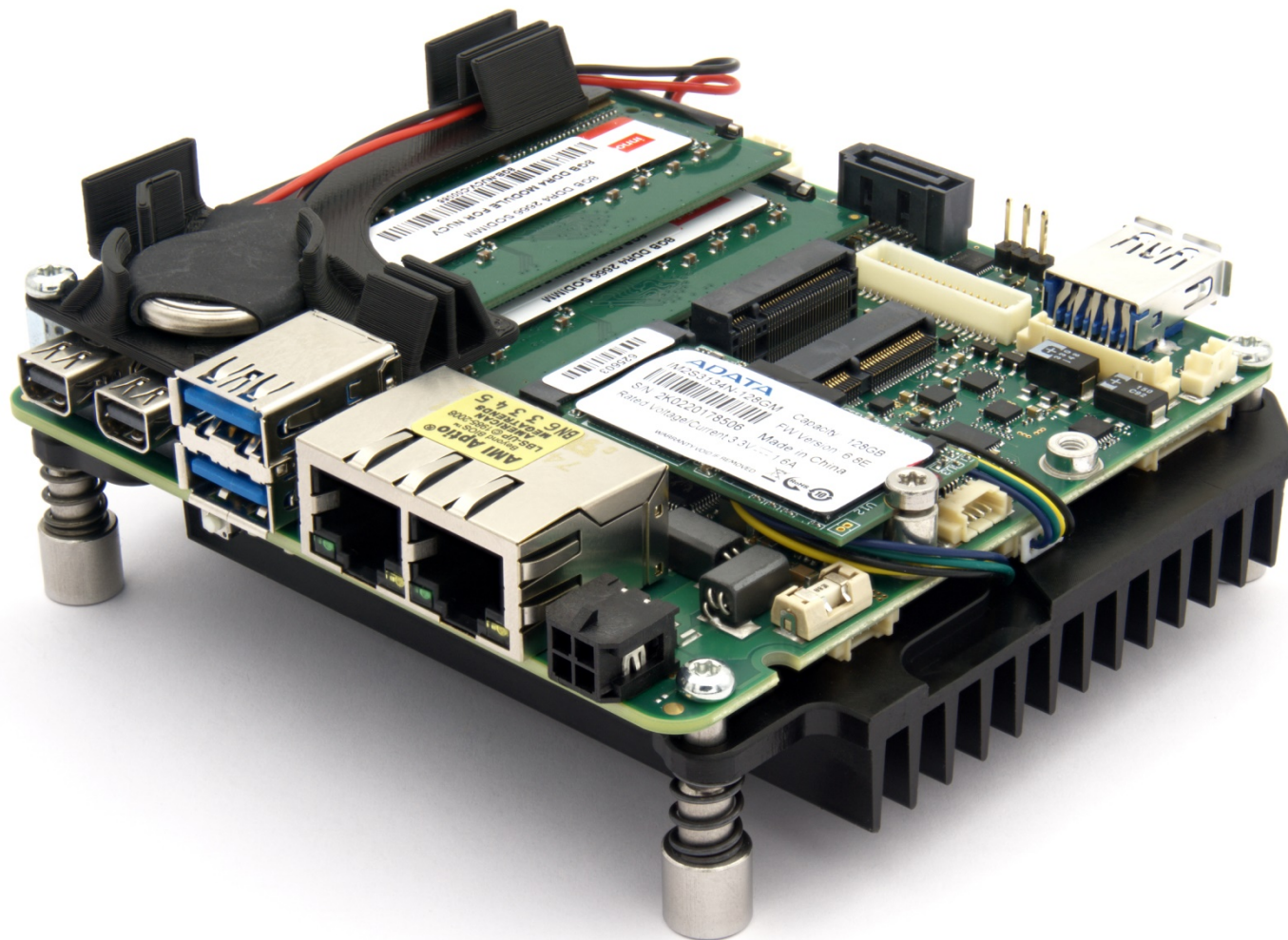


PROFIVE® NUCV|NUCR – Hardware Reference Manual – P – Rev. 3



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03/2021 Revision 3.4

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This product cannot be used as a stand-alone product!

Therefore it has to be integrated together with other products like power supplies, mass storage devices (i. e. hard disks), etc. to be functional.

To meet FCC and/or CE requirements every component as well as the combination of all components has to be validated against all standards required for the end product.

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It is on the customer's sole responsibility to assure that this end-product meets all required standards.

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This product will be free from defects in workmanship and material under normal and proper use for the period of time defined in our General Terms of Business, effective the date of the original shipment from E.E.P.D. GmbH.

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Reshipment

If you return the product to E.E.P.D. GmbH please remove all connections and peripheral equipment.

Protect the unit through a suitable packaging, preferably use the original packaging.

Packaging

The product is in a protective package to avoid damage during transport.
This protective package should be environmental friendly recycled after use.

Disposal of Device



At the end of the lifetime please dispose and/or recycle the components of the device accordingly.

Technical Support

For technical information about hardware and software please contact:
support@eepd.de

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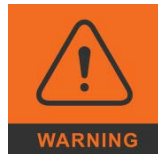
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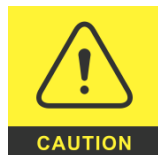
Used Symbols



The red danger sign warns you when a wrong or missing action dramatically endangers your life or health. The used components as well as the peripheral components could be destroyed.



The orange warning sign warns you when a wrong or missing action could seriously harm your health or destroy the used components.



The yellow caution sign warns you when a wrong or missing action could damage the component.



The yellow ESD sign draws your attention that static sensitive parts of the component could be destroyed. Unpack shielded components only with ESD protections like an ESD wrist strap.



The information sign gives you more information and advice for optimal use of this product. For example it helps you to purchase necessary or optional accessories.

1 Product Description

In the first chapter you will get a glance of all the integrated features. For further information and a brief description of all possible changes and extensions please refer to the corresponding chapter.

1.1 Feature Overview

Power Supply

Designed for min. 8 V to max. 32 V (DC) single power supply, 8 A fused
Four pin power connector with ignition input

Processor Support

AMD V1000 processor series

V1202B / 2C / 4T / 2.3 GHz – 3.2 GHz / 12 – 25 W (OEM option only)

V1605B / 4C / 8T / 2.0 GHz – 3.6 GHz / 12 – 25 W

V1756B / 4C / 8T / 3.25 GHz – 3.6 GHz / 35 – 54 W (max.35W TDP supported by design | OEM option only)

V1807B / 4C / 8T / 3.35 GHz – 3.8 GHz / 35 – 54 W (max.35W TDP supported by design)

V1404B / 4C / 8T / 2.8 GHz – 3.6 GHz / 12 – 25 W, extended Temp -40 - +85°C

AMD R1000 processor series

R1102G / 2C / 2T / 1.2 GHz – 2.6 GHz / 6 W

R1305G / 2C / 4T / 1.5 GHz – 2.8 GHz / 8 - 10 W

R1505G / 2C / 4T / 2.4 GHz – 3.3 GHz / 12 – 25 W

R1606G / 2C / 4T / 2.6 GHz – 3.5 GHz / 12 – 25 W

Ethernet Controller

2 Intel® i210 Gigabit Ethernet PCI Express® controllers with IEEE1588.

RAM Support

AMD V1000 processor series: Max. 32 GB dual channel DDR4 SODIMM, up to 3200 MT/s
 AMD R1000 processor series(except R1102G): Max. 32 GB dual channel DDR4 SODIMM, up to 2400 MT/s.
 AMD R1000 R1102G processor Max. 16 GB single channel DDR4 SODIMM, up to 2400 MT/s.

Display

AMD V1000 processor series based, boards only.
 1 LVDS dual channel 18/24-bit, up to 165 Mpx/s in dual channel mode, 85 Mpx/s in single channel mode, up to full HD

AMD R1000 processor series LVDS support for ODM only.

2 Mini-DP++ connectors, up to 4096 x 2160@ 60 Hz

USB Support

AMD V1000: 6 USB ports from the SoC

AMD R1000: 5 USB ports from the SoC

1 Dual-USB 3.1 Gen2 (10 Gb/s), Type A at the front side, support for USB 2.0 and 3.0

1 Single-USB 3.1 Gen2 (10 Gb/s), Type A at the rear side, support for USB 2.0 and 3.0, ready for USM-Module

1 USB 2.0 at the M.2 WWAN Mini card socket

1 USB 2.0 at the M.2 WLAN / BT Mini card socket

AMD V1000 processor series based boards only

1 internal USB connector, support for USB 2.0 and 3.0

Storage Support

1 MicroSD card socket at the rear side

1 M.2 Mini card socket Key M, 22 mm x 42 mm (for SSD only)

1 SATA (6G) with separate power connector

Expansion

2 M.2 Mini card sockets

1 Key E, 22 mm x 30 mm for WLAN / BT

1 Key B, 22 mm x 42 mm for WWAN onboard SIM card socket

Power supply for the M.2 socket (Key B) is switchable between 3.3V and 1.5V.

Serial Ports

1 RS-232/485(FDX|HDX Windows 10 only) port (8 wires) on internal Molex connector

1 RS-232 port (4 wires) on internal Molex connector

Audio

HDA Audio Codec; MIC IN, stereo HP OUT, stereo Line IN, stereo Line OUT

Extended Features

Onboard μ -Controller-IC for:

Input voltage level detection

Power-up sequencing and timing
System reset management
Temperature monitoring
Watchdog
Power button input
Reset button input
Feature connector (GPIOs / Power LED / Status LED)
Power LED onboard
Status LED onboard
LVDS panel backlight
RTC battery connector

1.2 Environmental Specification

Max. Operating Temperature

0 °C to +60 °C ambient, when adequate heatsink/cooling is provided.

NUCVD|NUCVG with V1807: 0 °C to +50 °C ambient

NUCVE with V1404B only: -40 °C to +85 °C ambient, when adequate heatsink/cooling/memory/SSD and all other accessories are provided to support the extended temperature range.



Other operating temperature ranges upon request.

Max. Storage Temperature

-40 °C to +85 °C

Max. rel. Humidity for all versions

95 % @ 40 °C non-condensing

2 System Overview

This chapter describes the main hardware components of the NUCVX board.

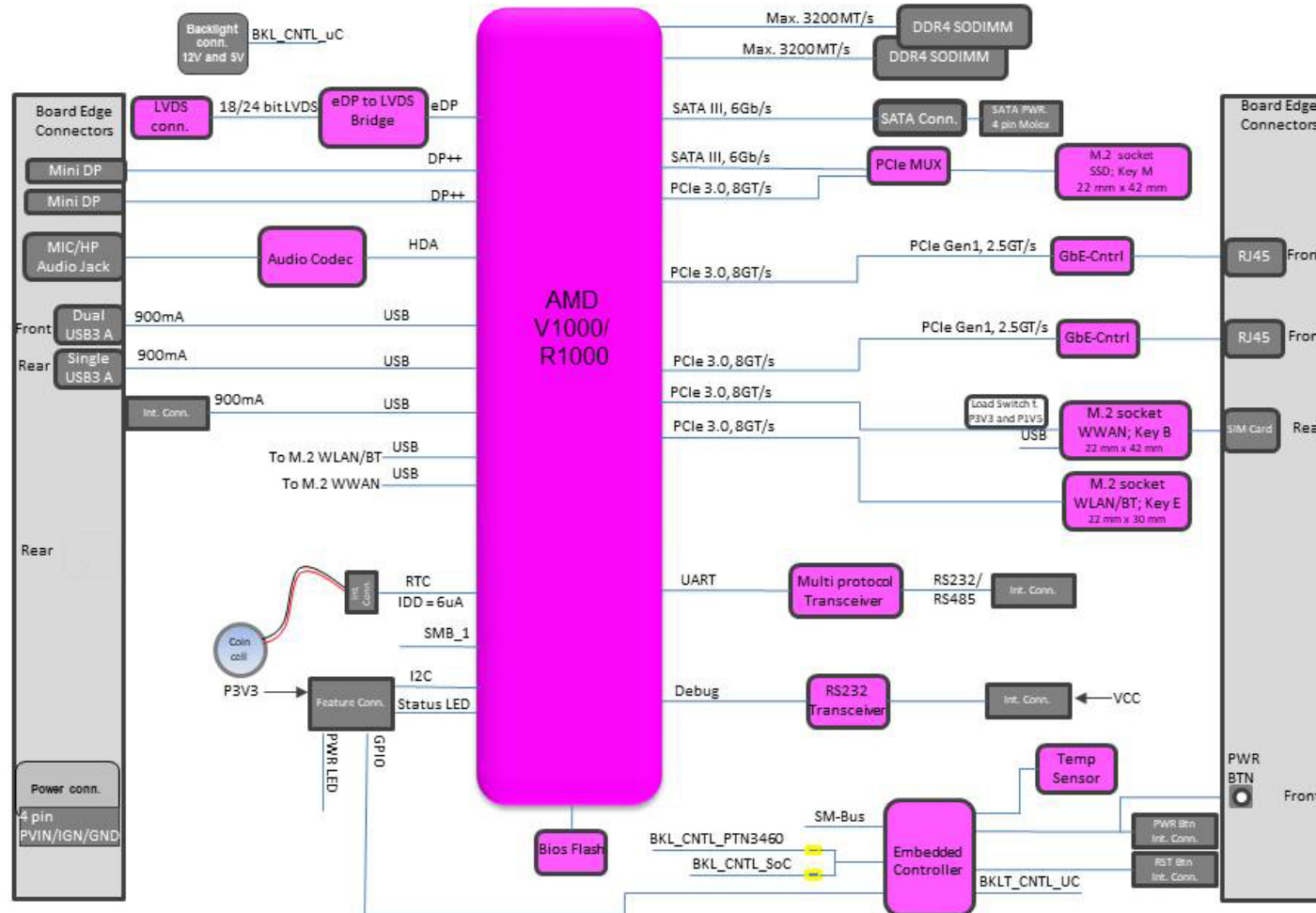


Fig. 1: System Overview

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3 Assembly

The board must be mounted in a stable case. The mechanical mounting points according to chapter 3.1 must be used.

The available sockets and connector for system build-up are specified in chapter 4.

E.E.P.D. recommends M3 Torx screws with a screw locking coating and a maximum tightening torque of 0.5 Nm.

