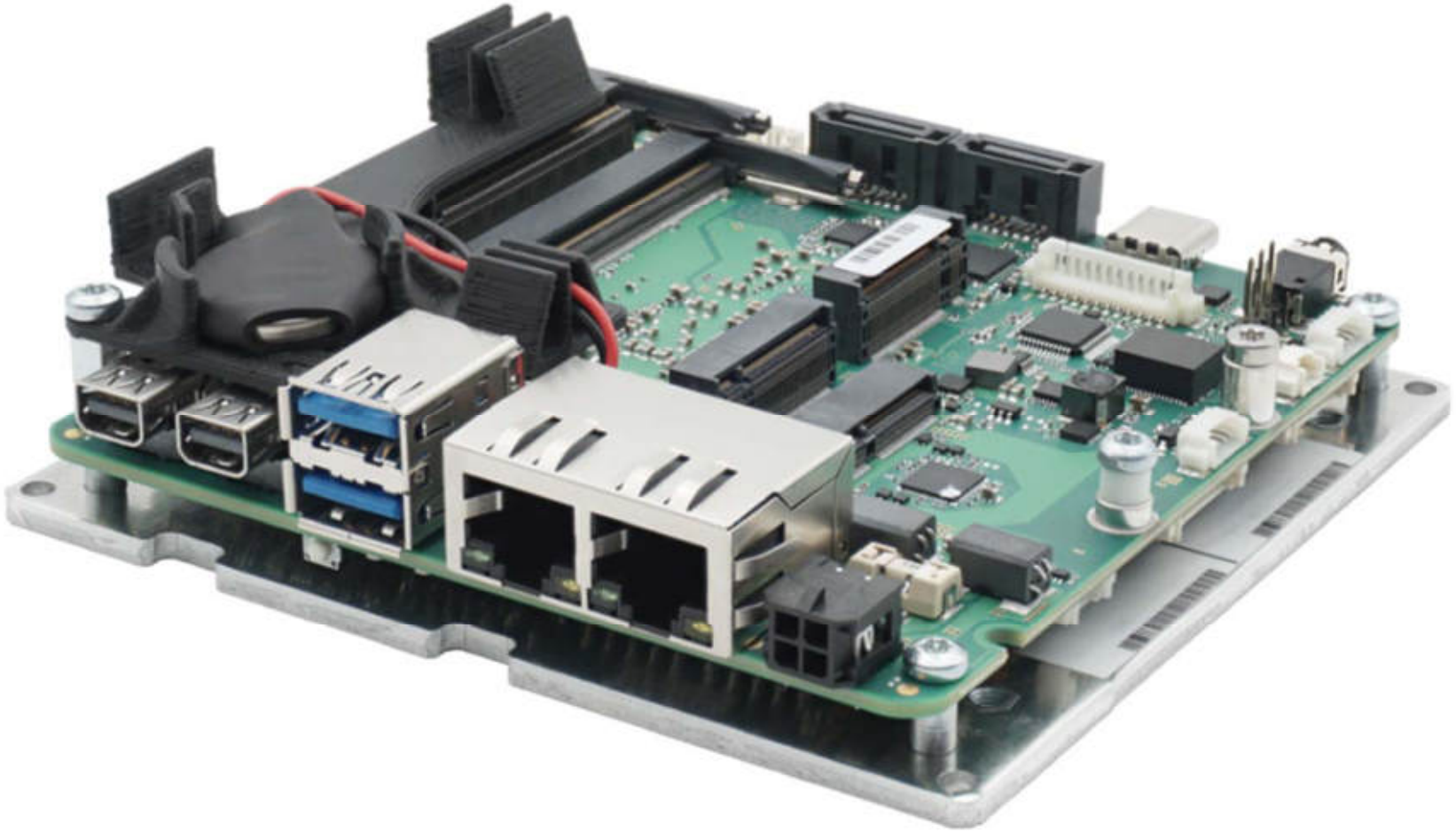
PROFIVE® NUCT_HS – Hardware Reference Manual – P – Rev. 2



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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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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.

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Packaging

The product is in a protective package to avoid damage during transport.
This protective package should be environmentally 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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Revision History

Date	Version	Changes	Proofed
29.02.2024	2.0	First release for NUCT easy to integrate	
12.03.2024	2.1	Minor corrections	

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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.

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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) automotive grade | KL15, 8 A fused EMI filtering
4-pin connector for external DC power, ignition and ground
Internal and external 3,3V power max. 20W
Internal and external 5V power max. 30W
Internal and external power is related to m.2 connectors, USB, fan, SATA and Display

Processor Support

Intel® Celeron® 6000 and 11th Generation Intel® Core™ processor series:

INTC6305E / 2C / 2T / 1.8 GHz / 15 W / commercial grade
i3-1115G4E / 2C / 4T / 2.2 GHz – 3.9 GHz / 12 – 28 W / commercial grade
i3-1115GRE / 2C / 4T / 2.2 GHz – 3.9 GHz / 12 – 28 W / ind. grade
i5-1145G7E / 4C / 8T / 1.5 GHz – 4.1 GHz / 12 – 28 W / commercial grade
i5-1145GRE / 4C / 8T / 1.8 GHz – 4.1 GHz / 12 – 28 W / ind. grade
i7-1185G7E / 4C / 8T / 1.8 GHz – 4.4 GHz / 12 – 28 W / commercial grade
i7-1185GRE / 4C / 8T / 2.2 GHz – 4.4 GHz / 12 – 28 W / ind. grade

Ethernet Controller

2 Intel® i225/i226 2.5 Gbit/s Ethernet PCI Express® controllers with IEEE1588, TSN-support, Wake-on-LAN supported by ETH1.
I225: 0 °C to +60 °C ambient commercial grade
I226: -40 °C to +85 °C ambient industrial grade

RAM Support

Max. 2x 32 GB dual channel DDR4 SODIMM, up to 3200 MT/s;
Industrial grade variants with In-Band ECC.

Display

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

1 eDP connector, up to 4096 x 2304 @ 60 Hz with backlight control (OEM/ODM only).

Serial Ports

2 RS-232/485 (FDX|HDX Windows only) port (8/4 wires) on internal Molex connectors.

USB Support

1 Dual-USB 3.2, Type A at the front side,
support for USB 2.0, USB 3.2 Gen1 and Gen2, max. 1.5 A per port.

1 USB-C connector at the rear side,
support for USB 2.0, USB 3.2 Gen1 and Gen2, max. 3 A.

1 USB 2.0 connection to the M.2 Key B socket.

1 USB 2.0 connection to the M.2 Key E socket.

2 internal USB connectors, support for USB 2.0, max. 900 mA per port.
All USB ports are equipped with overcurrent protection (OCP).

Storage Support

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1 M.2 socket Key M, 22 mm x 42 mm
(for SSD only / NVMe with PCIe x4 / SATA OEM/ODM only).

2 standard SATA III (6Gb/s) upright connectors + 2 SATA Power Molex connectors (+5V DC/1,5A/NOT-FUSED).

Expansion Slots

2 M.2 sockets:

- 1 Key E, 22 mm x 30 mm for WLAN/BT
- 1 Key B, 30 mm x 42 mm for WWAN or 2nd SSD

Audio

HDA Audio CODEC (only commercial grade)

MIC IN, stereo HP OUT on 3.5 mm headphone Jack

Stereo Line IN, stereo Line OUT on internal Molex connector

OS Support

Microsoft® Windows® 11

Microsoft® Windows® 10

Microsoft® Windows® 10 IoT Enterprise

Linux Ubuntu 22.04 LTS

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
- KL15 support

Feature connector (GPIO/PWM/LED)

Power LED onboard

Status LED onboard

RTC battery connector

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1.2 Environmental Specification

Max. Operating Temperature

Depending on variant and cooling system.

CPU throttling may occur at higher ambient temperatures.

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

-40 °C to +85 °C ambient industrial grade, when adequate heatsink/cooling is provided.

Max. Storage Temperature

-40 °C to +85 °C

Max. rel. Humidity for all versions

95 % @ 40 °C non-condensing

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2 System Overview

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

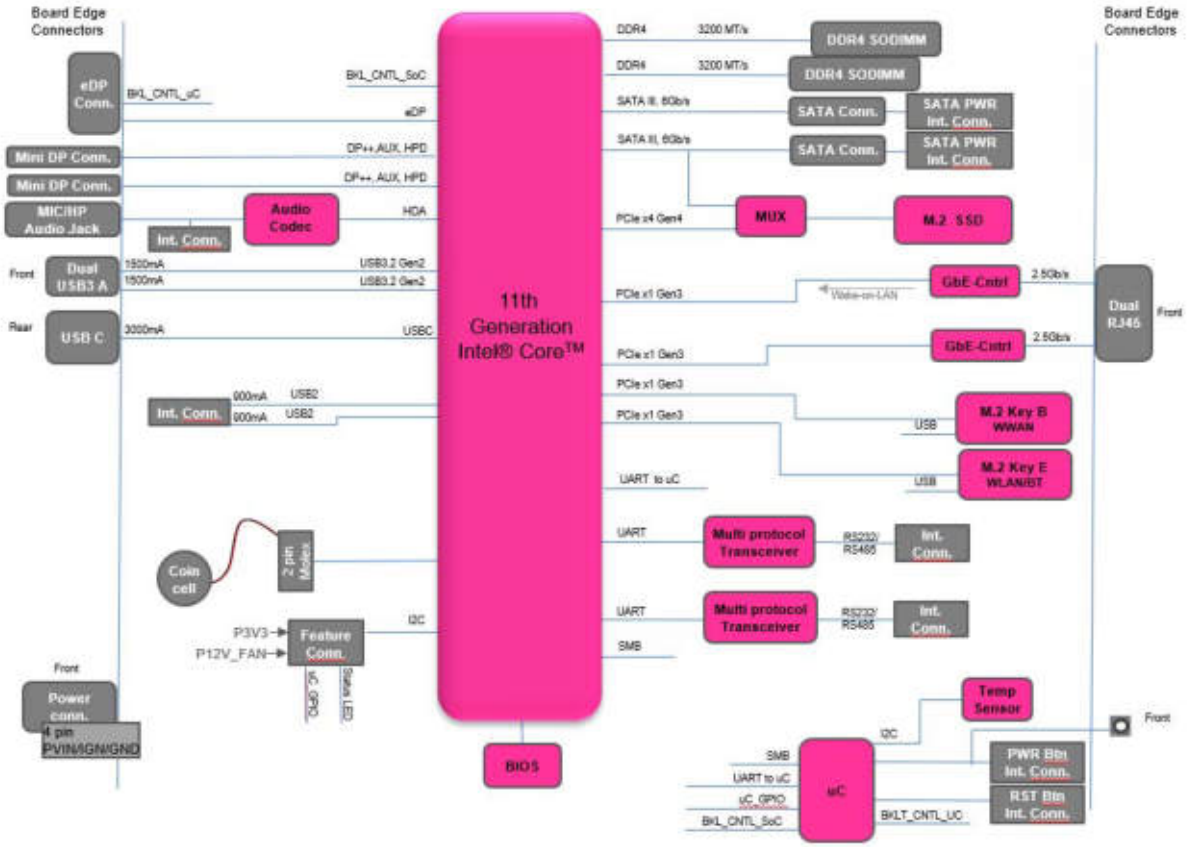

Fig. 1: System Overview

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3 Assembly

In order to obtain sufficient cooling, the "easy to integrate" unit must be mounted to a customer responsible cooling unit.

It is recommended to improve the thermal transition with thermal paste or gap pads between the NUCT and customers cooling unit. In order to obtain the necessary contact pressure, the mechanical fastening points according to Fig. 3 must be used. **The length of the M3 screws must be chosen so that they can be screwed into the fastening points by a maximum of 3mm.**

E.E.P.D. recommends M3 Torx screws (quality 8.8 or better) with screw lock coating and a tightening torque of 0.75 Nm to a **maximum of 1 Nm**.

