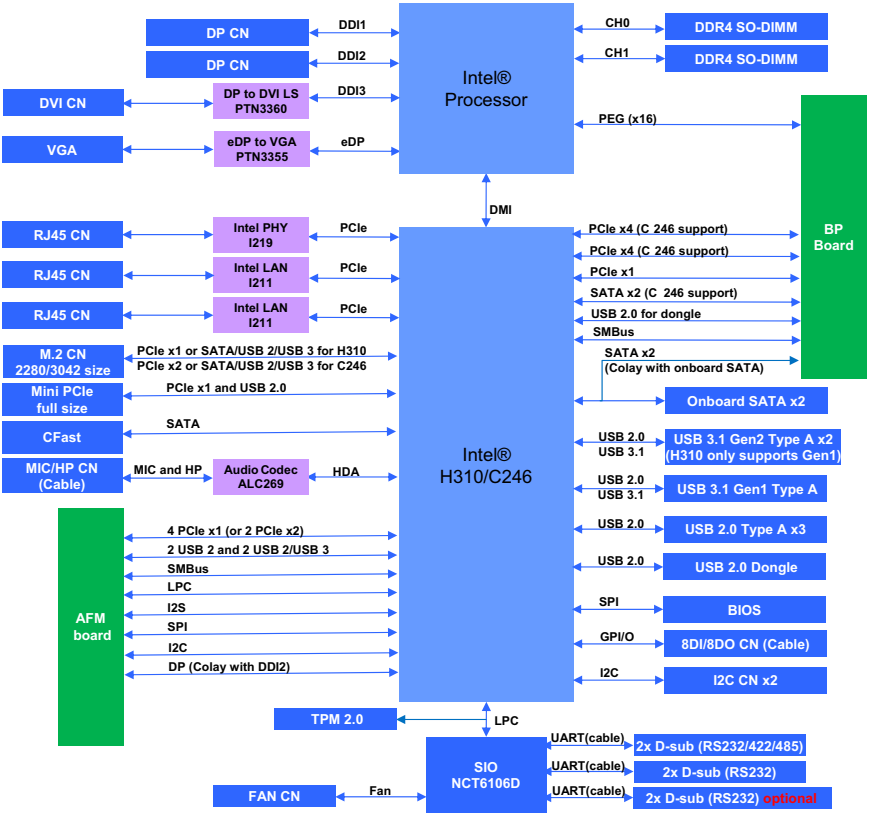


Figure 2-1: MVP-5100 Functional Block Diagram

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2.4 Display Options

With computing and graphic performance enhancement from its 8th & 9th Generation Intel processors, the MVP-5100 controller can support two (H310) or three (C246) independent displays, with configurations as follows.

	Port	Resolution
Display Option 1	DisplayPort1	4096x2304@60Hz
Display Option 2	DisplayPort2	4096x2304@60Hz
Display Option 3	DVI-D	1920x1200@60Hz
Display Option 4	VGA	1920x1080@60Hz

Table 2-1: Maximum Available Resolution Display Configurations

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2.5 Mechanical Dimensions

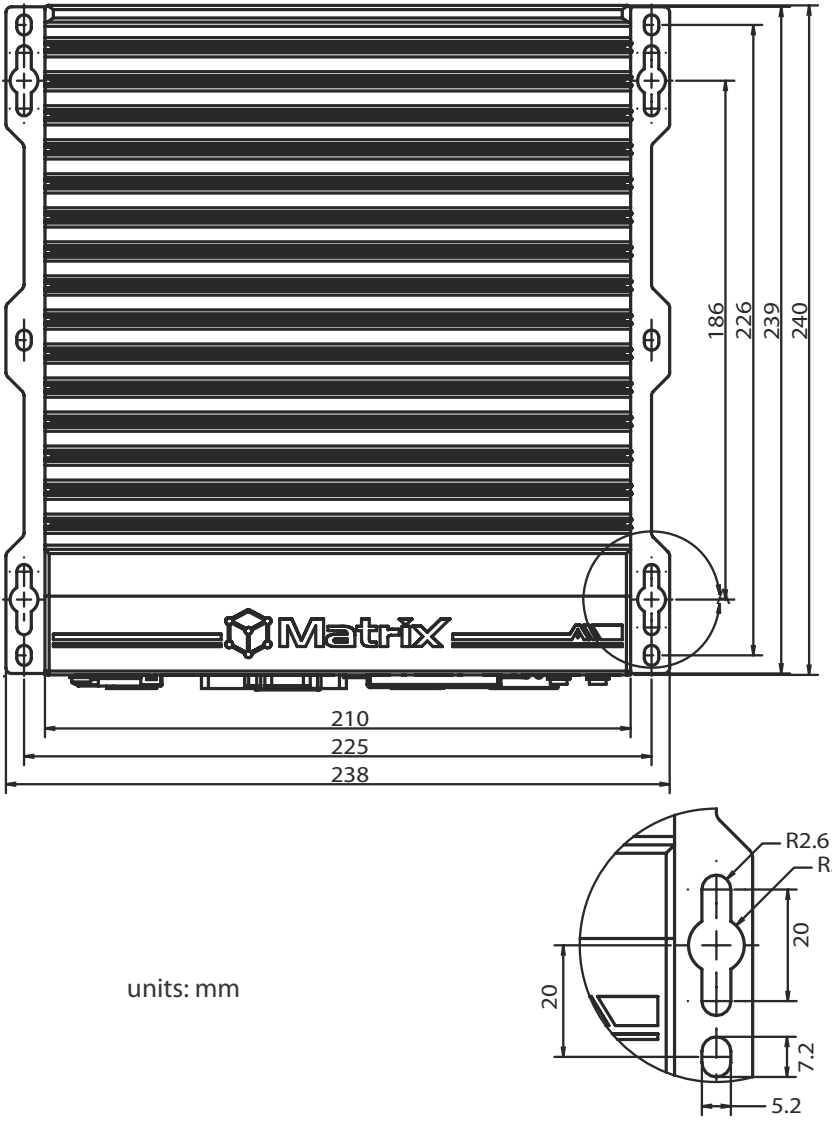
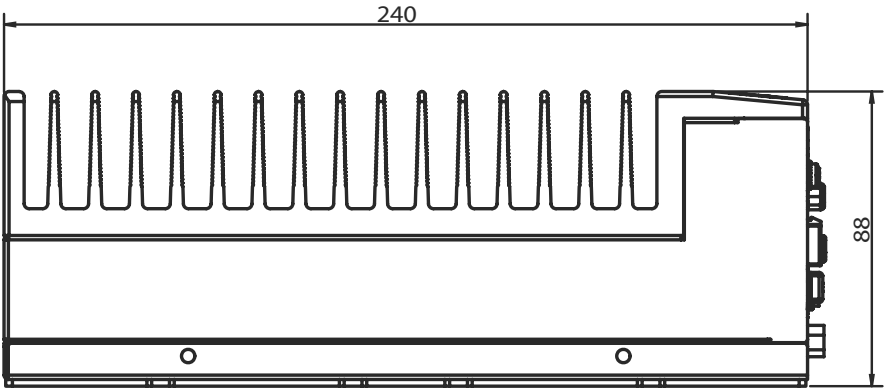


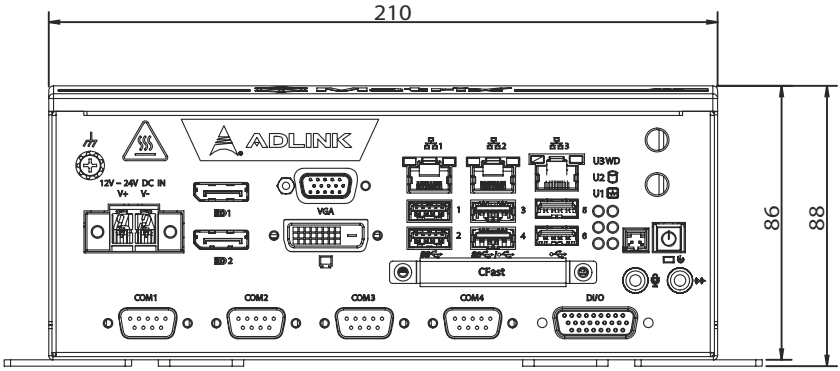
Figure 2-2: MVP-5100 Top View (including wall-mount brackets)

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units: mm

Figure 2-3: MVP-5100 Side View (including wall-mount brackets)



units: mm

Figure 2-4: MVP-5100 Front View (including wall-mount brackets)

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3 System Layout

3.1 Front Panel

The MVP-5100 Series provides the following front panel access features.

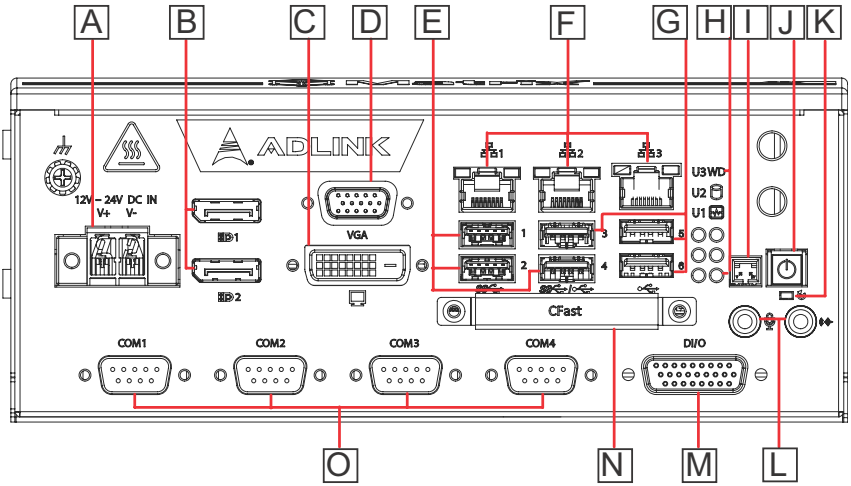


Figure 3-1: Front Panel I/O

A	DC Power Input	**I**	Extend Power Button
B	DisplayPort x2	**J**	Power
C	DVI-D	**K**	Reset
D	VGA	**L**	Audio (Mic, Phones/Speaker)
E	USB 2.0 Type-A x3 (1, 2, 4)	**M**	Digital Input/Output
F	Gigabit Ethernet x 3	**N**	CFast
G	USB 3.1 Type-A x3 (3, 5, 6)	**O**	COM Port x4
H	LED Indicators		

Table 3-1: Front Panel I/O Legend

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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 LED remains lit..
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.