Top View

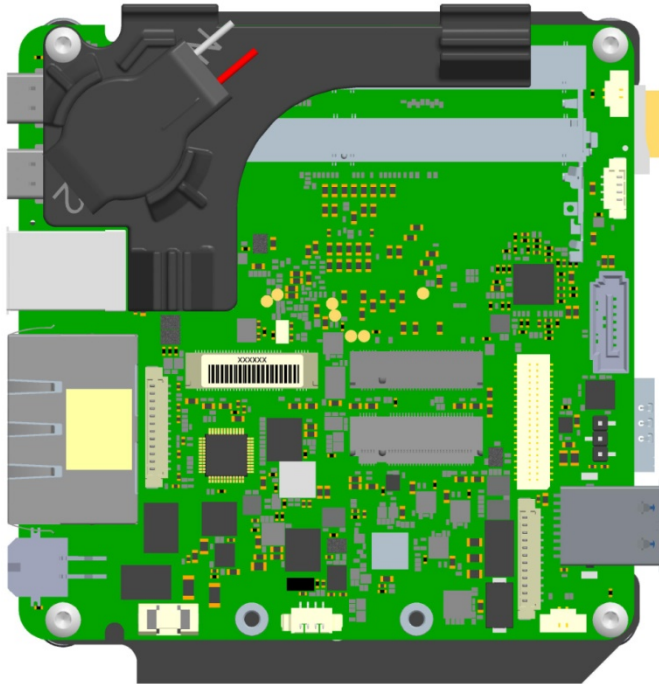


Fig. 2: Top View

Bottom View

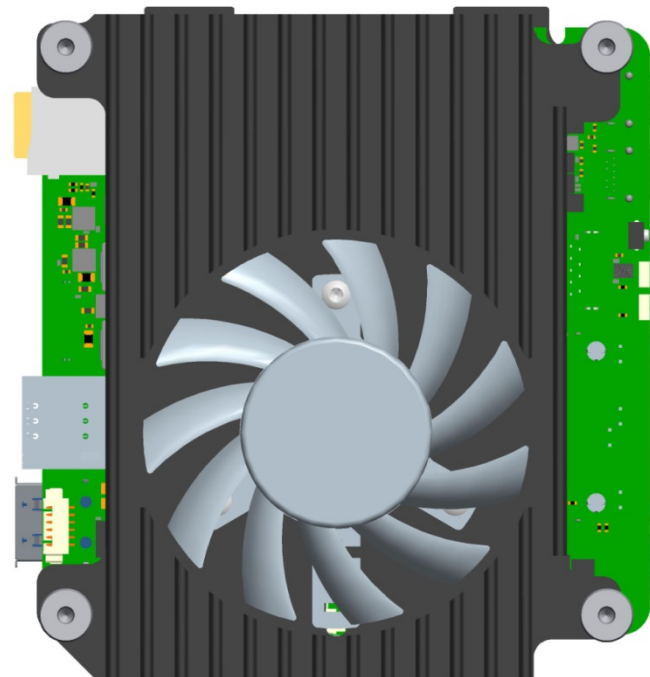


Fig. 3: Bottom View

Front View

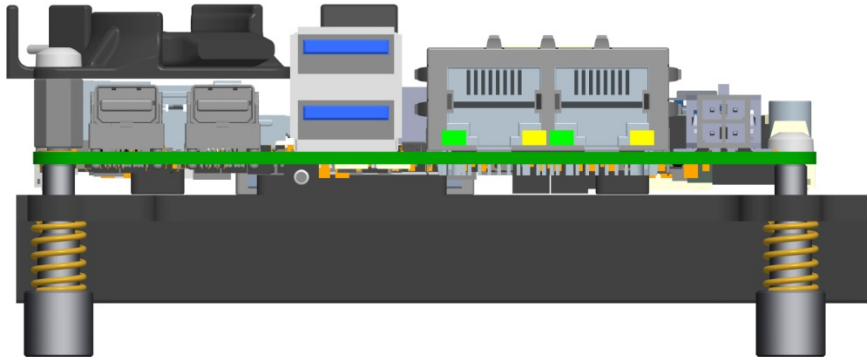


Fig. 4: Front View

Side View

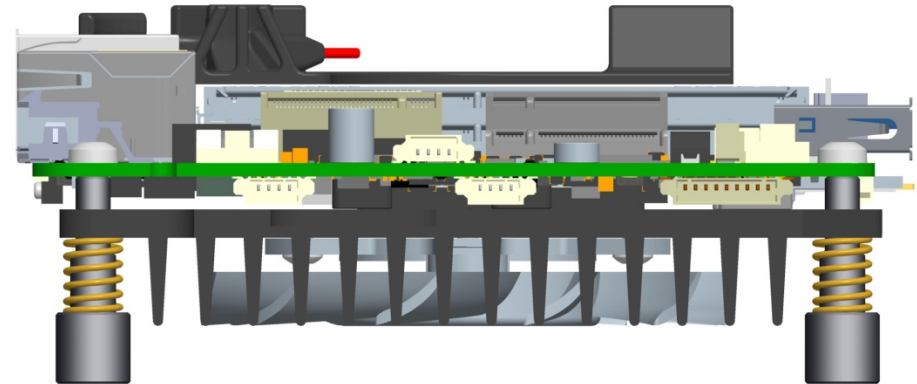


Fig. 6: Side View

Rear View

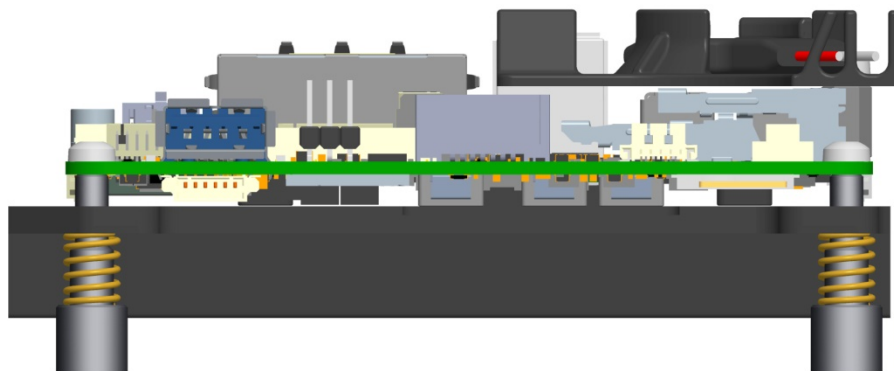


Fig. 5: Rear View

3.1 Mechanical Mounting

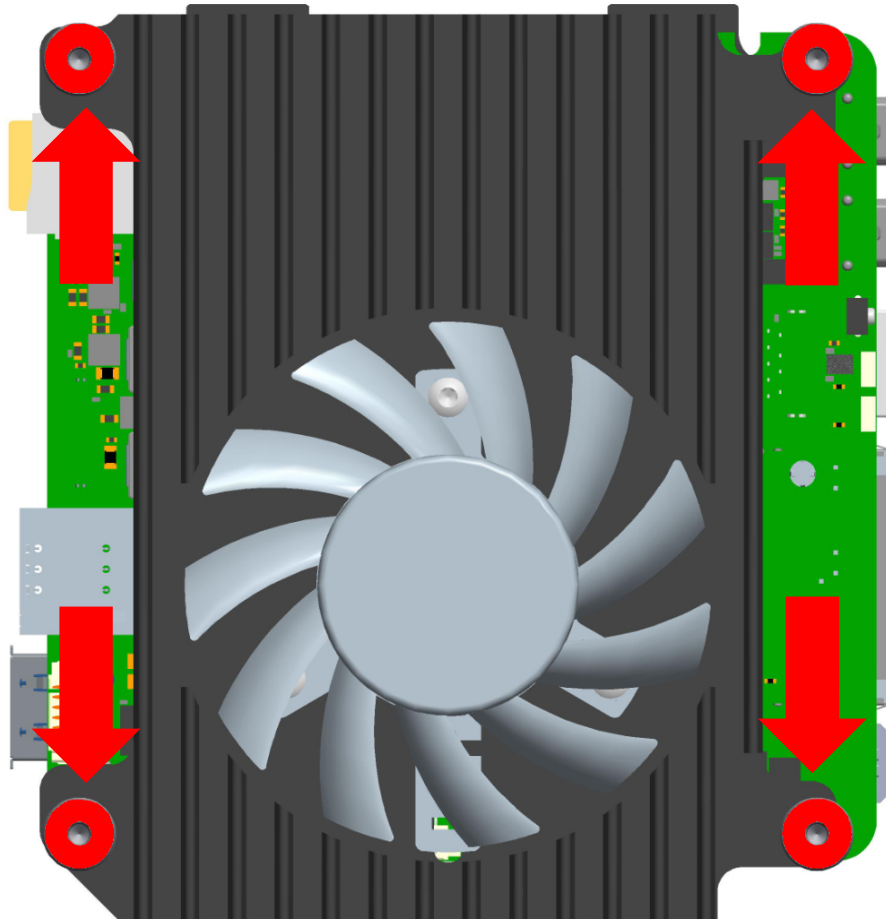


Fig. 7: Mechanical Mounting



Please use the 4 prepared mounting points (red outline) to fasten the base board in order to prevent short circuits.

Use 15.24 mm (0.6 inches) distance bolts for a stable mounting of the board.



Do not disassemble the cooling solution, this will void the warranty.

3.2 Dimensions of the board

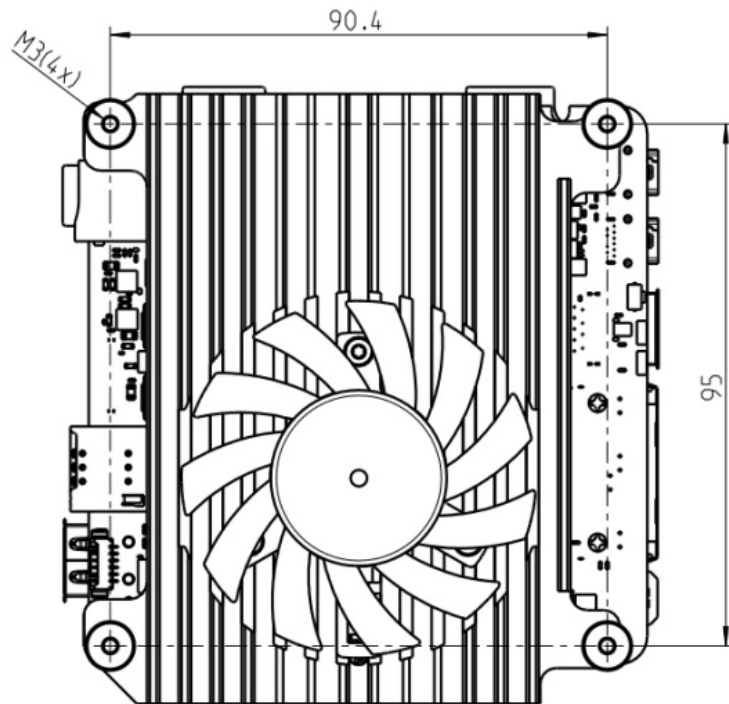


Fig. 8: Dimensions Bottom View

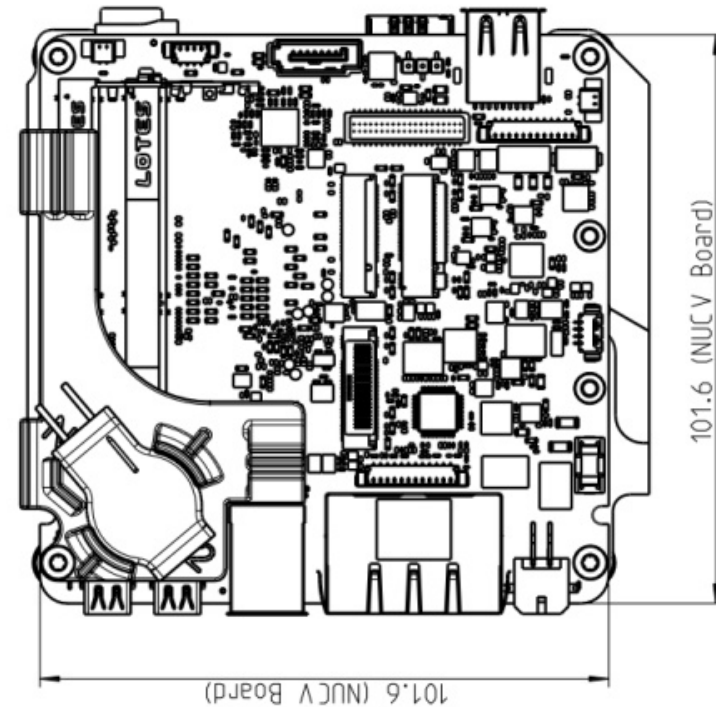


Fig. 9: Dimensions Top View

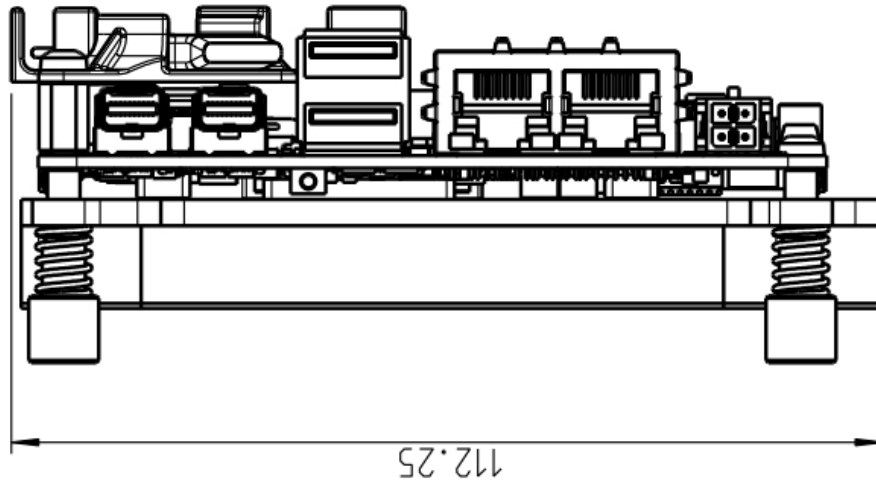


Fig. 10: Dimensions Front View

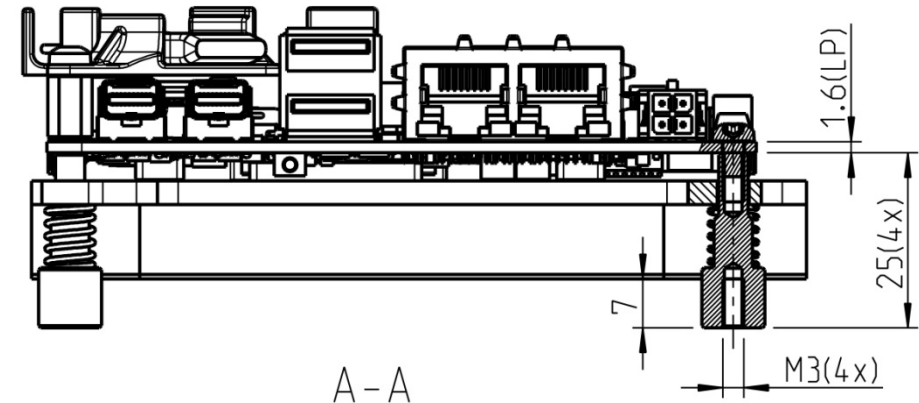


Fig. 12: Dimensions Threaded Bolts

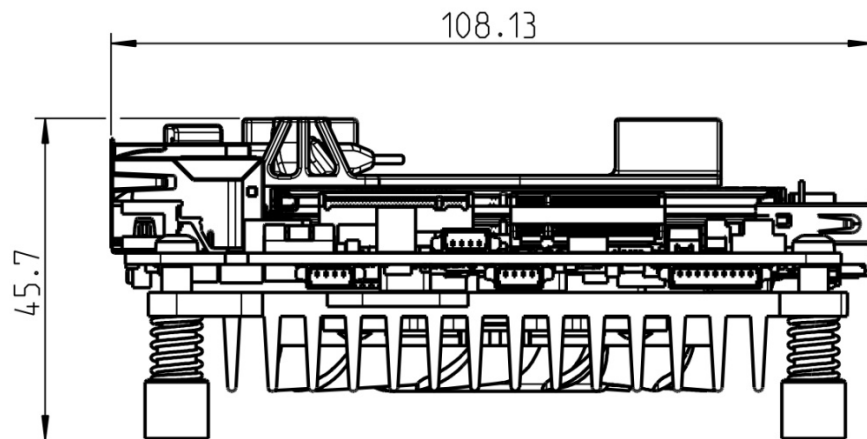


Fig. 11: Dimensions Side View

4 Feature Details

The following schedule contains all the necessary information to connect the board to your peripheral equipment.

On the left side of the page you will see the position on the board (red mark) and on the right side a magnified image of the explained item.

The explanation provides general information, electrical specifications and a pin assignment table.

All voltages are DC:

VCC	5 V
P3V3	3.3 V
P12V_DISPLAY	12 V

4.1 Mini-DP Connectors

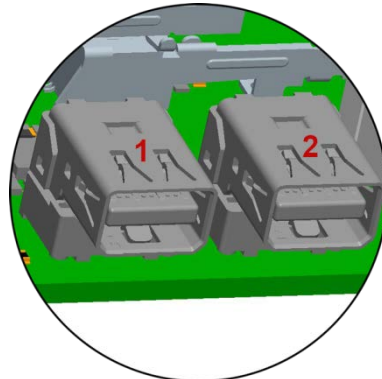
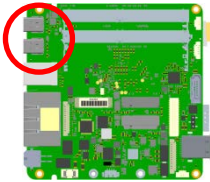


Fig. 13: Mini-DP Connector Detail

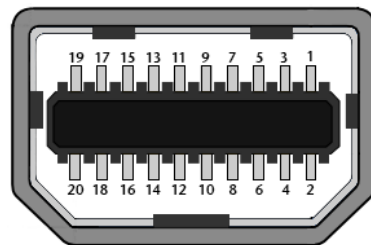


Fig. 14: Mini-DP Connector Schematic



Important Note:

There are two kinds of DisplayPort cables:

Cables for **direct connection** to a MiniDP monitor with **Pin 20** on both ends of the cable **NOT connected**.

Cables for use with **dongles** (e. g. MiniDP to DP, MiniDP to HDMI) with **Pin 20** on both ends of the cable **connected**.

Possible effects if wrong cable is used:

System might not start up properly.

Dongle does not work properly (black display).

4.2 Dual-USB 3.0 Port



USB 3.0 type ports providing 900 mA.

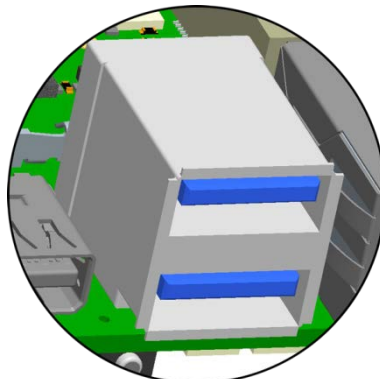
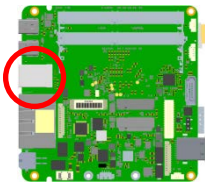


Fig. 15: Dual-USB 3.0 Port Detail

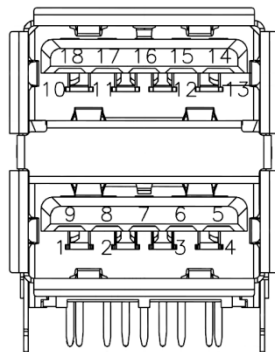


Fig. 16: Dual-USB 3.0 Port Schematic

4.3 Gigabit Ethernet Dual-Port

The Dual-Ethernet socket uses the Intel® Gigabit Ethernet Controller Intel® i210.

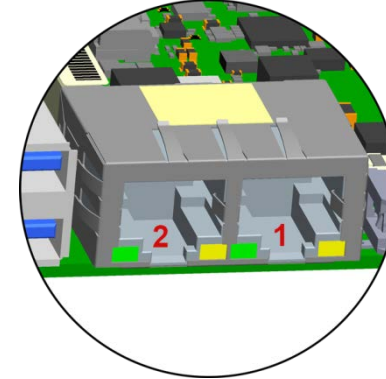
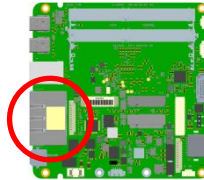


Fig. 17: Ethernet Dual-Port Detail

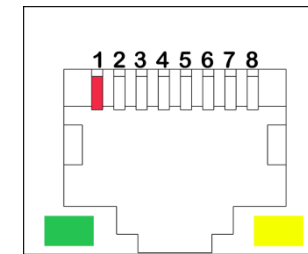


Fig. 18: Ethernet Port Schematic

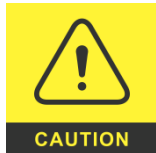
Yellow LED

Speed-LED is on during 1 Gbit transmission and switched off during 10/100 Mbit transmission.

Green LED

Link-/Activity-LED is permanently on to indicate an active connection on the Ethernet port. LED flashes during communication with the Ethernet network.

4.4 Power Connector



For stable operation:

Please ensure a system power supply of min. 60 W.
E.E.P.D. recommends a system power supply of 90 W.

Power source must be capable to respond to fast load changes!

Supply voltage (V_{in}) min. 8 V / max. 32 V

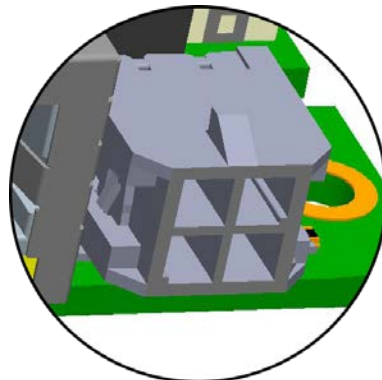
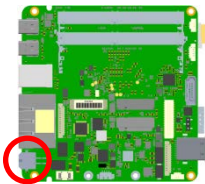


Fig. 19: Power Connector Detail

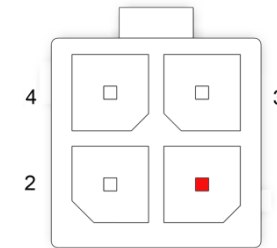


Fig. 20: Power Connector Schematic



Counterpart – plug:

Nexus Series 2300, 3.00 mm Micro MF housing with lock
Ordering number 2300P04xxx

Pin	Signal
1	GND_IN
2	GND_IN
3	PVIN
4	KL_15

Tab. 1: Power Connector

4.5 DDR4 RAM SODIMM Sockets

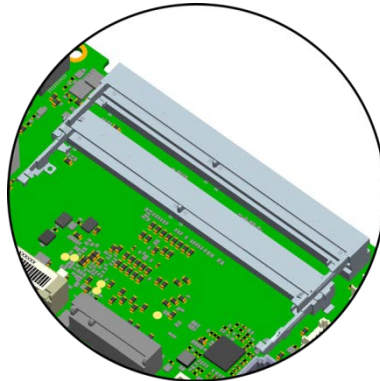
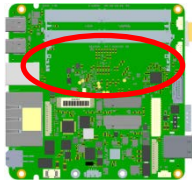


Fig. 21: DDR4 RAM SODIMM Socket Detail



Use only 1.2 V DDR4 SODIMM modules compliant with the DDR4 Standard.

