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

Manufacturer

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FCC and CE Disclaimer

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.

In order to meet FCC and/or CE requirements this product has to be integrated into a proper housing, which provides appropriate shielding and insulation.

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

E.E.P.D. GmbH gives no warranty at all that their products will meet the FCC and CE standards when used in combination with other third-party products or when used in any other way than specified.

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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.

In the event of a warranty claim for defects, which appear within the warranty period, customer shall deliver the product along with proof of purchase to the original place of purchase, shipping prepaid. Repair, replacement or refund of the purchase price of the defective product will be at the sole option of the manufacturer. All transportation risks and costs in connection with warranty service are the responsibility of the customer.

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The remedies for defects in this product are limited to those set forth above. If this limitation of remedies is held by any court to be void or unenforceable, or if no warranty is made, manufacturers liability shall in no event exceed the purchase price of the product giving rise to the claim, regardless of whether such claim is brought in breach of contract or warranty, negligence, strict liability or otherwise.

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.

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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**

Table of Contents

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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.

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. 10.8 V to max. 26.4 V (DC) single power supply, 10 A fused

EMI filtering

2-pin barrel connector for external DC Power and Ground

Processor Support

AMD V2000 processor series

V2546 / 6C / 12T / 3.0 GHz – 3.95 GHz / 35 – 54 W
V2748 / 8C / 16T / 2.9 GHz – 4.25 GHz / 35 – 54 W

Ethernet Controller

2 Intel® i225 2.5Gbit Ethernet PCI Express® controllers with IEEE1588.

RAM Support

Max. 32 GB dual channel DDR4 SODIMM, up to 3200 MT/s

Display

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

USB Support

7 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 3.1, max. 900 mA per port
- 1 Single-USB 3.1 Gen2 (10 Gb/s), Type C at the rear side, support for USB 2.0 and 3.1, max. 1.5 A
- 1 USB 2.0 at the M.2 Key B Mini card socket
- 1 USB 2.0 at the M.2 Key E Mini card socket
- 2 internal USB connectors, support for USB 2.0

Storage Support

1 M.2 Mini card socket Key M, 22 mm x 42 mm (for SSD only), SATA or PCIe-x4

2 standard SATA III (6 Gb/s) upright connectors + 2 SATA Power on Molex connectors

Expansion

2 M.2 Mini card sockets:

- 1 Key E, 22 mm x 30 mm, PCIe-x1 and USB2
- 1 Key B, 30/22 mm x 42 mm / onboard SIM card socket, PCIe-x1 and USB2

Serial Ports

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

Audio

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 20.04 LTS

Extended Features

Onboard µ-Controller-IC for:

- Input voltage level detection
- Power-up sequencing and timing
- System reset management
- Temperature monitoring and FAN control
- Watchdog
- Power button input
- Reset button input

Feature connector (GPIOs / Status LED)

Power LED onboard

Status LED onboard

RTC battery connector

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1.2 Environmental Specification

Max. Operating Temperature

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

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

System Overview

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

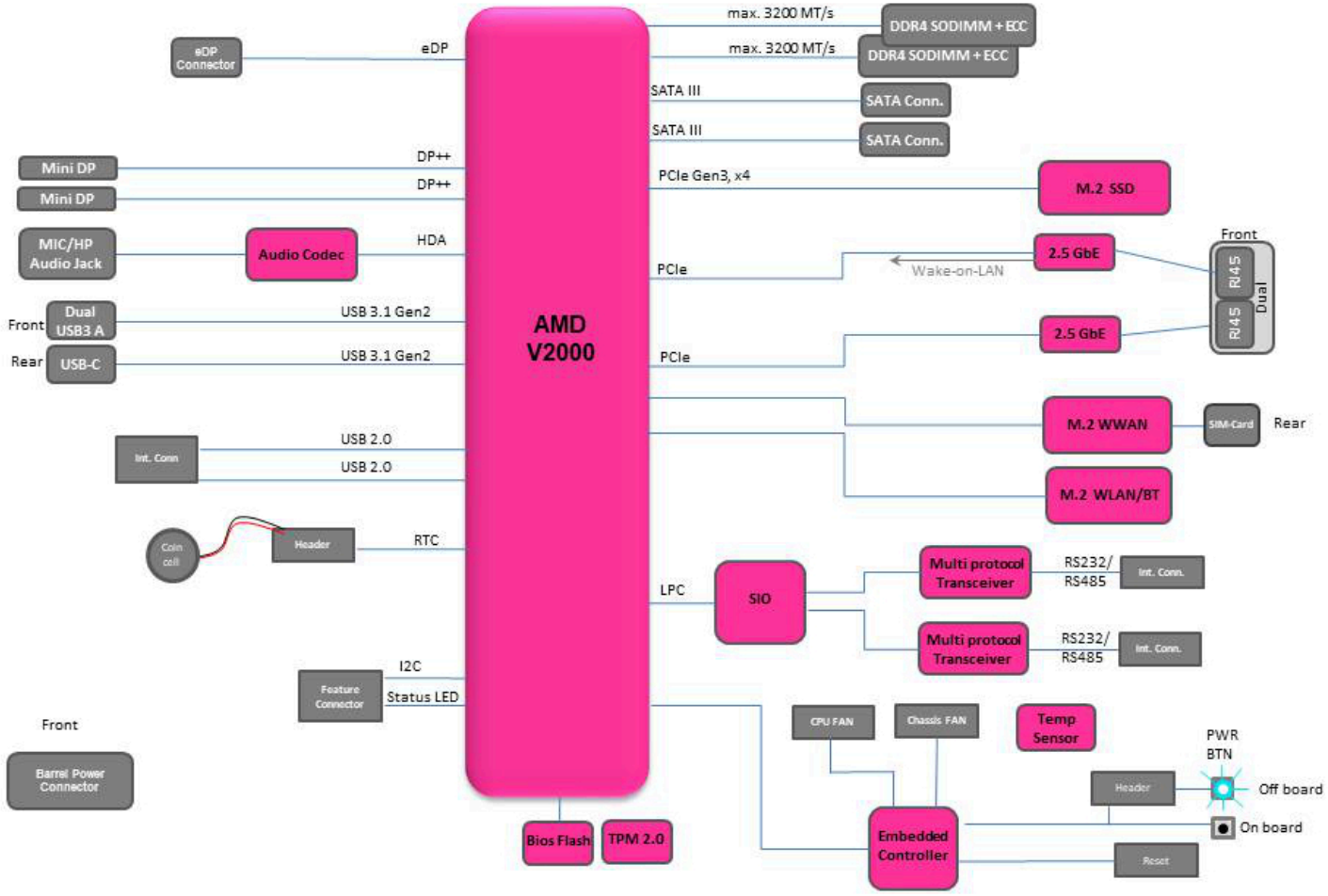


Fig. 1: System Overview

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**.