3.1.3 Reset Button

The reset button executes a hard reset for the MVP-5100.

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3.1.4 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.

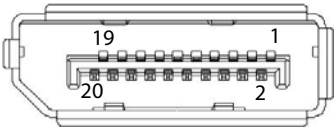


Figure 3-2: DisplayPort Connector Pin Definition

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 3-2: 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 3-3: Applicable Cable Types

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3.1.5 Digital I/O Connector

The MVP-5100 provides 8 channels of non-isolation digital input and 8 channels of non-isolation digital output circuits, with spec and circuits as follows.

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

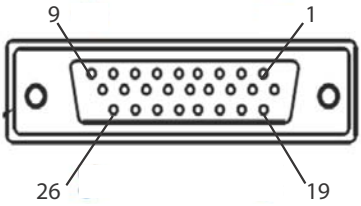


Figure 3-3: Digital I/O Connector Pin Definition

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 3-4: Digital Input/Output Connector Pin Definition

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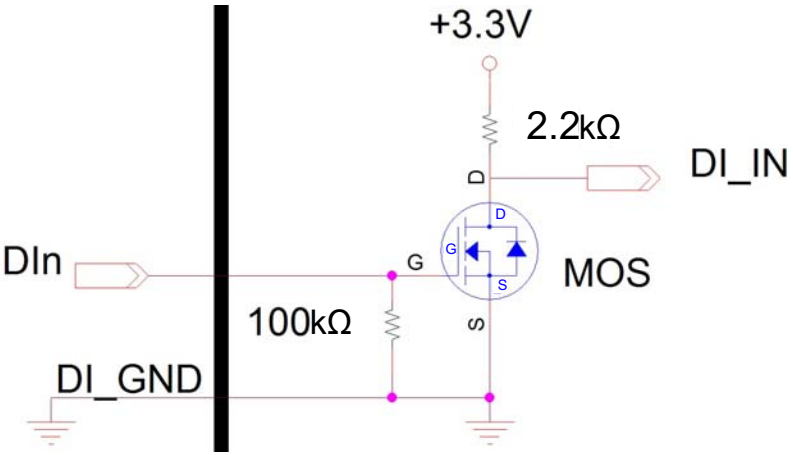


Figure 3-4: Digital Input Circuit

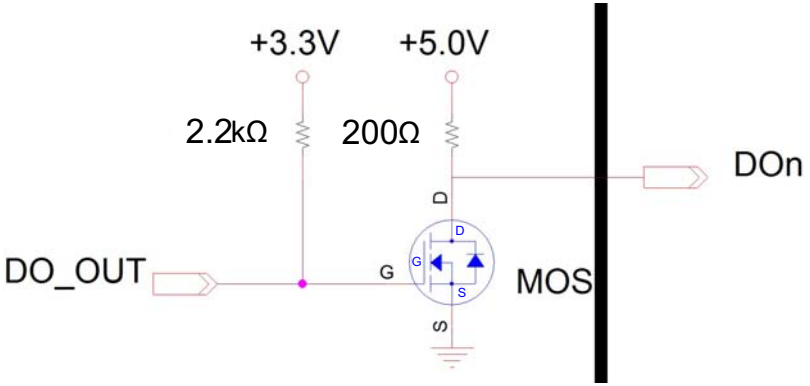


Figure 3-5: Digital Output Circuit

3.1.6 DVI-D Connector

The MVP-5100 provides one DVI-D connector for connection to an external monitor.

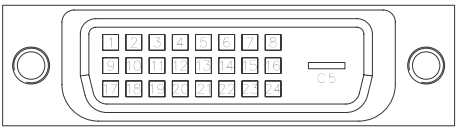


Figure 3-6: DVI-D Connector Pin Definition

Pin	Signal	Pin	Signal	Pin	Signal
1	DVIdata 2-	10	DVIdata 1+	19	GND
2	DVIdata 2+	11	GND	20	N/C
3	GND	12	N/C	21	N/C
4	N/C	13	N/C	22	GND
5	N/C	14	+5V	23	DVI clock +
6	DVIDC clock	15	GND	24	DVI clock -
7	DVIDC data	16	Hot plug detect	C5	GND
8	N/C	17	DVIdata 0-		
9	DVIdata 1-	18	DVIdata 0+		

Table 3-5: DVI-D Connector Pin Definition

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3.1.7 VGA Connector

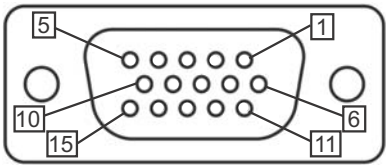


Figure 3-7: VGA Connector Pin Definition

Pin	Signal
1	G_VGA_R
2	G_VGA_G
3	G_VGA_B
4	N/C
5	GND
6	GND
7	GND
8	GND
9	N/C
10	GND
11	N/C
12	CRT_DDAT_CN
13	G_VGA_HSYNC
14	G_VGA_VSYNC
15	CRT_DCLK_CN

Table 3-6: VGA Connector Pin Definition

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3.1.8 USB 2.0 Ports

The MVP-5100 provides three USB 2.0 ports supporting Type A USB connection on the front panel. All USB ports are compatible with high-speed, full-speed and low-speed USB devices. The MVP-5100 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 BIOS.

3.1.9 USB 3.1 Ports

The MVP-5100 provides two USB 3.1 Gen2 and one USB 3.1 Gen1 ports supporting Type A USB 3.1 connection on the front panel. All USB 3.1 ports are compatible with SuperSpeed Gen2, high-speed, full-speed, and low-speed USB devices. The H310 SKU supports three USB 3.1 Gen1 ports only.

3.1.10 Gigabit Ethernet Ports

Three Gigabit Ethernet ports on the front panel support Intel WGI211AT and WGI219 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

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Speed LED Green/Orange	Active/Link Yellow

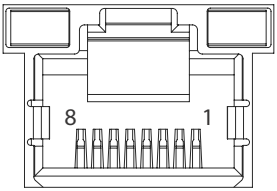


Figure 3-8: Ethernet Port and LEDs

Pin #	10BASE-T/ 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

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3.1.11 DC Power Input

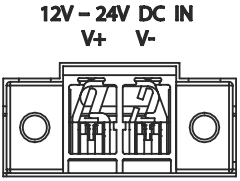


Figure 3-9: DC Power Input

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 29 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	12 to 24VDC	12A to 6A min.
AC-to-DC Adapter	24VDC	6 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.*

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3.1.12 COM Port Connectors

The MVP-5100 provides four COM ports through D-sub 9-pin connectors. The COM1 & COM2 ports support RS-232/422/485 modes by BIOS setting, while COM3 and COM4 support only RS-232.

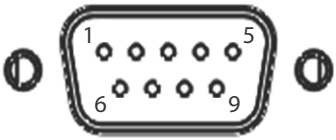


Figure 3-10: COM Port Pin Definition

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

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3.1.13 CFast Host Slot

The MVP-5100 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

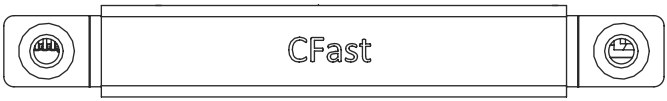


Figure 3-11: CFast Host Slot

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3.2 Internal I/O Connectors

3.2.1 Mainboard Connector Locations

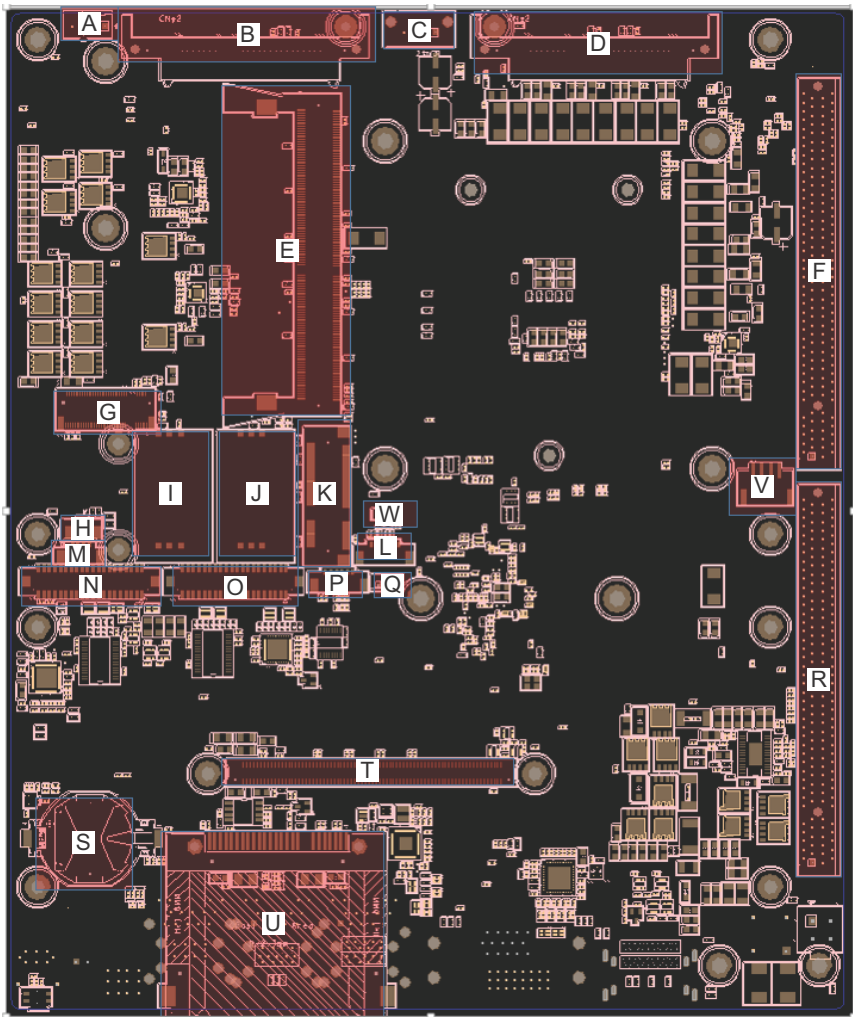


Figure 3-12: Mainboard Connectors

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A	Smart Fan
B	SATA
C	USB 2.0 dongle
D	SATA
E	DDR4 SODIMM
F	PCIe x16 slot for PEG and SATA
G	M.2
H	Wafer for GPS external power
I	SIM for M.2
J	SIM for Mini PCIe
K	Mini PCIe
L	Wafer for I2C sensor
M	Wafer for Speaker
N	Wafer for COM x2 (optional), DI x8, DO x8, Mic in and Line Out
O	Wafer for COM x4
P	Wafer for I2C sensor
Q	Internal Power button
R	PCIe x16 slot for PCIe and BP Power
S	RTC battery
T	Board-to-Board for AFM Board
U	CFast
V	PWR for AFM MXM carrier board (12V)
W	Clear CMOS Jumper

Table 3-12: Mainboard Connector Legend

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3.2.2 GPS Module Power Headers

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

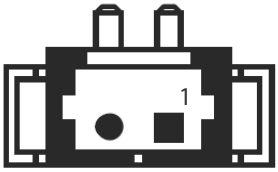


Figure 3-13: GPS Module Power Header Pin Definition

Pin	Signal
1	+5V_GPS
2	GND

Table 3-13: GPS Module Power Header Pin Definition

3.2.3 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.