Assembly:

First slide RAM module into the RAM socket.

Then press the module in direction to the board till you hear it snap.

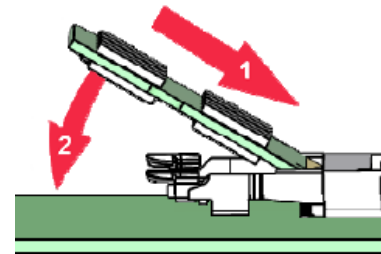


Fig. 22: RAM Assembly

Disassembly:

First press both clamps outwards.

Then the RAM module will set upright automatically.

Remove the card from the socket.

4.6 Audio Connector

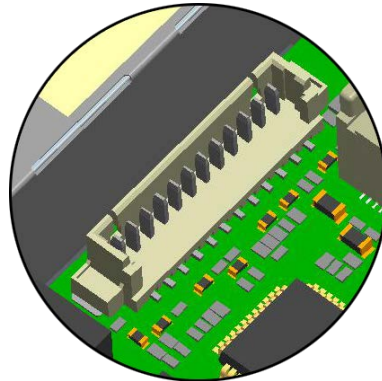
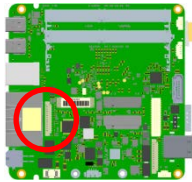


Fig. 23: Molex Audio Connector Detail

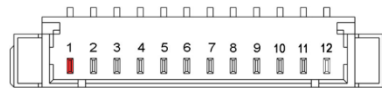


Fig. 24: Molex Audio Connector Schematic



Counterpart – plug:
MOLEX Pico Blade 0510211200

Pin	Signal
1	JD_LINE_IN
2	LINE_IN_L
3	LINE_IN_R
4	GND_AUDIO
5	MIC_IN
6	GND_AUDIO
7	JD_LINE_OUT
8	LINE_OUT_L
9	LINE_OUT_R
10	GND_AUDIO
11	HP_OUT_L
12	HP_OUT_R

Tab. 2: Audio Connector



For optimum audio performance:
Please ensure to use cables provided by E.E.P.D.

4.7 M.2 Sockets

4.7.1 M.2 Socket Key M

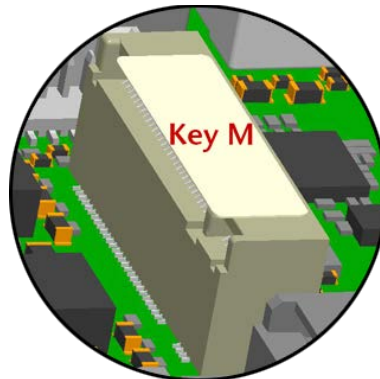
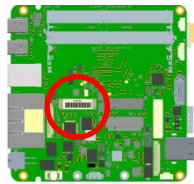


Fig. 25: M.2 Key M Connector Detail

4.7.3 M.2 Socket Key B

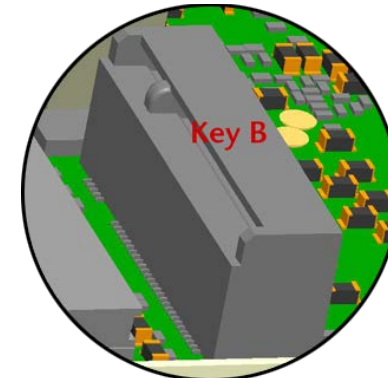
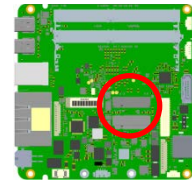


Fig. 27: M.2 Key B Connector Detail

4.7.2 M.2 Socket Key E

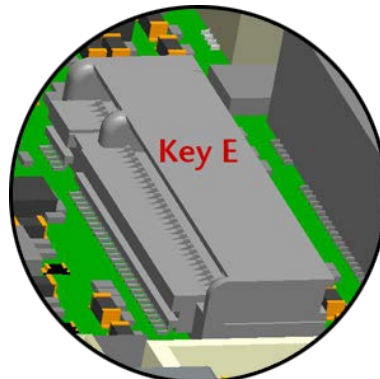
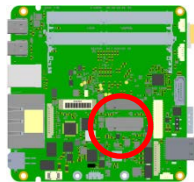


Fig. 26: M.2 Key E Connector Detail

4.8 Rear USB Port



USB 3.0 type port providing 900 mA.

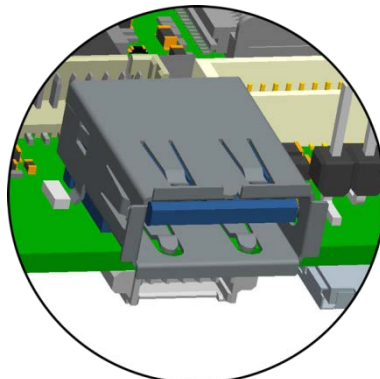
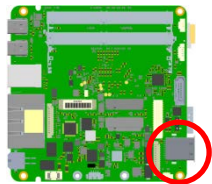


Fig. 28: USB 3.0 Port Detail

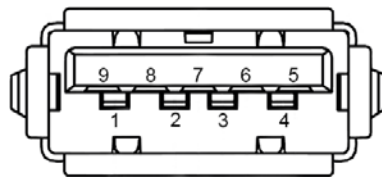


Fig. 29: USB 3.0 Port Schematic

4.9 Battery Connector

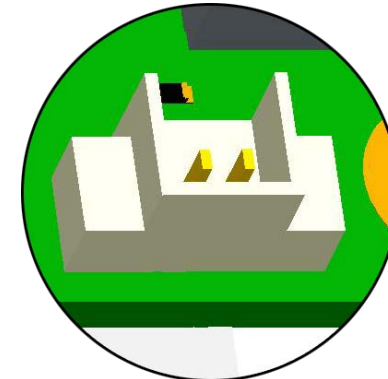
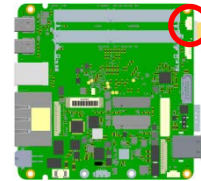


Fig. 30: Battery Connector Detail

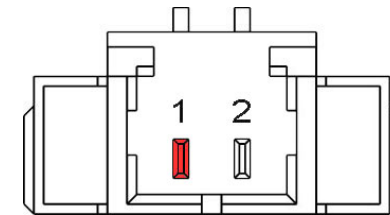


Fig. 31: Battery Connector Schematic



Counterpart – plug:
MOLEX Pico Blade 0510210200

Pin	Signal
1	BATT
2	GND

Tab. 3: Battery Connector

4.10 SATA Data Connector

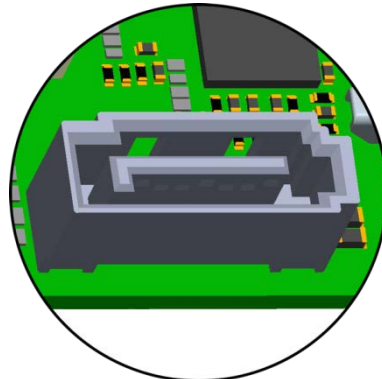
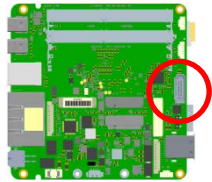


Fig. 32: SATA Data Connector Detail

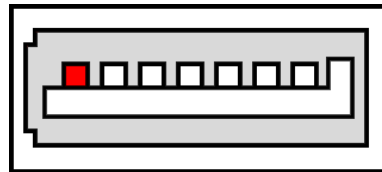


Fig. 33: SATA Data Connector Schematic

4.11 SATA Power Connector

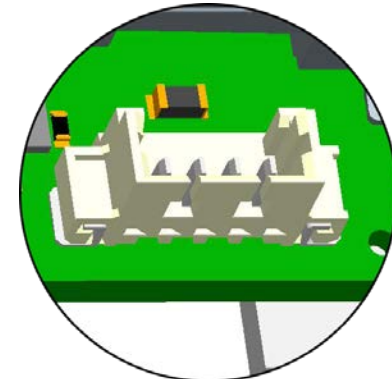
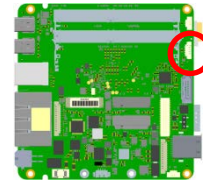


Fig. 34: Molex SATA Power Connector Detail

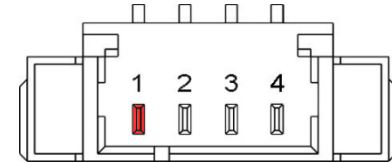


Fig. 35: Molex SATA Power Connector Schematic



Counterpart – plug:
MOLEX Pico Blade 0510210400

Pin	Signal
1	VCC
2	VCC
3	GND
4	GND

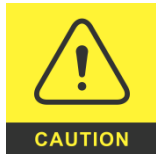
Tab. 4: Molex SATA Power Connector

4.12 LVDS Connector

AMD V1000 processor series based boards only.

AMD R1000 processor series boards: This option is not available for standard boards, only available for ODM.

Interface for controlling TFT- and LC-Displays. For specific panel support, please contact E.E.P.D.



The connector supplies the LVDS data / logic section of your LC-display with 3.3 V or 5 V.

Selection via jumper.

Please assure the correct setting of the LVDS panel power supply before connecting the LC-display to the board.

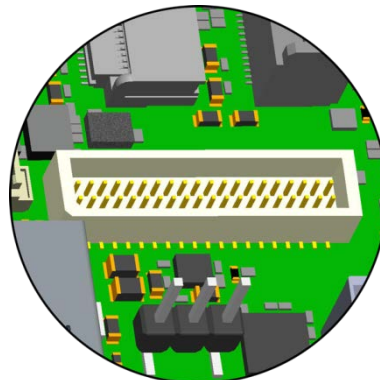
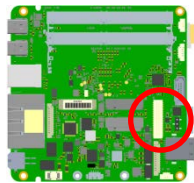


Fig. 36: LVDS Data Connector Detail



Counterpart – plug:
JST SHDR-40V-S-B



Fig. 37: LVDS Data Connector Schematic

4.12.1 Jumpersetting for LVDS Data section of the LC-display

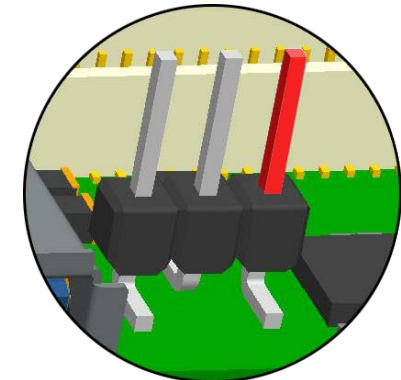
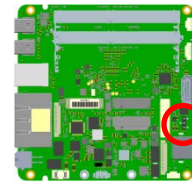


Fig. 38: STL3X1 Detail

Pin	Signal
1	VCC
2	VDD_LCD
3	P3V3

Tab. 5: STL3X1

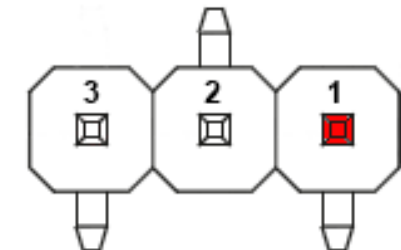


Fig. 39: STL3X1 Schematic

4.13 LC-Display Backlight Connector

AMD V1000 processor series based boards only.

AMD R1000 processor series boards: This option is not available for standard boards, only available for ODM.

Connector supplies the power section of your LC-Display with power.



The connector supplies your Backlight Inverter with 5 V and 12 V (maximum load of 3 A).

For 12 V backlight supply PVIN must be min. 15 V.

Please pay attention to this, when selecting the Backlight Inverter.

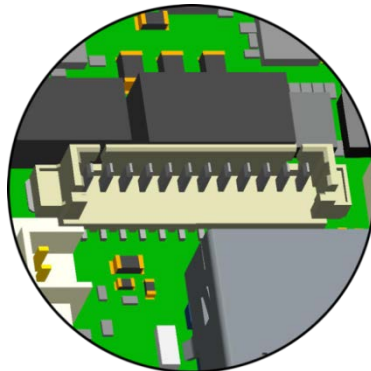
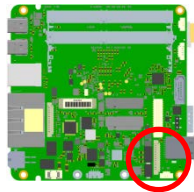


Fig. 40: Molex LC-Display Backlight Connector Detail

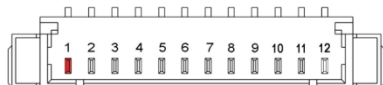


Fig. 41: Molex LC-Display Backlight Connector Detail



Counterpart – plug:
MOLEX Pico Blade 0510211200

Pin	Signal
1	VCC
2	VCC
3	VCC
4	P12V_DISPLAY
5	P12V_DISPLAY
6	P12V_DISPLAY
7	GND
8	GND
9	LCD_BKLEN
10	GND
11	BRT_ADJ (PWM)
12	GND

Tab. 6: Molex LC-Display Backlight Connector

4.14 Feature Connector

Status LED and GPIO Connector.

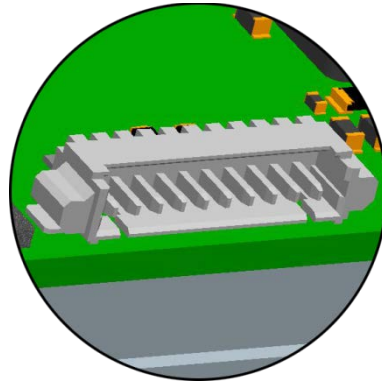
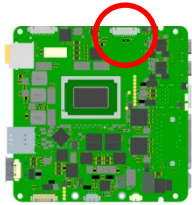


Fig. 42: Molex Feature Connector Detail



Fig. 43: Molex Feature Connector Schematic



Counterpart – plug:
MOLEX Pico Blade 0510211000

Pin	Signal
1	P3V3
2	Reserved
3	Reserved
4	PWR_LED_ANODE
5	PWR_LED_CATHODE
6	STATUS_LED_ANODE
7	STATUS_LED_CATHODE
8	GND
9	FEATURE_CONN_GPIO0
10	FEATURE_CONN_GPIO1

Tab. 7: Molex Feature Connector

4.15 RS232/485 Connector

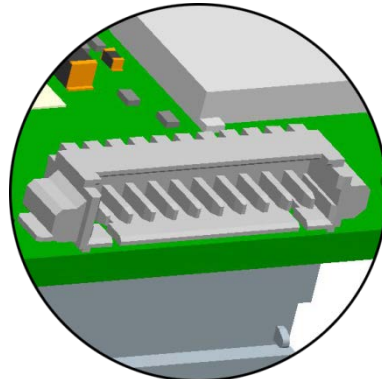
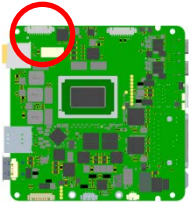


Fig. 44: Molex RS232/485 Connector Detail

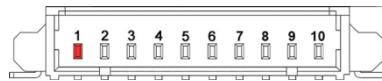


Fig. 45: Molex RS232/485 Connector Schematic



Counterpart – plug:
MOLEX Pico Blade 0510211000

Pin	Signal RS232	Signal RS485/FDX	Signal RS485/HDX for Windows only	for 10
1	-	RS485-TX_N	RS485-RX/TX_N	
2	-	-		
3	RXD0	RS485-TX_P	RS485-RX/TX_P	
4	RTS0_m	-		
5	TXD0	RS485-RX_P		
6	CTS0_m	-		
7	-	RS485-RX_N		
8	-	-		
9	VCC	VCC	VCC	
10	GND	GND	GND	

Tab. 8: Molex RS232/485 Connector

4.16 RS232 Connector

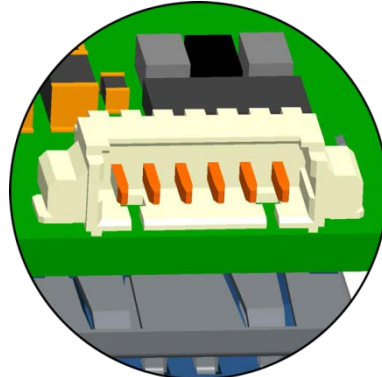
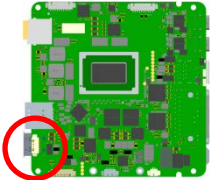


Fig. 46: Molex RS232 Connector Detail

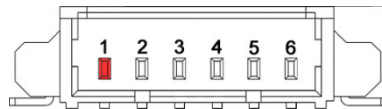


Fig. 47: Molex RS232 Connector Schematic



Counterpart – plug:
MOLEX Pico Blade 0510210600

Pin	Signal
1	RXD1
2	RTS1_m
3	TXD1
4	CTS1_m
5	VCC
6	GND

Tab. 9: Molex RS232 Connector

4.17 MicroSD Card Slot

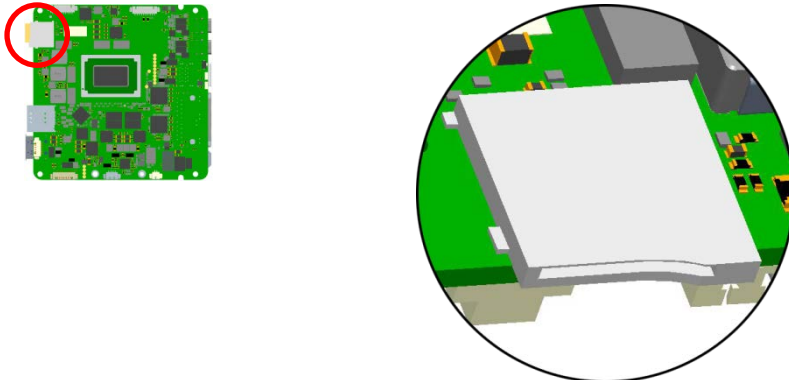


Fig. 48: MicroSD Card Slot Detail

4.18 MicroSIM Card Slot

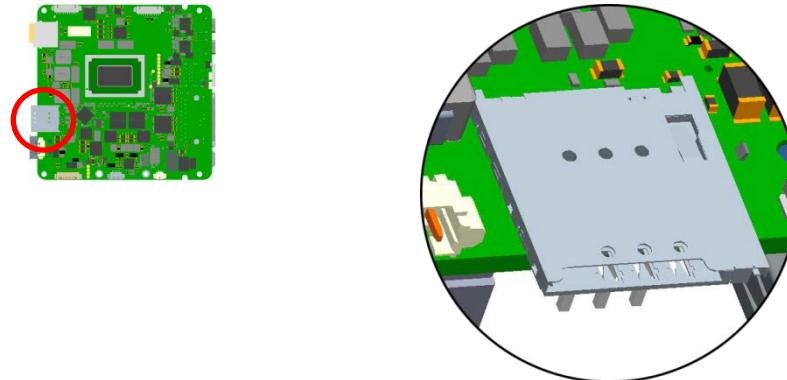


Fig. 49: MicroSIM Card Socket Detail

4.19 USB Internal Connector

AMD V1000 processor series based boards only.