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Top View

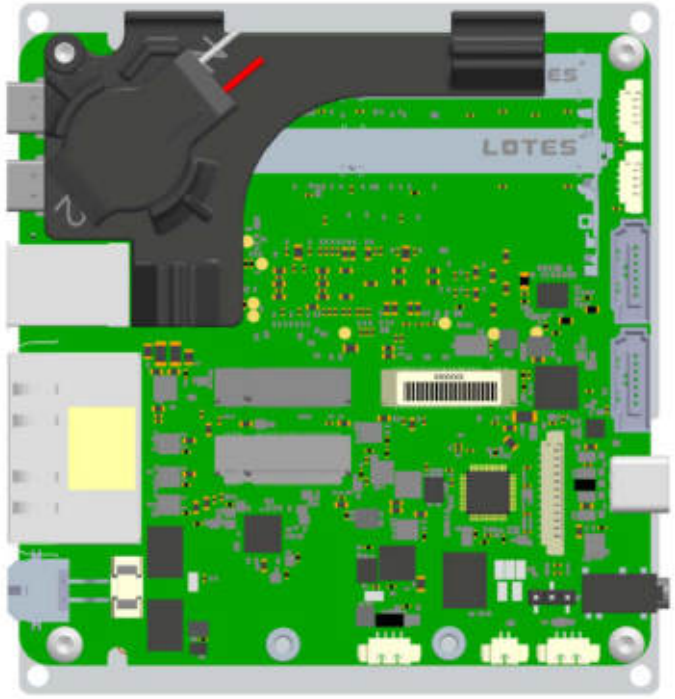

Fig. 2: Top View

Bottom View

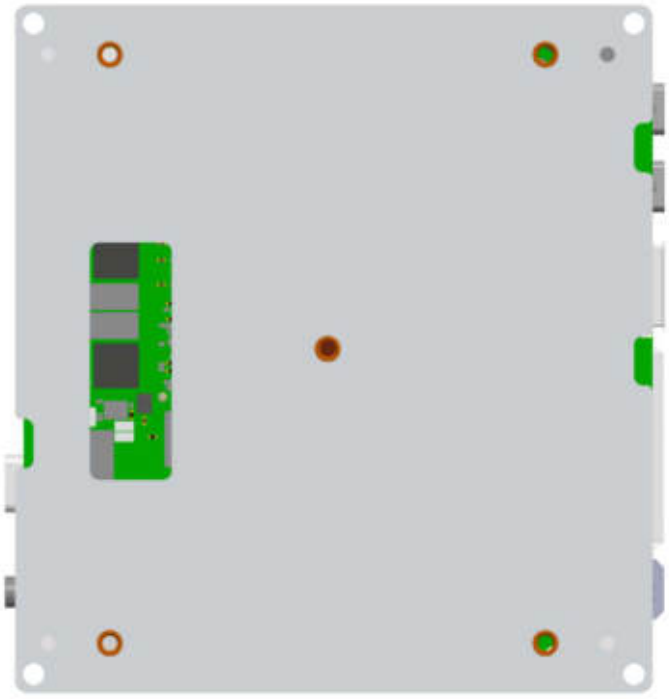

Fig. 3: Bottom View, with mounting points for customers cooling unit

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Front View

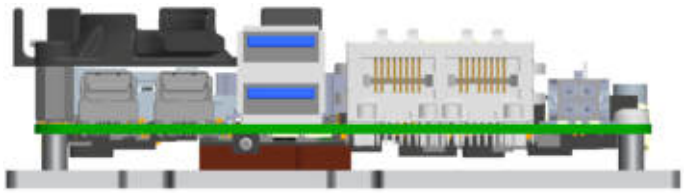

Fig. 4: Front View

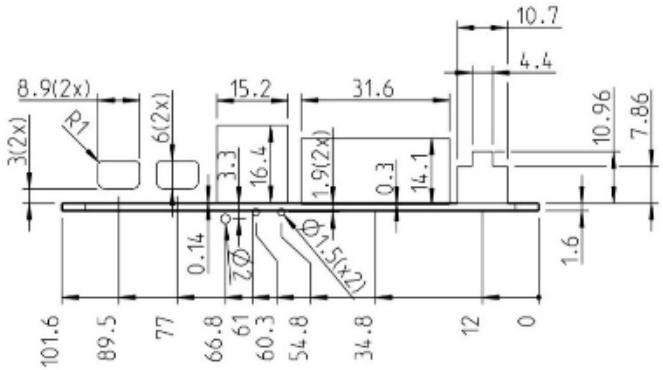

Fig. 5: recommended cutouts front panel

Rear View

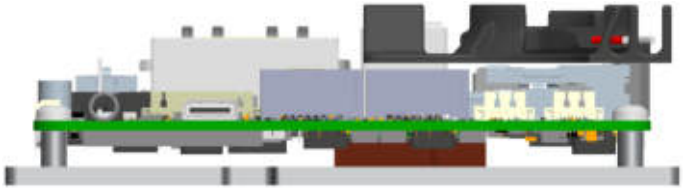

Fig. 6: Rear View

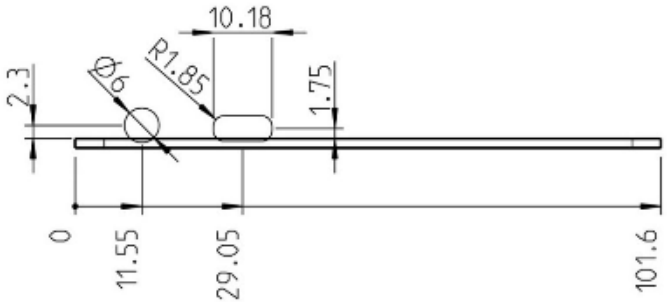

Fig. 7: recommended cutouts rear panel

Side View

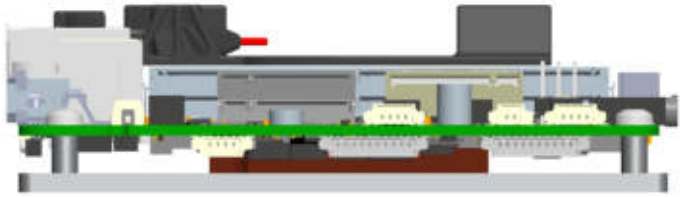

Fig. 8: Side View

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3.1 Mechanical Mounting

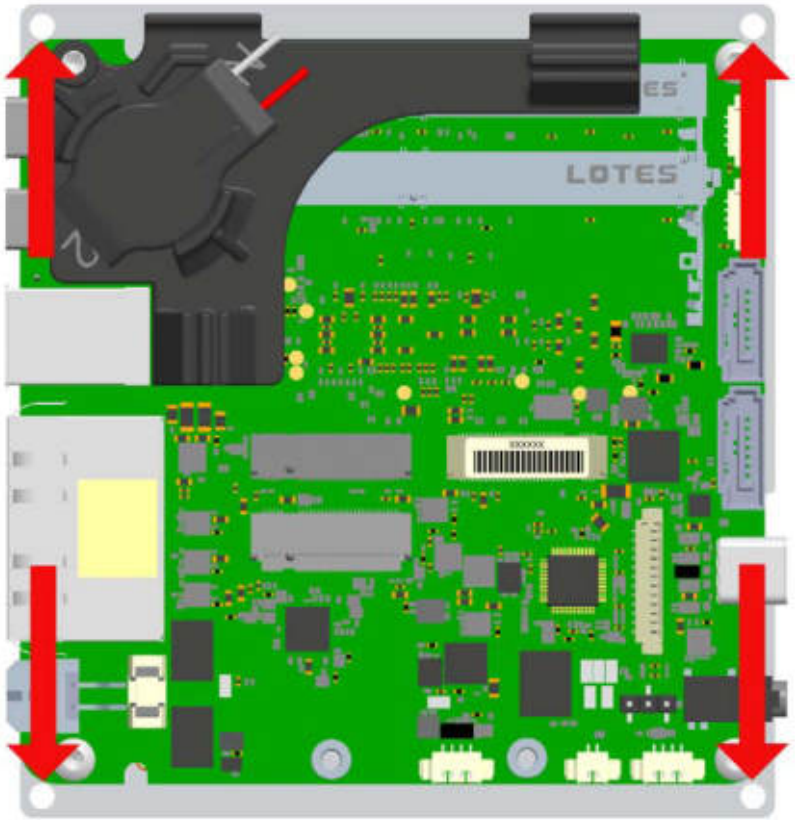

Fig. 9: Mechanical Mounting

CAUTION

The combination of “easy to integrate” NUCT and customer responsible cooling unit can be mounted using these 4 additional attachment points if necessary.

Do not remove the board from the mounting plate or the warranty will be void.

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3.2 Dimensions

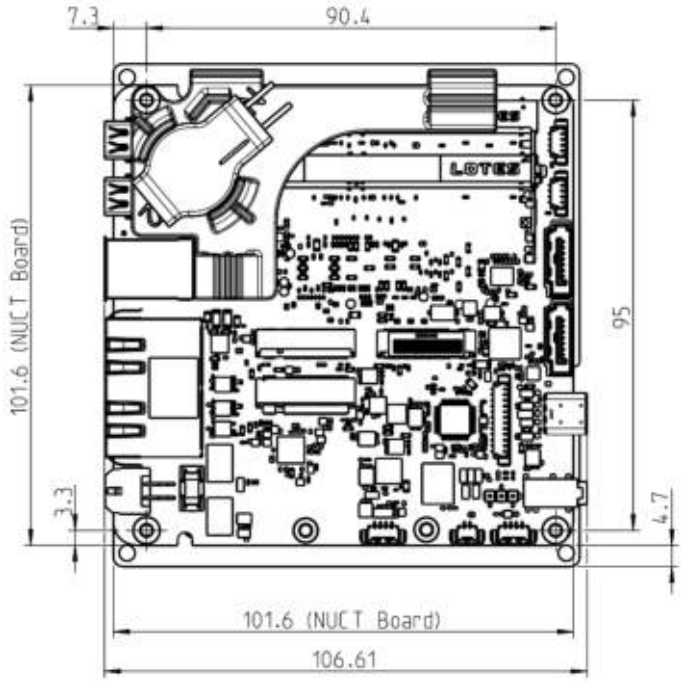

Fig. 10: Dimensions – top side

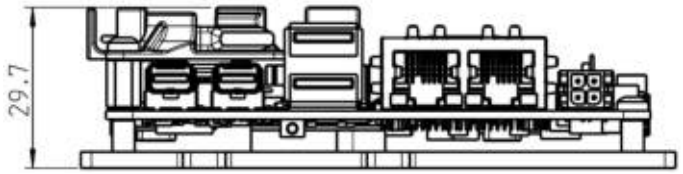

Fig. 11: Dimensions - height

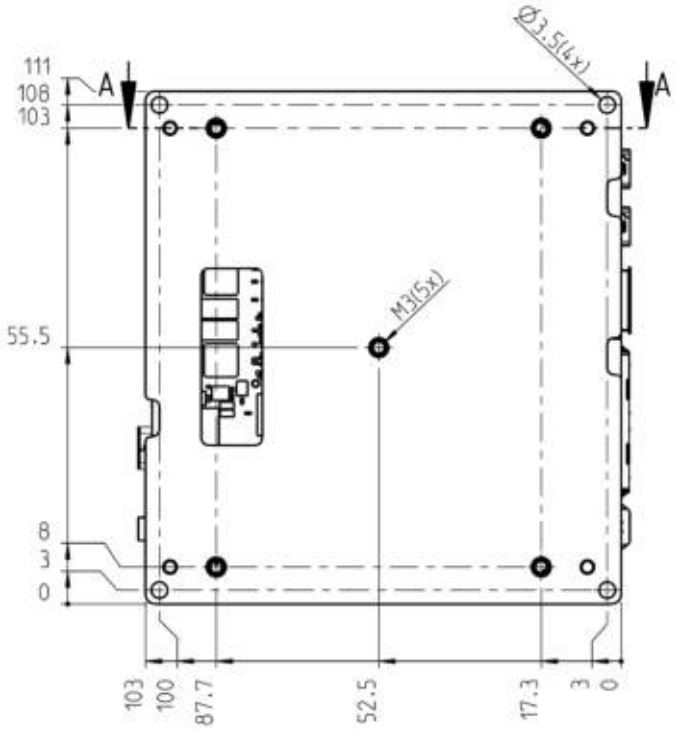

Fig. 12: Dimensions – bottom side

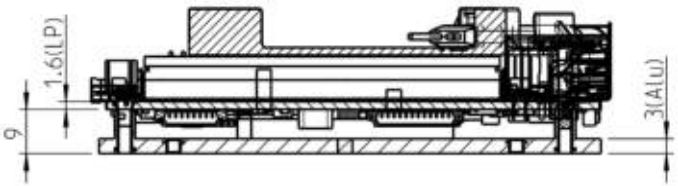

Fig. 13: Dimensions - heatspreader

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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 +/-5%
P3V3	3.3 V +/-5%
P12V_eDP	12 V +/-5%

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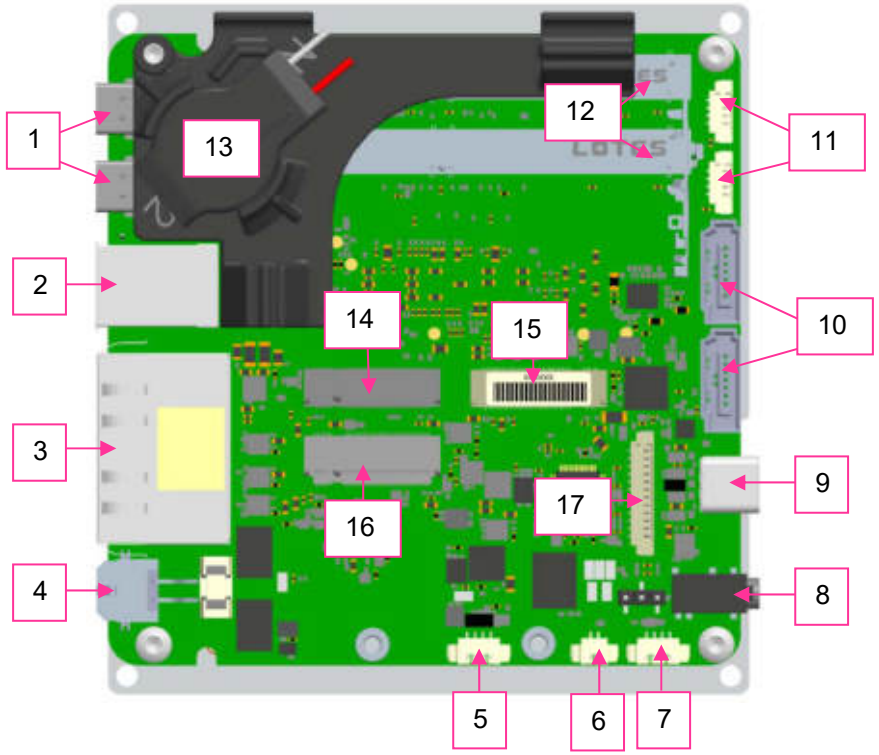
4.1 Connection Overview

Top Side



1 – Mini-DP connectors, see chapter *4.2*
2 – Dual-USB 3.2 port, see chapter *4.3*
3 – 2.5 Gigabit Ethernet Dual-Port, see chapter *4.4*
4 – Power connector, see chapter *4.5*
5 – SSD FAN connector, see chapter *4.19*
6 – Reset button connector, see chapter *4.17*
7 – Power button connector, see chapter *4.18*
8 – Audio Jack, see chapter *4.10*
9 – Rear USB-C port, see chapter *4.9*
10 – SATA Data connectors, see chapter *4.13*
11 – SATA Power connectors, see chapter *4.14*
12 – DDR4 SODIMM sockets, see chapter *4.6*
13 – Battery, see chapter *4.12*
14 – M.2 Key B socket, see chapter *4.8.3*
15 – M.2 Key M socket, see chapter *4.8.1*
16 – M.2 Key E socket, see chapter *4.8.2*
17 – Audio connector, see chapter *4.7*

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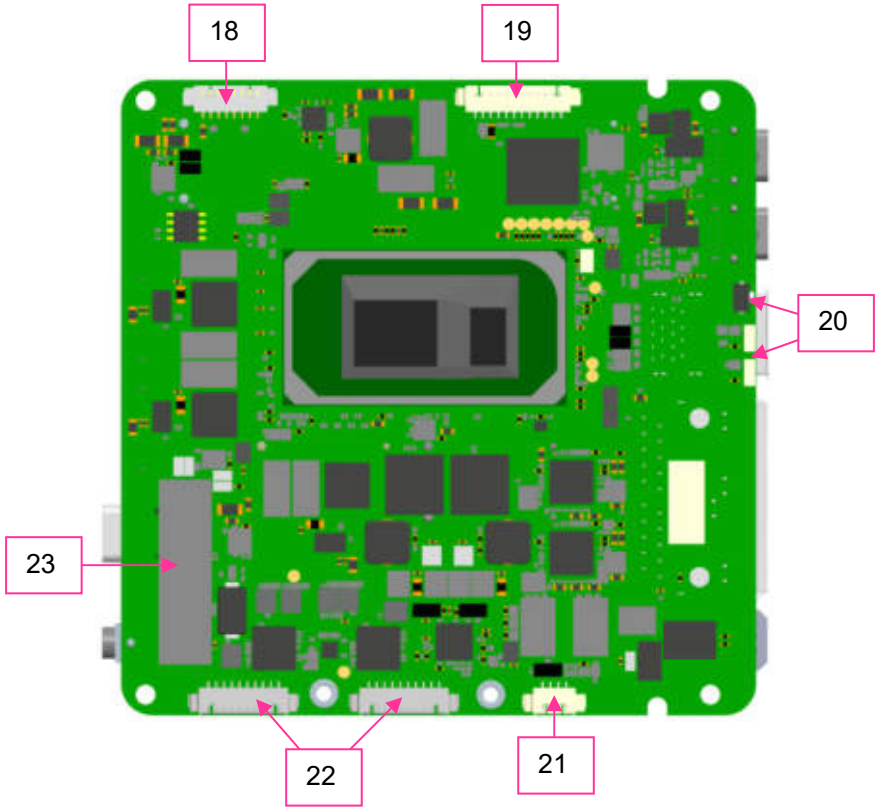
Bottom Side



18 – Internal USB connector, see chapter *4.22*

19 – Feature connector, see chapter *4.21*

20 – Power Button, Power and SATA LEDs *4.16*

21 – SoC FAN connector, see chapter *4.19*

22 – RS232/485 connectors, see chapter *4.19*

23 – eDP connector, see chapter *4.15*

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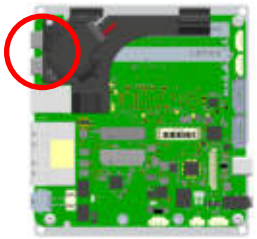
4.2 Mini-DP Connectors



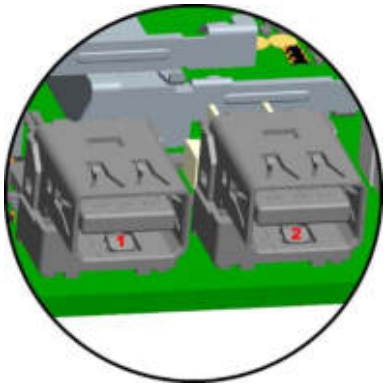


Fig. 14: Mini-DP Connector Detail

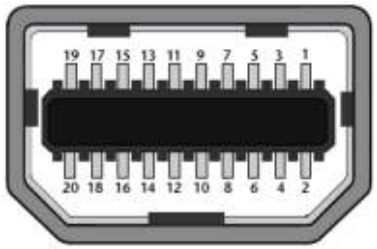


Fig. 15: Mini-DP Connector Schematic

CAUTION

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.
Dongles do not work properly (black display).

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4.3 Dual-USB 3.2 Port

USB 3.2 type ports providing max. 1.5 A per port / OCP.
Support for USB 2.0 and USB 3.2 Gen2 (10Gb/s).

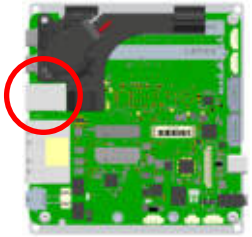


Fig. 16: Dual-USB 3.2 Port Detail

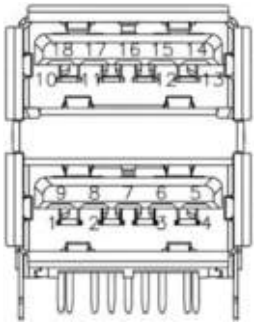
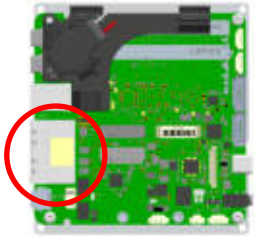


Fig. 17: Dual-USB 3.2 Port Schematic

4.4 2.5 Gigabit Ethernet Dual-Port

The Dual-Ethernet socket uses two Intel i225/i226 controllers.
ETH1 supports Wake-on-LAN.



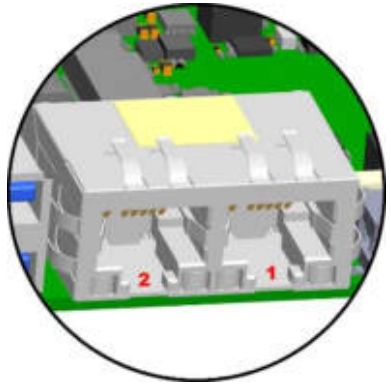


Fig. 18: Ethernet Dual-Port Detail

Yellow LED
Speed-LED is on during 2.5 or 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 blinks during communication with the Ethernet network.