3.2.4 Mini PCIe Connector

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

3.2.5 SATA Connector

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

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3.2.6 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.

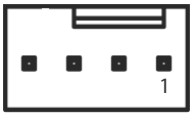


Figure 3-14: 12V Fan Connector Pin Definition

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

Table 3-14: 12V Fan Connector Pin Definition

3.2.7 Clear CMOS Jumper

Upon encountering an abnormal condition preventing the device 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

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3.2.8 Extended PWR/RESET Header

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

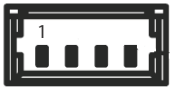


Figure 3-16: PWR/RESET Header Pin Definition

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

Table 3-15: PWR/RESET Header Pin Definition

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3.2.9 USIM Slot

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

3.2.10 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.

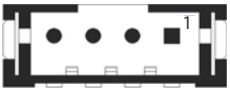


Figure 3-17: 12V Power Pin Definition

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

Table 3-16: 12V Power Pin Definition

NOTE:

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

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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 11 and secure it to the chassis using the captive screws.



Connect a DC power source as described in **Section 3.1.11: DC Power Input on page 20** to the inputs of the DC power connector, making sure to use the correct input voltage andpolarity.

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 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.

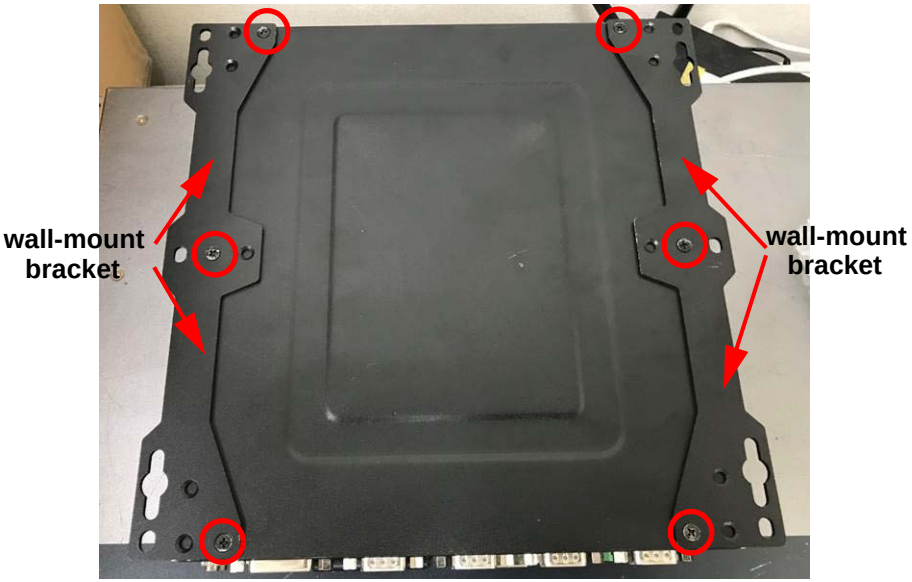
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4.2 Mounting the MVP-5100

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.

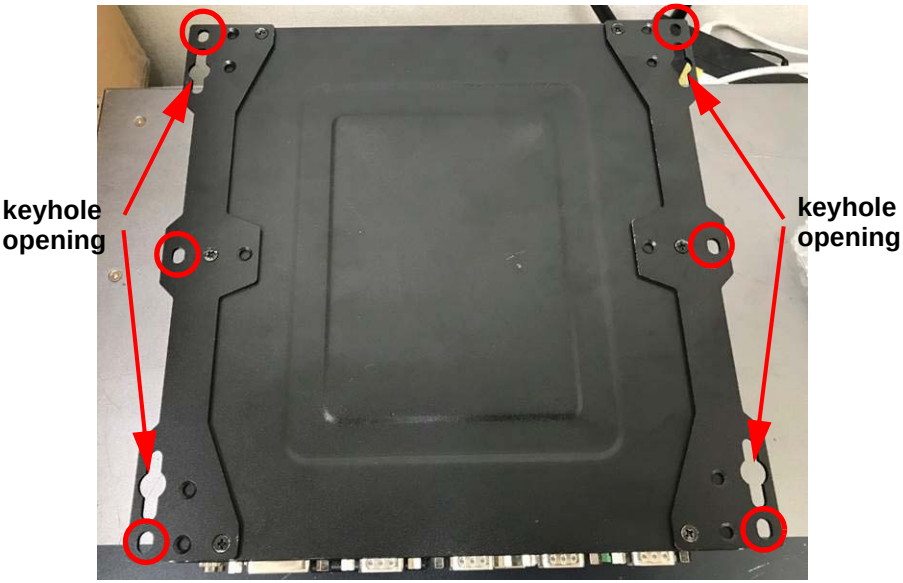


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Mounting the Device / Montage de l'Appareil

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 MVP-5100 Top View (including wall-mount brackets).

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 MVP-5100 Top View (including wall-mount brackets).



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/ExpandableFanlessEmbeddedComputers/MVP-5100_Series and install.

The following drivers must be installed:

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

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Appendix A Power

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, PS2 keyboard/mouse, 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
MVP-510A Intel® Core™ i7 65W	3.7W	21W	127W	144W	160W or 220W
MVP-5101 Intel® Core™ i7	3.6W	24W	65W	97W	160W
MVP-5102 Intel® Core™ i5	3.7W	22W	64W	94W	160W
MVP-5103 Intel® Core™ i3	3.8W	22W	56W	85W	160W
MVP-5104 Celeron®	4W	20W	41W	69W	160W

Table A-1: Power Consumption

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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.

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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 MVP-5100. The BIOS setup program includes menus for configuring settings and enabling features of the MVP-5100. Most users do not need to use the BIOS setup program, as the MVP-5100 ships with default settings that work well for most configurations.

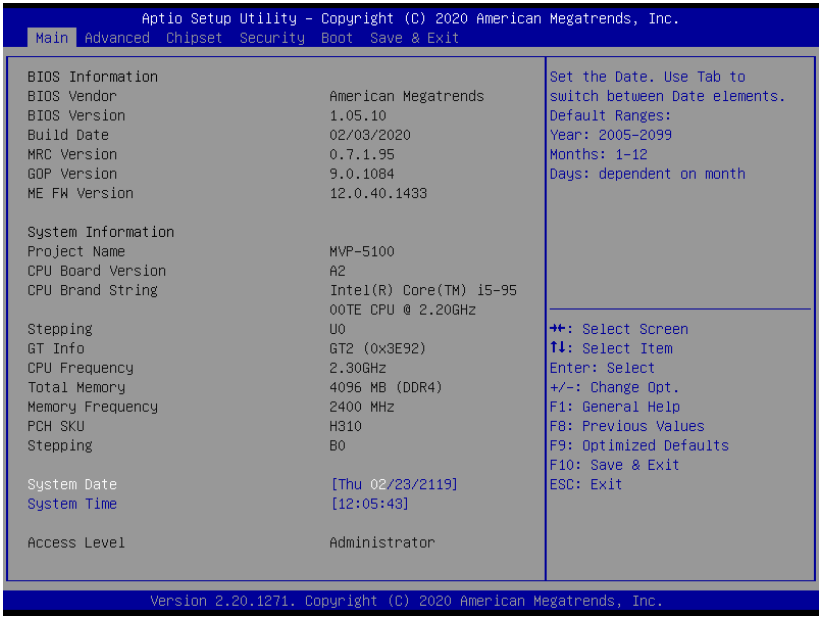
Enter BIOS setup by selecting DEL when the system is powered on the POST (Power On Self Test) message is displayed.The MVP-5100 controller supports one-time Boot Menu allowing selection of boot device. Enter the Boot Menu by selecting F7 at POST.


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.
- Users are welcome to download the latest BIOS version from our official website.

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B.1 Main



Contains basic system information for the MVP-5100.

WARNING:

Changing BIOS settings may lead to incorrect controller behavior and possible inability to boot. In such a case, Section 3.2.7: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.

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System Time/System Date

Allows adjustment of system time and date, as follows.

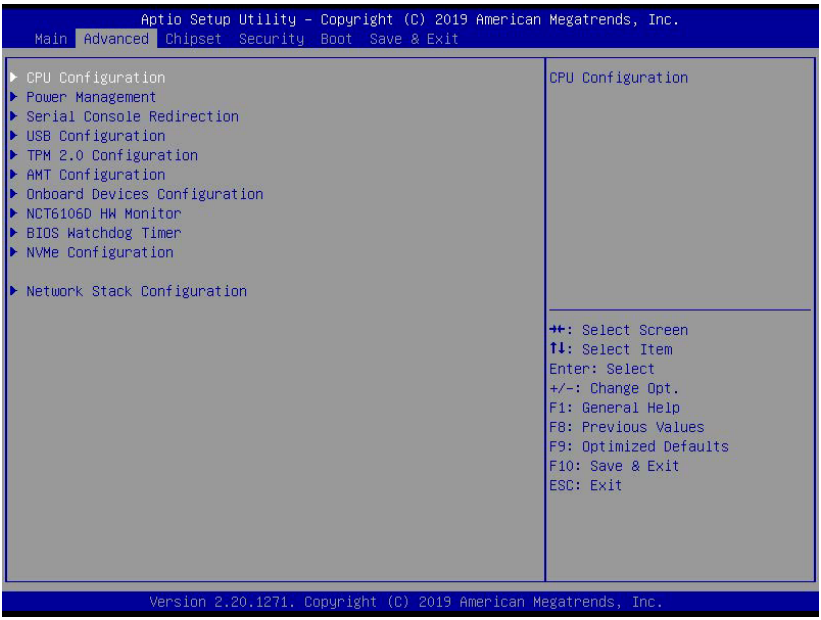
1. Highlight System Time or System Date using the up and down <Arrow> keys.
2. Enter new values using the keyboard and select <Enter>.
3. Select < Tab > to move between fields.