AMD R1000 processor series boards: This option is not available.

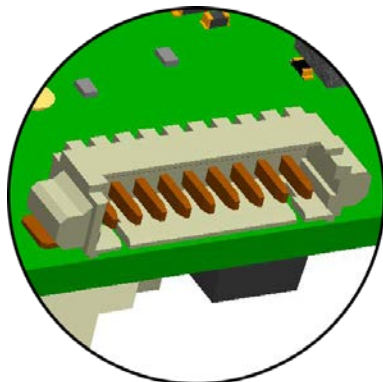
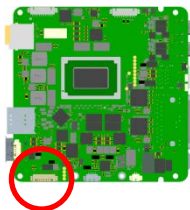


Fig. 50: Molex USB internal Connector Detail

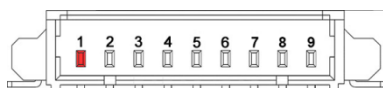


Fig. 51: Molex USB internal Connector Schematic



Counterpart – plug:
MOLEX Pico Blade 0510210900

Pin	Signal
1	VCC_USBSS_4_INT
2	USB2_4_INT_N
3	USB2_4_INT_P
4	GND0_USBSS_4
5	USBSS_4_INT_TX_N
6	USBSS_4_INT_TX_P
7	GND1_USBSS_4
8	USBSS_4_INT_RX_N
9	USBSS_4_INT_RX_P

Tab. 10: Molex USB internal Connector

4.20 FAN Connectors

4.20.1 SoC FAN Connector

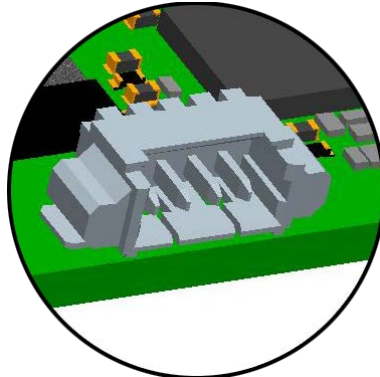
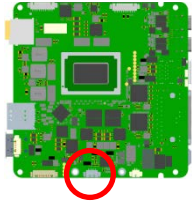


Fig. 52: Molex SoC FAN Connector Detail

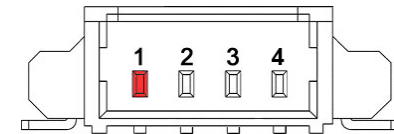


Fig. 54: Molex FAN Connector Schematic



Counterpart – plug:
MOLEX Pico Blade 0510210400

4.20.2 SSD FAN Connector

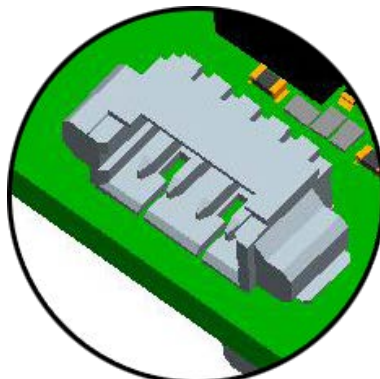
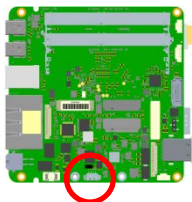


Fig. 53: Molex SSD FAN Connector Detail

Pin	Signal
1	GND
2	VCC
3	FAN_TACHO
4	FAN_PWM

Tab. 11: Molex FAN Connectors

4.21 Power Button, Power and SATA LEDs

Press power button once to start up.

Press power button to shut down into S3/S4.

Hold power button (> 4 sec.) to shut down into S5.

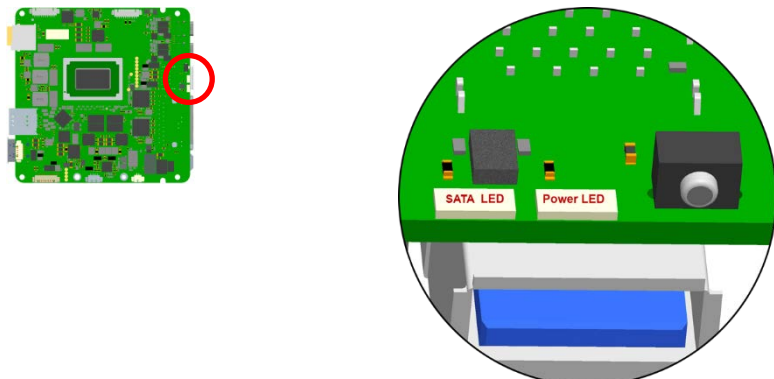


Fig. 55: Power Button/Power and SATA LEDs Detail

4.22 Power Button Connector

Press power button once to start up.

Press power button to shut down into S3/S4.

Hold power button (> 4 sec.) to shut down into S5.

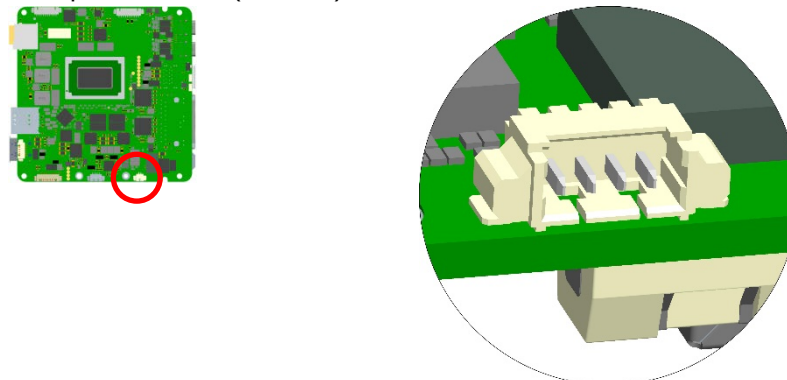


Fig. 56: Molex Power Button Connector Detail

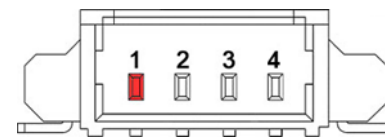


Fig. 57: Molex Power Button Connector Schematic



Counterpart – plug:

MOLEX Pico Blade 0510210400

Pin	Signal
1	PWR_LED_ANODE 3.3V with 100 Ohm series resistor
2	PWR_LED_CATHODE
3	GND
4	POWERBUTTON

Tab. 12: Molex Power Button Connector

4.23 Reset Connector

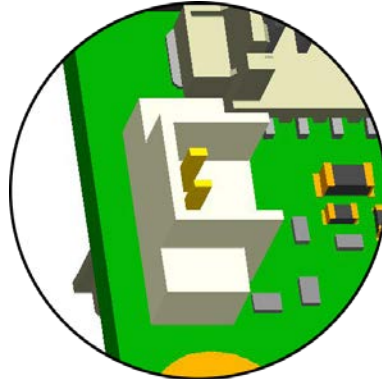
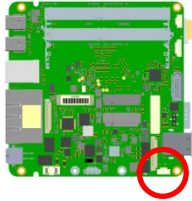


Fig. 58: Molex Reset Connector Detail

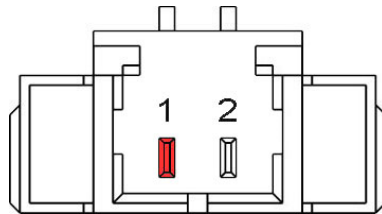


Fig. 59: Molex Reset Connector Schematic



Counterpart – plug:
MOLEX Pico Blade 0510210200

Pin	Signal
1	GND
2	SYS_RST_uC_IN_m

Tab. 13: Molex Reset Connector

5 BIOS

The BIOS ROM has a built-in Setup program that allows users to modify the basic system configurations. This type of information is stored in battery-backed CMOS RAM, so that Setup information is retained when the power is turned off.

5.1 Entering Setup

Power on the board and press and hold [Del] immediately to enter Setup.

5.2 Main Menu

Once you enter the Setup Utility, the Main Menu (Figure 60) will appear on the screen.

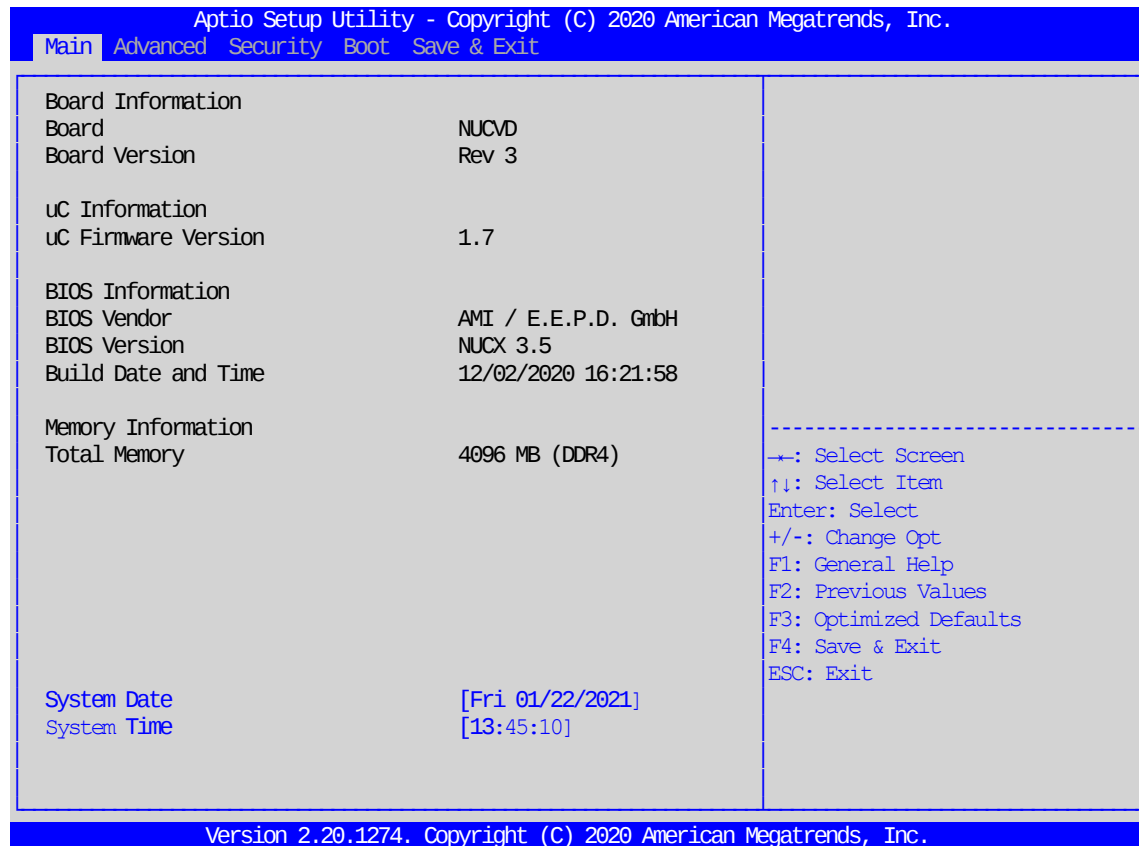


Fig. 60: Main Menu

Board Information

Board This function shows the name of the board variant

Board Version This function shows the HW Revision of the board

uC Firmware Version This function shows the firmware version of the embedded controller

BIOS Information

BIOS Vendor This function shows the vendor name of the BIOS

BIOS Version This function shows the current BIOS version

Build Date and Time This function shows the build date and time of the current BIOS version

Memory Information

Total Memory This function displays the total amount of memory available in the system

System Date/System Time

This option allows you to change the system date and time. Use the arrow keys to highlight the system date or time. Enter new values using the keyboard. Press the <Tab> key or the arrow keys to move between the fields. The date must be entered in MM/DD/YYYYY format. The time is entered in the format HH:MM:SS.

Note: The time is given in 24-hour format. For example, 17:30 is displayed as 17:30:00. The default value of the date is the BIOS build date after resetting the RTC.

5.3 Advanced Menu

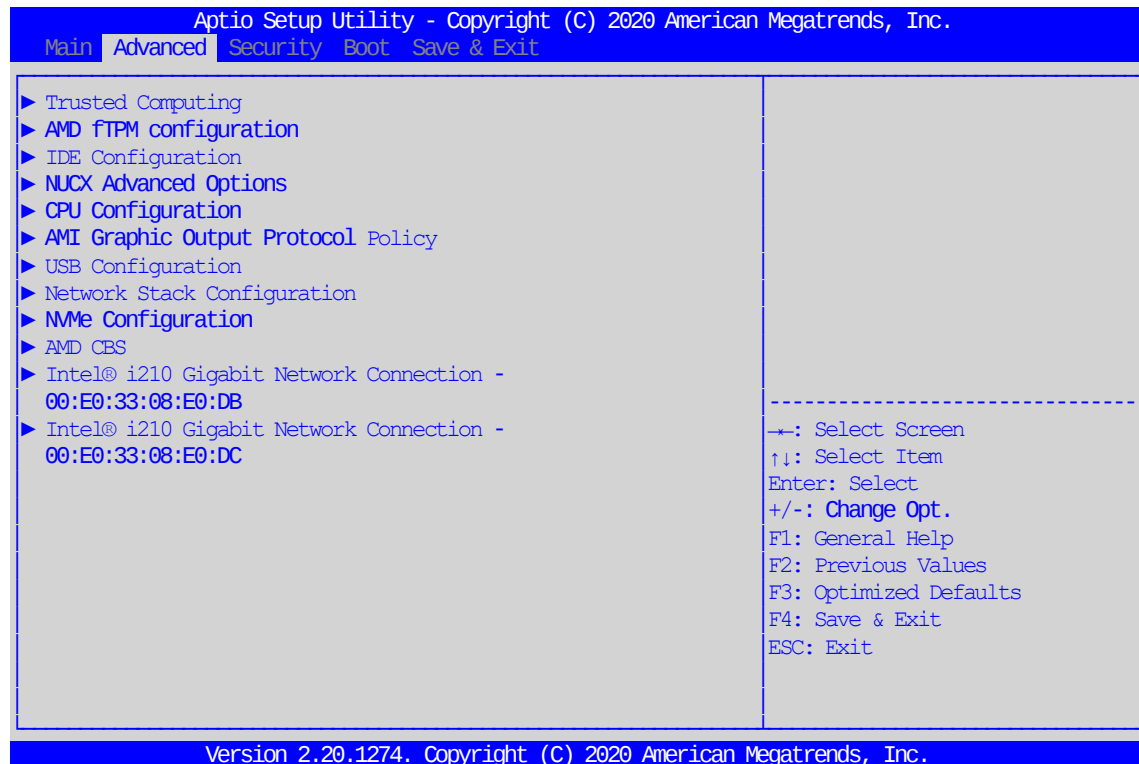


Fig. 61: Advanced Menu

5.3.1 Trusted Computing

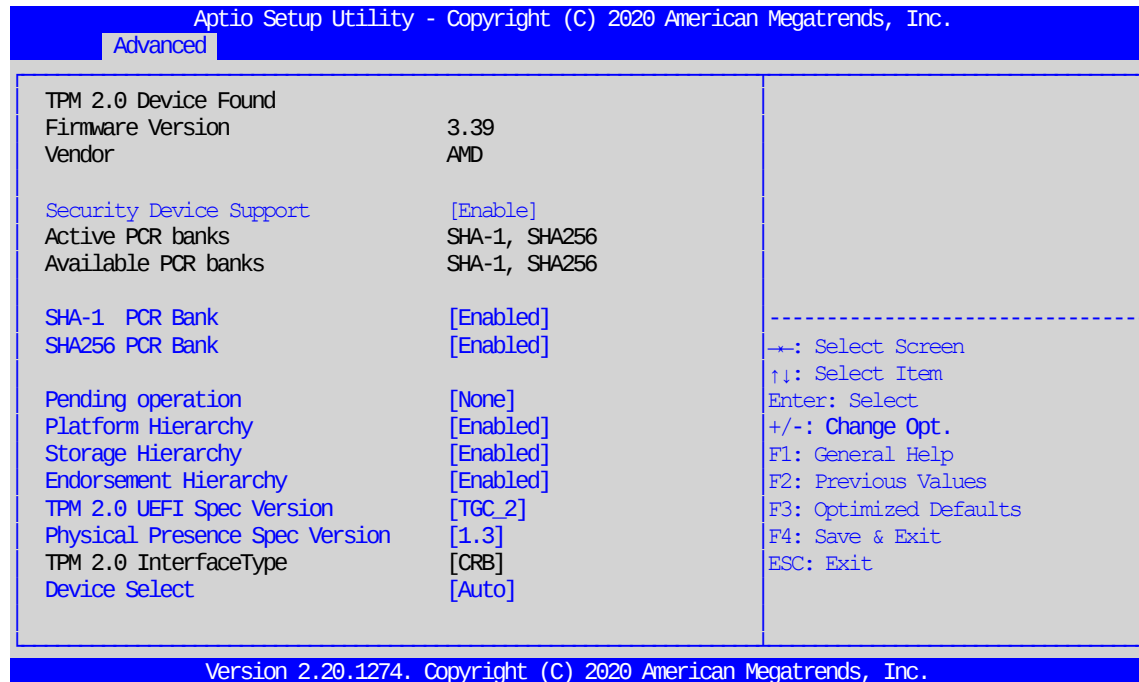


Fig. 62: Trusted Computing

Security Device Support:	Enable/Disable Bios support for security device
SHA-1 PCR Bank:	Enable/Disable SHA-1 PCR Bank
SHA256 PCR Bank:	Enable/Disable SHA256 PCR Bank
Pending operation:	Schedule an Operation for the Security Device Note: Computer will reboot in order to change State of Security Device
Platform Hierarchy:	Enable/Disable Platform Hierarchy
Storage Hierarchy:	Enable/Disable Storage Hierarchy
Endorsement Hierarchy:	Enable/Disable Endorsement Hierarchy
TPM 2.0 UEFI Spec Version:	Select the TCG2 Spec Version TCG_1_2: compatible mode for Win8/Win10 TCG_2: new protocol and event format for Win10 or later
Physical Presence Spec Version:	Select to tell OS to support PPI Spec Version 1.2 or 1.3.
Device Select:	Select TPM 1.2 or TPM2.0 or Auto TPM1.2 restricts support to TPM 1.2 devices. TPM2.0 restricts support to TPM 2.0 devices. Auto supports both. TPM2.0 is default. If TPM2.0 devices not found, TPM 1.2 devices will be enumerated