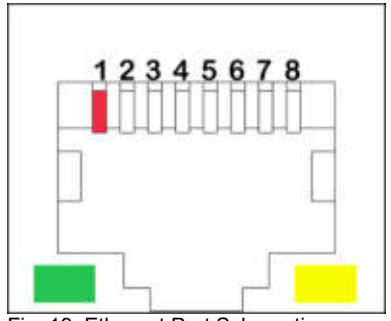


Fig. 19: Ethernet Port Schematic

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4.5 Power Connector

CAUTION

For a 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 (PVIN) min. 8 V / max. 32 V

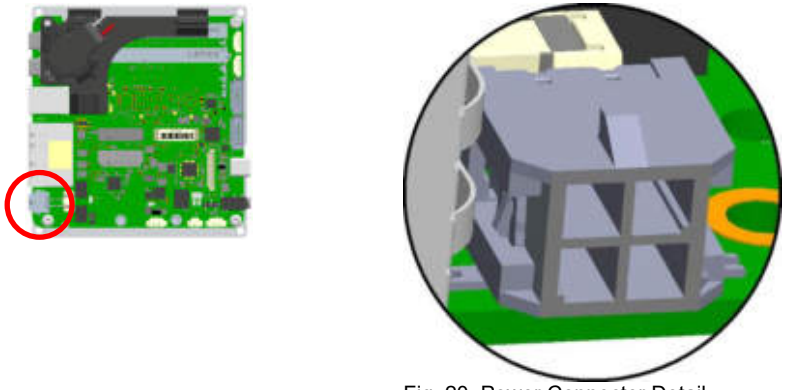

Fig. 20: Power Connector Detail

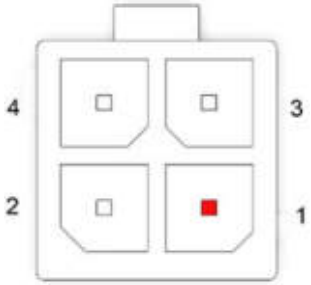

Fig. 21: Power Connector Schematic

Counterpart – plug:

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

Pin	Signal
1	GND
2	GND
3	PVIN
4	KL_15/Ignition

Tab. 1: Power Connector

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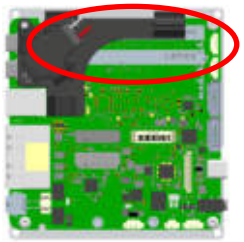
4.6 DDR4 RAM SODIMM Sockets



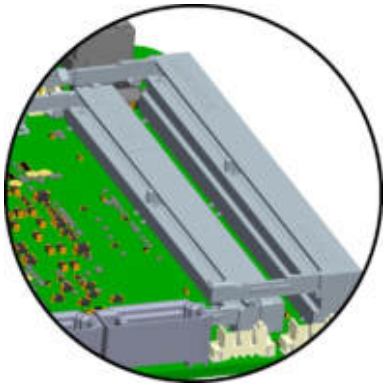


Fig. 22: DDR4 RAM SODIMM Socket Detail

Use only 1.2 V DDR4 SODIMM modules compliant with the DDR4 Standard.
Dual-channel DDR4 SODIMM, max. 2x 32 GB, up to 3200 MT/s.

Assembly:
First slide RAM module into the RAM socket.
Then press the module in direction to the board till you hear it snap.

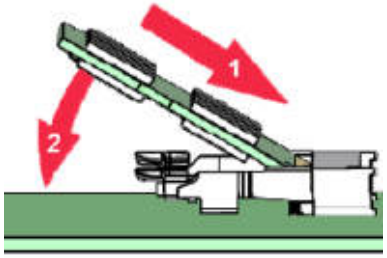


Fig. 23: RAM Assembly

Disassembly:
First press both clamps outwards.
Then the RAM module will set upright automatically.
Remove the card from the socket.

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4.7 Audio Connector

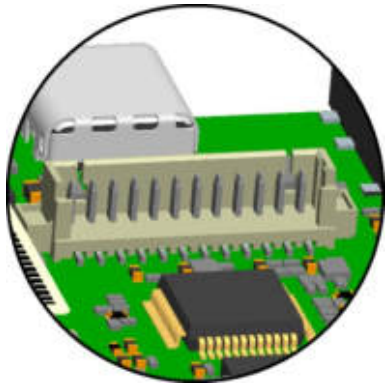

Fig. 24: Molex Audio Connector Detail

Counterpart – plug:

MOELX Pico Blade 0510211200

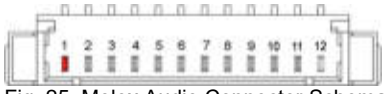

Fig. 25: Molex Audio Connector Schematic

Pin	Signal
1	JD_LINE_IN
2	LINE_IN_L
3	LINE_IN_R
4	GND_AUDIO
5	N.C.
6	GND_AUDIO
7	JD_LINE_OUT
8	LINE_OUT_L
9	LINE_OUT_R
10	GND_AUDIO
11	N.C.
12	N.C.

Tab. 2: Audio Connector

CAUTION

For optimum audio performance:

Please ensure to use cables provided by E.E.P.D.

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4.8 M.2 Sockets

4.8.1 M.2 Socket Key M, 22mm x 42mm, PCIe x4 (SATA OEM/ODM only), P3V3 max. 3,5 A, NOT-FUSED

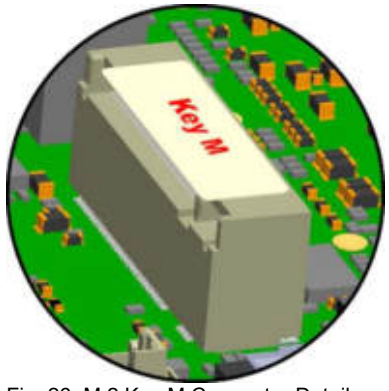

Fig. 26: M.2 Key M Connector Detail

4.8.2 M.2 Socket Key E, 22mm x 30mm, PCIe x1 and USB2, P3V3 max. 2 A

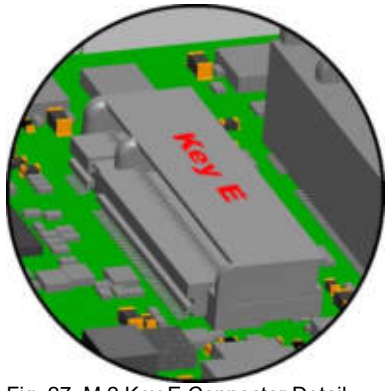

Fig. 27: M.2 Key E Connector Detail

4.8.3 M.2 Socket Key B, 30mm x 42mm, PCIe x1 and USB2, P3V3 max. 2.5 A

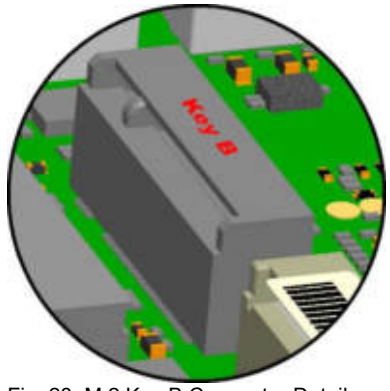

Fig. 28: M.2 Key B Connector Detail

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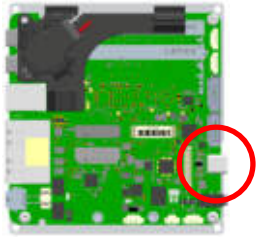
4.9 Rear USB-C Port

Support for USB 2.0 and USB 3.1 Gen2 (10Gb/s), max. 3 A (OCP).



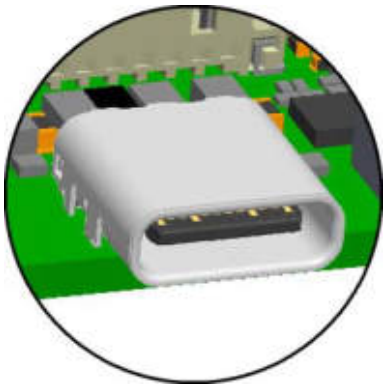


Fig. 29: USB-C Port Detail

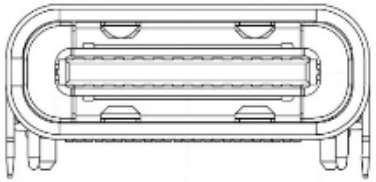


Fig. 30: USB-C Port Schematic

4.10 Audio Jack

3.5 mm Audio Jack provides mono microphone IN and stereo headset OUT.

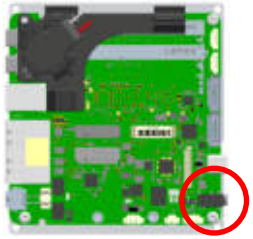


Fig. 31: Audio Jack Detail

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4.11 Jumper-Setting for Display Backlight – OEM/ODM only

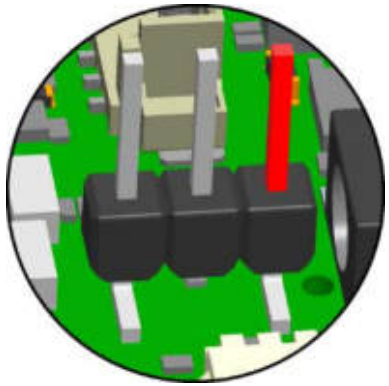

Fig. 32: STL3X1 Detail

Pin	Signal
1	P12V_eDP -> 12V +/-5%*
2	VDD_BKL
3	VCC_A -> 5V +/-5%

Tab. 3: STL3X1

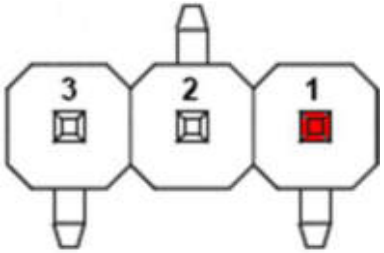

Fig. 33: STL3X1 Schematic

VDD_BKL provides max. 3A NOT-FUSED

4.12 Battery

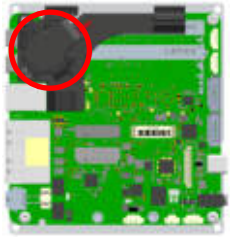

Fig. 34: Battery Detail

Danger of explosion if battery is incorrectly replaced.

Use only Lithium cell assemblies from EEPD. Battery assemblies can be obtained through sales@eepd.de.
For proper function of the board change the battery every five years.

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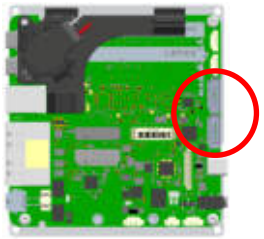
4.13 SATA Data Connectors



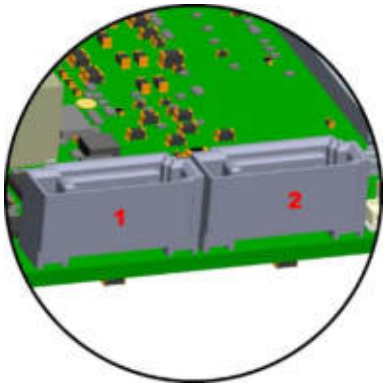


Fig. 35: SATA Data Connector Detail

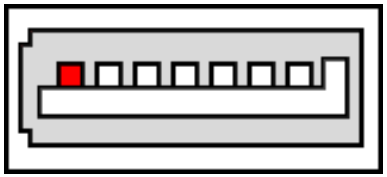
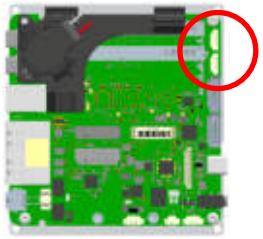


Fig. 36: SATA Data Connector Schematic

4.14 SATA Power Connectors

Provides 1.5 A, NOT-FUSED.



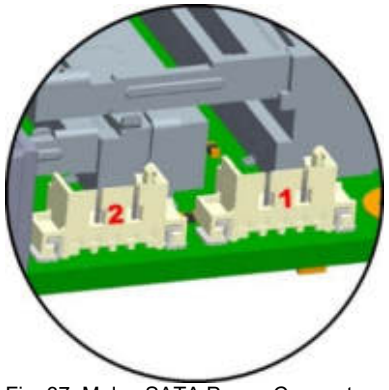


Fig. 37: Molex SATA Power Connector Detail

Counterpart – plug:

MOLEX Pico Blade 0510210400

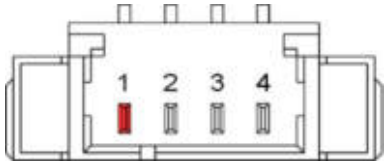


Fig. 38: Molex SATA Power Connector Schematic

Pin	Signal
1	VCC 5V +/- 5%
2	VCC 5V +/- 5%
3	GND
4	GND

Tab. 4: SATA Power Connector

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4.15 eDP Connector – OEM/ODM only

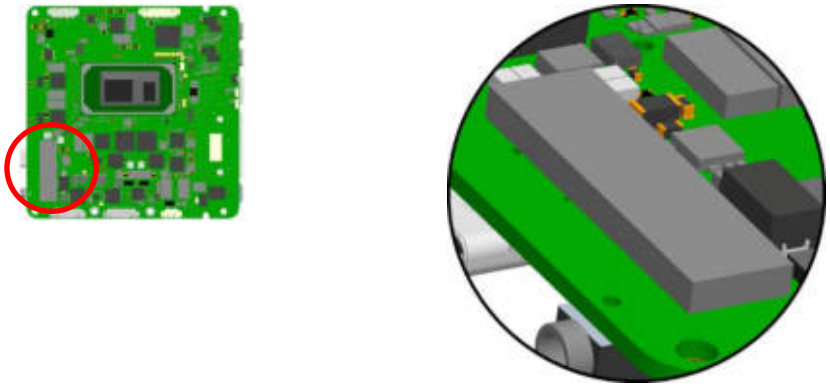

Fig. 39: eDP Connector Detail

Fig. 40: eDP Connector Schematic

Counterpart – plug:

e.g. ACES 50204-40

Pin	Signal	Pin	Signal
1	N.C.	23	GND
2	GND	24	GND
3	eDP_TX3_N	25	GND
4	eDP_TX3_P	26	GND
5	GND	27	eDP_HPD
6	eDP_TX2_N	28	GND
7	eDP_TX2_P	29	GND
8	GND	30	GND
9	eDP_TX1_N	31	GND
10	eDP_TX1_P	32	eDP_BKLEN
11	GND	33	eDP_BKLCTL_uC_OUT
12	eDP_TX0_N	34	N.C.
13	eDP_TX0_P	35	N.C.
14	GND	36	VDD_BKL*²
15	eDP_AUX_P	37	VDD_BKL*²
16	eDP_AUX_N	38	VDD_BKL*²
17	GND	39	VDD_BKL*²
18	VDD_LCD*	40	N.C.
19	VDD_LCD*	41	SHIELD_eDP
20	VDD_LCD*	42	SHIELD_eDP
21	VDD_LCD*	43	SHIELD_eDP
22	N.C.	44	SHIELD_eDP

Tab. 5: eDP Connector

* VDD_LCD = 3,3V +/- 5%, max. 3A, (other on request)
*² VDD_BKL = 5V or 12V, max. 3A, depends on jumper setting (4.11)

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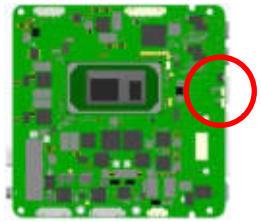
4.16 Power Button, Power and SATA LEDs

Press power button once to start up.
Press power button to shut down into S3/S4/S5 (Standby/Hibernate/OFF; depending on OS setting).
Hold power button (> 4 sec.) to shut down into S5 (OFF).



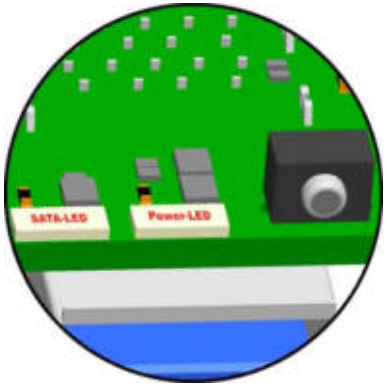


Fig. 41: Power Button/Power and SATA LEDs Detail

4.17 Reset Button Connector

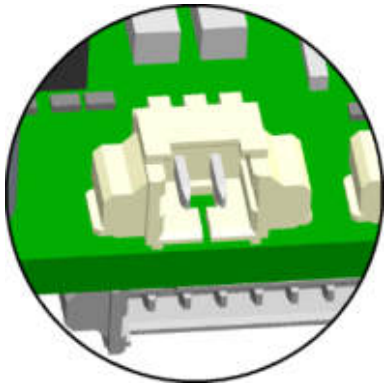


Fig. 42: Molex Reset Button Connector Detail

Counterpart – plug:

MOLEX Pico Blade 0510210200

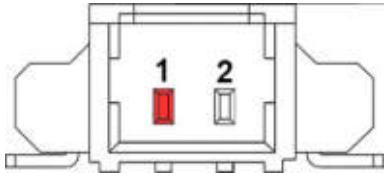


Fig. 43: Molex Reset Button Connector Schematic

Pin	Signal
1	RESET_IN
2	GND

Tab. 6: Reset Button Connector

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4.18 Power Button Connector

Press power button once to start up.
Press power button to shut down into S3/S4/S5 (Standby/Hibernate/OFF; depending on OS setting).
Hold power button (> 4 sec.) to shut down into S5 (OFF).