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.

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B.2 Advanced



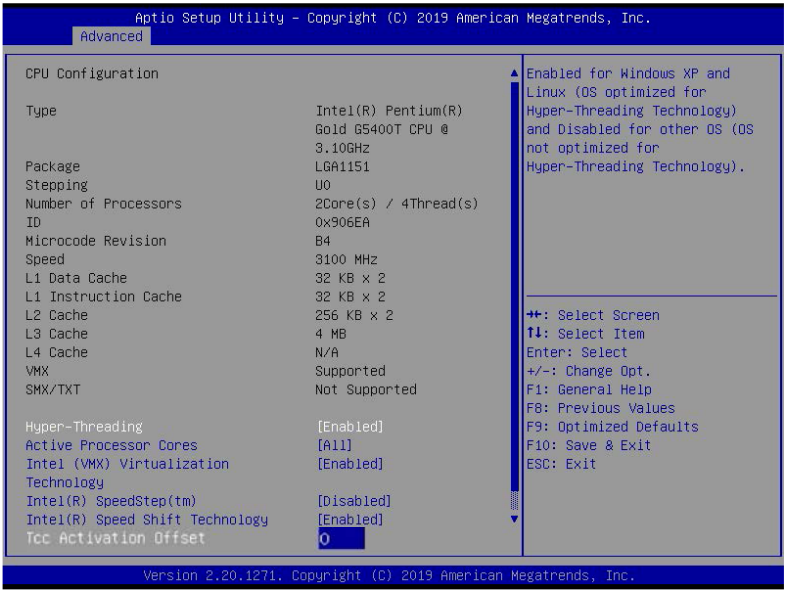
CAUTION:

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

Accesses advanced options of the MVP-5100.

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B.2.1 CPU Configuration



Hyper-Threading

Enabled for Windows XP and Linux (optimized for Hyper-Threading Technology) and Disabled for other OS (not 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® SpeedStep™

Allows more than two frequency ranges to be supported.

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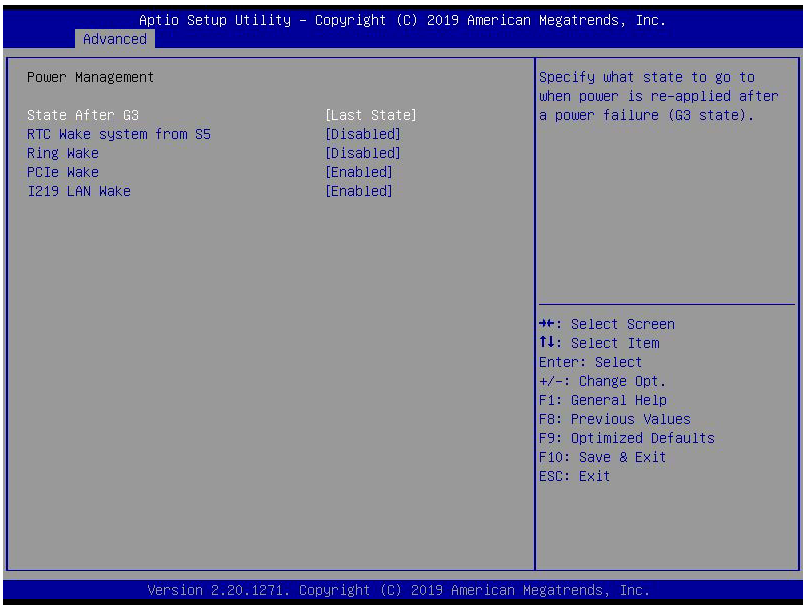
Intel® Speed Shift Technology)

Enables/disables Intel® Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow hardware controlled P-states.

TCC Activation Offset

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

B.2.2 Power Management



State After G3

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

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RTC Wake system from S5

Enables/disables System Wake on Alarm event. FixedTime sets system to wake on the hr::min::sec specified, DynamicTime sets system to wake ay the current time + Increase minute(s).

Ring Wake

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

PCIe Wake

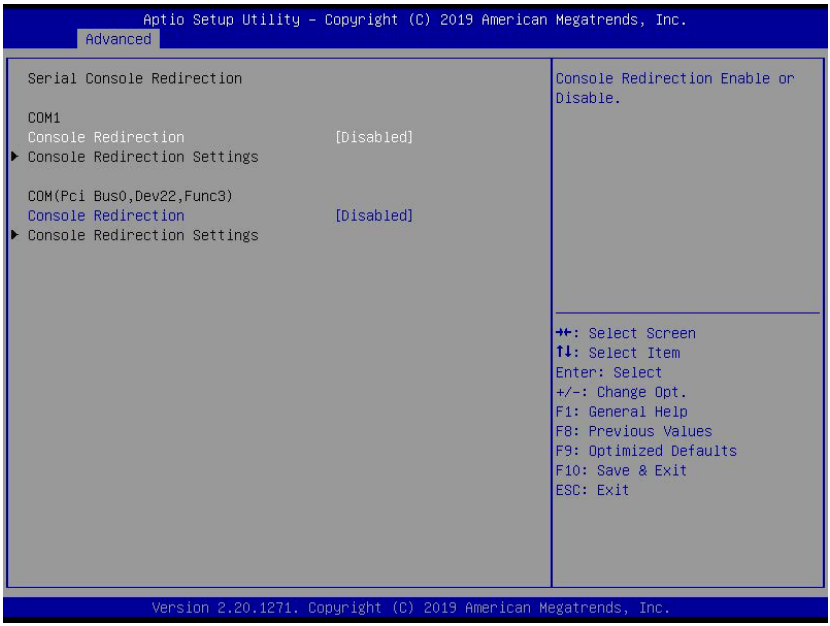
Enables/disables PCI Express wake capability.

I219 LAN Wake

Enables/disables onboard LAN I219 wake capability.

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B.2.3 Serial Console Configuration



COM1

Console Redirection

Enables/disables SIO COM1 Console Redirection.

Console Redirection Settings

Specify how the host computer and the remote computer (in use) exchange data. Both computers should have the same or compatible settings.

COM SOL (Pci Bus0,Dev22.Fun3)

Console Redirection

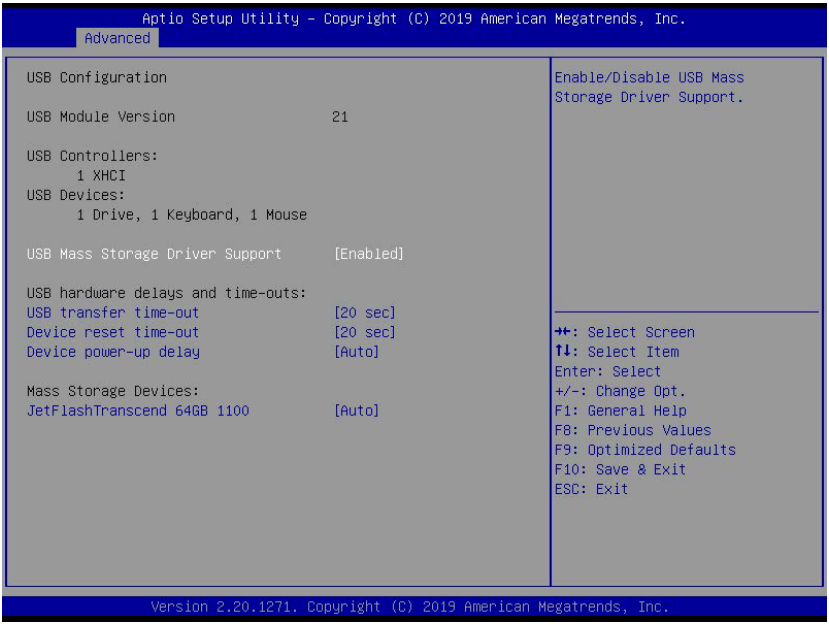
Enables/disables PCI SOL Console Redirection.

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Console Redirection Settings

Specify how the host computer and the remote computer (in use) 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

The time-out value for Control, Bulk, and Interrupt transfers.

Device reset time-out

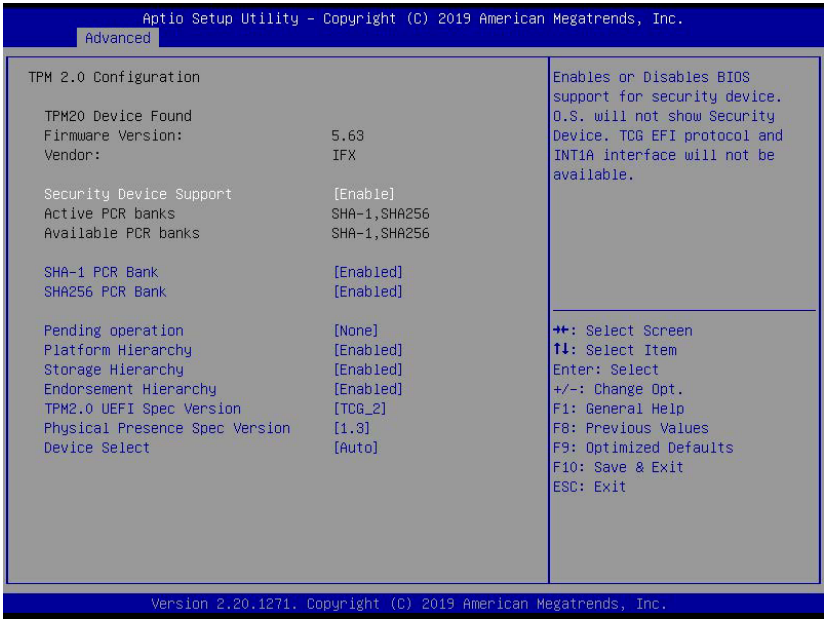
USB mass storage device Start Unit command time-out.