5.3.2 AMD fTPM Configuration Menu

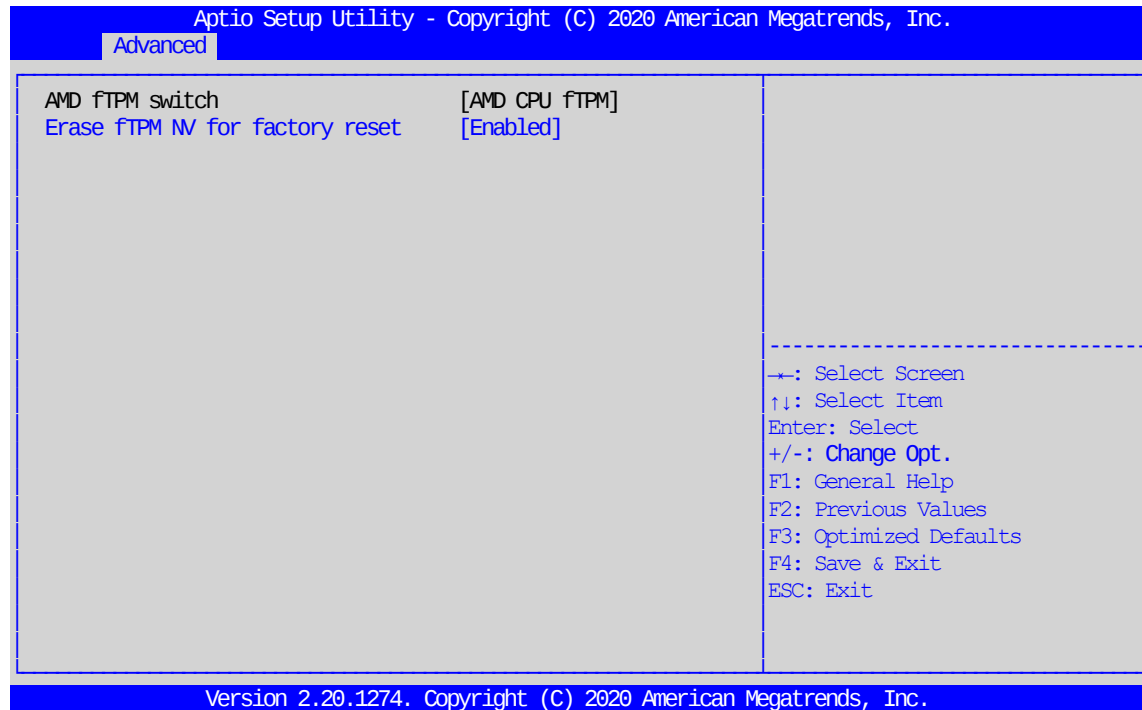


Fig. 63: AMD fTPM Configuration Menu

AMD fTPM switch

Erase fTPM NV for factory reset

AMD CPU fTPM

Select [Enabled] when a new CPU is installed. fTPM is reset. If you have BitLocker or encryption-enabled system, system will not boot without recovery key. Select [Disabled] to keep previous fTPM record and continue system boot. fTPM will not be enabled with new CPU unless fTPM is reset.

5.3.3 IDE Configuration

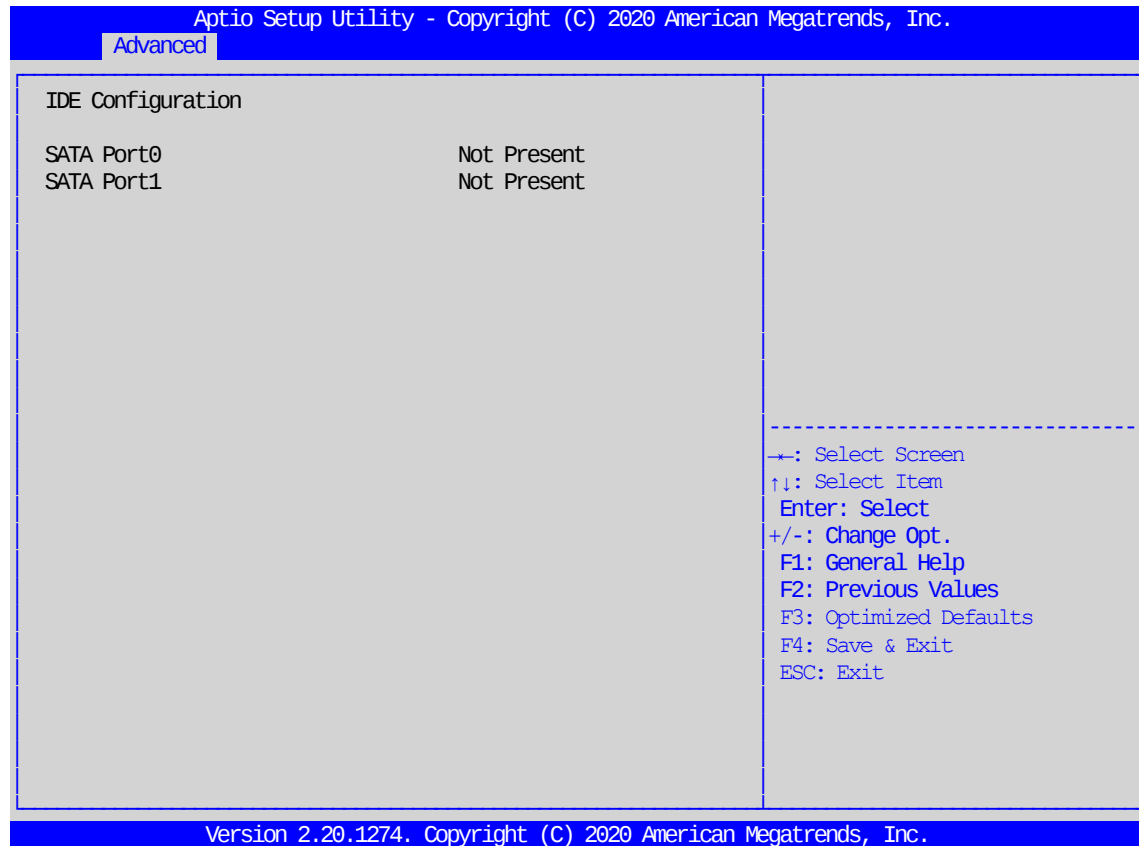


Fig. 64: IDE Configuration

This page provides information about SATA configuration.

5.3.4 NUCX Advanced Options

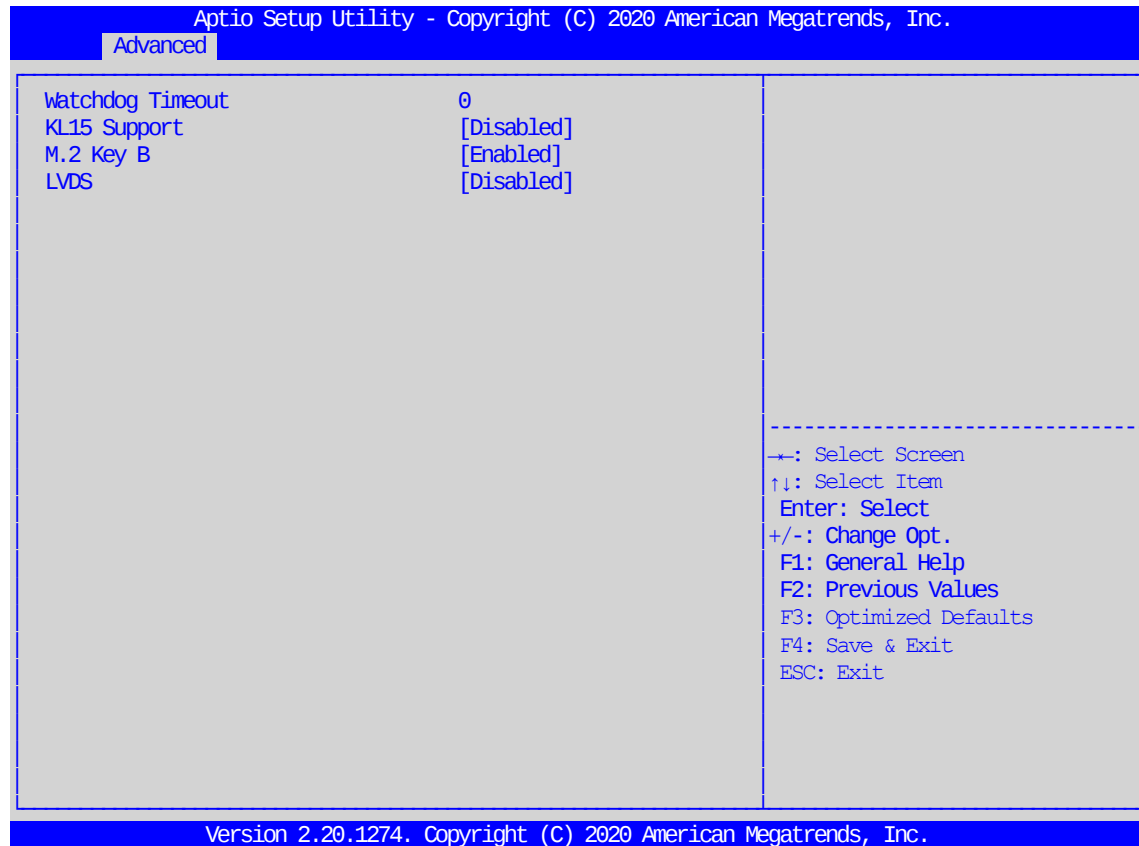


Fig. 65: NUCX Advanced Options

- Watchdog Timeout:** Seconds before watchdog times out. Set to 0 to disable watchdog. Values between 1 and 30 are set to 30. Range 30-240 seconds.
- KL15 Support:** Enable/Disable KL15 Support
- M.2 Key B:** Enable/Disable the M.2 Key B Slot
- LVDS:** Enable/Disable the eDP to LVDS transceiver

5.3.5 CPU Configuration

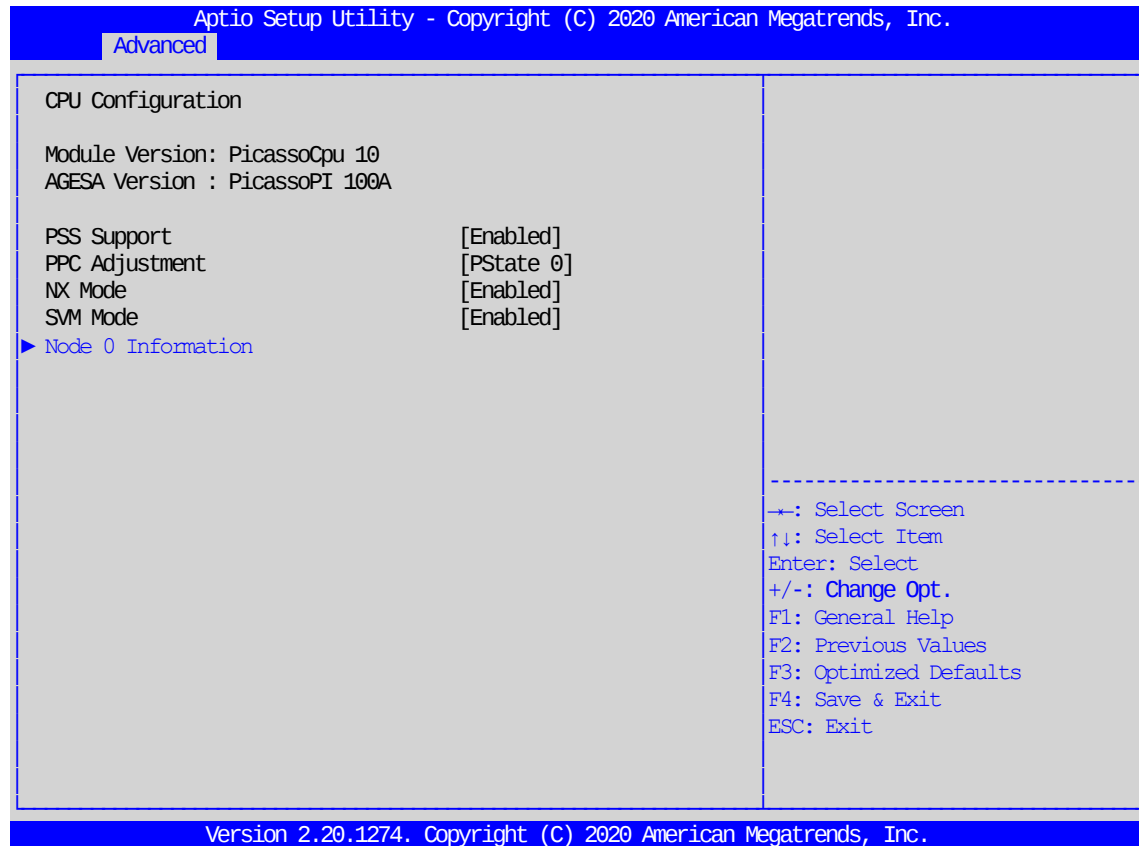


Fig. 66: CPU Configuration

Node 0 Information: Detailed Information on CPU. Processor Family | Processor Model | CPU ID | MAX/MIN Speed (Frequency) | Cache

5.3.6 Graphic Output Protocol Policy

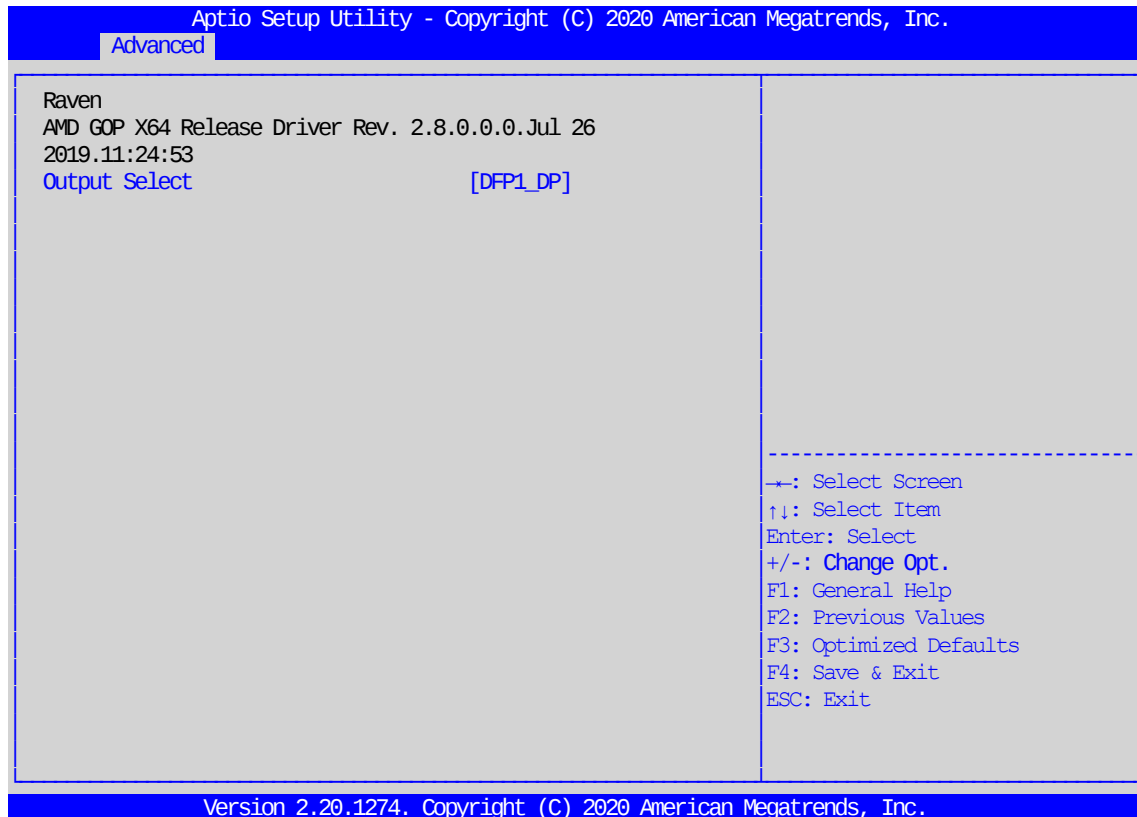


Fig. 67: Graphic Output Protocol Policy

Output Select: In Dual Screen Operation, select the pre-OS boot graphic output Interface.