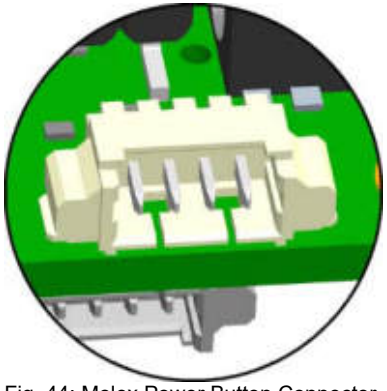


Fig. 44: Molex Power Button Connector Detail

Counterpart -plug:

MOLEX Pico Blade 0510210400

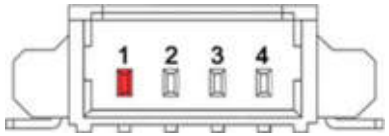
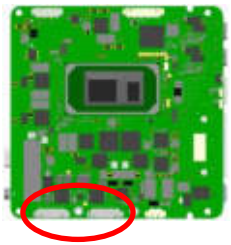


Fig. 45: Molex Power Button Connector Schematic

Pin	Signal	Pin	Signal
1	PWR_LED_ANODE 3.3V +/- 5% with 100 Ohm series resistor, 33mA max.	3	GND
2	PWR_LED_CATHODE	4	POWERBUTTON

Tab. 7: Power Button Connector

4.19 RS232/485 Connectors



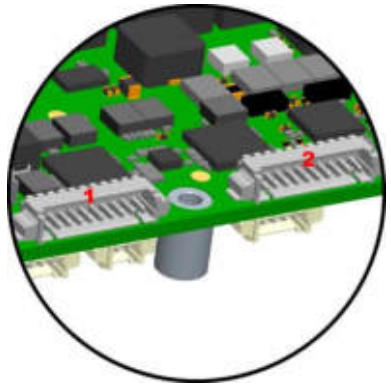


Fig. 46: Molex RS232/485 Connector Detail

Counterpart – plug:

MOLEX Pico Blade 0510211000

Fig. 47: Molex RS232/485 Connector Schematic

Pin	Signal	Pin	Signal
1	DCD_m	6	CTS_m
2	DSR_m	7	DTR_m
3	RXD	8	RI_m
4	RTS_m	9	Reserved N.C.
5	TXD	10	GND

Tab. 8: RS232/485 Connectors

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4.20 FAN Connectors

4.20.1 SoC FAN Connector

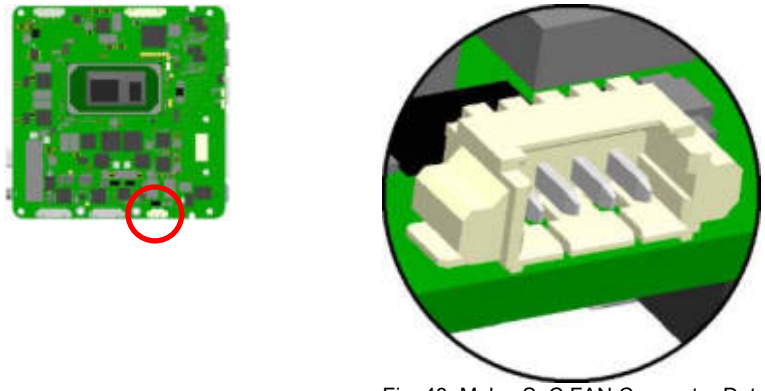

Fig. 48: Molex SoC FAN Connector Detail

Counterpart – plug:

MOLEX Pico Blade 0510210400

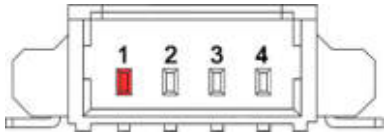

Fig. 50: Molex FAN Connector Schematic

Pin	Signal
1	GND
2	VDD_FAN *
3	FAN_TACHO
4	FAN_PWM

Tab. 9: FAN Connectors

4.20.2 SSD FAN Connector

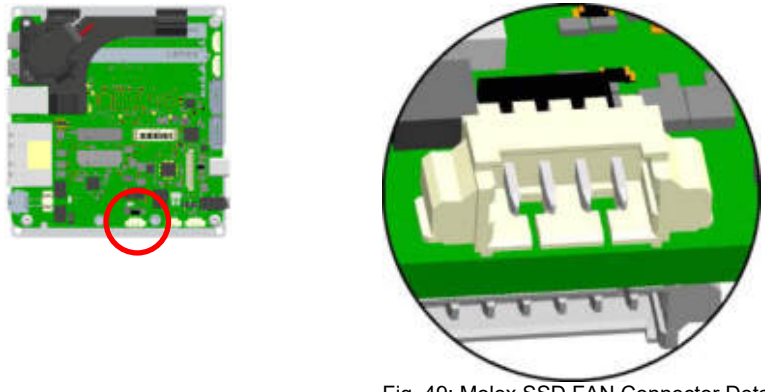

Fig. 49: Molex SSD FAN Connector Detail

*Voltage depends on board variant (applies to SoC and SSD FAN connector):
NUCTA-G = 5V +/-5%
12V on request
Max. 200mA

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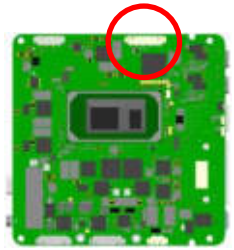
4.21 Feature Connector

Status LED and GPIO Connector.



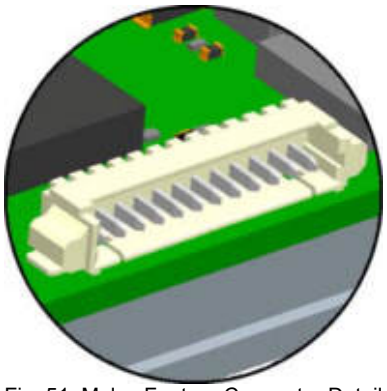


Fig. 51: Molex Feature Connector Detail

Counterpart – plug:

MOLEX Pico Blade 0510211200

Fig. 52: Molex Feature Connector Schematic

Pin	Signal
1	P3V3 +/- 5% | 200mA max.
2	P12V_FAN * | 100mA max.
3	GPIO0 *²
4	GPIO1 *²
5	GPIO2 *²
6	GPIO3 *²
7	GPO4 *³
8	GPO5 *³
9	GPO6 *³
10	STATUS_LED_ANODE 3.3V +/- 5% with 100 Ohm series resistor | 33mA max.
11	STATUS_LED_CATHODE
12	GND

Tab. 10: Feature Connector

*12V +/- 5%; PVIN must be >12V

*² GPIO [0:3]: max. 3.3V / max. 15mA sink/source

*³ GPO [4:6]: max. voltage = PVIN max / series resistor 100 Ohm (1/16W)

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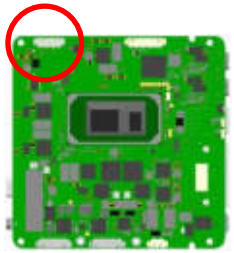
4.22 USB Internal Connector



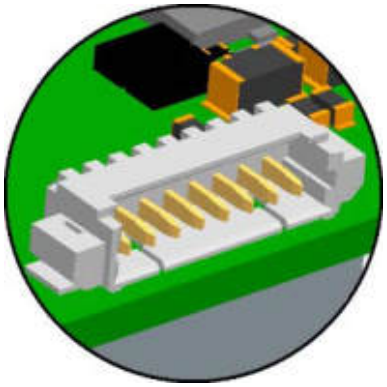


Fig. 53: Molex USB internal Connector Detail

Pin	Signal
1	VCC_USB2_4 -> 5V +/- 5%,OCP , 900mA
2	USB2_4_N
3	USB2_4_P
4	GND
5	VCC_USB2_5 -> 5V +/- 5%, OCP, 900mA
6	USB2_5_N
7	USB2_5_P
8	GND

Tab. 11: USB internal Connector

Counterpart – plug:

MOLEX Pico Blade 0510210800

Fig. 54: Molex USB internal Connector Schematic

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5 BIOS

The following description shows a snapshot of the BIOS setup. Later BIOS updates may change the content slightly.

Asterisk (*) indicates default setting.

5.1 Entering Setup

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

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5.2 Main Menu

Once you enter the Setup Utility, the Main Menu will appear on the screen.

Fig. 55: Main Menu

BIOS Settings	Options	Description
System Language	<English>*	Select the current default language used by the AMI-Aptio
System Date	No options	This is the help for the month field, day field, year field. Valid range is from 1 to 12, 1 to 31, 2000 to 2099. (Error checking will be done against month/day/year combinations that are not supported.) INCREASE/REDUCE: +/-.

Tab. 12: Main Menu

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5.3 Advanced Menu

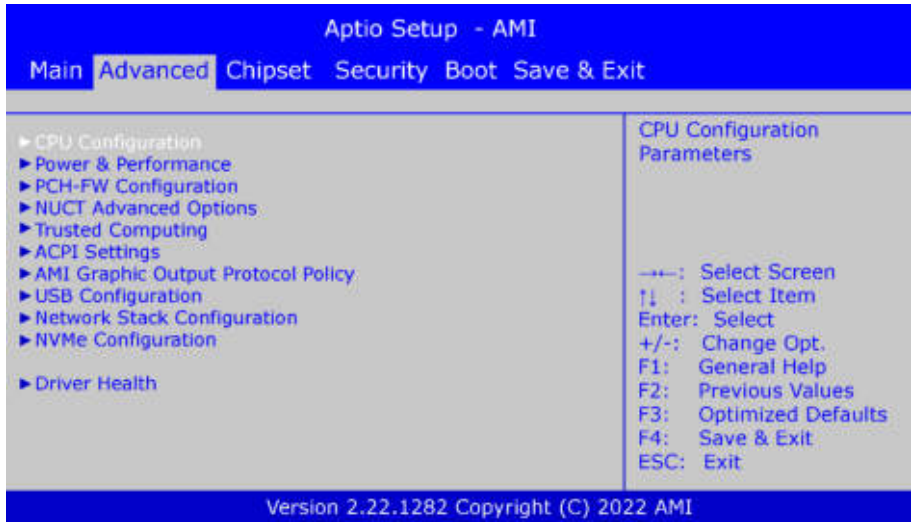

Fig. 56: Advanced Menu

BIOS Settings	Options	Description
CPU Configuration	No options	Detailed Information on CPU. Type | CPU ID | Speed (Frequency) | Cache
Power & Performance	See submenu	This Page allows the user to view and configure the power and performance settings of the system
PCH-FW Configurations	See submenu	Configure Management Engine Technology Parameters
NUCT Advanced Options	See submenu	Show more setup options and debug information
Trusted Computing	See submenu	Trusted Computing Settings
ACPI Settings	See submenu	The ACPI (Advanced Configuration and Power Interface) option is an advanced PnP and power management function
AMI Graphic Output Protocol Policy	See submenu	Output interface Selection. It depends on what kind of monitor you connect to this board
USB Configuration	See submenu	USB Configuration Parameters
Network Stack Configuration	See submenu	Network Stack Settings
NVMe Configuration	See submenu	NVMe Device Options Settings
Driver Health	See submenu	Provides Health Status for the Drivers/Controllers

Tab. 13: Advanced Menu

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5.3.1 CPU Configuration

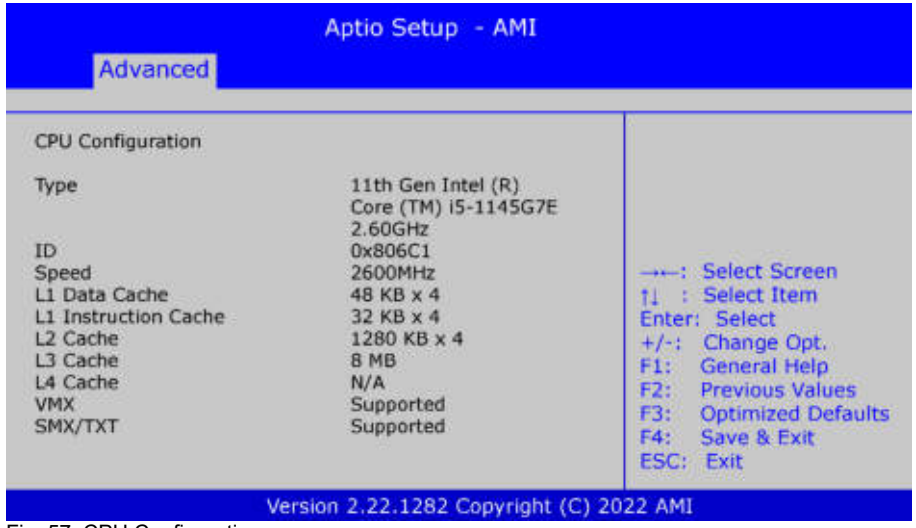

Fig. 57: CPU Configuration

BIOS Settings	Options	Description
CPU Configuration	Info page	

Tab. 14: CPU Configuration

5.3.2 Power & Performance

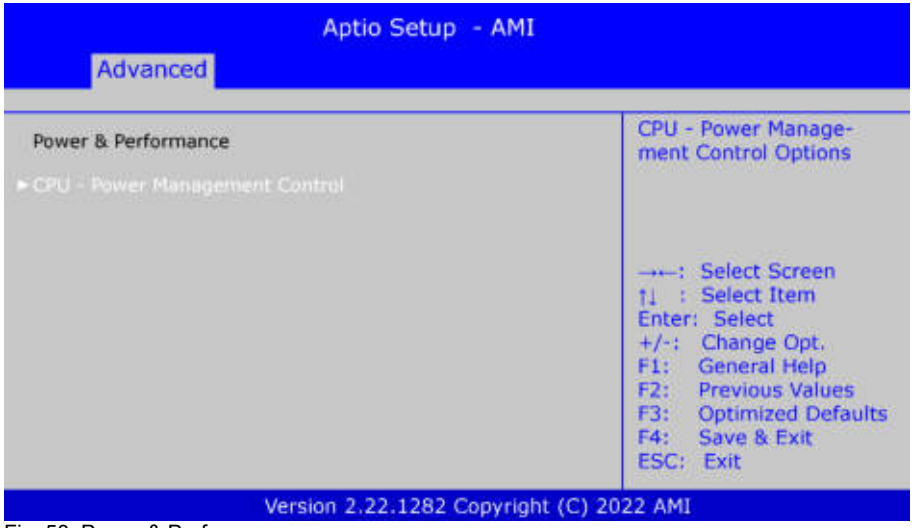

Fig. 58: Power & Performance

BIOS Settings	Options	Description
CPU - Power Management Control	See submenu	CPU – Power Management Control Options

Tab. 15: Power & Performance

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5.3.2.1 CPU – Power Management Control

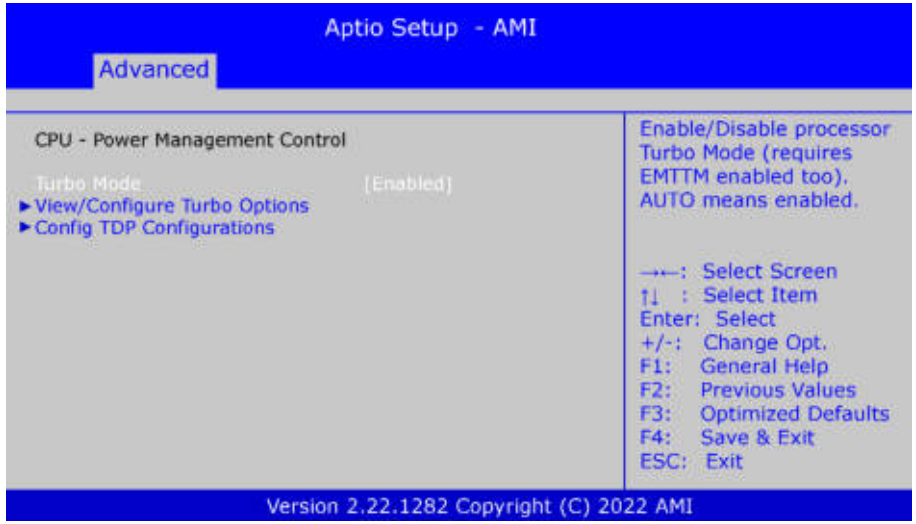

Fig. 59: CPU – Power Management Control

BIOS Settings	Options	Description
Turbo Mode	<Enabled>* <Disabled>	Enable or Disable processor Turbo Mode
View/Configure Turbo Options	Info page See submenu	View Turbo Options
Config TDP Configurations	See submenu	Configure TDP Options