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Device power-up delay

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

B.2.5 TPM 2.0 Configuration



Security Device Support

Enables/disables BIOS support for security device. OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

SHA-1 PCR Bank

Enables/disables SHA-1 PCR Bank.

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SHA256 PCR Bank

Enables/disables SHA256 PCR Bank.

Pending Operation

Schedules Operation for the Security Device. Computer will reboot during restart in order to change State of Security Device.

Platform Hierarchy

Enables/disables Platform Hierarchy.

Storage Hierarchy

Enables/disables Storage Hierarchy.

Endorsement Hierarchy

Enables/disables Endorsement Hierarchy.

TPM 2.0 UEFI Spec Version

Selects TCG2 Spec Version Support.

Physical Presence Spec Version

Directs OS to support PPI Spec Version 1.2 or 1.3. Some HCK tests may not support 1.3.

Device Select

TPM 1.2 restricts support to TPM 1.2 devices, TPM 2.0 restricts support to TPM 2.0 devices, Auto supports both with default TPM 2.0 devices if not found, TPM 1.2 devices will be enumerated.

B.2.6 AMT Configuration



AMT BIOS Features

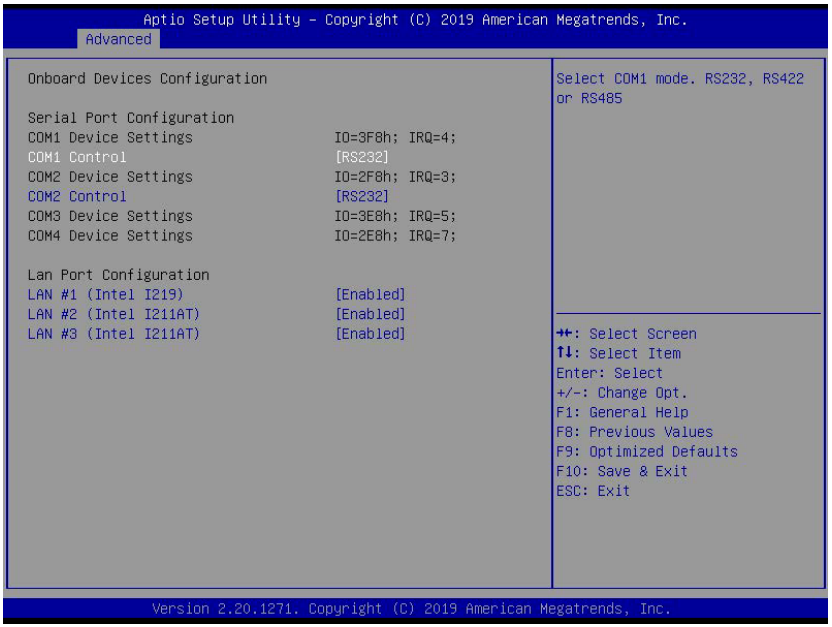
When disabled, AMT BIOS features are no longer supported and user is no longer able to access MEBx Setup.

MEBx Hotkey Pressed

Enables/disables automatic MEBx hotkey press.

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B.2.7 Onboard Devices Configuration



COM1 Control

Selects COM1 mode from RS232, RS422 or RS485.

COM2 Control

Selects COM2 mode from RS232, RS422 or RS485.

LAN #1 (Intel I219)

Enables/disables I219 LAN1.

LAN #2 (Intel I211AT)

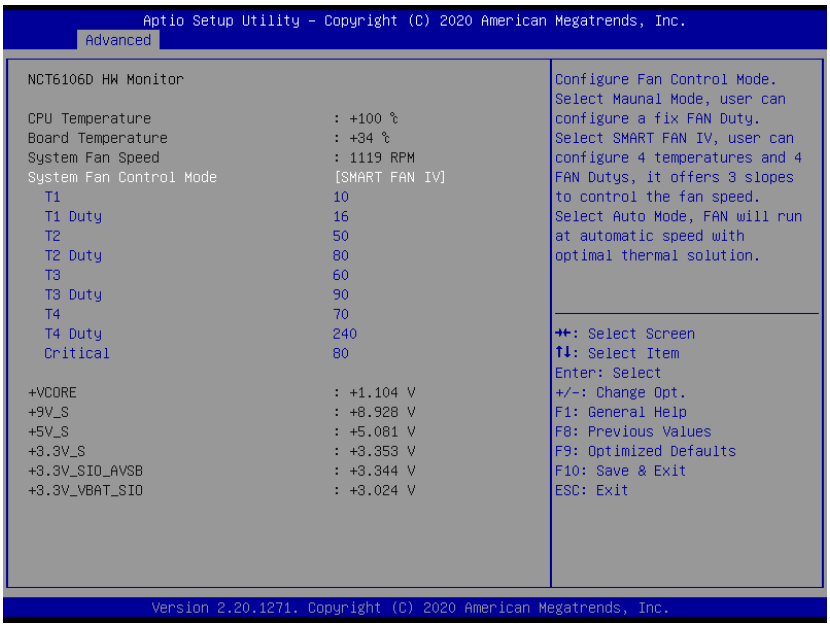
Enables/disables I211 LAN2.

LAN #3 (Intel I211AT)

Enables/disables I211 LAN3.

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B.2.8 NCT6106D HW Monitor



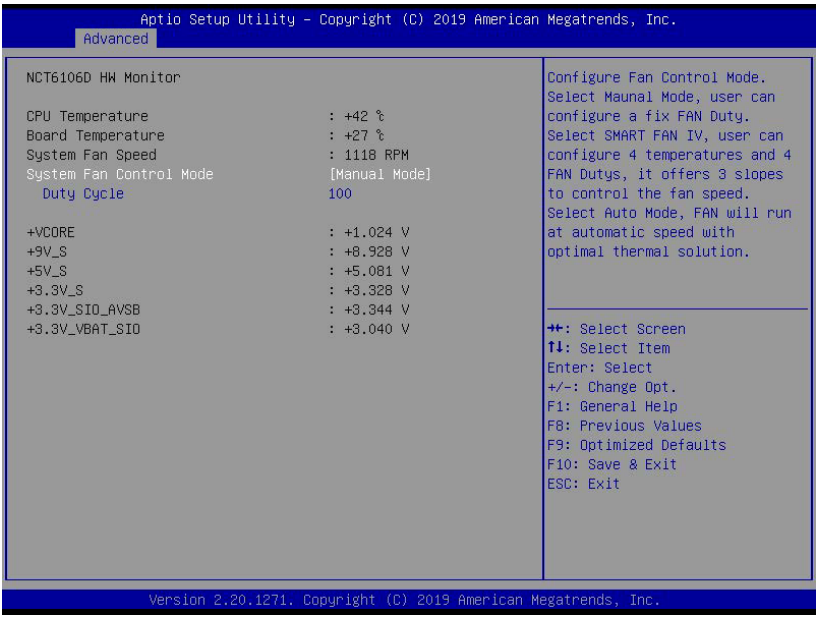
Displays CPU/Board Temperatures, System fan speeds, and various Voltages.

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System Fan Control Mode

Configures fan control mode from among Manual Mode, Auto Mode, and SMART FAN IV.

Manual Mode

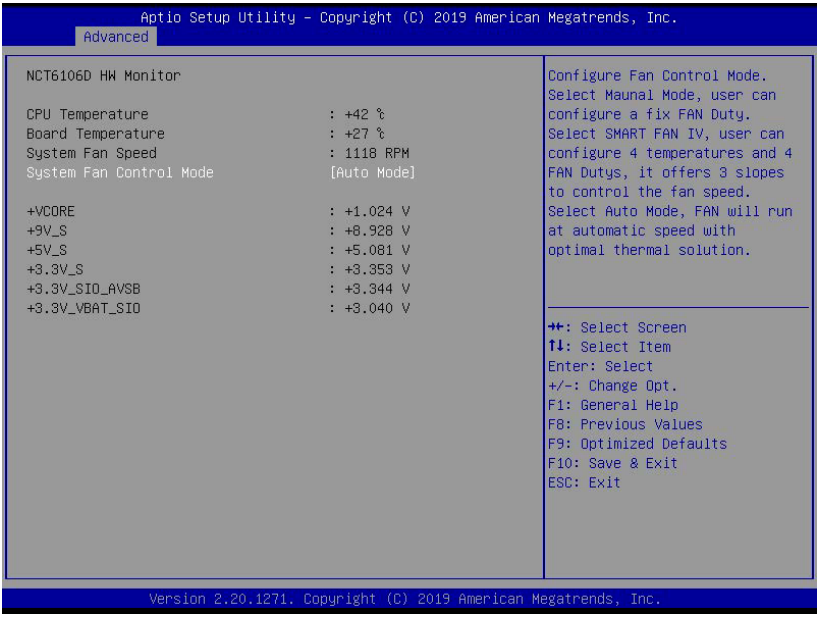


Allows configuration of a set fan duty cycle.

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Auto Mode

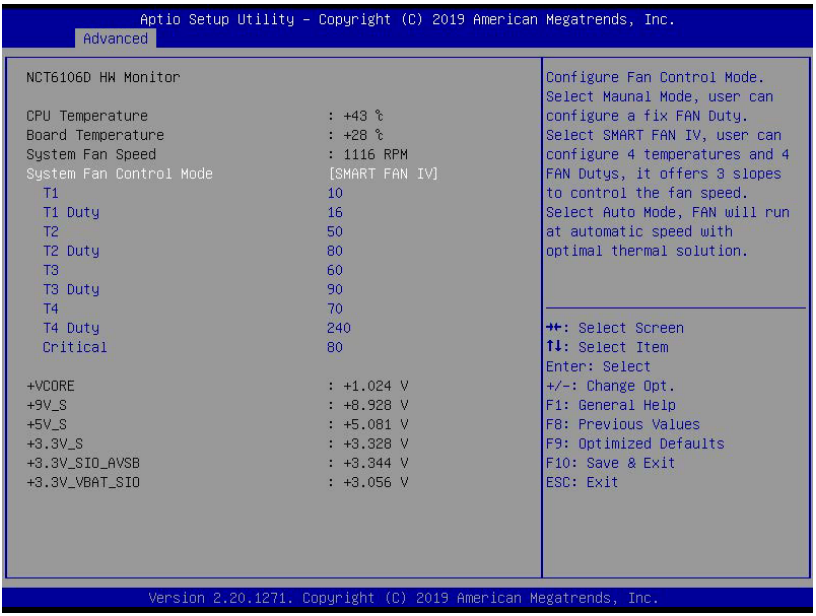
Fan runs at automatic speed for optimal thermal solution.