5.3.7 USB Configuration

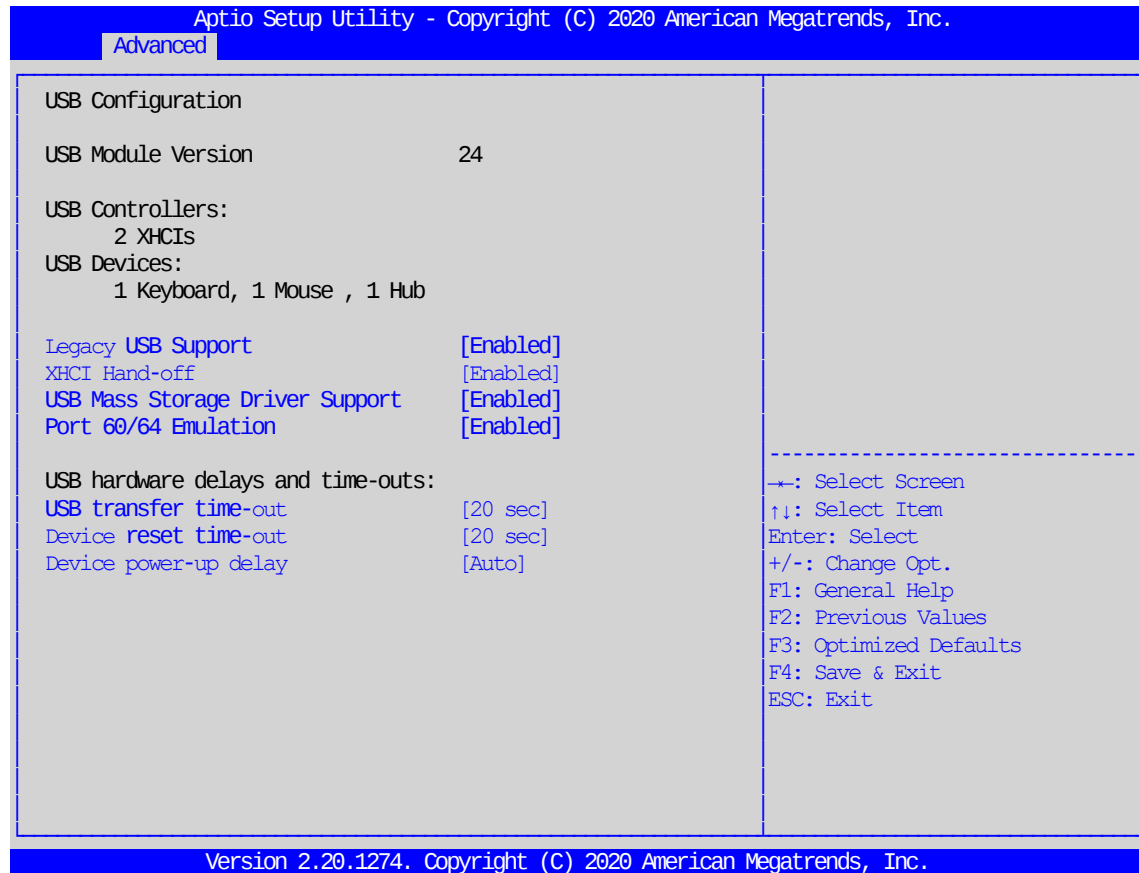


Fig. 68: USB Configuration

USB Configuration

USB Module Version:	Shows the USB module version used by the UEFI firmware
USB Controllers:	Shows the number of XHCI controllers that are available
USB Devices:	Shows the connected USB devices
Legacy USB Support:	Select Enabled to support legacy onboard USB devices. Select Auto to disable support for legacy USB devices if no legacy USB devices are present. Select Disabled to have all USB devices available for EFI applications only. The options are Enabled, Disabled and Auto.
XHCI Hand-off:	This is a workaround for operating systems that do not support XHCI (Extensible Host Controller Interface) passing. The XHCI change of ownership should be requested by the XHCI driver. The available settings are Enabled or Disabled.
USB Mass Storage Driver Support:	Select Enabled for USB mass storage device support. The options are Disabled and Enabled.
Port 60/64 Emulation:	Enables I/O port 60/64 emulation support

USB hardware delays and time-outs

USB transfer time-out:	Select time-out section. The time-out value for control, mass and interrupt transfers. Default setting is 20sec.
USB reset time-out:	Select device time-out section. USB mass storage devices start unit command time-out. Default setting is 20sec.
USB power-up time-out:	Select device power-up section. Maximum time the device takes before it properly reports itself to the host controller. Auto uses a default value: for a root port, it is 100 ms, for a hub port the delay is taken from the hub descriptor.

5.3.8 Network Stack Configuration

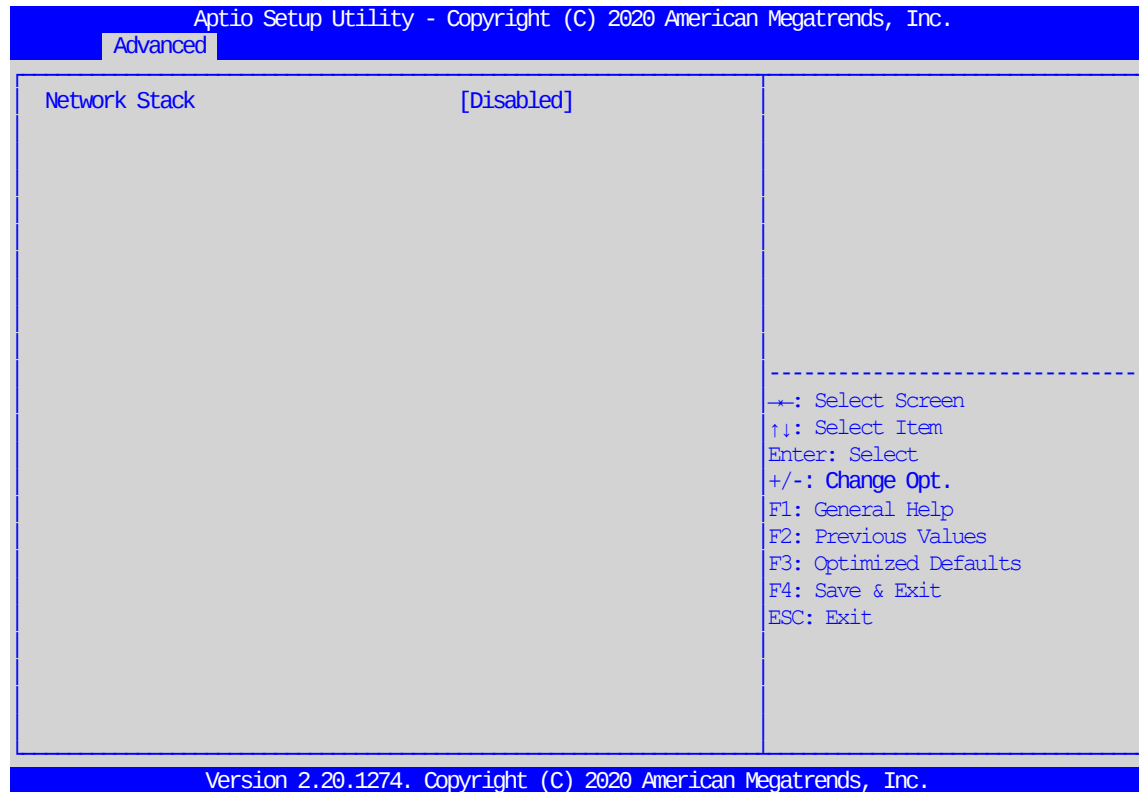


Fig. 69: Network Stack Configuration

Network Stack:

Select Enabled to enable PXE (Preboot Execution Environment) or UEFI (Unified Extensible Firmware Interface) for network stack support. The options are Disabled and Enabled. *** When the above function is set to Enabled, the following functions are available for configuration:**

Ipv4 PXE Support:

Select Enabled to enable IPv4 PXE boot support. The options are Disabled or **Enabled**

Ipv4 HTTP Support:

Select Enabled to enable IPv4 HTTP boot support. The options are **Disabled** or Enabled

Ipv6 PXE Support:

Select Enabled to enable IPv6 PXE boot support. The options are Disabled or **Enabled**

Ipv6 HTTP Support:

Select Enabled to enable IPv6 HTTP boot support. The options are **Disabled** or Enabled

IPSEC Certificate:

The function is displayed when network stacking is enabled. Internet Protocol Security (IPSEC) provides a secure connection for remote computers through a secure tunnel. The options are Disabled or Enabled

PXE boot wait time:

This function allows you to set the waiting time for pressing the ESC key to cancel the PXE boot process. Press "+" or "-" on your keyboard to change the value. The default setting is 0.

Media detect count:

This function allows you to specify how often media should be checked. Press "+" or "-" on your keyboard to change the value. The default setting is 1.

5.3.9 NVME Configuration



Fig. 70: NVME Configuration

NVME Configuration

This function shows the connected NVME device.

5.3.10 AMD CBS

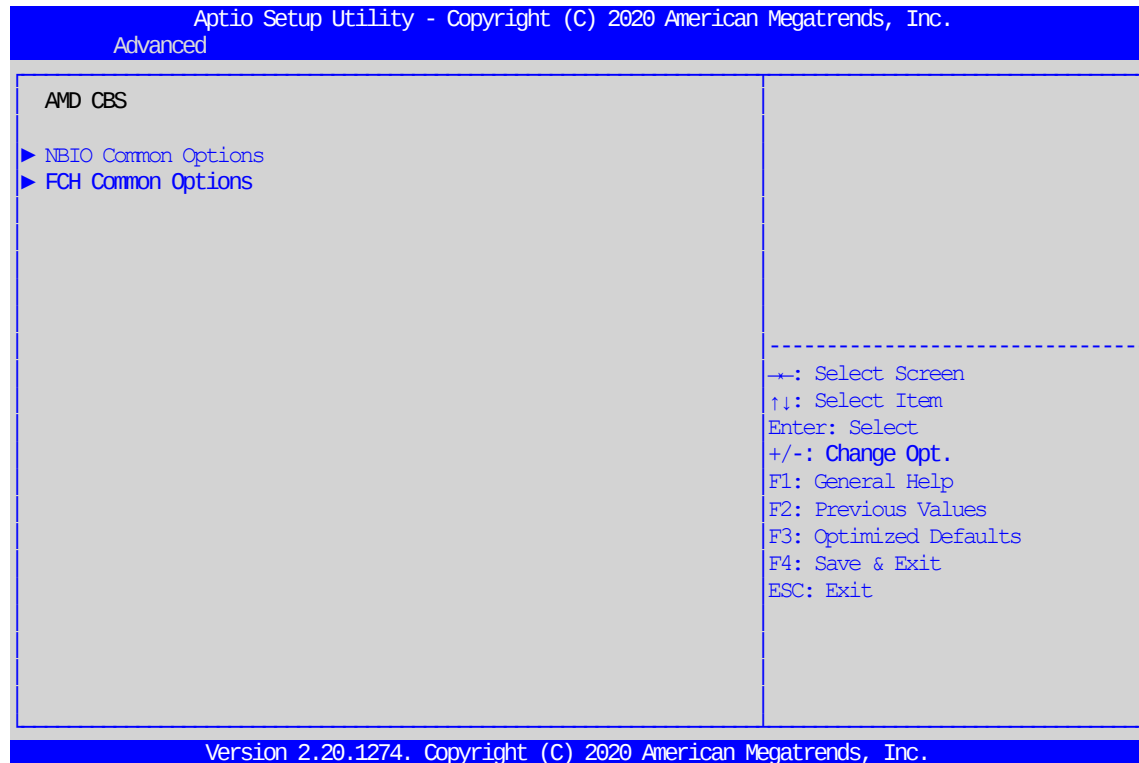


Fig. 71: AMD CBS Screen

5.3.11 NBIO Common Options

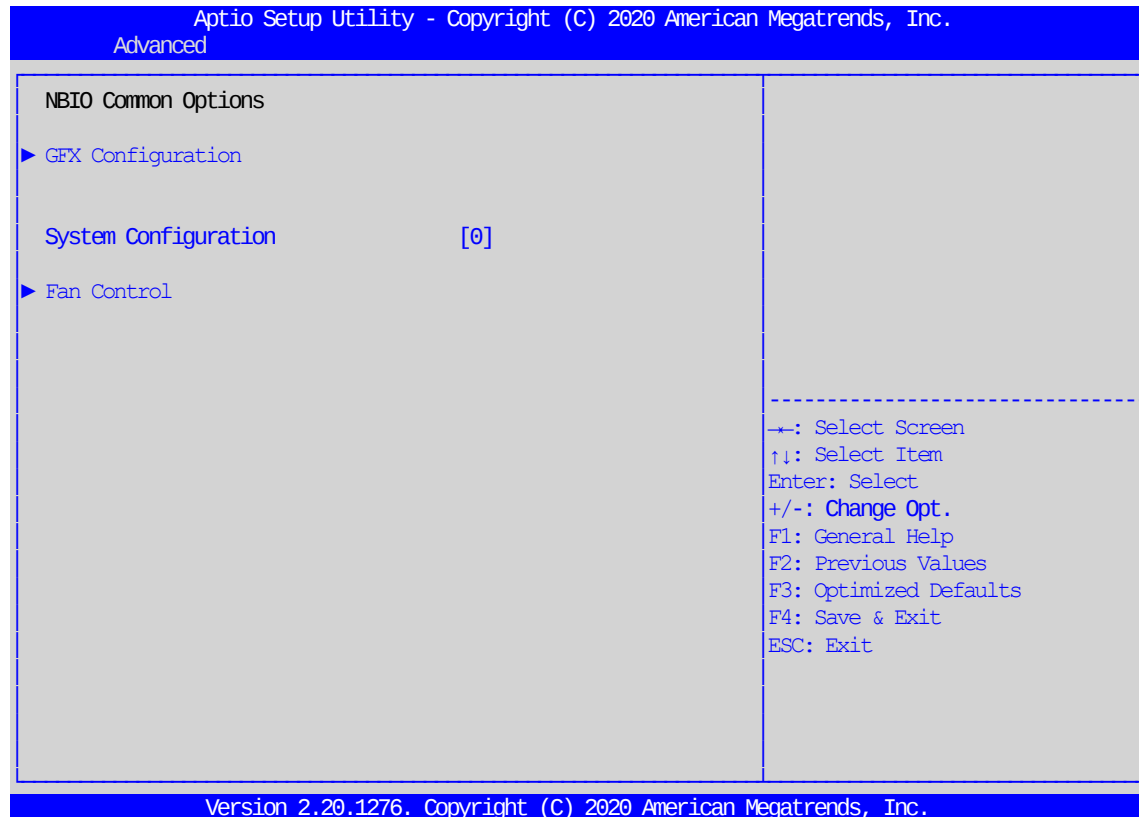


Fig. 72: NBIO Common Options

System configuration:

With this function the max system performance can be set. 0 = default, value is read from the corresponding register of the CPU.

5.3.12 GFX Configuration

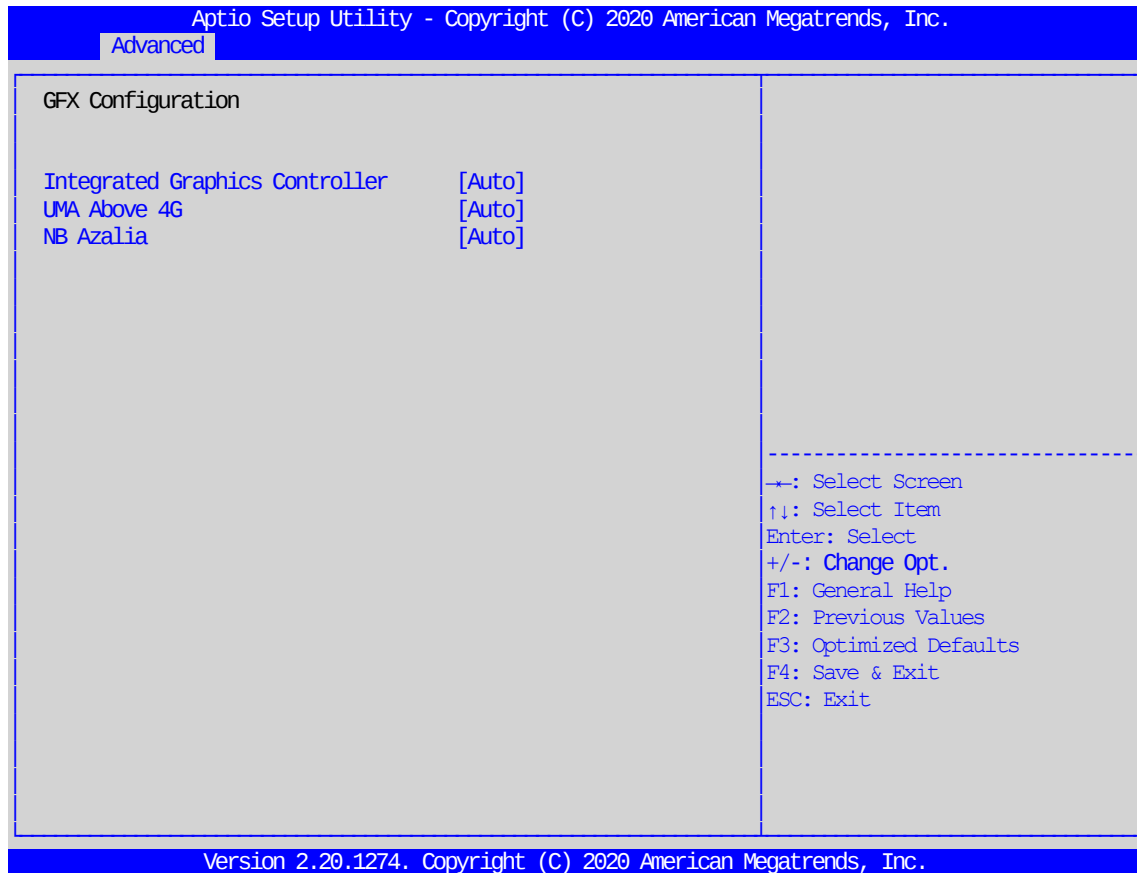


Fig. 73: GFX Configuration

GFX Configuration

Integrated Graphics Controller:

This function allows you to enable or disable the integrated graphics controller

UMA Above 4G:

This option enables or disables 64-bit capable devices to be decoded in above 4G address space. It only works if the system supports 64-bit PCI decoding.