3.1 Standard cooling solution

Front View

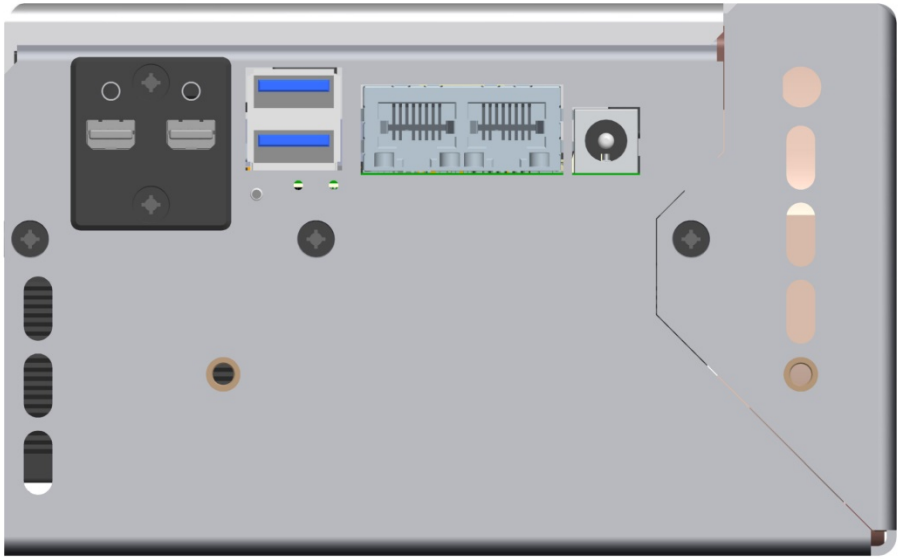


Fig. 2: Front View – standard cooling solution

Rear View

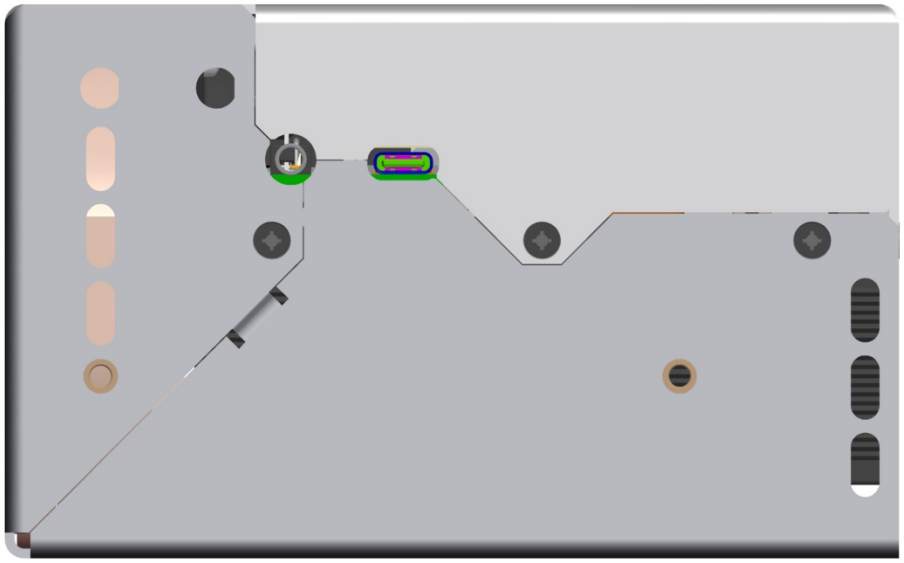


Fig. 3: Rear View – standard cooling solution

Side View

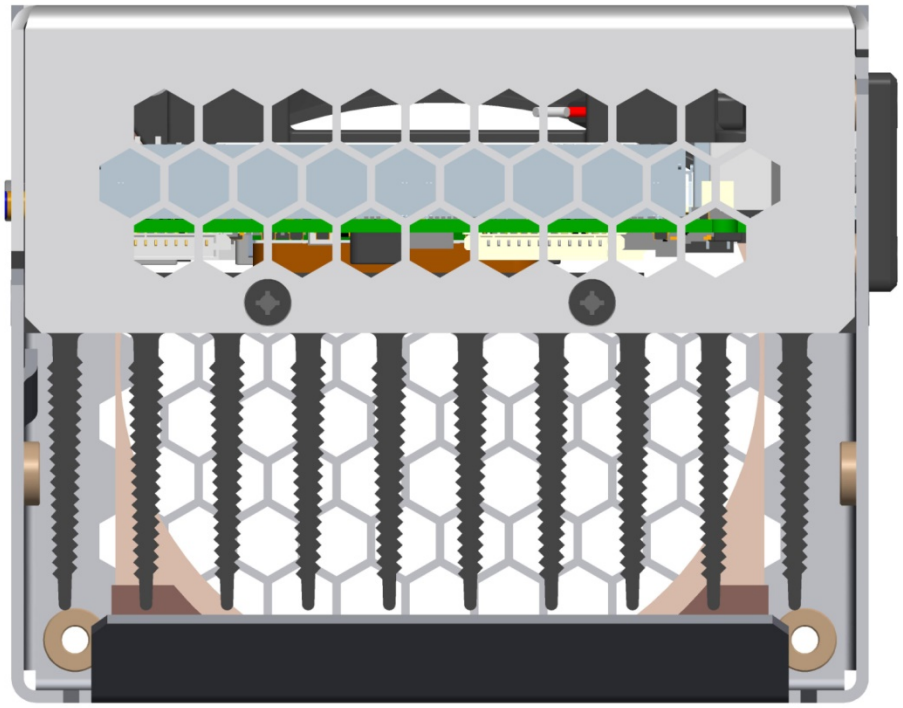


Fig. 4: Side View left – standard cooling solution

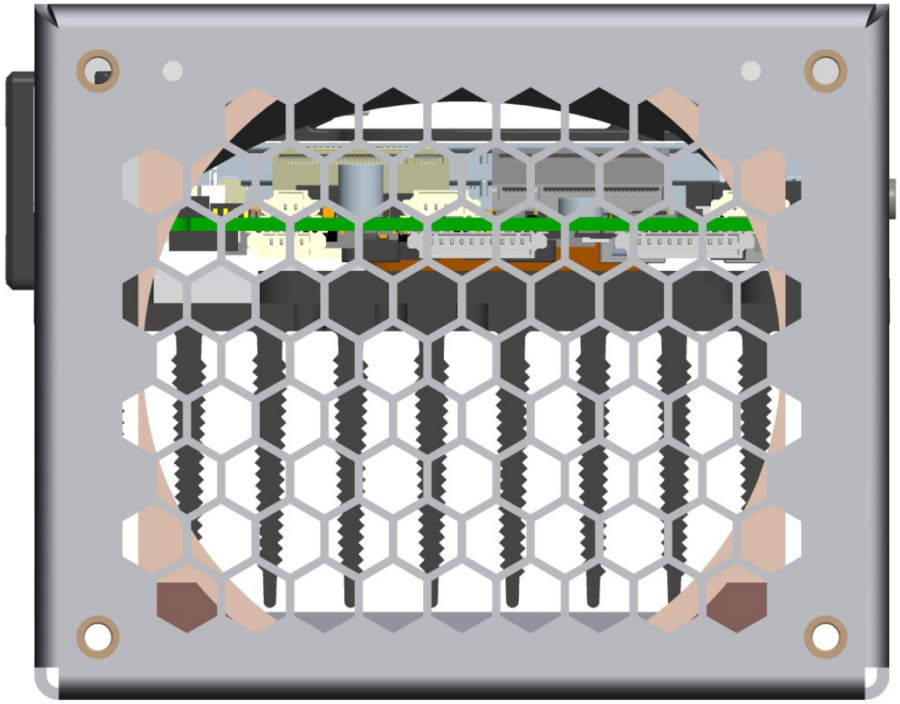


Fig. 5: Side View right – standard cooling solution

Dimensions – standard cooling solution

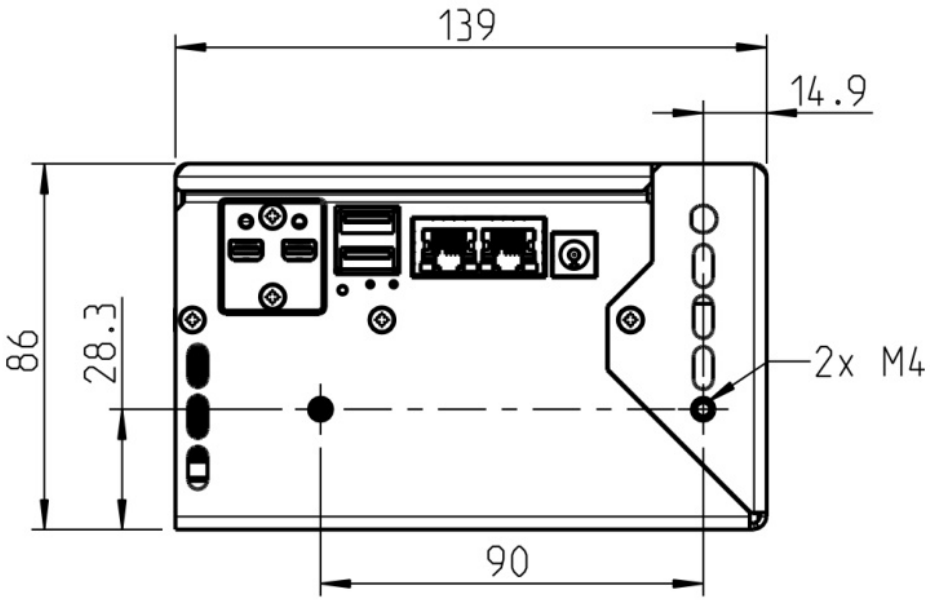