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SMART FAN IV

Four temperatures and four fan duty cycles, with three available fan speed presets, can be user-configured.



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B.2.9 BIOS Watchdog Timer

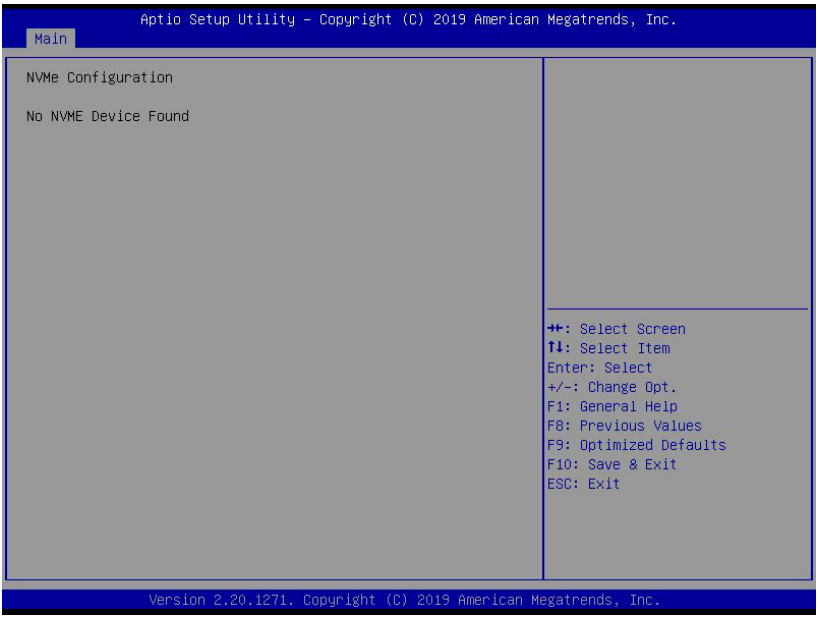


BIOS POST Watchdog

Disable disables WatchDog Timer, Second Mode enables Watchdog Timer in second mode, Minute Mode enables Watchdog Timer in minute mode.

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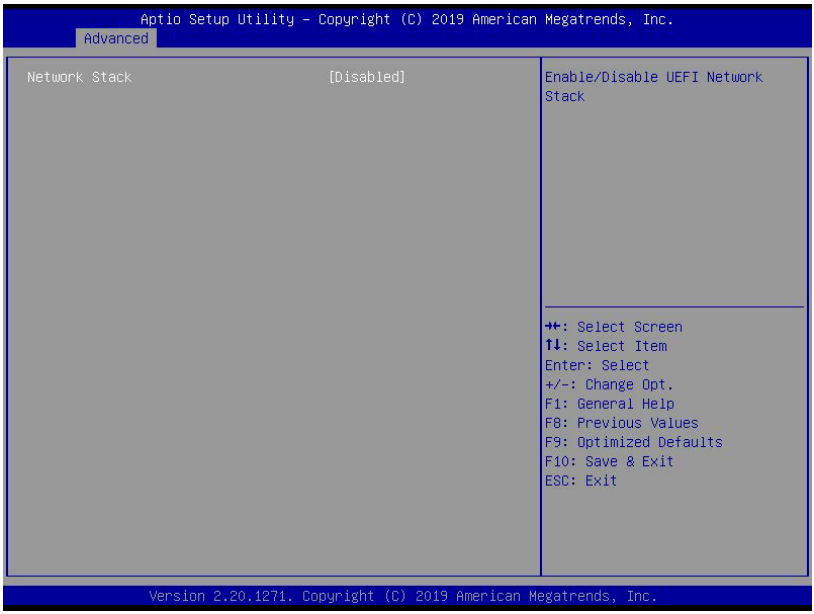
B.2.10 NVME Configuration



Displays NVMe device status.

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B.2.11 Network Stack Configuration



Network Stack

Enables/disables UEFI Network Stack.

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B.3 Chipset



WARNING:

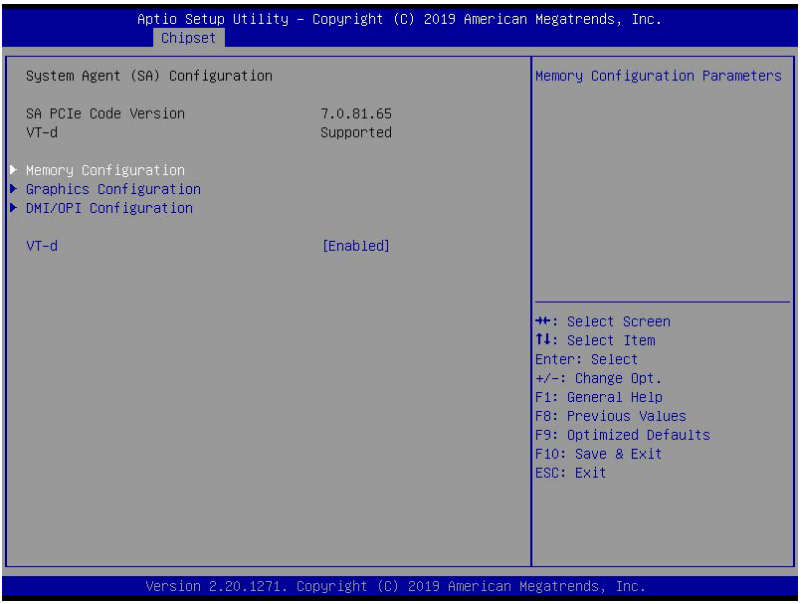
Setting incorrect or conflicting values in Chipset BIOS Setup may cause system malfunction.

Above 4G Decoding

Enables/disables 64bit-capable devices to be decoded in Above 4G Address Space (only when system supports 64-bit PCI Decoding).

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B.3.1 System Agent (SA) Configuration

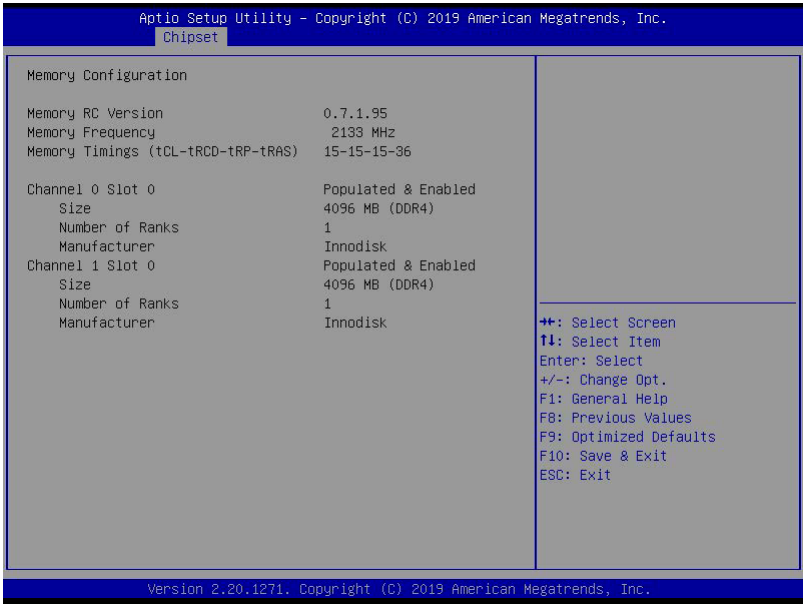


System Agent (SA) Configuration

Displays and configures VT-d capability and provides settings for Memory, Graphics, and DMI/OPI configuration.

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B.3.1.1 Memory Configuration

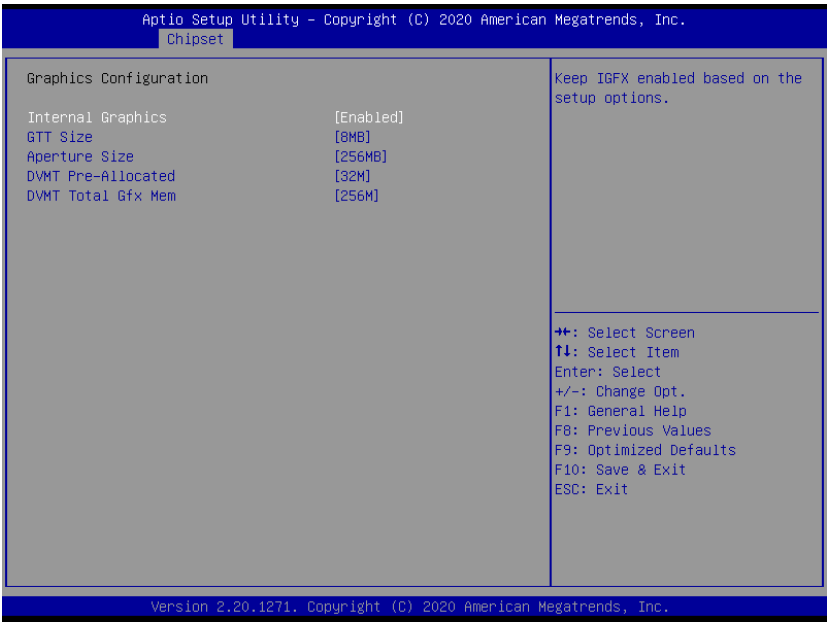


Memory Configuration

Displays memory speed, size, maker, and configuration.

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B.3.1.2 Graphics Configuration



Internal Graphics

Keeps IGFX enabled based on Setup options.

GTT Size

Selects GTT Size.

Aperture Size

Selects Aperture Size.