Tab. 16: CPU – Power Management Control

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5.3.2.1.1 View/Configure Turbo Options

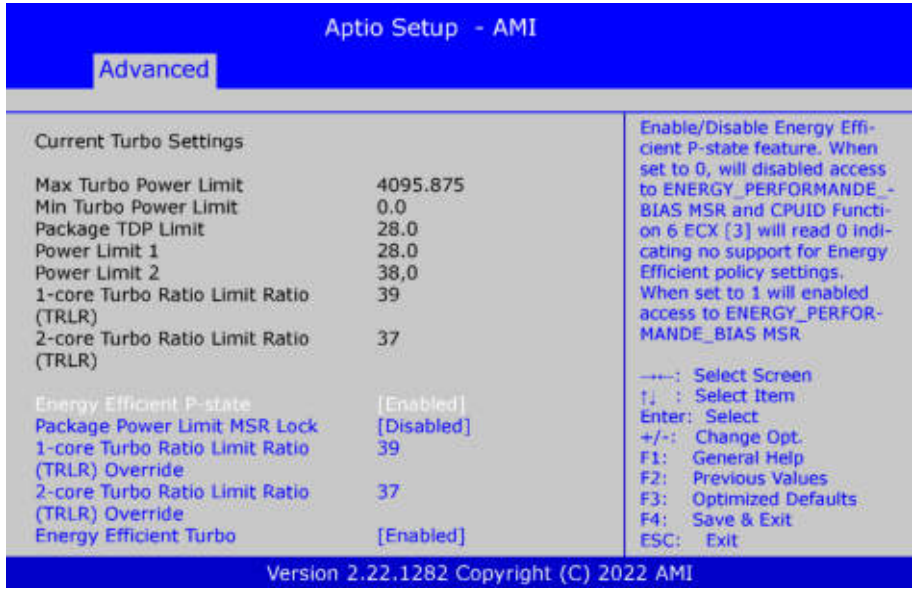

Fig. 60: View/Configure Turbo Options

BIOS Settings	Options	Description
Energy Efficient P-state		
Package Power Limit MSR Lock		
1-core Turbo Ratio Limit Ratio		
(TRLR) Override		
2-core Turbo Ratio Limit Ratio		
(TRLR) Override		
Energy Efficient Turbo		

Tab. 17: View/Configure Turbo Options

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5.3.2.1.2 Config TDP Configurations

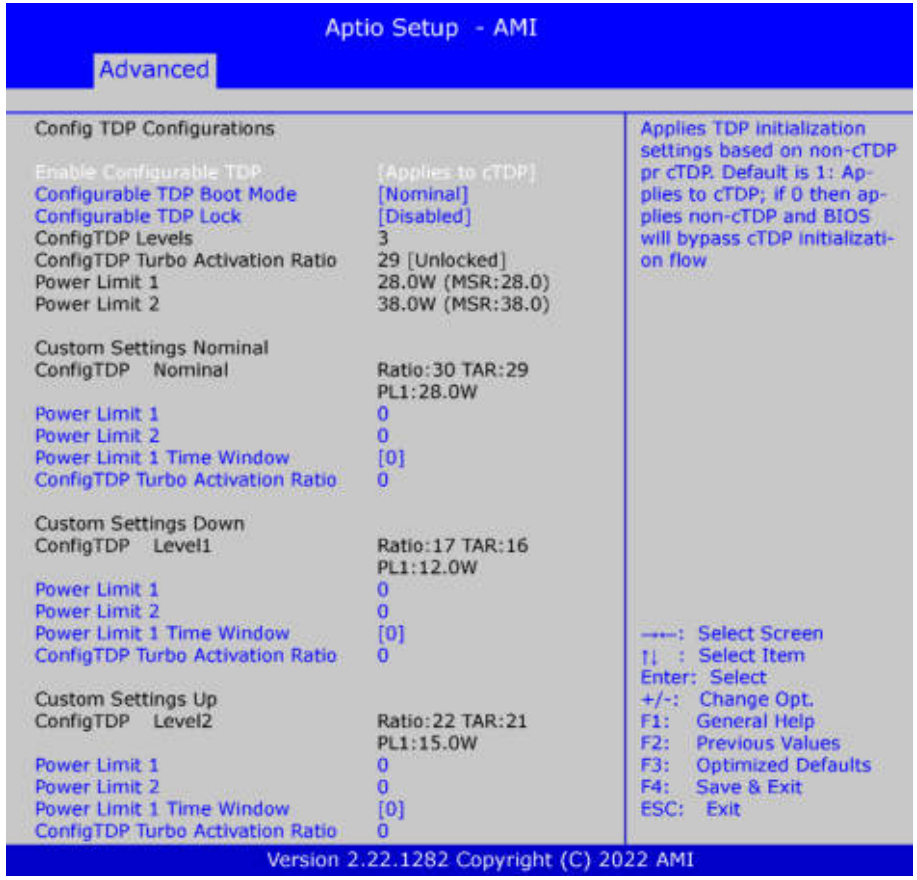

Fig. 61: Config TDP Configurations

BIOS Settings	Options	Description
Enable Configurable TDP	<Applies to cTDP>* <Applies to non-cTDP>	Applies TDP initialization settings based on non-cTDP or cTDP.
Configurable TDP Boot Mode	<Nominal>* <Down> <Up> <Deactivate>	Configurable TDP Mode as Nominal/Up/Down/Deactivate TDP selection. Deactivate option will set MSR to Nominal and MMIo to Zero
Configurable TDP Lock	<Enabled> <Disabled>*	Configurable TDP Mode Lock sets the Lock bits on TURBO_ACTIVATION_RATIO and CONFIG_TDP_CONTROL. Note: When CTDP Lock is enabled Custom ConfigTDP Count will be forced to 1 and Custom ConfigTDP Boot index will be forced to 0
Power Limit 1	<0 - X>	Power Limit 1 in milliwatts. BIOS will round to the nearest 1/8 W when programming. 0 = no custom override. For 12.50 W, enter 12500.
Power Limit 2	<0 - X>	Power Limit 2 value in milliwatts. BIOS will round to the nearest 1/8W when programming. 0 = no custom override. For 12.50 W, enter 12500. Processor applies control policies such that the package power does not exceed this limit.

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E.E.P.D. ...just embedded!

Power Limit 1 Time Window	<0 - 128>	Power Limit 1 Time Window value in seconds. The value may vary from 0 to 128. 0 = use default value (28 sec). Defines time window which TDP value should be maintained
ConfigTDP Turbo Activation Ratio	<0 - 125>	Custom value for Turbo Activation Ratio. Needs to be configured with valid values from LFM to Max Turbo. 0 means don't use custom value

Tab. 18: Config TDP Configurations

5.3.3 PCH-FW Configuration

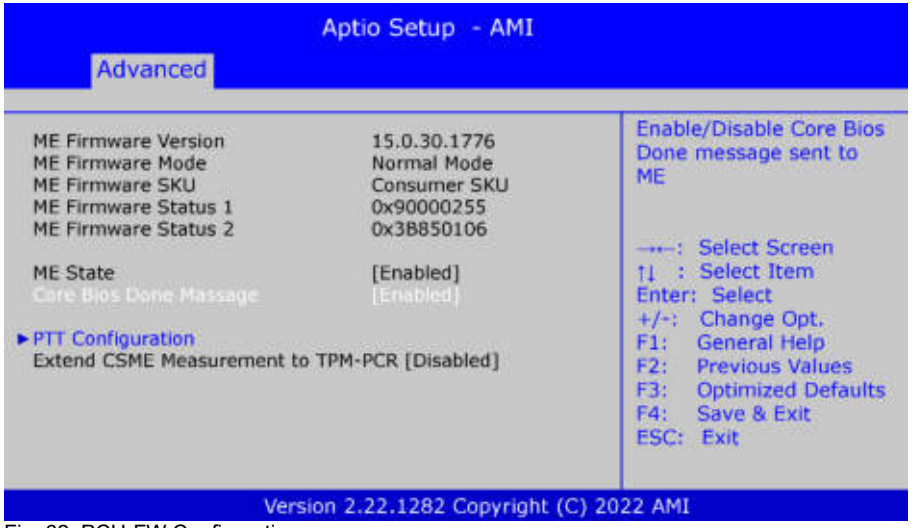

Fig. 62: PCH-FW Configuration

BIOS Settings	Options	Description
ME State	<Enabled>* <Disabled>	When disabled ME will be put into ME Temporarily Disabled Mode
Core BIOS Done Message	<Enabled>* <Disabled>	Enable/Disable Core BIOS Done Message sent to ME
PTT Configuration	Info page	PTT (Platform Trust Technology) enables low-cost and low-power devices to support the same root of trust concepts enabled by hardware-based TPM

Tab. 19: PCH-FW Configuration

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5.3.3.1 PTT Configuration

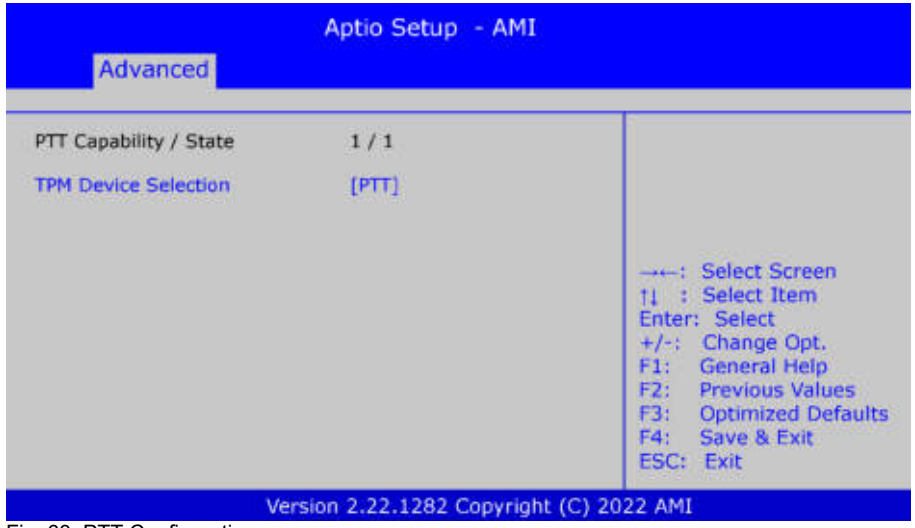

Fig. 63: PTT Configuration

BIOS Settings	Options	Description
TPM Device Selection	<PTT>* <dTPM>	Selects TPM Device: PTT or dTPM. PTT enables PTT in SkuMgr. dTPM disables PTT in SkuMgr

Tab. 20: PTT Configuration

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5.3.4 NUCT Advanced Options

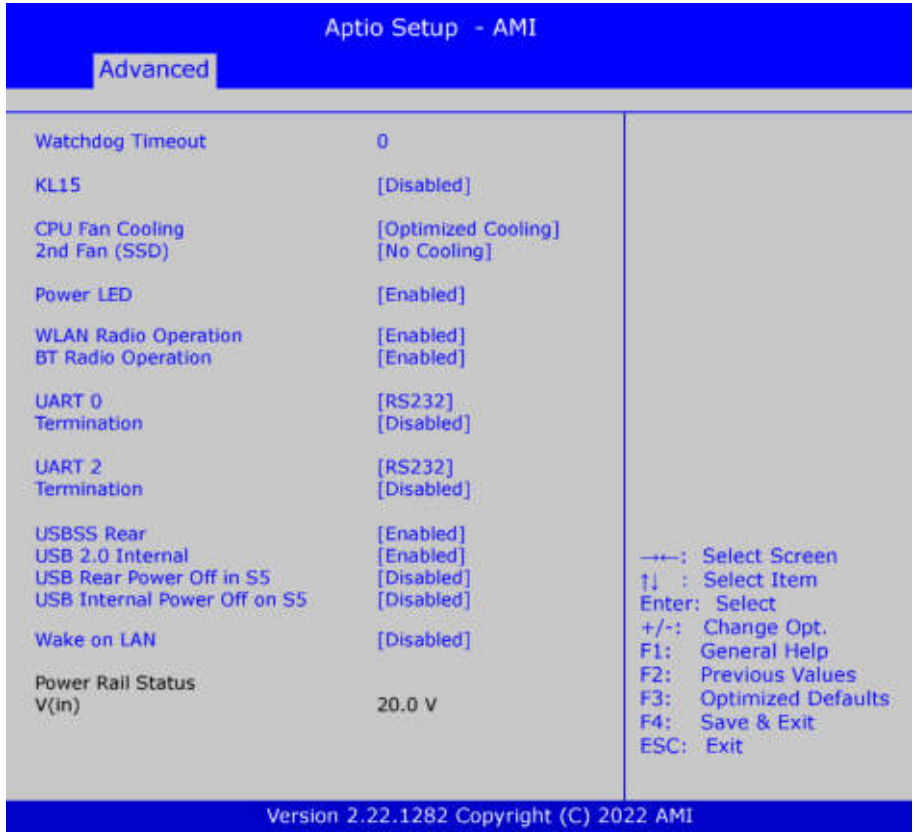

Fig. 64: NUCT Advanced Options

BIOS Settings	Options	Description
Watchdog Timeout	<0*,30-240>	Seconds before watchdog times out. Set 0 to disable watchdog. Values between 1 and 30 seconds are set to 30. Range 30-240 seconds
KL15 Support	<Enabled> <Disabled>*	If enabled, ensure Wake on Lan is disabled for proper function
CPU Fan Cooling	<Optimized Cooling>* <Low Noise> <Max Cooling> <No Cooling>	Configure CPU Fan Cooling options
2nd Fan (SSD)	<Optimized Cooling> <Low Noise> <Max Cooling> <No Cooling>*	Configure SSD Fan Cooling options
Power LED	<Enabled>* <Disabled>	Enable/Disable Power LED
WLAN Radio Operation	<Enabled>* <Disabled>	When a module is inserted select whether to enable or disable WLAN Radio Operation
BT Radio Operation	<Enabled>* <Disabled>	When a module is inserted select whether to enable or disable Bluetooth Radio Operation
UART 0	<Loopback> <RS232>* <RS485 Half Duplex>	Configure UART port 0 using options

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	<RS485/422 Full Duplex>	
Termination	<Enabled> <Disabled>*	Selects UART cable termination: disabled or enabled (120 ohms). NOTE: Only available for RS-485 and RS-422 modes
UART 1	<Loopback> <RS232>* <RS485 Half Duplex> <RS485/422 Full Duplex>	Configure UART port 0 using options
Termination	<Enabled> <Disabled>*	Selects UART cable termination: disabled or enabled (120 ohms). NOTE: Only available for RS-485 and RS-422 modes
USBSS Rear	<Enabled>* <Disabled>	Enables or disables power of the USBSS rear ports
USB 2.0 Internal	<Enabled>* <Disabled>	Enables or disables power of the internal USB2.0-ports
USB Rear Power off in S5	<Enabled> <Disabled>*	Enables or disables power of the USBSS rear ports, only when the system is shut down
USB Internal Power off in S5	<Enabled> <Disabled>*	Enables or disables power of the internal USB2.0-ports, only when the system is shut down
Wake on LAN	<Enabled> <Disabled>*	Enable or disable Wake on LAN