Fig. 6: Dimensions front side – standard cooling solution

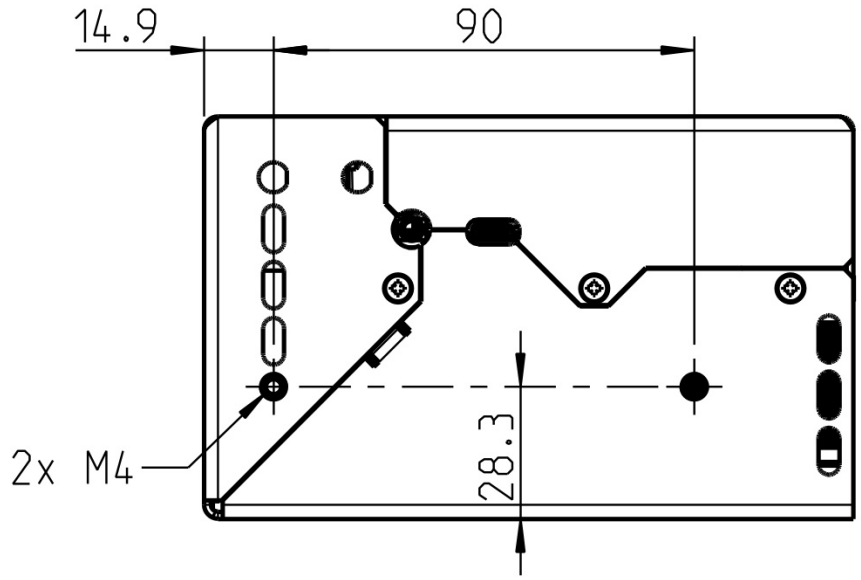


Fig. 7: Dimensions back side – standard cooling solution

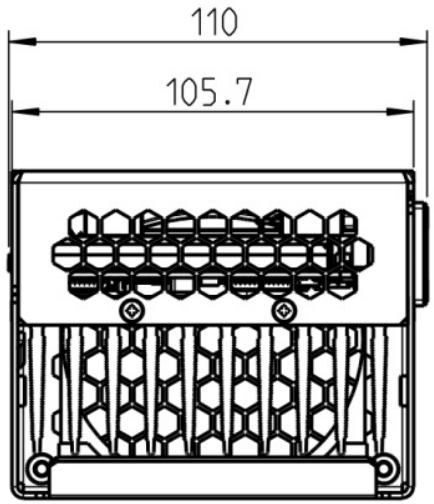


Fig. 8: Dimensions left side – standard cooling solution

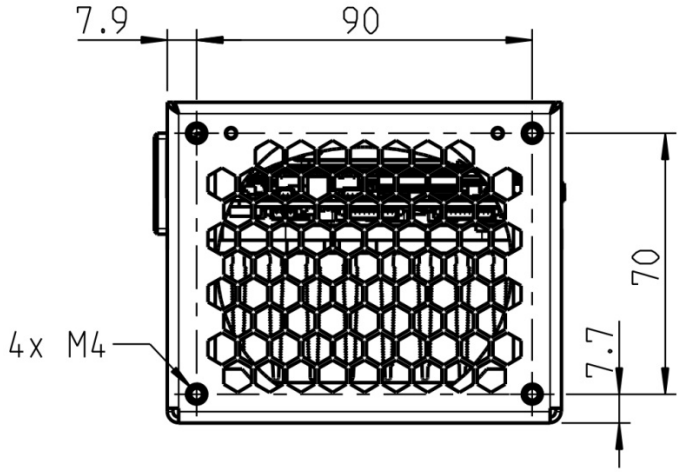


Fig. 9: Dimensions right side – standard cooling solution

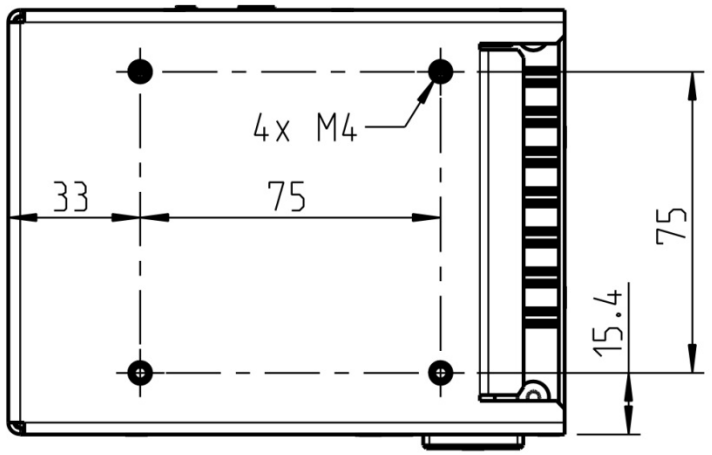


Fig. 10: Dimensions bottom side – standard cooling solution

3.2 Custom housing

For OEM/ODM customers only.