DVMT Pre-Allocated

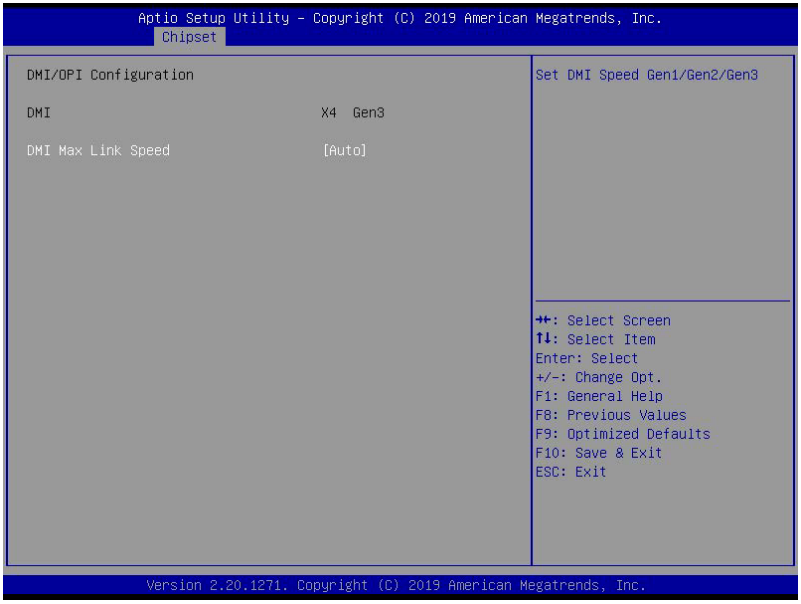
Selects DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.

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DVMT Total Gfx Mem

Selects DVMT5.0 Total Graphic Memory size used by Internal Graphics Device.

B.3.1.3 DMI/OPI Configuration



DMI/OPI Configuration

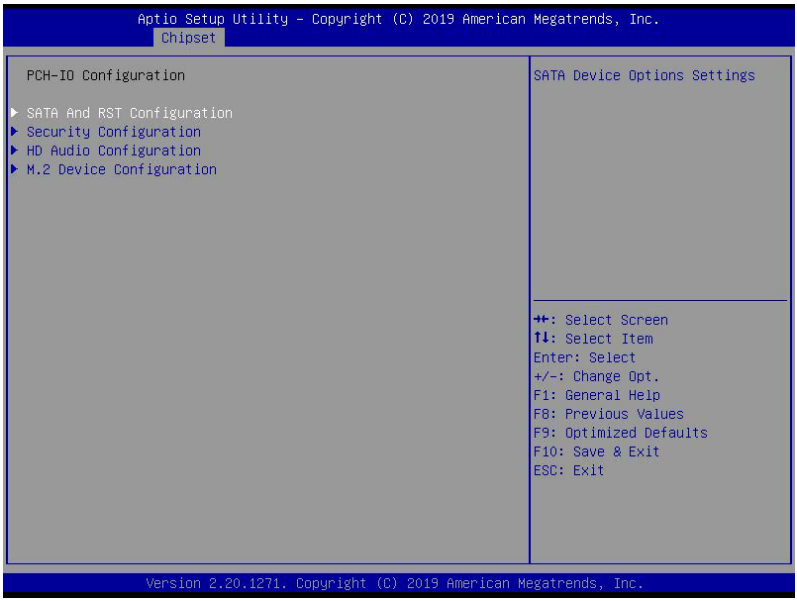
Displays DMI link speed and width.

DMI Max Link Speed

Sets DMI Speed from among Gen1/Gen2/Gen3.

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B.3.2 PCH-IO Configuration

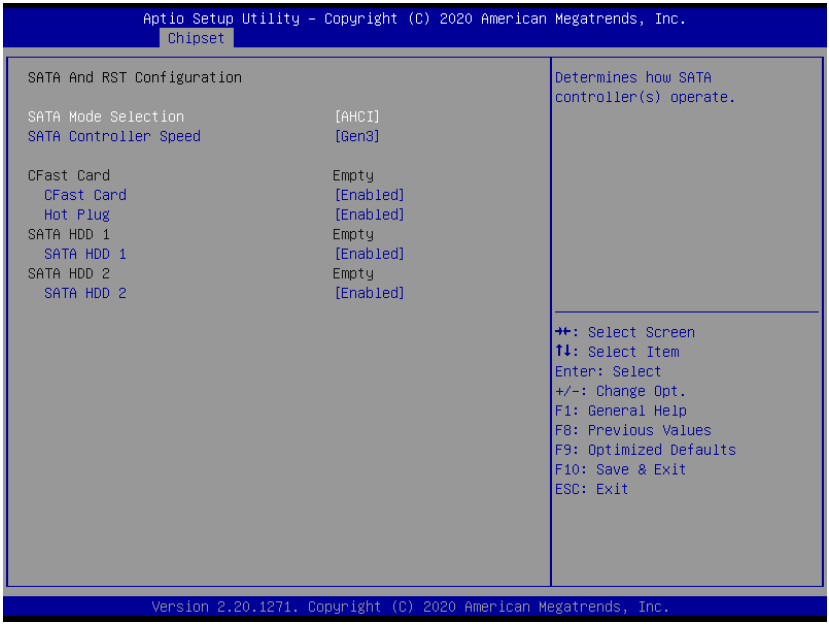


PCH-IO Configuration

Configures SATA, Security, and HD Audio.

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B.3.2.1 SATA And RST Configuration



SATA Mode Selection

Determines how SATA controller(s) operate.

SATA Controller Speed

Sets maximum speed the SATA controller can support.

CFast Card

Enables/disables CFast Card.

Hot Plug

Designates the port as Hot Pluggable.

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SATA HDD 1

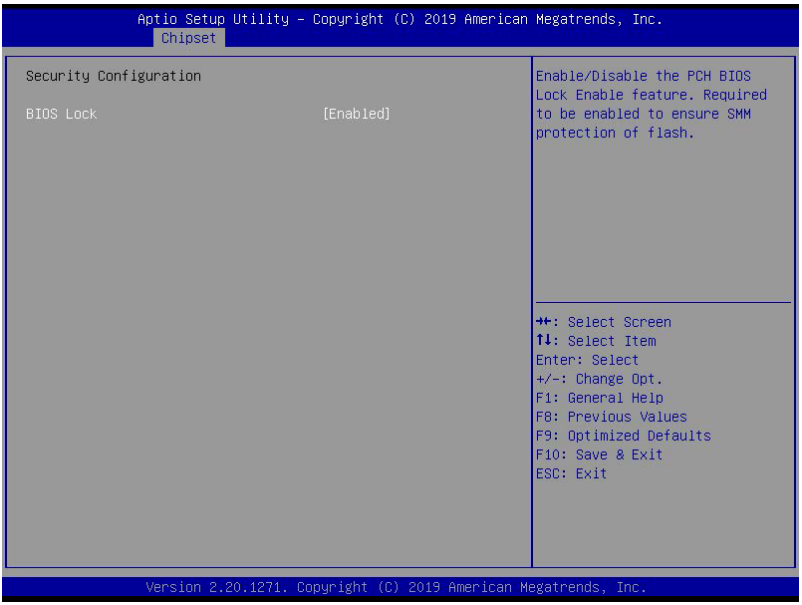
Enables/disables SATA HDD 1.

SATA HDD 2

Enables/disables SATA HDD 2.

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B.3.2.2 Security Configuration

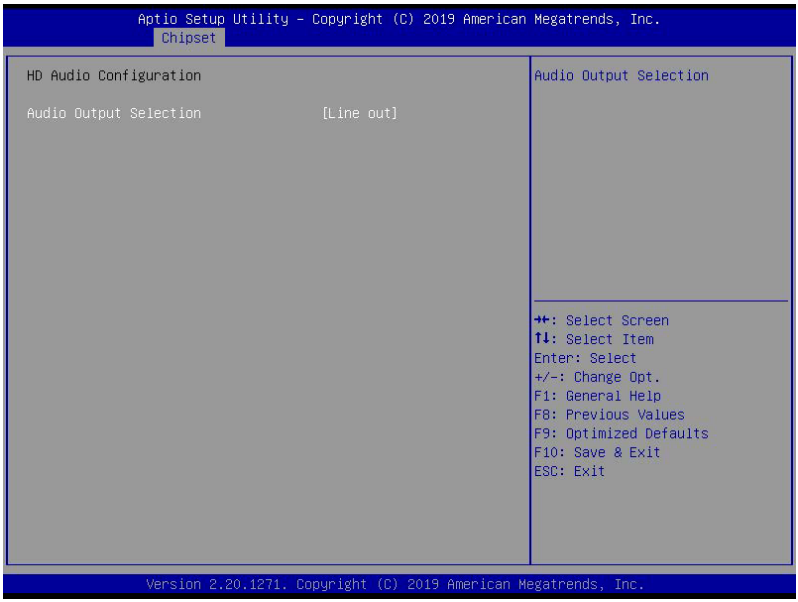


BIOS Lock

Enables/disables PCH BIOS Lock Enable. Required to be enabled to ensure SMM flash protection.

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B.3.2.3 HD Audio Configuration

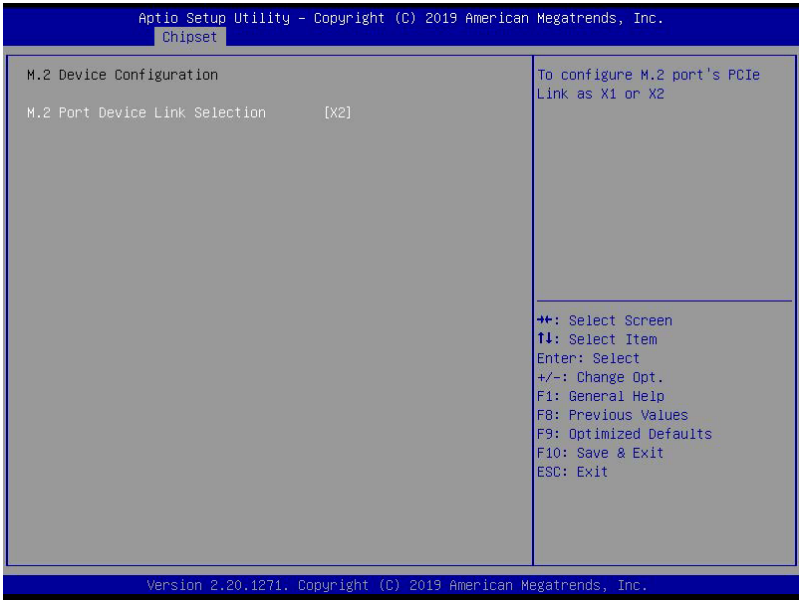


Audio Output Selection

Selects Audio Output.