Tab. 21: NUCT Advanced Options

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5.3.5 Trusted Computing

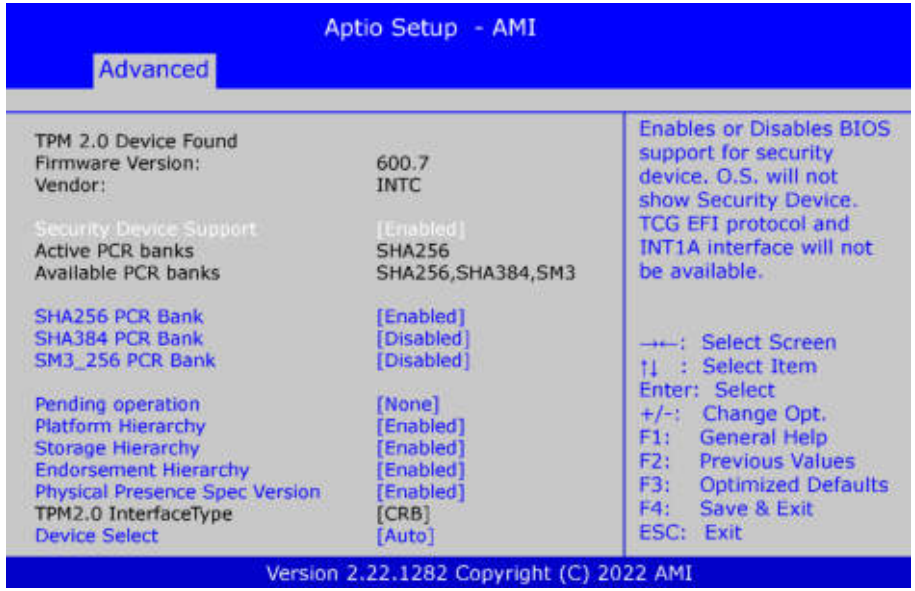

Fig. 65: Trusted Computing

BIOS Settings	Options	Description
Security Device Support	<Enabled>* <Disabled>	Enables or disables BIOS support for security device
SHA256 PCR Bank	<Enabled>* <Disabled>	Enable or Disable SHA256 PCR Bank
SHA384 PCR Bank	<Enabled> <Disabled>*	Enable or Disable SHA384 PCR Bank
SM3_256 PCR Bank	<Enabled> <Disabled>*	Enable or Disable SM3_256 PCR Bank
Pending Hierarchy	<none>* <TPM clear>	Schedule an Operation for the Security Device
Platform Hierarchy	<Enabled>* <Disabled>	The platform hierarchy is intended to be under the control of the platform manufacturer, represented by the early boot code shipped with the platform
Storage Hierarchy	<Enabled>* <Disabled>	The storage hierarchy is intended for non-privacy-sensitive operations, whereas the endorsement hierarchy, with separate controls, addresses privacy
Endorsement Hierarchy	<Enabled>* <Disabled>	The endorsement hierarchy enables secure storage of objects relevant for proving the identity of a given TPM-enabled platform. This includes the endorsement key, which is unique for each manufactured TPM device
Physical Presence Spec Version	<1.2> <1.3>*	Select to tell OS the supported PPI Spec Version
Device Select	<TPM 1.2> <TPM 2.0> <Auto>*	Select TPM device version

Tab. 22: Trusted Computing

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5.3.6 ACPI Settings

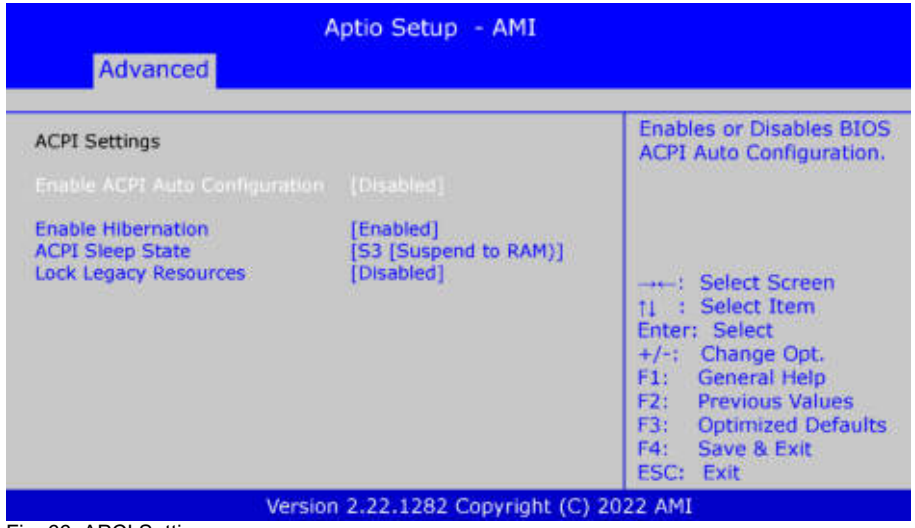

Fig. 66: APCI Settings

BIOS Settings	Options	Description
Enable ACPI Auto Configuration	<Enabled> <Disabled>*	Enables or disables ACPI Auto Configuration
Enable Hibernation	<Enabled>* <Disabled>	Enable or Disable system ability to Hibernation
ACPI Sleep State	<S3 [Suspend to RAM]>* <Suspend disabled>	Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed
Lock Legacy Resources	<Enabled> <Disabled>*	Locks legacy resources of the devices

Tab. 23: APCI Settings

5.3.7 AMI Graphic Output Protocol Policy

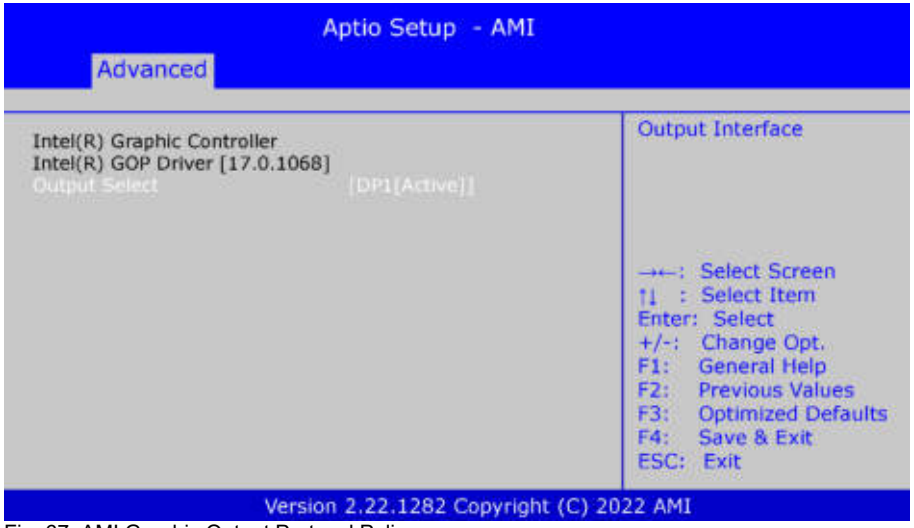

Fig. 67: AMI Graphic Output Protocol Policy

BIOS Settings	Options	Description
AMI Graphic Output Protocol Policy	<DP1> <DP2>	In Dual Screen Operation, select the pre-OS boot graphic output Interface

Tab. 24: AMI Graphic Output Protocol Policy

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5.3.8 USB Configuration

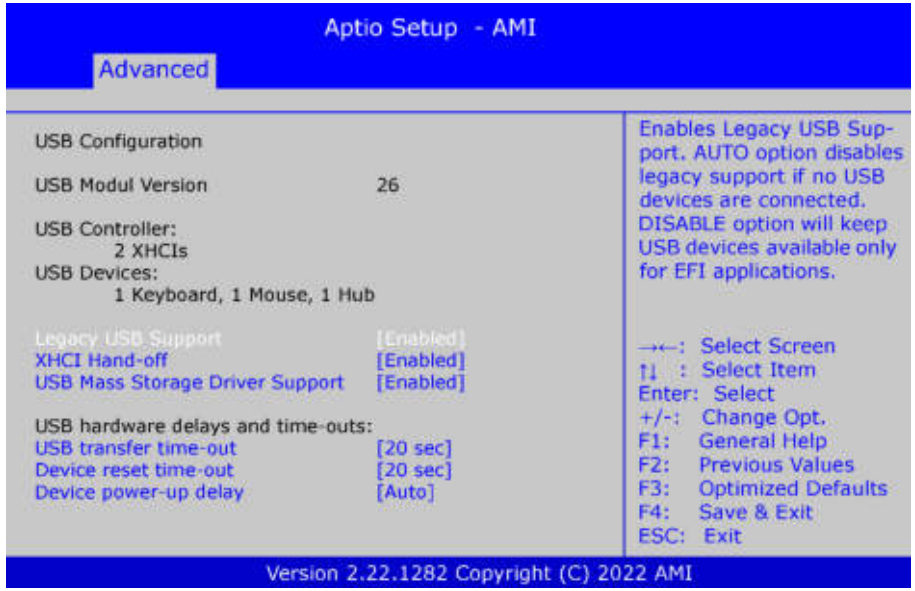

Fig. 68: USB Configuration

BIOS Settings	Options	Description
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	<Enabled>* <Disabled> <Auto>	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.
XHCI Hand-off	<Enabled>* <Disabled>	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.
USB Mass Storage Driver Support	<Enabled>* <Disabled>	Select Enabled for USB mass storage device support.
USB transfer time-out	<1sec> <5sec> <10sec> <20sec>*	Select time-out section. The time-out value for control, mass and interrupt transfers.
Device reset time-out	<10sec> <20sec>* <30sec> <40sec>	Select device time-out section. USB mass storage devices start unit command time-out
Device power-up delay	<Auto>* <Manual>	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.

Tab. 25: USB Configuration

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5.3.9 Network Stack Configuration

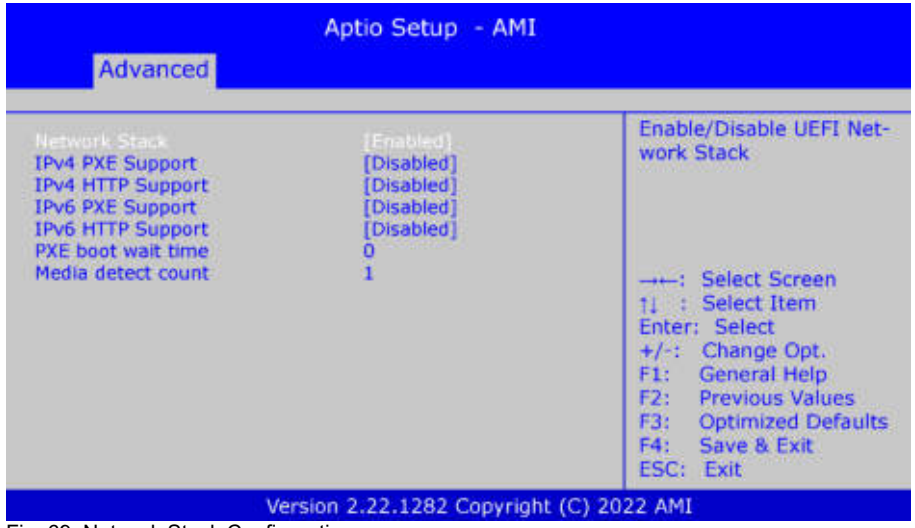

Fig. 69: Network Stack Configuration

BIOS Settings	Options	Description
Network Stack	<Disabled>* <Enabled>	Enable/Disable UEFI Network Stack
IPv4 PXE Support	<Disabled>* <Enabled>	Select Enabled to enable IPv4 PXE boot support
IPv4 HTTP Support	<Disabled>* <Enabled>	Select Enabled to enable IPv4 HTTP boot support
IPv6 PXE Support	<Disabled>* <Enabled>	Select Enabled to enable IPv6 PXE boot support
IPv6 HTTP Support	<Disabled>* <Enabled>	Select Enabled to enable IPv6 HTTP boot support
PXE boot wait time	<0*-5>	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	<1*-50>	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

Tab. 26: Network Stack Configuration

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5.3.10 NVMe Configuration

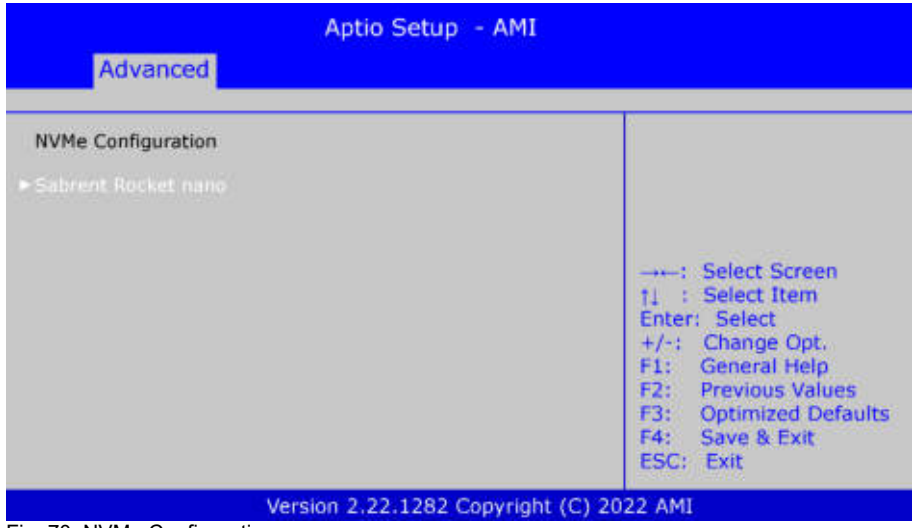

Fig. 70: NVMe Configuration

BIOS Settings	Options	Description
NVMe Configuration	See submenu	Display NVMe controller or Drive information

Tab. 27: NVMe Configuration

5.3.10.1 Example Device

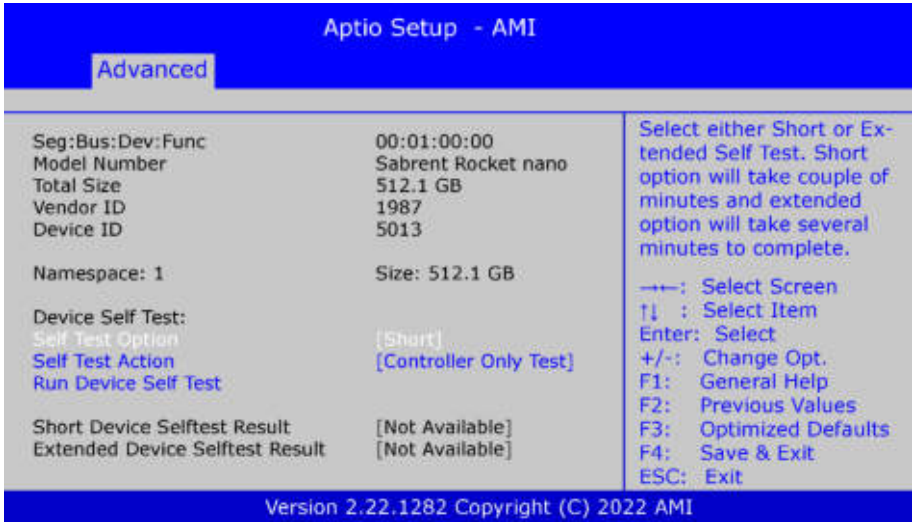

Fig. 71: Example Device

BIOS Settings	Options	Description
Self Test Option		
Self Test Action		
Run Device Self Test		

Tab. 28: Example Device

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5.3.11 Driver Health

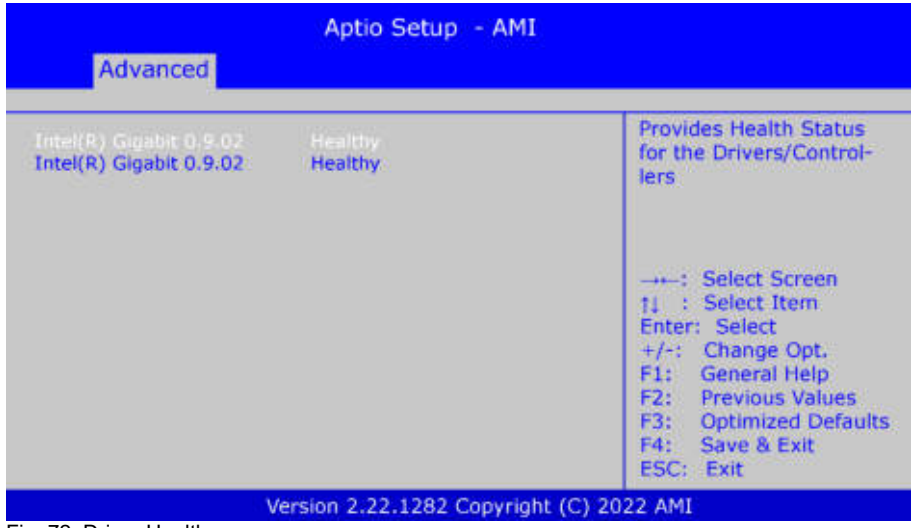

Fig. 72: Driver Health

BIOS Settings	Options	Description
Intel® Gigabit 0.9.02		
Intel® Gigabit 0.9.02		

Tab. 29: Driver Health

5.4 Chipset Menu

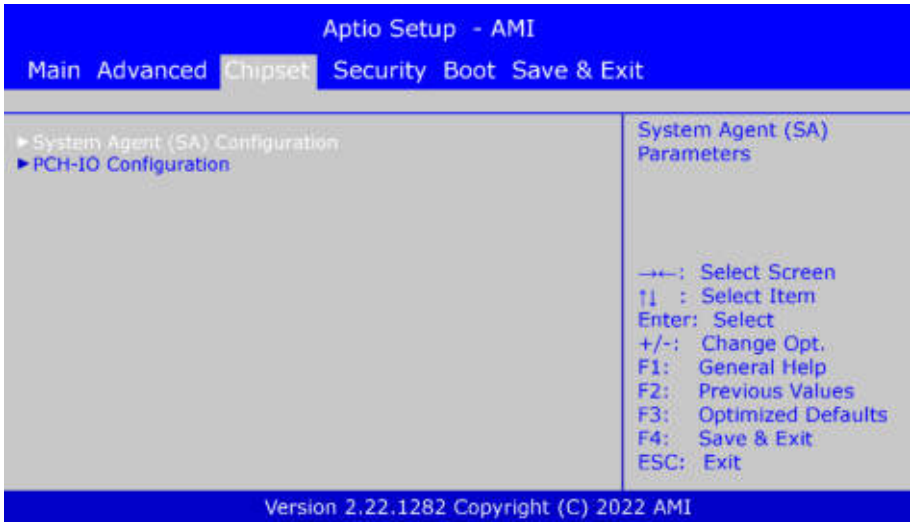

Fig. 73: Chipset Menu

BIOS Settings	Options	Description
System Agent (SA) Configuration	See submenu	System Agent (SA) Parameters
PCH-IO Configuration	See submenu	PCH Parameters