Front View

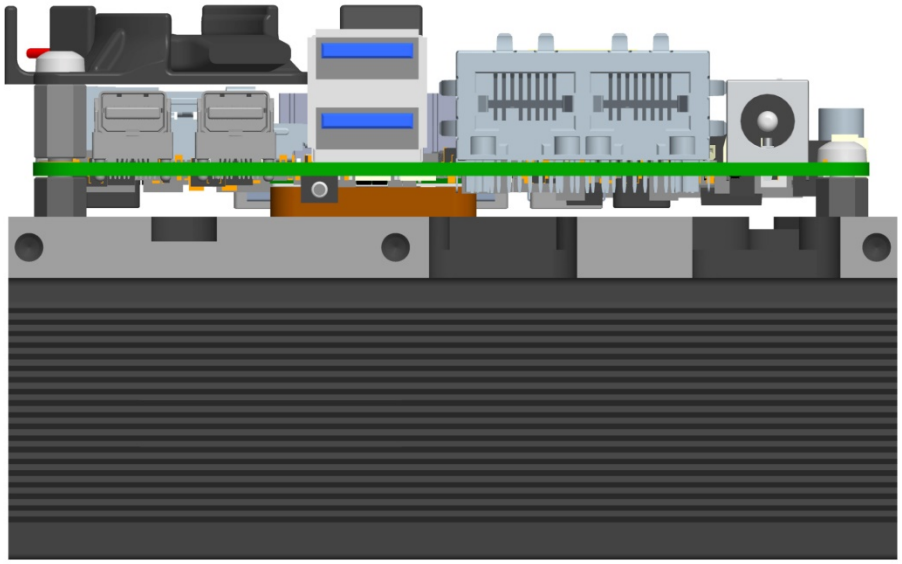


Fig. 11: Front View – custom housing

Rear View

Fig. 12: Rear View – custom housing

Side View

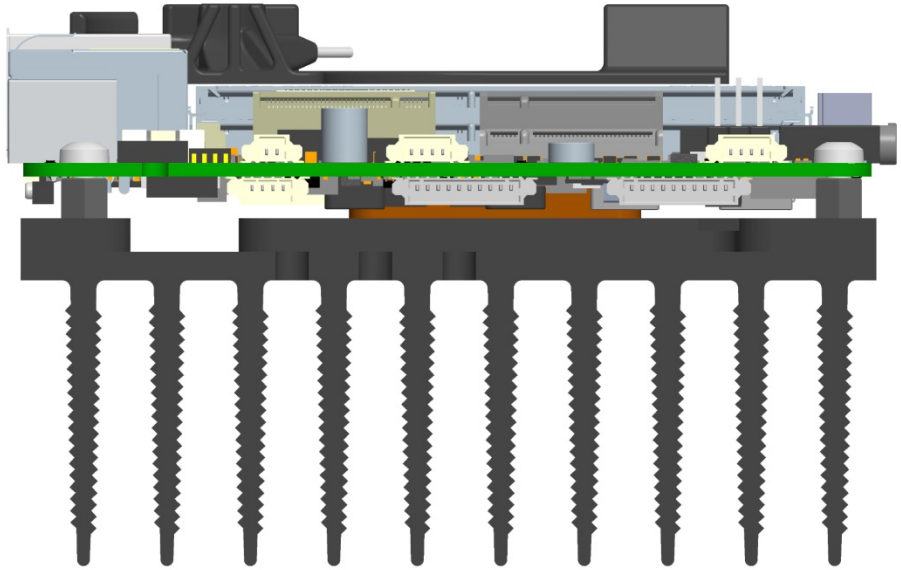


Fig. 13: Side View – custom housing

Dimensions for custom housing

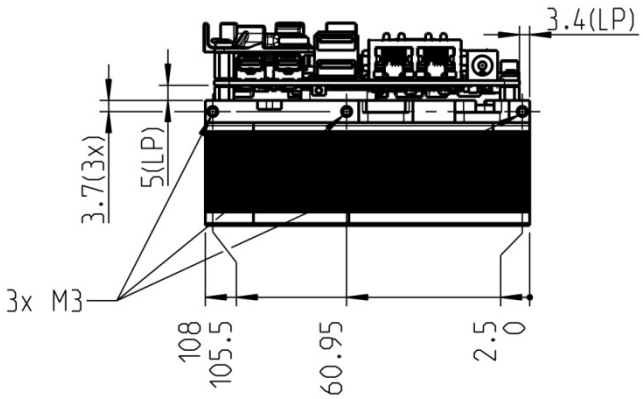


Fig. 14: Dimensions front side – custom housing

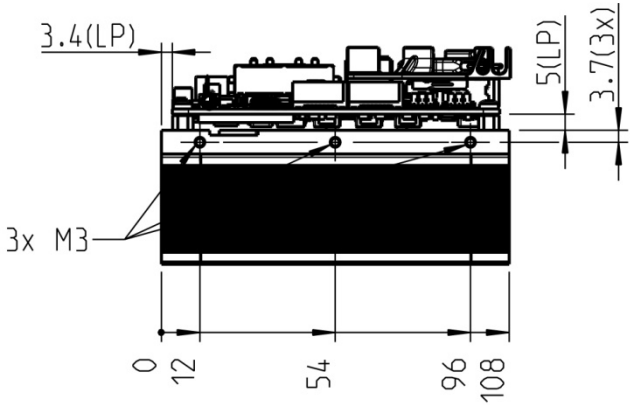


Fig. 15: Dimensions back side – custom housing

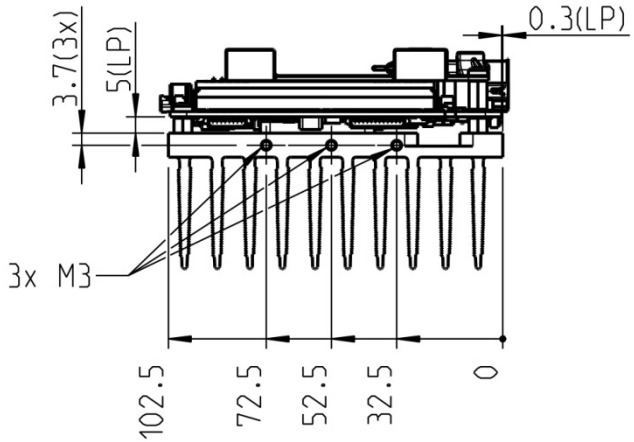


Fig. 16: Dimensions left side – custom housing

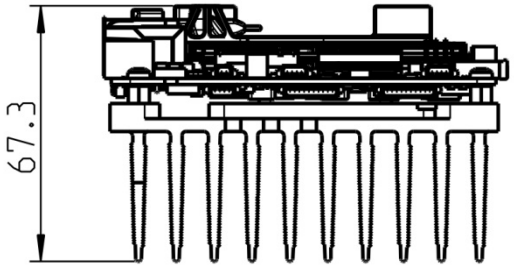


Fig. 17: Dimensions right side – custom housing

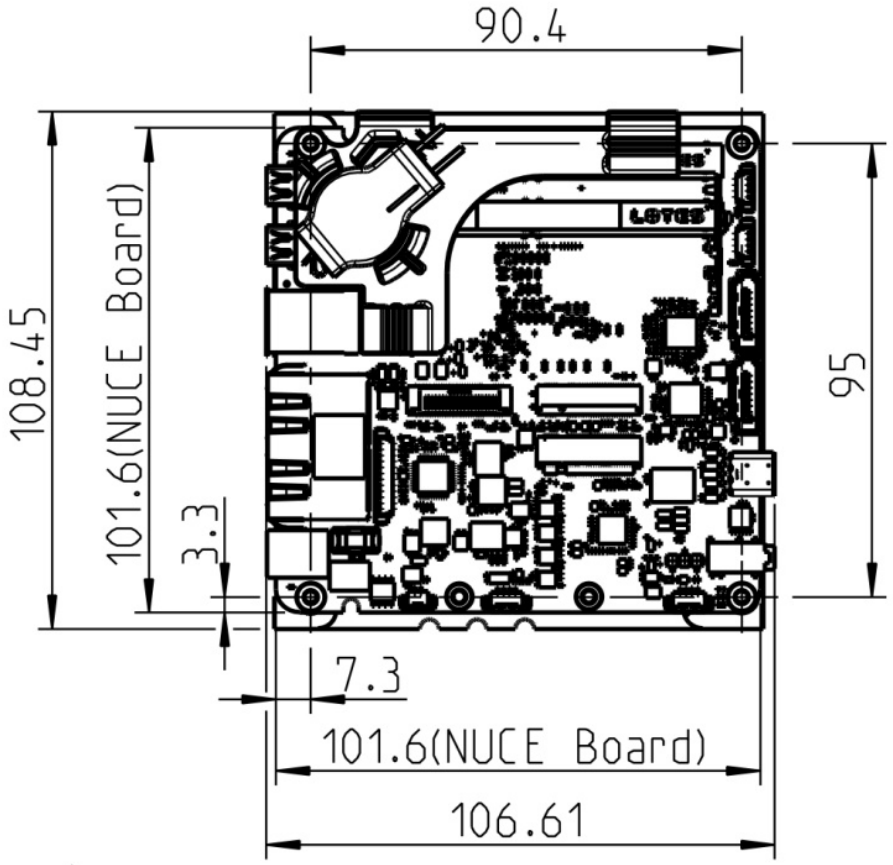


Fig. 18: Dimensions top side – custom housing

Feature Details

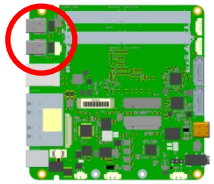