Configuration options: Disabled, Enabled, Auto

NB Azalia:

Select Enabled to enable the Azalia High Definition Audio feature

Configuration options: Disabled, Enabled, Auto

5.3.13 Fan Control

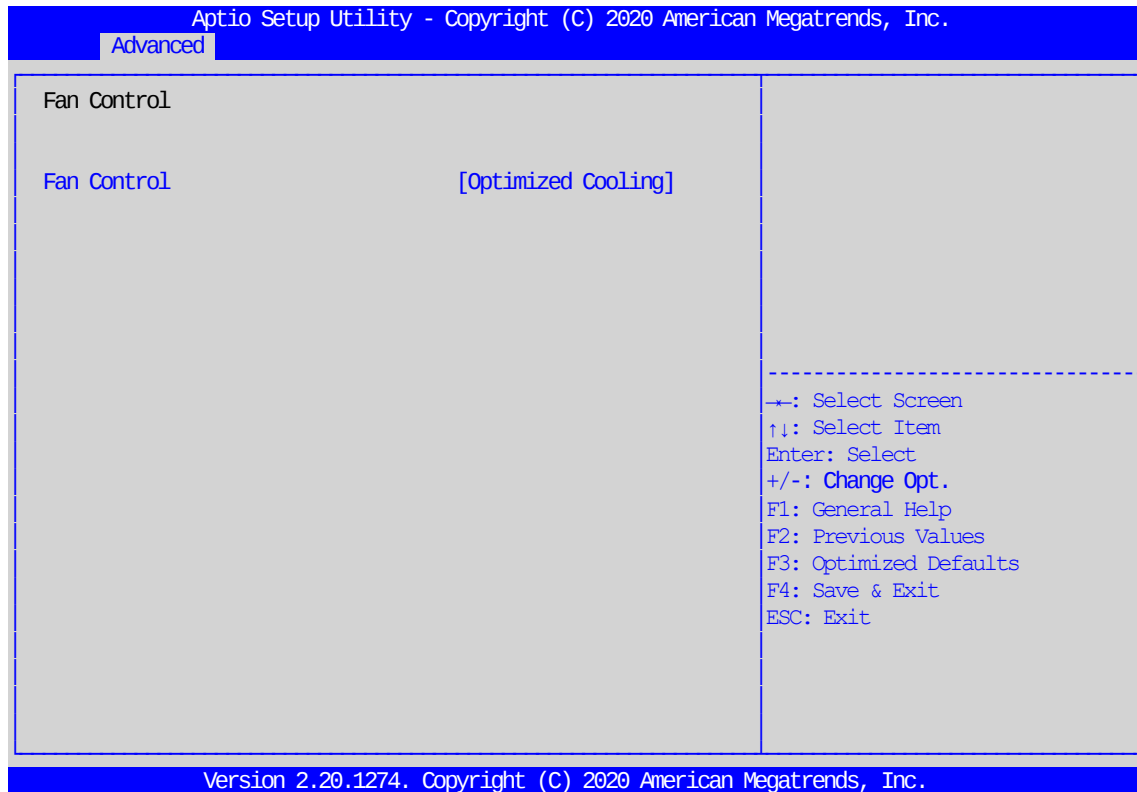


Fig. 74: Fan Control

FAN Control:

This function selects predefined cooling profiles. Configuration options: Optimized Cooling, Silent Mode, Max Cooling.

5.3.14 FCH Common Options

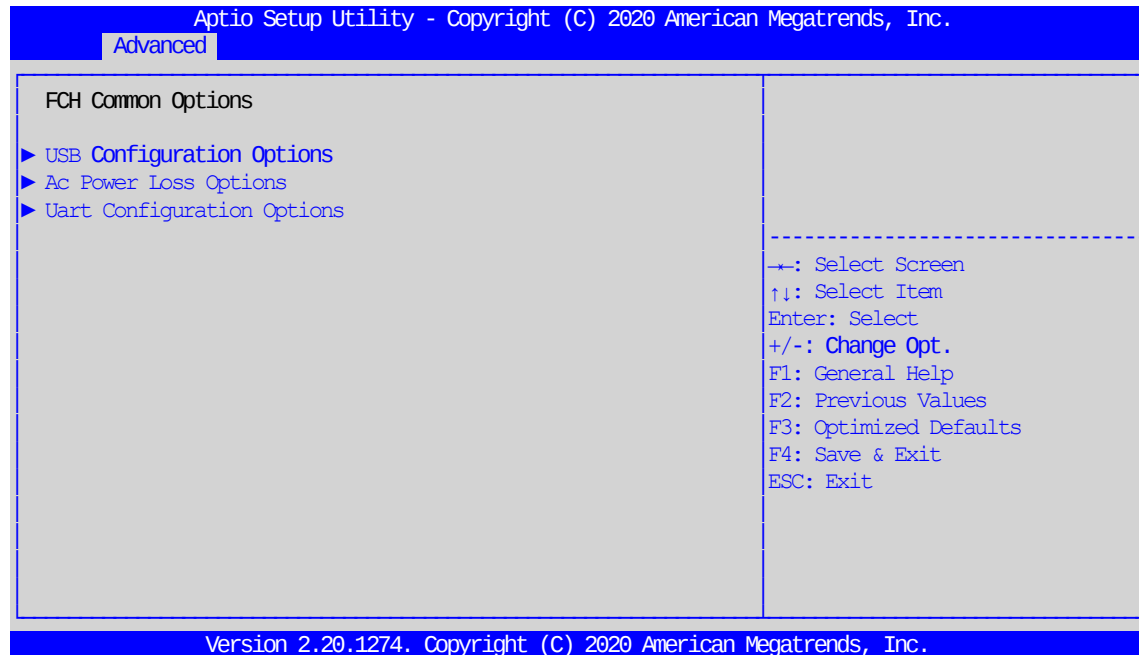


Fig. 75: FCH Common Options

5.3.14.1 USB Configuration Options

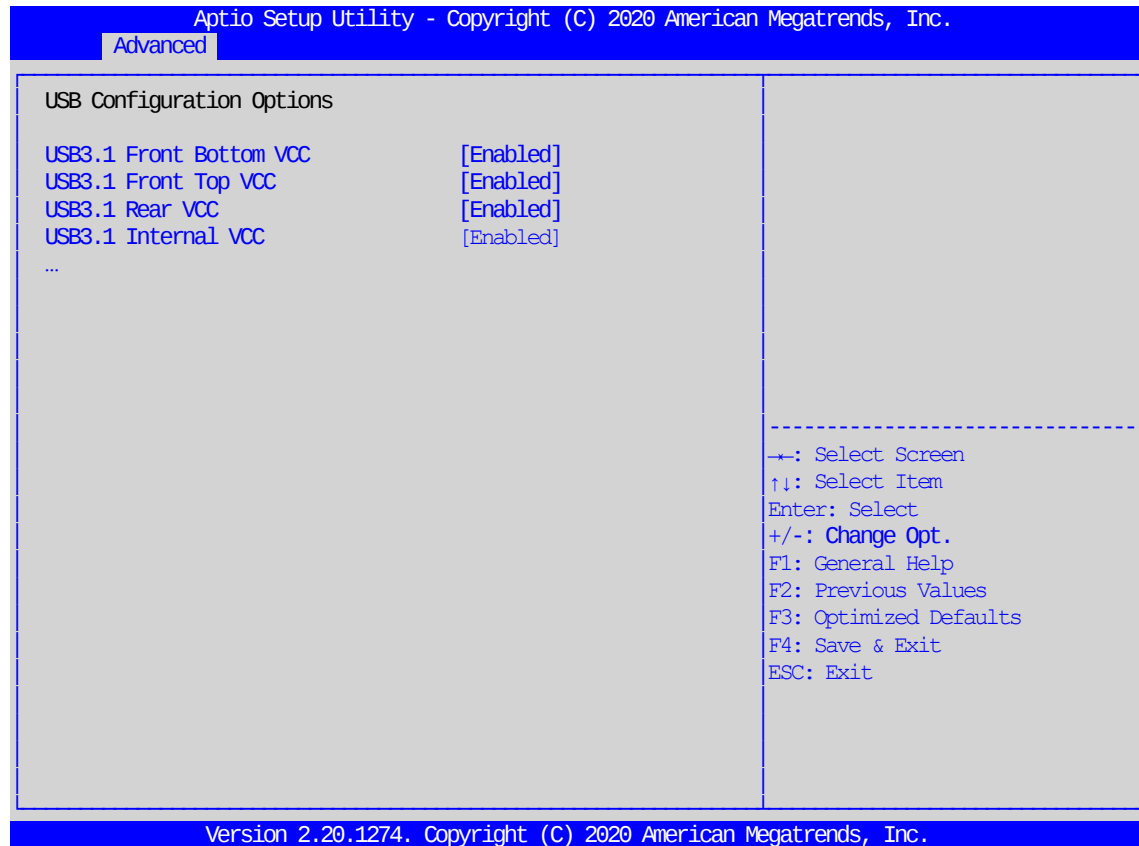


Fig. 76: USB Configuration Options

USB Configuration Options

USB3.1 Front Bottom VCC:	This function allows you to enable or disable the power for the Front Bottom USB port.
USB3.1 Front Top VCC:	This function allows you to enable or disable the power for the Front Top USB port.
USB3.1 Rear VCC:	This function allows you to enable or disable the power for the Rear USB port.
USB3.1 Internal VCC:	This function allows you to enable or disable the power for the internal USB header.

Note: In order to not exclude yourself from the BIOS setup, at least one USB port should be enabled at all times. In case you select the “Disabled” option on all ports, the “USB31Front Bottom VCC” port will automatically be enabled by the system.

5.3.14.2 Ac Power Loss Options

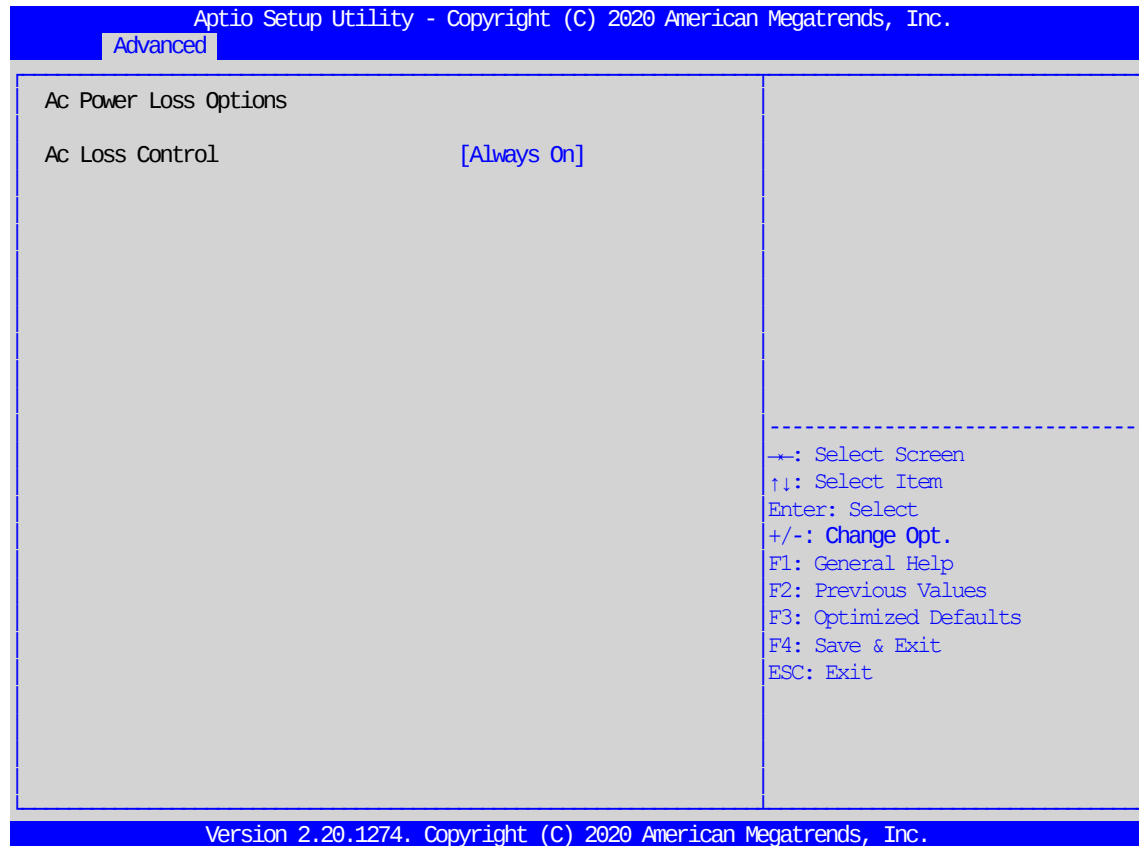


Fig. 77: Ac Power Loss Options

Ac Power Loss Options**Ac Loss Control:**

This function allows you to set the power status after a power failure. Select Always Off to keep the system power off after a power failure. Select Always On to turn on the system power after a power failure. Select Previous to allow the system to resume its last power state before a power failure. Configuration options: Always On, Always Off, Previous.

5.3.14.3 Uart Configuration Options

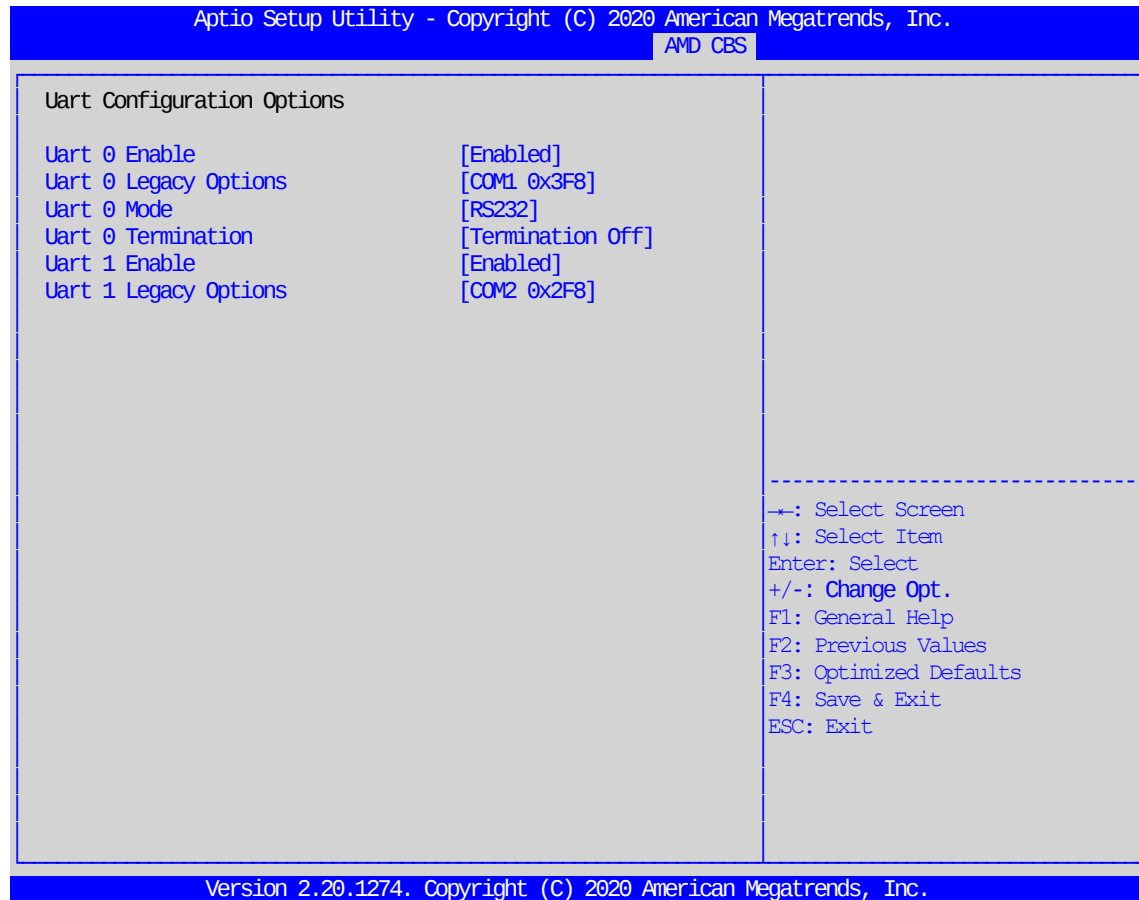


Fig. 78: Uart Configuration Options

UART Configuration Options**UART 0 Enable:**

This function allows you to enable or disable the UART0 port. Configuration options: Disabled, Enabled, Auto

UART 0 Legacy Options:

This function specifies the base I/O port address of a user-specified serial port. Select Auto to allow the BIOS to automatically assign the base I/O address. Configuration options: Disabled | COM1 0x3F8 | COM2 0x2F8 | COM3 0x3E8 | COM4 0x2E8 | Auto

UART 0 Mode:

Shows the UART Modes – RS232, RS485 Half-Duplex, RS485 Full-Duplex

UART 0 Termination:

Select UART 0 transceiver termination: off / 120 Ohm diff.

UART 1 Enable:

This function allows you to enable or disable the UART1 port. Configuration options: Disabled, Enabled, Auto

UART 1 Legacy Options:

This function specifies the base I/O port address of a user-specified serial port. Select Auto to allow the BIOS to automatically assign the base I/O address. Configuration options: Disabled | COM1 0x3F8 | COM2 0x2F8 | COM3 0x3E8 | COM4 0x2E8 | Auto

5.4 Security Menu

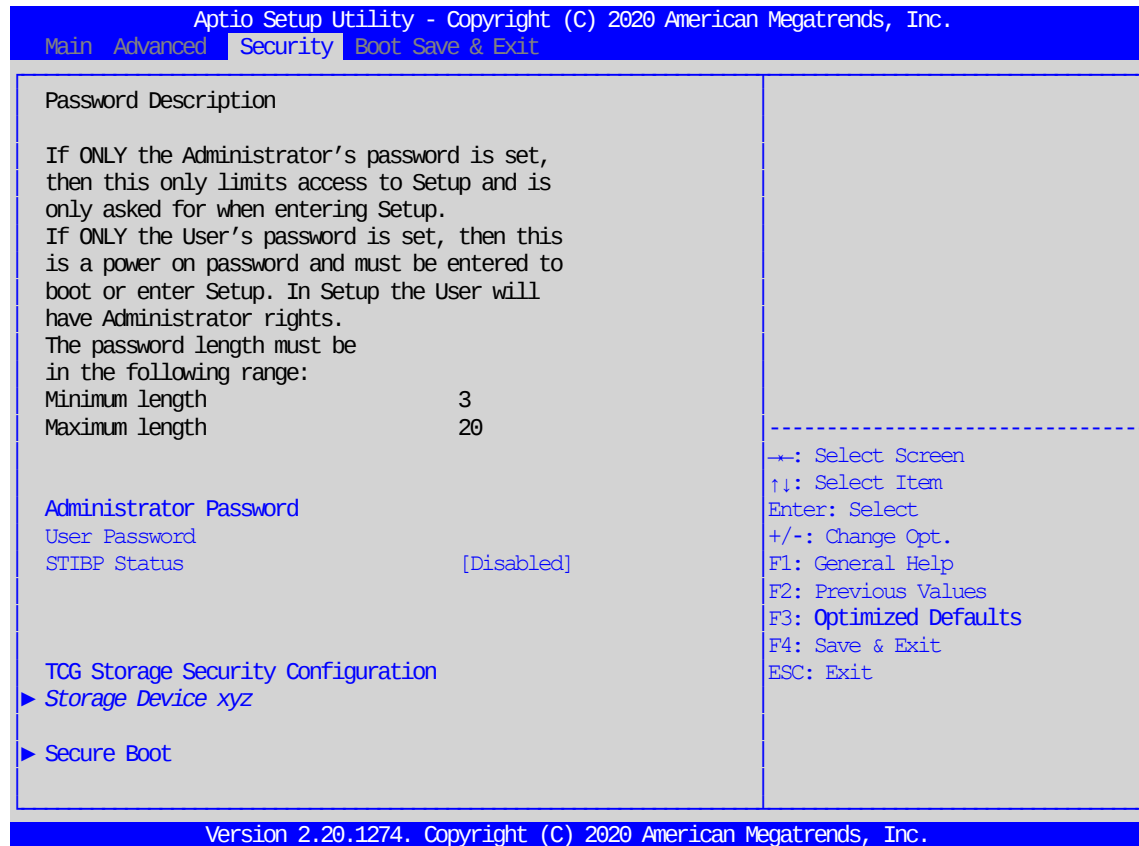


Fig. 79: Security Menu

Administrator Password:	Use this feature to set the administrator password required to enter the BIOS setup utility. The password should be 3 to 20 characters long. - this controls access to the BIOS setup ONLY
User Password:	Press Enter to create a new, or change an existing User password. - this password must be entered at each system start or boot and also has administrator rights in the setup.
STIBP Status:	The STIBP-BIOS function (Single Thread Indirect Branch Predictor, STIBP) mitigates the Spectre variant 2 vulnerability on systems with AMD processors. Enabling STIBP may have some performance impact depending on system load.