Tab. 30: Chipset Menu

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5.4.1 System Agent (SA) Configuration

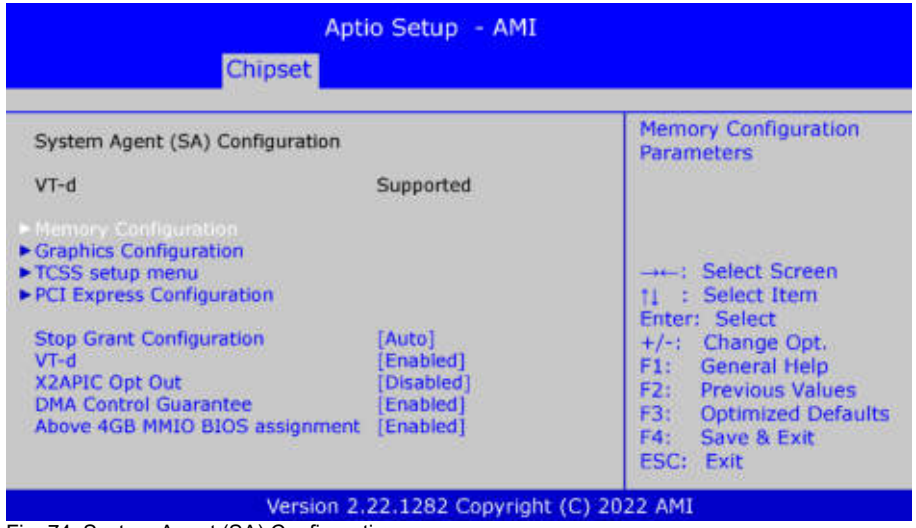

Fig. 74: System Agent (SA) Configuration

BIOS Settings	Options	Description
Memory Configuration	See submenu	
Graphics Configuration	See submenu	
TCSS Setup Menu	Info page	
PCI Express Configuration	See submenu	
Stop Grant Configuration	<Auto>* <Manual>	
VT-d	<Enabled>* <Disabled>	
X2APIC Opt Out	<Enabled> <Disabled>*	
DMA Control Guarantee	<Enabled>* <Disabled>	
Above 4GB MMIO BIOS assignment	<Enabled>* <Disabled>	

Tab. 31: System Agent (SA) Configuration

5.4.1.1 Memory Configuration

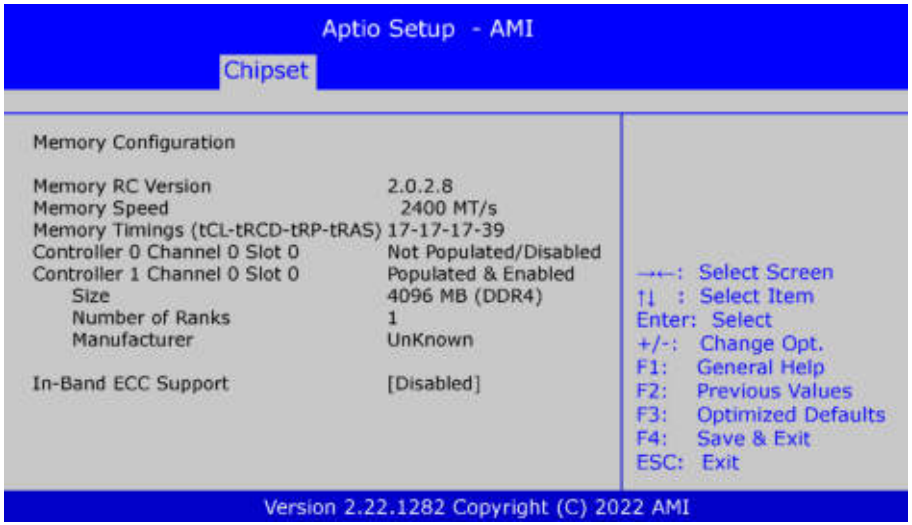

Fig. 75: Memory Configuration

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5.4.1.2 Graphics Configuration

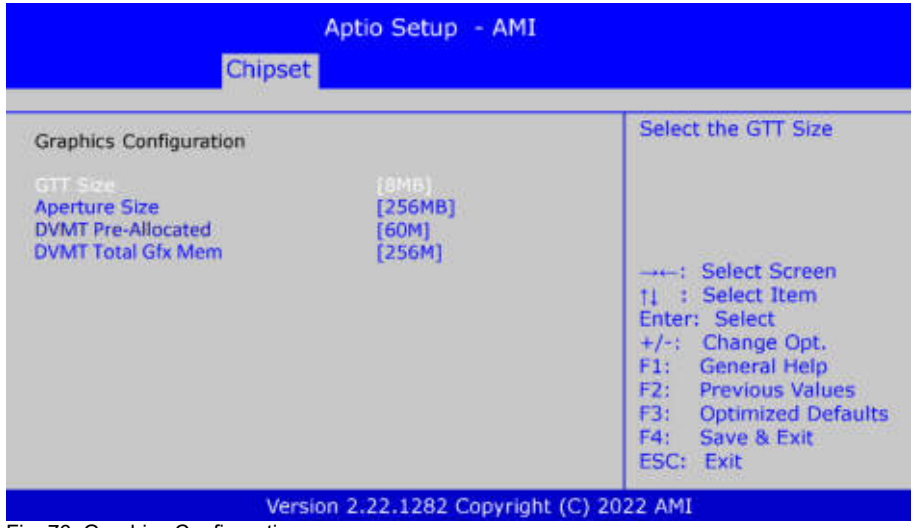

Fig. 76: Graphics Configuration

BIOS Settings	Options	Description
GTT Size	<2MB> <4MB> <8MB>*	This item selects the GTT Size
Aperture Size	<128MB> <256MB>* <512MB> <1024MB>	This item selects Aperture Size
DVMT Pre-Allocated	<0M> <32M> <64M> <96M> <128M> <160M> <4M> <8M> <12M> <16M> <20M> <24M> <28M> <36M> <40M> <44M> <48M> <52M> <56M> <60M>*	Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device
DVMT Total Gfx Mem	<128M> <256M>* <MAX>	Select DVMT 5.0 Total Graphic Memory size used by the Internal Graphics Device

Tab. 32: Graphics Configuration

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5.4.1.3 TCSS Configuration

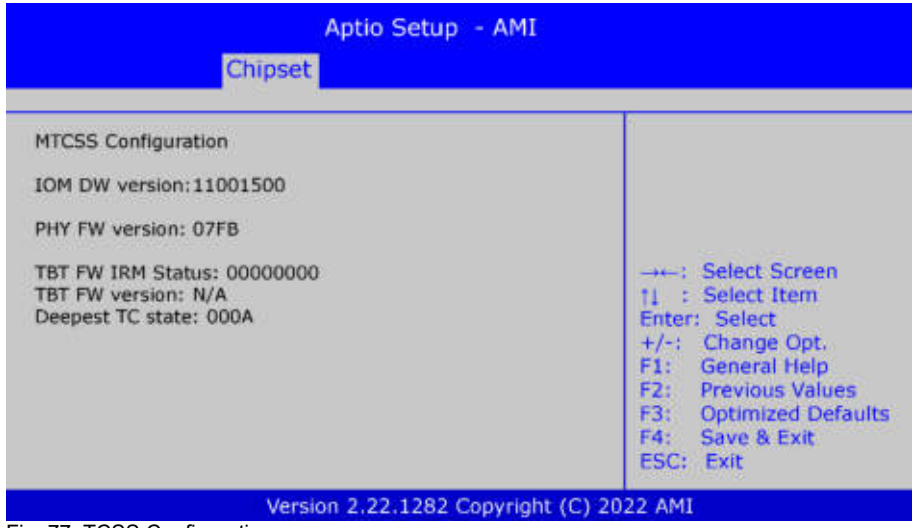

Fig. 77: TCSS Configuration

5.4.1.4 PCI Express Configuration

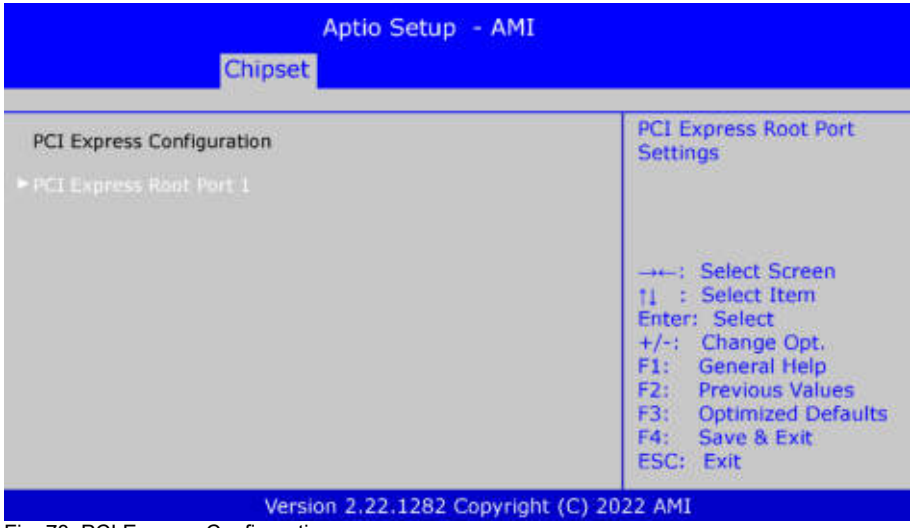

Fig. 78: PCI Express Configuration

BIOS Settings	Options	Description
PCI Express Root Port 1	See submenu	Configuration of the corresponding PCI Express Root Port 1

Tab. 33: PCI Express Configuration

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5.4.1.4.1 PCI Express Root Port 1

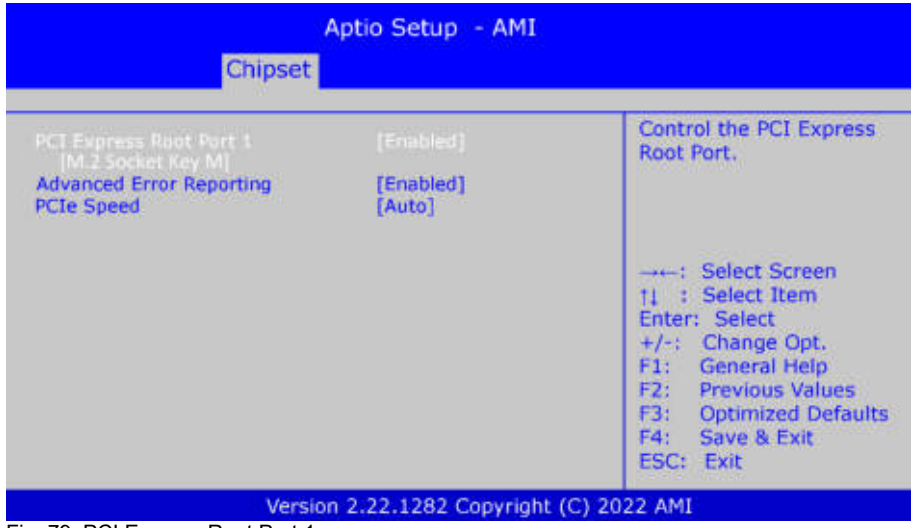

Fig. 79: PCI Express Root Port 1

BIOS Settings	Options	Description
PCI Express Root Port 1 [M.2 Socket Key M]	<Enabled>* <Disabled>	Control the PCI Express Root Port 1
Advanced Error Reporting	<Enabled>* <Disabled>	Advanced Error Reporting Enable/Disable
PCIe Speed	<Auto>* <Gen1> <Gen2> <Gen3> <Gen4>	Configure PCIe Speed

Tab. 34: PCI Express Root Port 1

5.4.2 PCH-IO Configuration

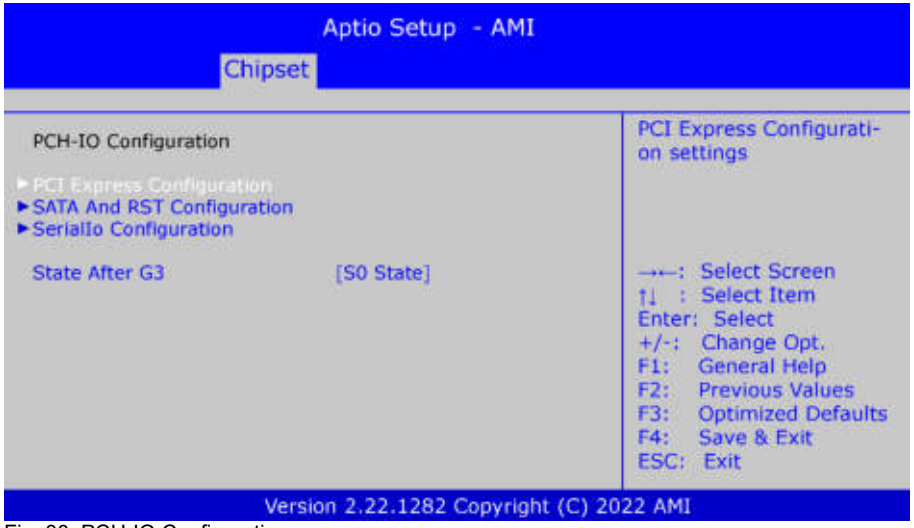

Fig. 80: PCH-IO Configuration

BIOS Settings	Options	Description
PCI Express Configuration		PCI Express Configuration settings
SATA and RST Configuration		SATA Device Options settings
SerialIO Configuration		
State After G3	<S0 State>* <S5 State>	Specify what state to go to when power is re-applied after a power failure (G3 state)

Tab. 35: PCH-IO Configuration

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5.4.2.1 PCI Express Configuration

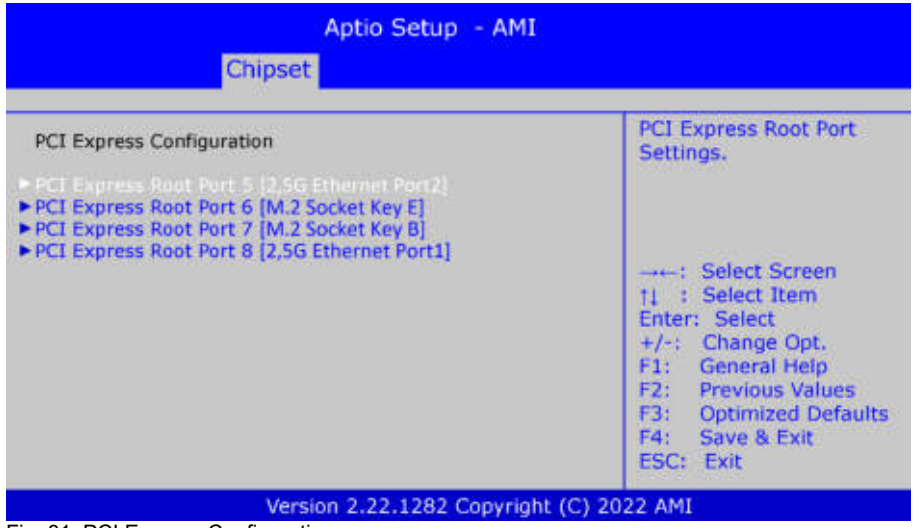

Fig. 81: PCI Express Configuration

BIOS Settings	Options	Description
PCI Express Root Port X	See submenu	Configuration of the corresponding PCI Express Root Port X

Tab. 36: PCI Express Configuration

5.4.2.1.1 PCI Express Root Port X (5-8)

Fig. 82: PCI Express Root Port X (5-8)

BIOS Settings	Options	Description
PCI Express Root Port X […]	<Enabled>* <Disabled>	Control the PCI Express Root Port (5-8)
Advanced Error Reporting	<Enabled>* <Disabled>	Advanced Error Reporting Enable/Disable
PCIe Speed	<Auto>* <Gen1> <Gen2> <Gen3>	Configure PCIe Speed