The following schedule contains all the necessary information to connect the board to your peripheral equipment.

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_DISPLAY	12 V +/-5%

4.1 Mini-DP Connectors



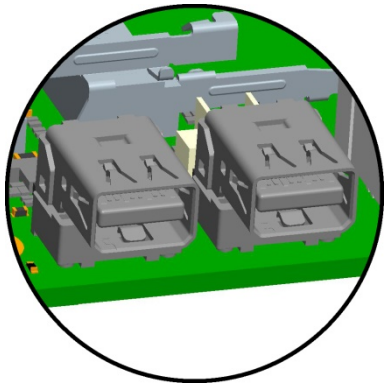


Fig. 19: Mini-DP Connector Detail

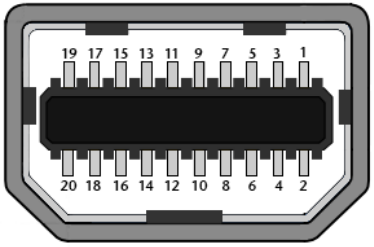


Fig. 20: Mini-DP Connector Schematic

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.

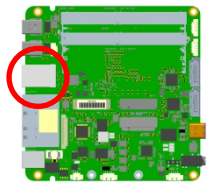
Cables for use with dongles (e. g. MiniDP to DP, MiniDP to HDMI) with Pin 20 on both ends of the cable connected.

Possible effects if wrong cable is used:

System might not start up properly.
Dongle does not work properly (black display).

4.2 Dual-USB 3.1 Gen2 Port

USB 3.1 Gen2 type ports providing max. 900 mA per port.