5.4.1 Secure Boot

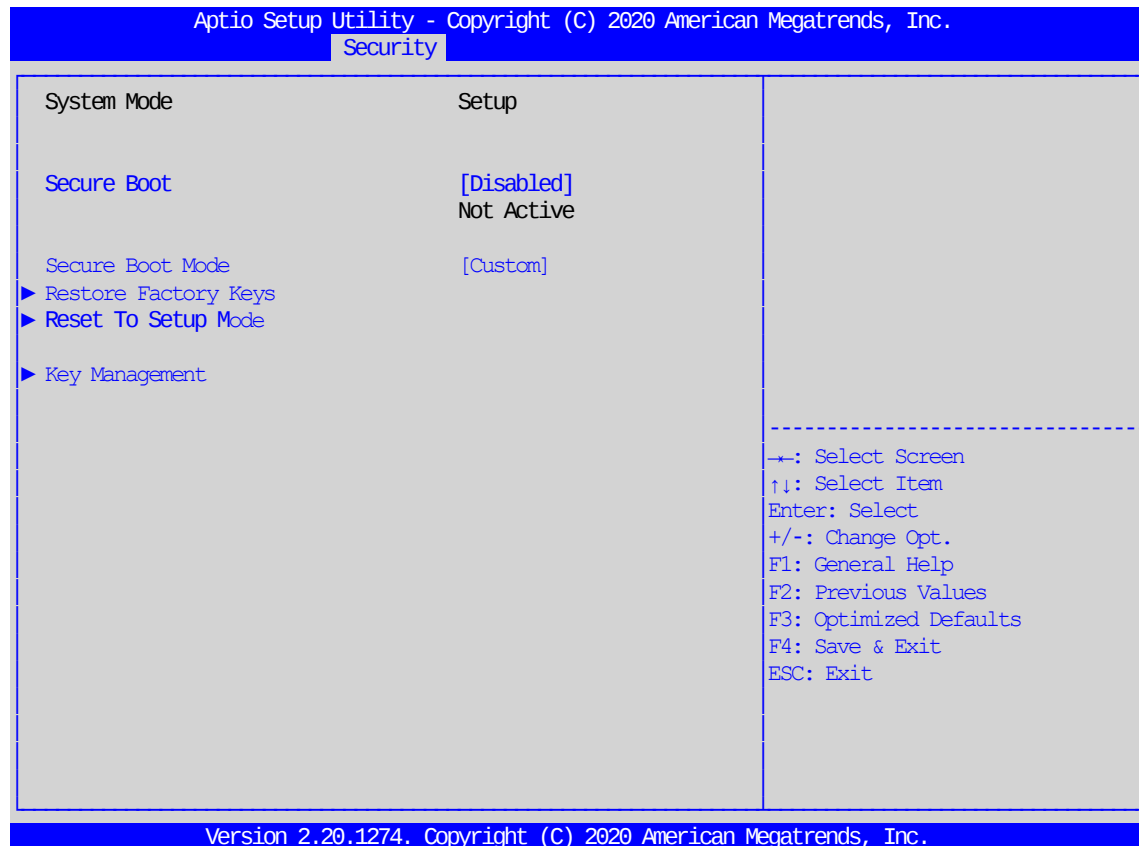


Fig. 80: Secure Boot

Secure Boot

Secure Boot Mode:

This function allows you to select the desired secure boot mode for the system. The options are Standard and Custom. When the Secure Boot Mode is set to Custom, Key Management functions are available for configuration

5.4.1.1 Key Management

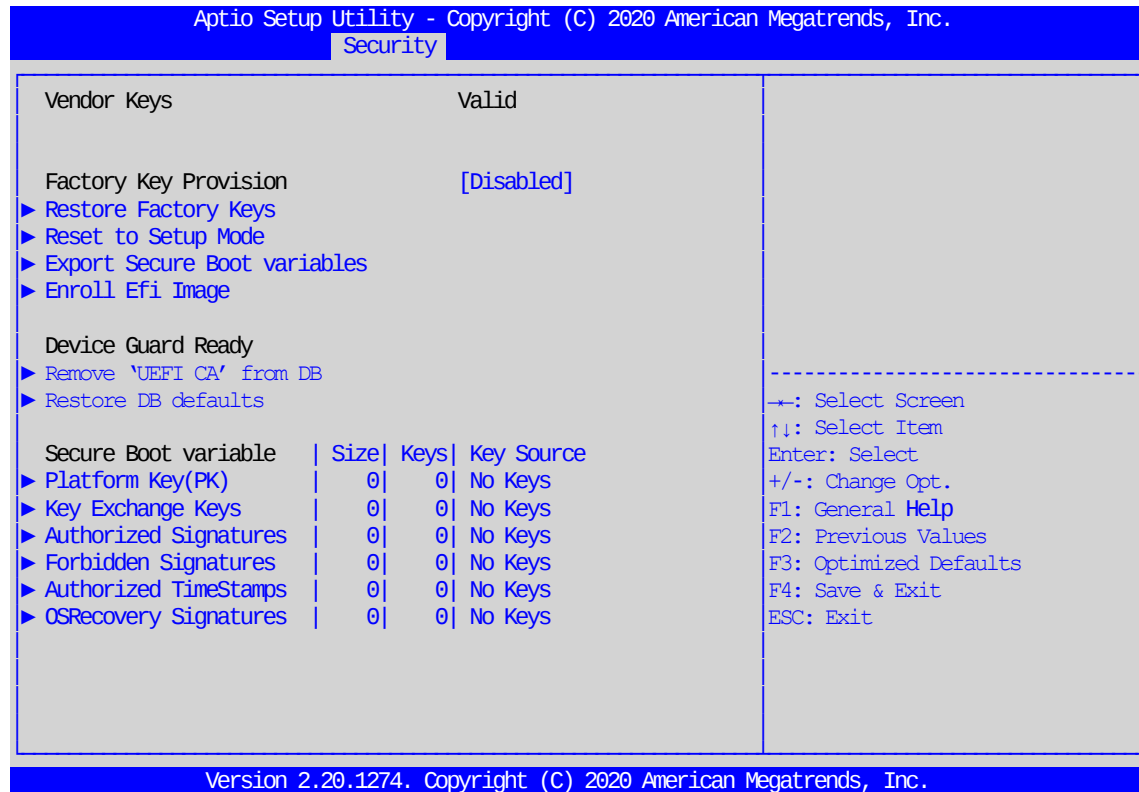


Fig. 81: Key Management

Vendor Keys

Factory Key Provision:	The options are Disabled or Enabled. Select Enabled to install the default Secure Boot Keys set by the manufacturer.
Restore Factory Keys:	Force System to User Mode. Install factory default Secure Boot key databases
Reset To Setup Mode:	Delete all Secure Boot key databases from NVRAM and force the system to Setup Mode.
Export Secure Boot variables:	Use this feature to copy NVRAM content of the Secure Boot variables to a file in a root folder on a file system device
Enroll Efi Image:	This feature allows the image to run in Secure Boot mode
Remove 'UEFI CA' from DB:	Use this feature to remove the Microsoft UEFI CA certificate from the database
Restore DB defaults:	Restore all DBs to the factory default settings
Secure Boot variable:	
Platform Key (PK):	Options are Details, Export, Update or Delete
Key Exchange Keys:	Options are Details, Export, Update, Append or Delete
Authorized Signatures	Options are Details, Export, Update, Append or Delete
Forbidden Signatures	Options are Details, Export, Update, Append or Delete
Authorized TimeStamps	Options are Update or Append
OsRecovery Signatures	Options are Update or Append

5.5 Boot Menu

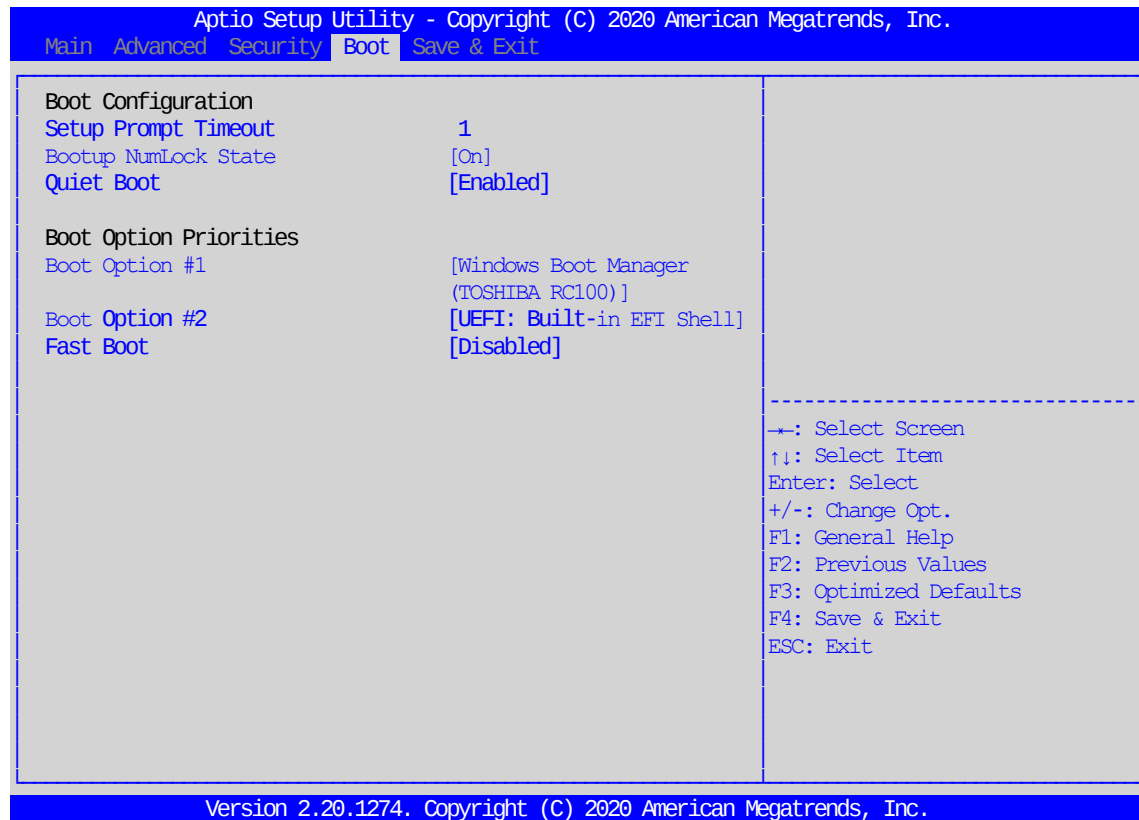


Fig. 82: Boot Menu

Boot

Boot Configuration:	Use this menu to configure boot settings
Setup Prompt Timeout	This function allows you to specify the amount of time (in seconds) the BIOS should wait before rebooting the system when the Setup Activation key is pressed. Enter the value 65535 (0xFFFF) that the BIOS should wait indefinitely. The default setting is 1.
Boot NumLock State:	Select the keyboard NumLock state
Quiet Boot:	This function allows you to select the screen display between POST messages or the E.E.P.D. logo at startup. Select 'Enabled' to display the E.E.P.D logo instead of the normal POST messages. Select 'Disabled' to display the POST messages.
Boot Option Priorities:	This option prioritizes the order of bootable devices from which the system is booted. Press <Enter> on each entry from top to bottom to select devices.
Fast Boot:	Fast Boot is a BIOS feature that shortens the boot time. The computer will boot with a minimal set of required devices.

If one if the following options is disabled, they will not be available until after OS Boot: SATA Support, NVMe Support, VGA Support, USB Support, PS2 Support, Network Stack Driver Support, Redirection Support

5.6 Save & Exit Menu

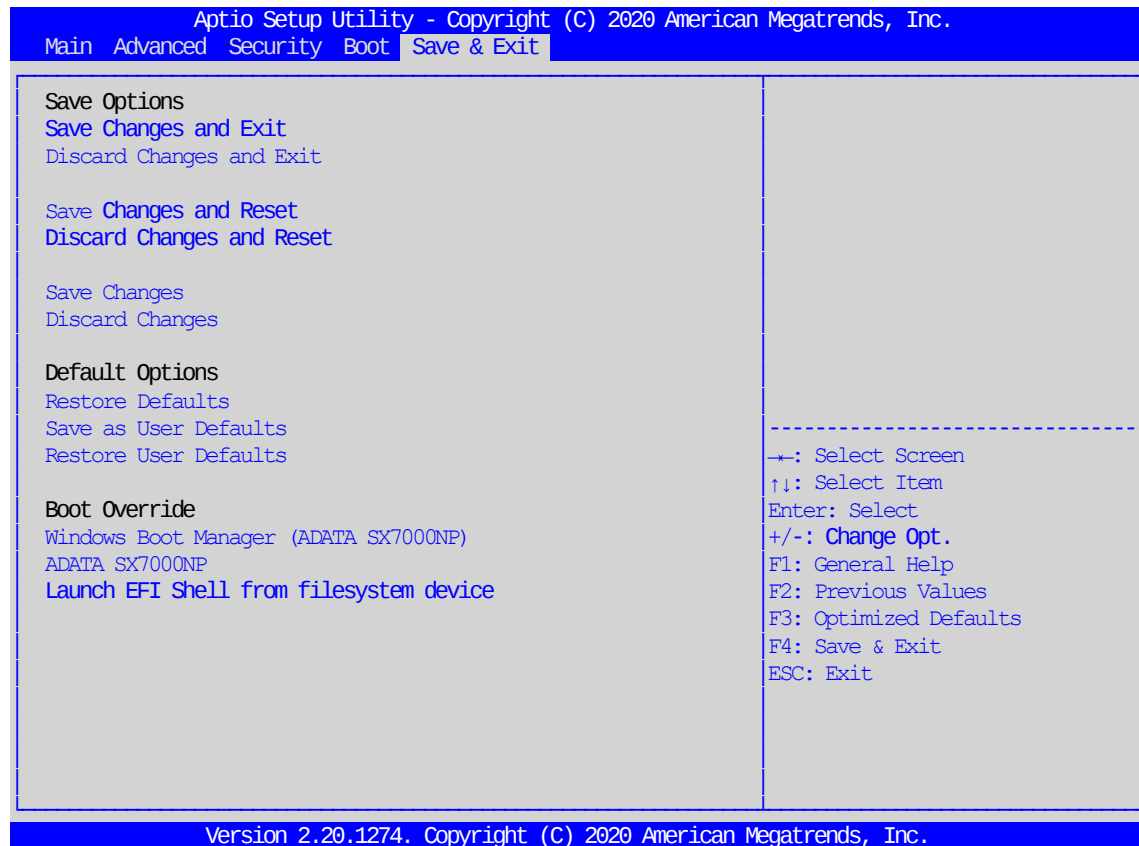


Fig. 83: Save & Exit Menu

Save Options

Save Changes and Exit:	Select this option to save all changes made. This will exit the BIOS setup and reboot the system.
Discard Changes and Exit:	Select this function to exit the BIOS setup without making permanent changes to the system configuration and restart the computer.
Save Changes and Reset:	Select this option to save all changes made and reset the system.
Discard Changes and Reset:	Reset the system setup without saving any changes.
Save Changes:	Save changes done so far and stay in BIOS setup
Discard Changes:	Discard changes done so far and stay in BIOS setup

Default Options

Restore Defaults:	Restore/Load Default values for all setup options.
Save as User Defaults:	Save the changes done so far as User Defaults.
Restore User Defaults	Restore the User Defaults to all the setup options.
Boot Override	Set this feature to override a previously defined boot device. The available Boot Options are listed below.

Revision History

Date	Version	Changes
25.03.2019	0.1	First release
15.10.2019	1.0	New manual design
25.02.2020	1.1	Update HW Rev. 2
05.03.2020	2.0	Public release
05.03.2020	3.0	Update HW Rev. 3 with R1000 support added
16.04.2020	3.1	Powerbutton connector update
13.05.2020	3.2	Power LED voltage clarified
18.01.2021	3.3	BIOS-description and board with cooling solution added
10.03.2021	3.4	Different max. operating temp. for V1807 added; Disclaimer Update

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Terminology

BT	Bluetooth
CPU	Central Processing Unit or processor
DC	Direct Current
DDR4	Fourth generation „Double Data Rate“ memory technology
DP	Display port
EMI	ElectroMagnetic Interference
Gigabit Ethernet	Ethernet connection with a frame transfer speed up to 1000 Mbit/s
GND	Ground
MIC	Microphone
M.2	Next generation mSATA
PWM	Pulse-Width Modulation
RAM	Random Access Memory
RS-232	Serial standard interface
RS-485	Serial standard interface
SD	Secure Digital memory card
SIM	Subscriber Identity Module (Card) used to store information in mobile phones
SoC	System on a Chip means the integration of all or a large part of the functions of a programmable electronic system on a single chip
SODIMM	Small Outline Dual Inline Memory Module
SSD	Solid State Drive
USB	Universal Serial Bus
Watchdog	A watchdog (timer) is a computer hardware timing device that triggers a system reset if the main program hangs, in order to keep the computer running
WLAN	Wireless Local Area Network
WWAN	Wireless Wide Area Network

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