Tab. 37: PCI Express Root Port X (5-8)

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5.4.2.2 SATA And RST Configuration

Fig. 83: SATA And RST Configuration

BIOS Settings	Options	Description
SATA Controller		Enable/Disable SATA Device
SATA Mode Selection		Determines how SATA controller(s) operate
Port 0		
Port 1		

Tab. 38: SATA and RST Configuration

5.4.2.3 Serial IO Configuration

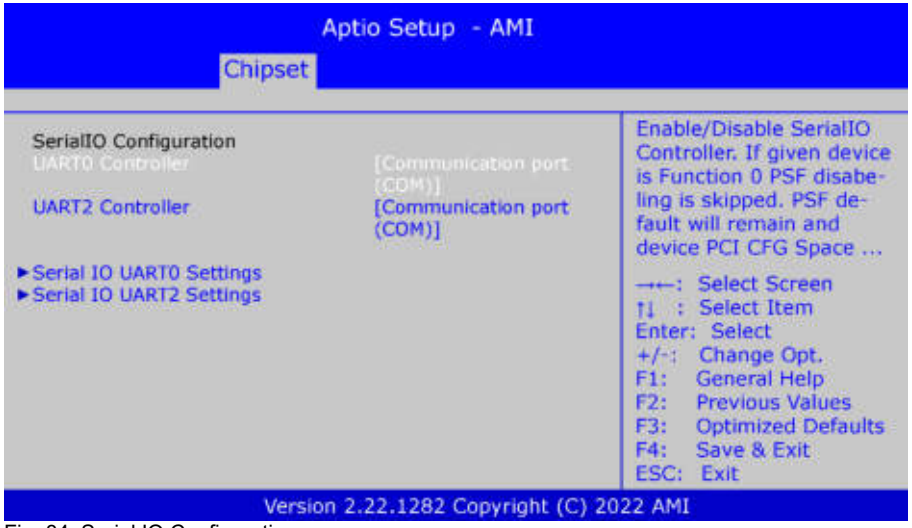

Fig. 84: Serial IO Configuration

BIOS Settings	Options	Description
UARTx Controller		
Serial IO UARTx Settings	See submenu	

Tab. 39: Serial IO Configuration

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5.4.2.4 Serial IO UART0/2 Settings

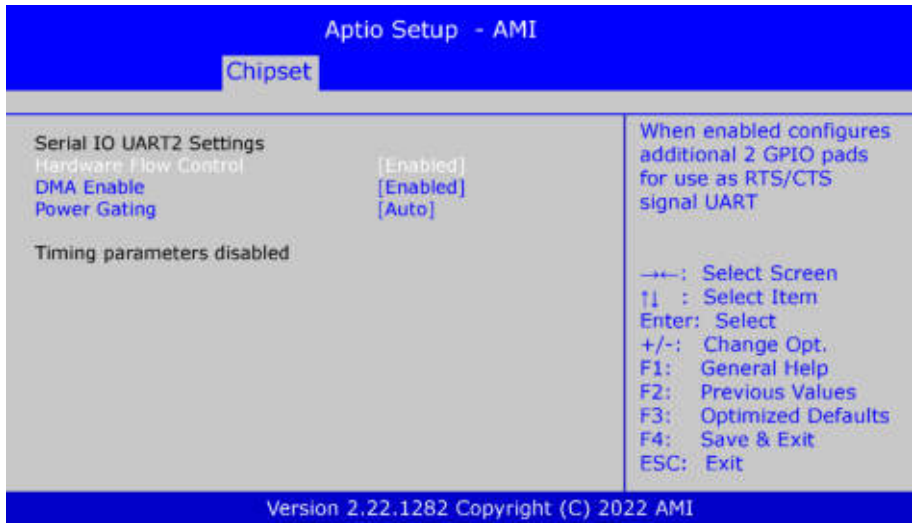

Fig. 85: Serial IO UART2 Settings

BIOS Settings	Options	Description
Hardware Flow Control	<Enabled>* <Disabled>	Enables RTS/CTS for UART2
DMA Enable		
Power Gating		

Tab. 40: Serial IO UART2 Settings

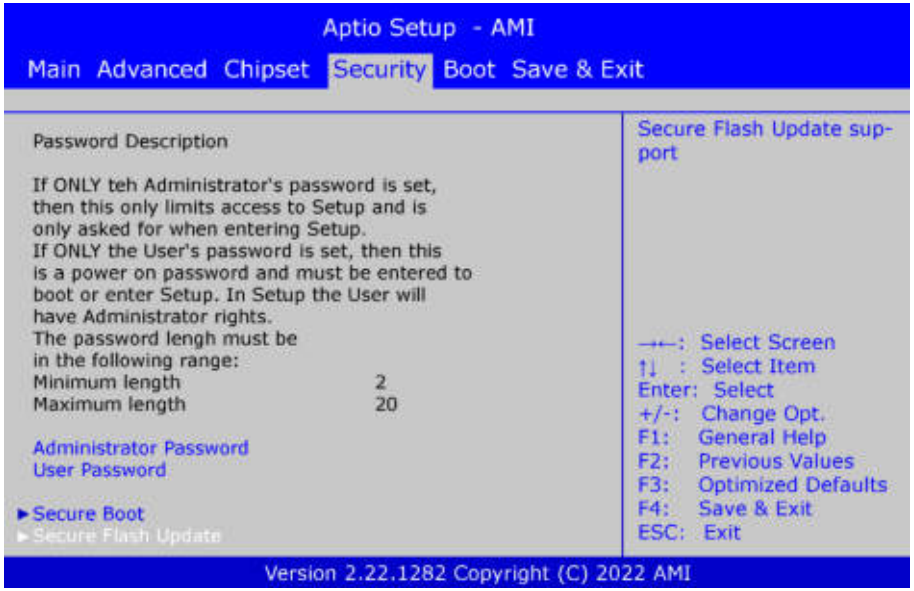

Fig. 86: Security Menu

BIOS Settings	Options	Description
Administrator Password		
User Password		
Secure Boot	See submenu	
Secure Flash Update	See submenu	

Tab. 41: Security Menu

5.5 Security Menu

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5.5.1 Secure Boot

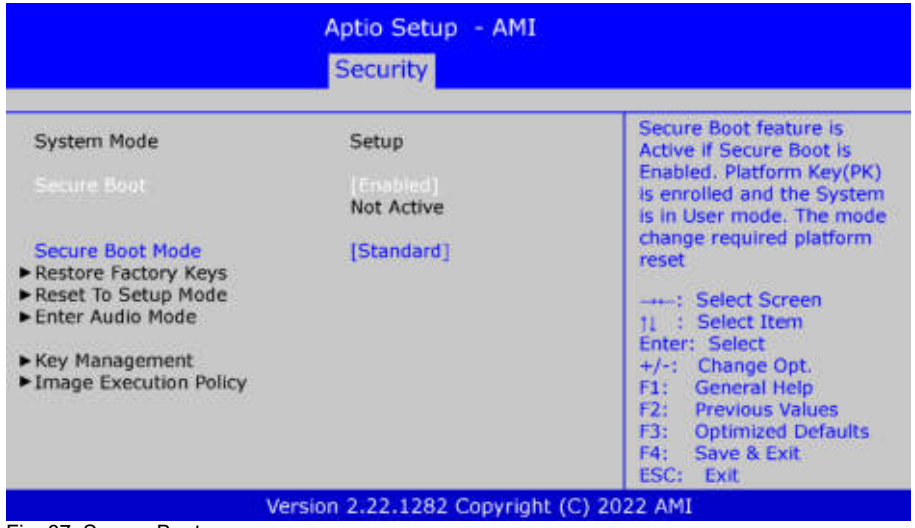

Fig. 87: Secure Boot

BIOS Settings	Options	Description
Secure Boot	<Enabled>* <Disabled>	Enables/disables Secure Boot. When enabled, Secure Boot activated, Platform Key (PK) is enrolled, System mode is User
Secure Boot Mode		Sets UEFI Secure Boot Mode to Standard mode or Custom mode, this change is in effect after save.
Key Management		Enables expert user to modify Secure Boot Policy variables without full authentication. NOTE: These settings are for advanced users only.

Tab. 42: Secure Boot

5.5.2 Secure Flash Update

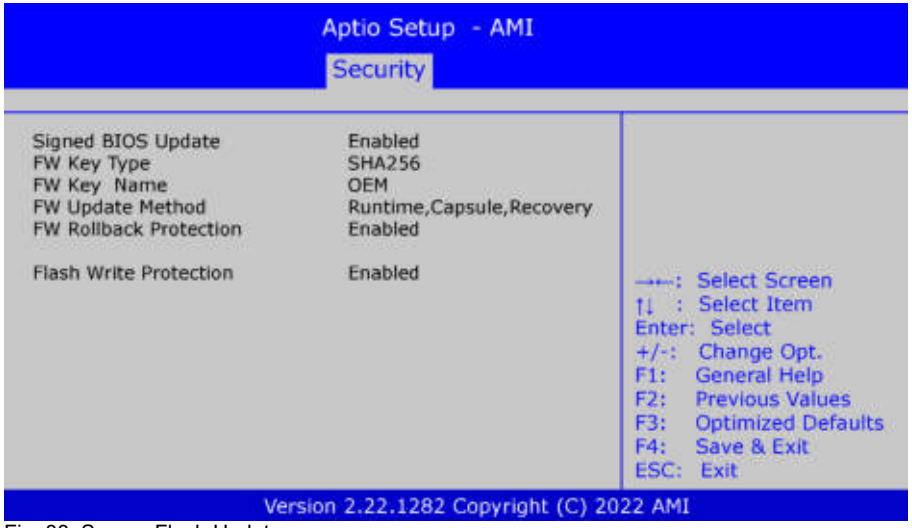

Fig. 88: Secure Flash Update

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5.5.3 TCG Storage Security Password Description

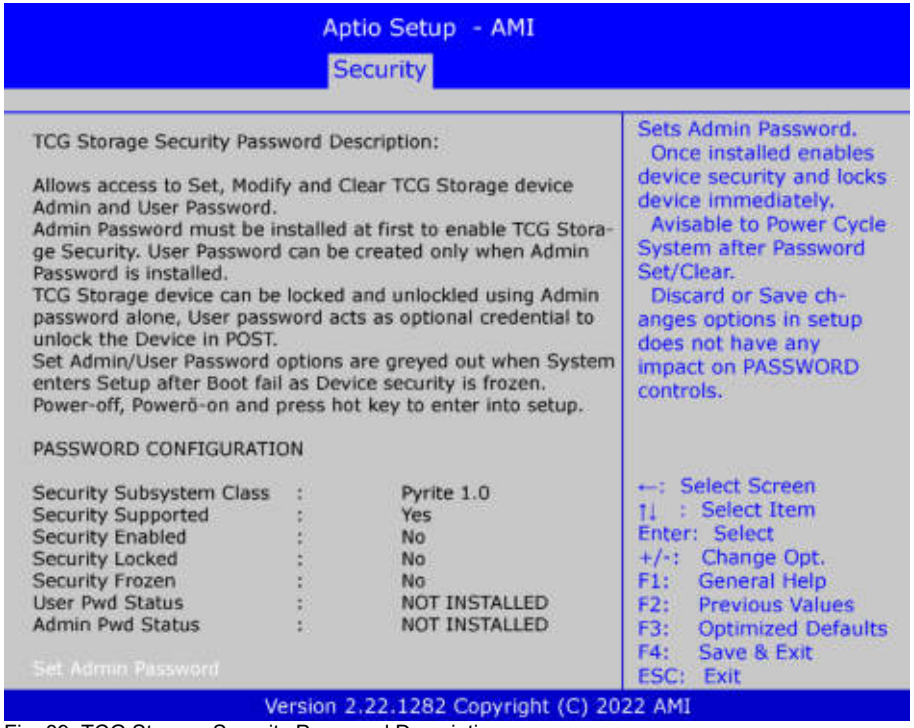

Fig. 89: TCG Storage Security Password Description

BIOS Settings	Options	Description
Set Admin Password		

Tab. 43: TCG Storage Security Password Description

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5.6 Boot Menu

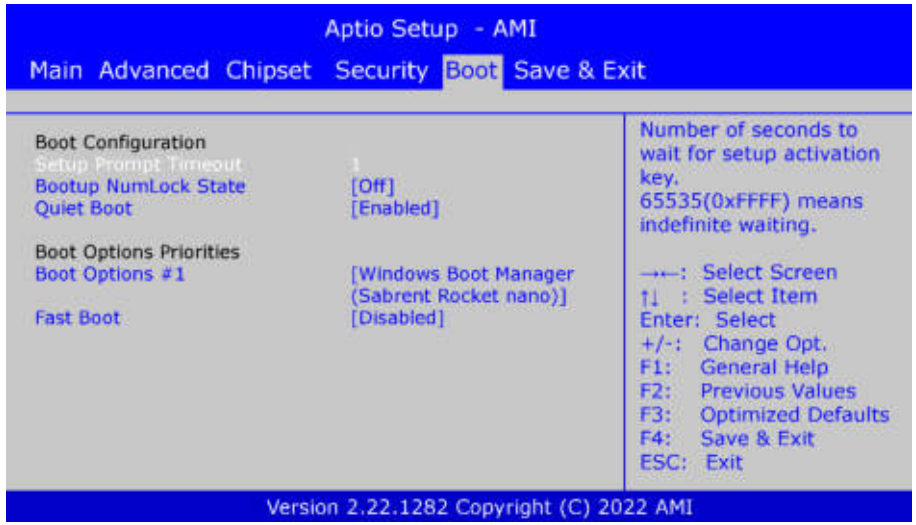

Fig. 90: Boot Menu

BIOS Settings	Options	Description
Setup Prompt Timeout	<1-65535>	Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting
Bootup NumLock State	<On> <Off>*	Select the keyboard NumLock state
Quiet Boot	<Enabled>* <Disabled>	Enables/disables quiet boot. Enabling this option hides the BIOS post messages on bootup and displays the AMI BIOS logo
Boot Options		Sets the System boot order
Fast Boot	<Enabled> <Disabled>*	Enables/disables the Fast Boot features, which shorten the normal boot path for booting into an OS rapidly. Most device probes are skipped to reduce boot time.

Tab. 44: Boot Menu

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5.7 Save & Exit Menu

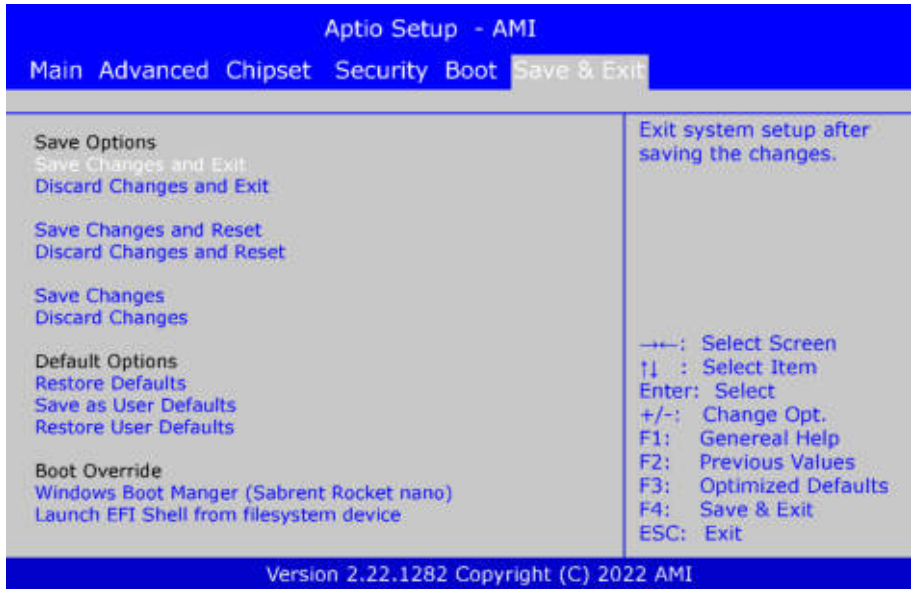

Fig. 91: Save & Exit Menu

BIOS Settings	Options	Description
Save Changes and Exit	No options	Saves all custom configured BIOS settings, then immediately boots to the first boot device set in Boot Option Properties
Discard Changes and Exit	No options	Reverts any custom configured BIOS settings to default, then boots to your first boot device
Save Changes and Reset	No options	Saves all custom configured BIOS settings, then immediately reboots the computer
Discard Changes and Reset	No options	Reverts any custom configured BIOS settings back to default, then reboots the computer
Save Changes	No options	Saves all custom configured BIOS settings
Discard Changes	No options	Reverts any custom configured BIOS settings during this session back to default

Tab. 45: Save & Exit Menu

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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	Electro Magnetic 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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