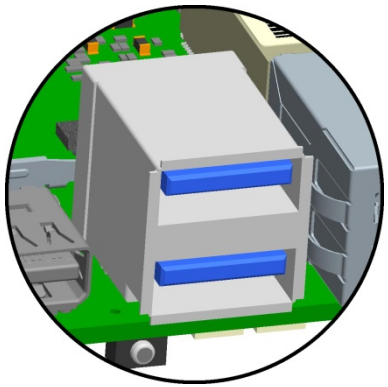


Fig. 21: Dual-USB 3.1 Port Detail

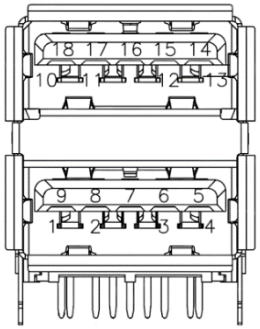
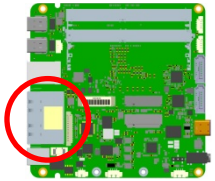


Fig. 22: Dual-USB 3.1 Port Schematic

4.3 Gigabit Ethernet Dual-Port

The Dual-Ethernet socket uses the Intel® 2.5Gigabit Ethernet Controller Intel® i225. ETH1 supports wake-on-LAN.



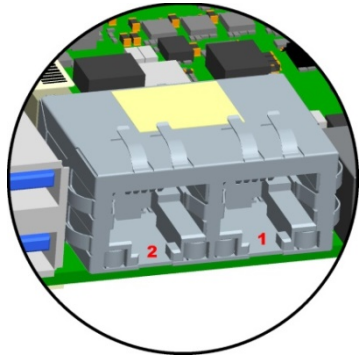


Fig. 23: Ethernet Dual-Port Detail

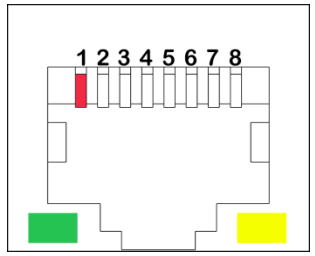


Fig. 24: Ethernet Port Schematic

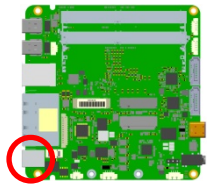
Yellow LED
Speed-LED is on during 2.5 or 1 Gbit transmission and switched off during 10/100 Mbit transmission.

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

4.4 Power Connector

CAUTION

For stable operation:
Please ensure a system power supply of min. 120 W.
Power source must be capable to respond to fast load changes!
Supply voltage (PVIN) min. 10.8 V / max. 26.4 V (DC)



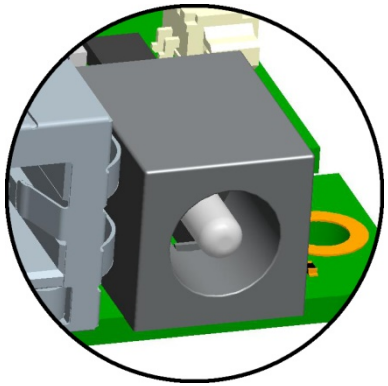


Fig. 25: Power Connector Detail

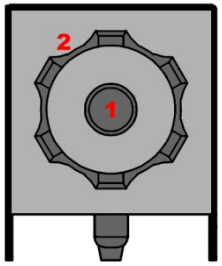


Fig. 26: Power Connector Schematic

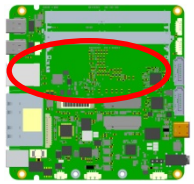
Counterpart – plug:

CUI Devices Power Plug ID 2.5mm, AD 5.5mm
Ordering number: PP3-002B

Pin	Signal
1	PVIN
2	GND

Tab. 1: Power Connector

4.5 DDR4 SODIMM Sockets



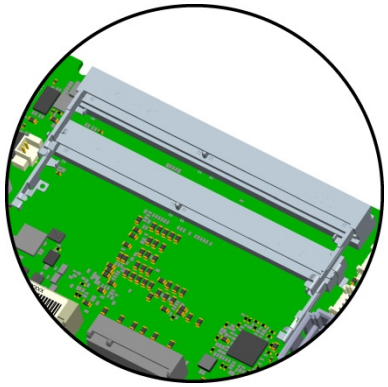


Fig. 27: DDR4 SODIMM Socket Detail

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.

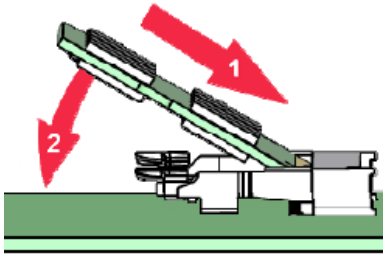
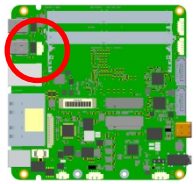


Fig. 28: RAM Assembly

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

4.6 Battery Connector



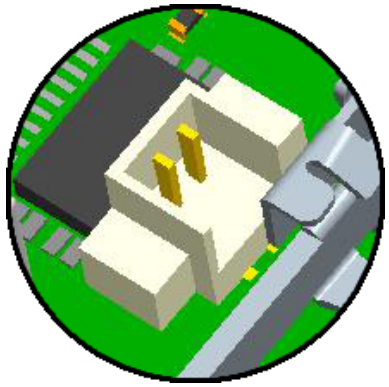


Fig. 29: Molex Battery Connector Detail

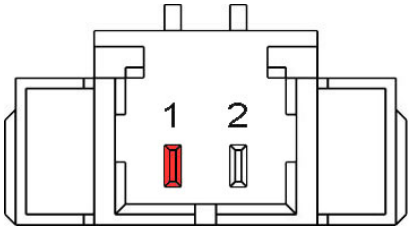


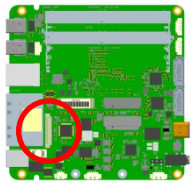
Fig. 30: Molex Battery Connector Schematic

Counterpart – plug:
MOLEX Pico Blade 0510210200

Pin	Signal
1	BATT
2	GND

Tab. 2: Battery Connector

4.7 Audio Connector



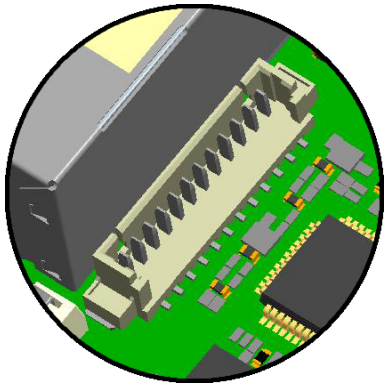


Fig. 31: Molex Audio Connector Detail

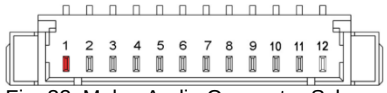


Fig. 32: Molex Audio Connector Schematic

Counterpart – plug:
MOLEX Pico Blade 0510211200

CAUTION

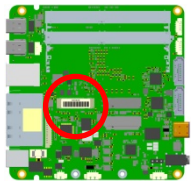
For optimum audio performance:
Please ensure to use cables provided by E.E.P.D.