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B.3.2.4 M.2 Device Configuration

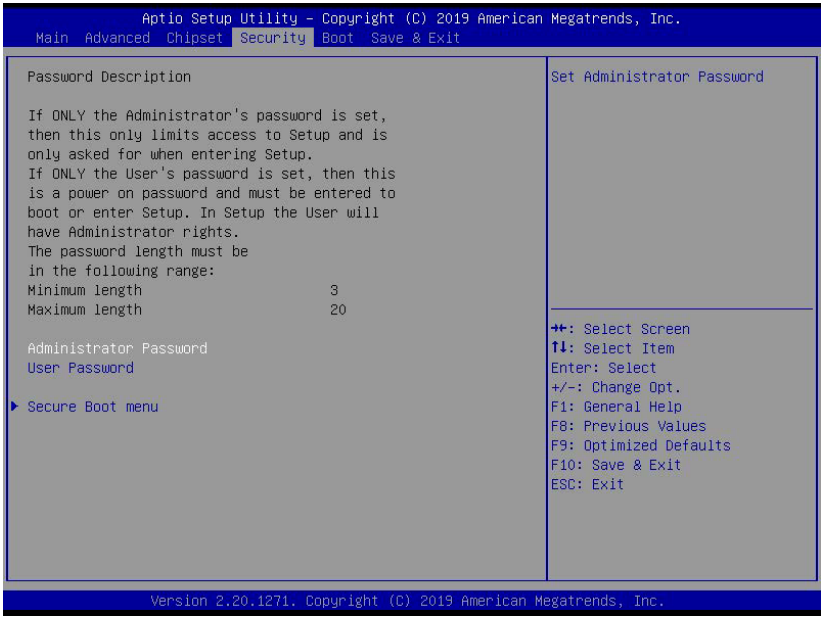


M.2 Port Device Link Selection

Configures M.2 port PCIe Link as X1 or X2.

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B.4 Security



If only the Administrator password is set, access is 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.

Administrator Password

Sets Administrator Password.

User Password

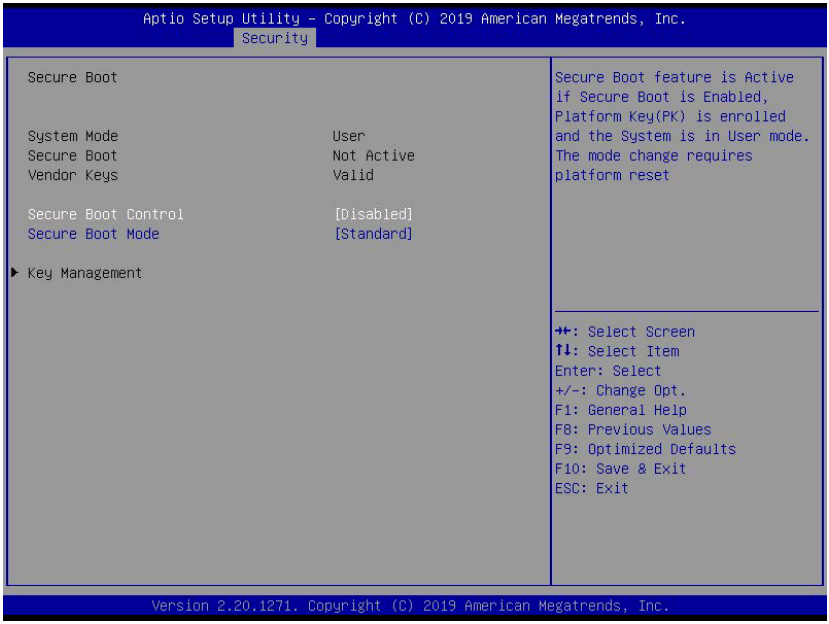
Sets User Password.

Secure Boot Menu

Configures Secure Boot.

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B.4.1 Secure Boot Menu



Secure Boot Control

Active if Secure Boot is Enabled, Platform Key (PK) is enrolled and the System is in User mode. Mode change requires platform reset.

Secure Boot Mode

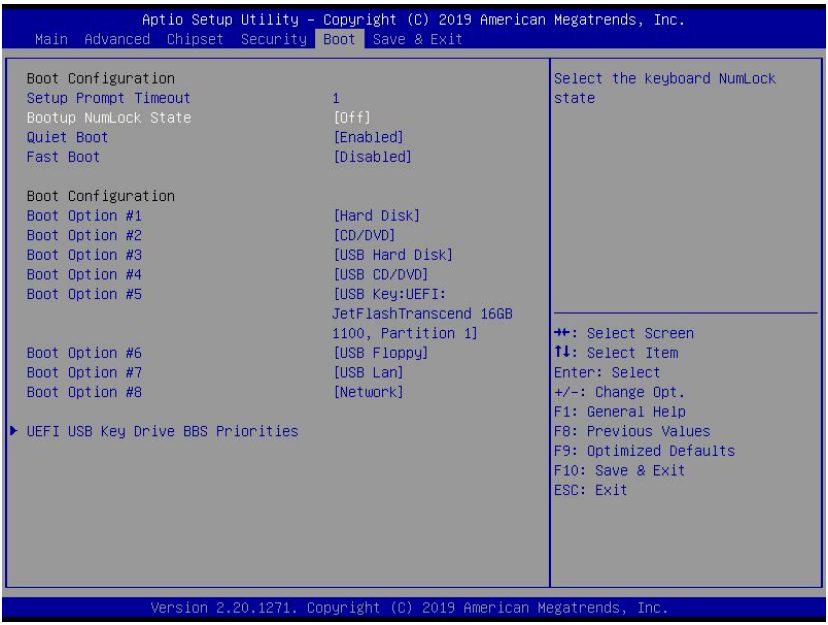
Selects from Standard or Custom. In Custom, Secure Boot Policy variables can be configured by a physically present user without full authentication.

Key Management

Enables expert users to modify Secure Boot Policy variables without full authentication.

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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.

Boot Configuration

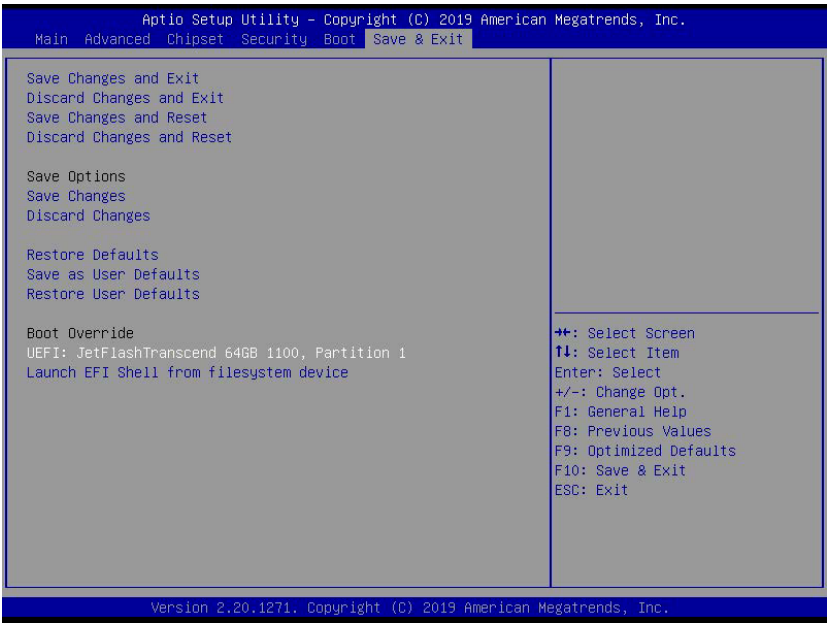
Specifies the priority of boot devices, all of which are detected during POST and displayed. Target Boot Option # and click to select the desired device.

UEFI USB Hard Drive Disk Drives BBS Priorities

Specifies Boot Device Priority sequence from available UEFI USB Drives.

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B.6 Save & Exit



Save Changes and Exit

Exits system setup after saving the changes.

Discard Changes and Exit

Exits system setup without saving any changes.

Save Changes and Reset

Resets the system setup after saving changes.

Discard Changes and Reset

Resets system setup without saving any changes.

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Save Changes

Saves Changes so far to any of the setup options.

Discard Changes

Discards Changes so far to any of the setup options.

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

Saves all changes so far 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.

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Appendix C Watchdog Timer (WDT) Function Library

This appendix describes use of the watchdog timer (WDT) function library for the MVP-5100 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/ExpandableFanlessEmbeddedComputers/MVP-5100_Series

To use the WDT function library for the MVP-5100, 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.

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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()
```


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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.

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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");
```

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```
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);
```

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```
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 (incl. source code) can be downloaded from http://www.adlinktech.com.

To use the DI/O function library for MVP-5100 series, include the header file awl.h and linkage library awl.lib in the C++ project. DI/O functions are as follows.

AwlDioGetValue

Reads the digital logic state of a digital input line.

Syntax

C/C++

```
int __stdcall AwlDioGetValue(int Index)
```

Parameter(s)

Index

Indexes the digital logic state of MVP-5100 digital input channels 1 to 8 (bit 0 to 7)

Return codes

```
0: Operation Success
-1: Operation Failed
```

AwlDioSetValue

Sets the digital logic state of the digital output line.

AwlDioGetValue

Reads the digital logic state of a digital input line.

Syntax

C/C++

```
int __stdcall AwlDioGetValue(int Index , int
     Value)
```

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Parameter(s)

Index

Indexes the digital logic state of MVP-5100 digital input channels 1 to 8 (bit 0 to 7)

Value

Sets the digital logic state of MVP-5100 digital output channels 1 to 8 (bit 0 to 7) to 0 or 1.

Return codes

```
0: Operation Success
-1: Operation Failed
```

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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 adapter.
- 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.

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- 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



BURN HAZARD

Hot surface! Do not touch! Touching this surface could result in bodily injury. To reduce risk, allow the surface to cool before touching.

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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 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.

- *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*** ***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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