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. 3: Audio Connector

4.8 M.2 Sockets

M.2 Socket Key M, 22mm x 42mm, SATA or PCIe-x4



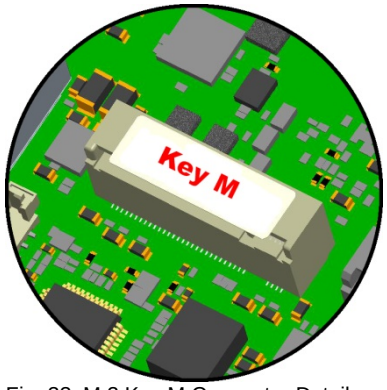
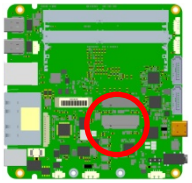


Fig. 33: M.2 Key M Connector Detail

M.2 Socket Key E, 22mm x 30mm, PCIe-x1 and USB2



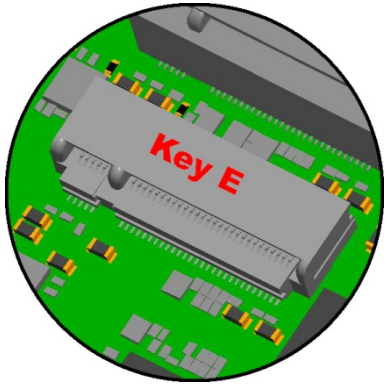
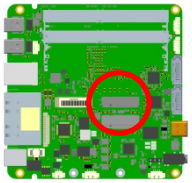


Fig. 34: M.2 Key E Connector Detail

M.2 Socket Key B, 30mm x 42mm, PCIe-x1 and USB2



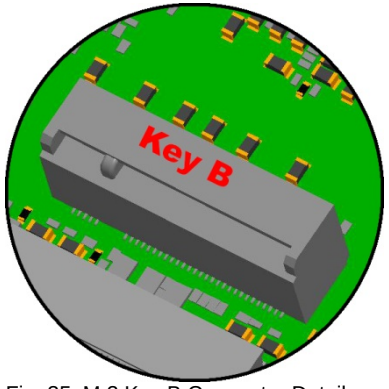
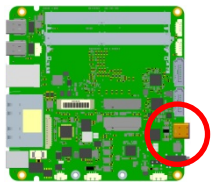


Fig. 35: M.2 Key B Connector Detail

4.9 Rear USB-C Port

Support for USB 2.0 and USB 3.1 Gen2 (10 Gb/s).
Port provides max. 1.5 A.



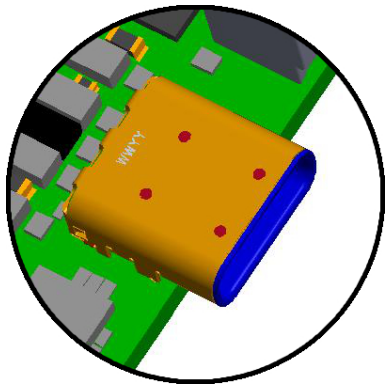


Fig. 36: USB-C Port Detail

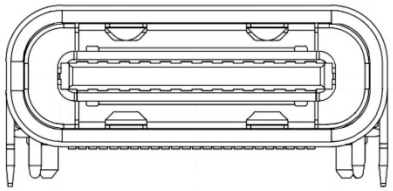
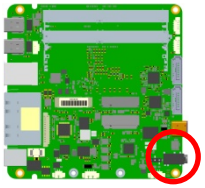


Fig. 37: USB-C Port Schematic

4.10 Audio Jack

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



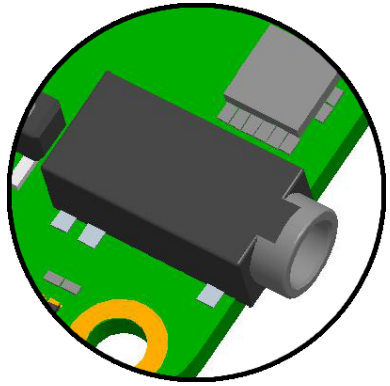
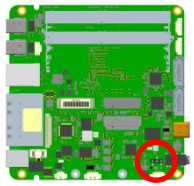


Fig. 38: Audio Jack Detail

4.11 Jumpersetting for eDP Backlight – OEM/ODM only



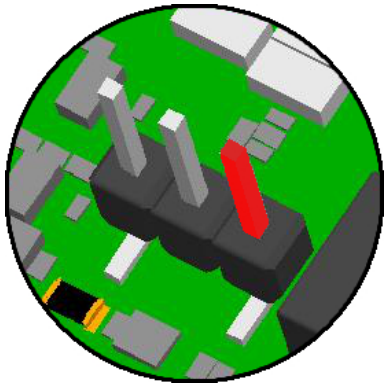


Fig. 39: STL3X1 Detail

Pin	Signal
1	PVIN -> 10.8V – 26.4V*
2	VDD_BKL
3	VCC_A -> 5V +/- 5%

Tab. 4: STL3X1

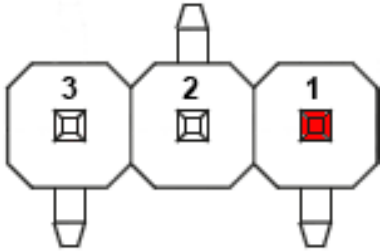
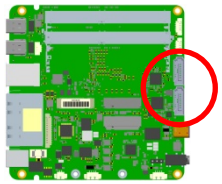


Fig. 40: STL3X1 Schematic

*depends on power in voltage

4.12 SATA Data Connector



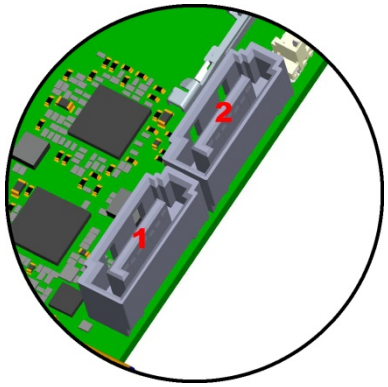


Fig. 41: SATA Data Connector Detail

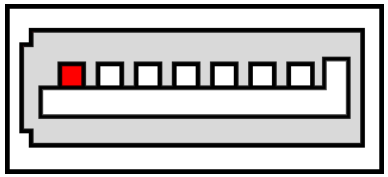
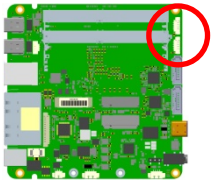


Fig. 42: SATA Data Connector Schematic

4.13 SATA Power Connector

Provides 1.5 A.



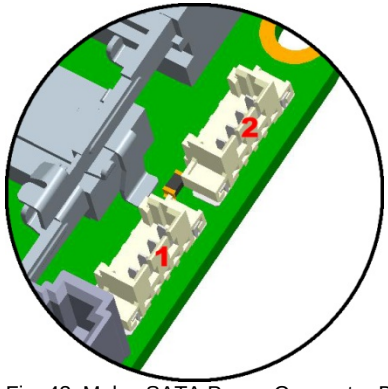


Fig. 43: Molex SATA Power Connector Detail

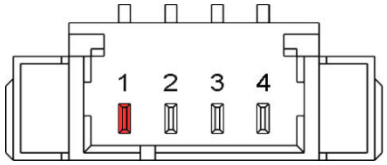


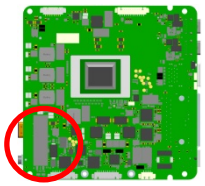
Fig. 44: Molex SATA Power Connector Schematic

Counterpart – plug:
MOLEX Pico Blade 0510210400

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

Tab. 5: Molex SATA Power Connector

4.14 eDP Connector – OEM/ODM only



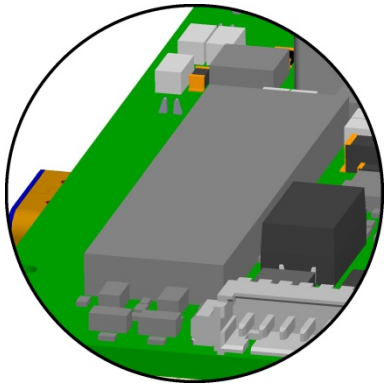


Fig. 45: eDP Connector Detail

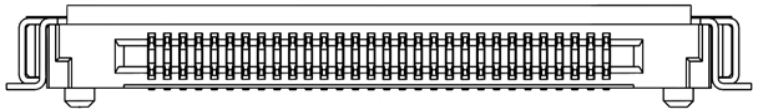


Fig. 46: eDP Connector Schematic

Counterpart – plug:
e.g. ACES 50204-40

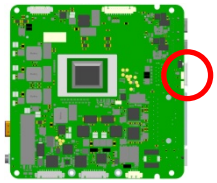
Pin	Signal	Pin	Signal
1	N.C.	23	GND
2	GND	24	GND
3	eDP_TX3_N	25	GND
4	eDP_TX3_P	26	GND
5	GND	27	eDP_HPD
6	eDP_TX2_N	28	GND
7	eDP_TX2_P	29	GND
8	GND	30	GND
9	eDP_TX1_N	31	GND
10	eDP_TX1_P	32	eDP_BKLEN
11	GND	33	eDP_BKLCTL
12	eDP_TX0_N	34	N.C.
13	eDP_TX0_P	35	N.C.
14	GND	36	VDD_BKL*²
15	eDP_AUX_P	37	VDD_BKL*²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

Tab. 6: eDP Connector

* VDD_LCD = 10,4V +/- 5% (other on request)
*² VDD_BKL = 5V +/- 5% or PVIN, depends on jumper setting (4.11)

4.15 Power Button, Power and SATA LEDs

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



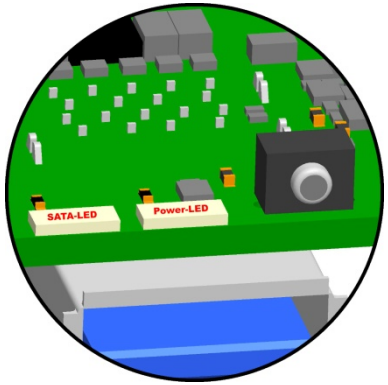
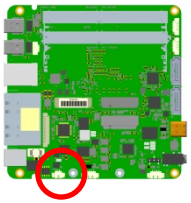


Fig. 47: Power Button/Power and SATA LEDs Detail

4.16 Reset Connector



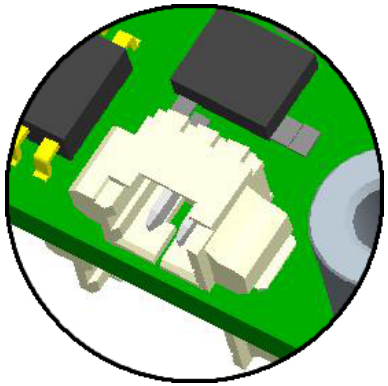


Fig. 48: Molex Reset Connector Detail

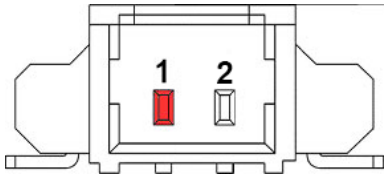


Fig. 49: Molex Reset Connector Schematic

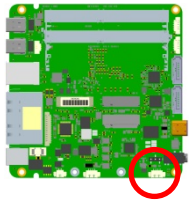
Counterpart – plug:
MOLEX Pico Blade 0510210200

Pin	Signal
1	RESET_IN
2	GND

Tab. 7: Molex Reset Connector

4.17 Power Button Connector

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



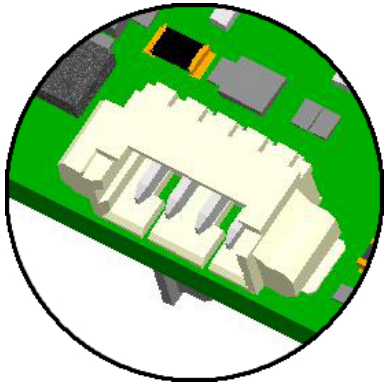


Fig. 50: Molex Power Button Connector Detail

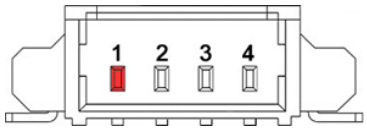


Fig. 51: Molex Power Button Connector Schematic

Counterpart – plug:
MOLEX Pico Blade 0510210400

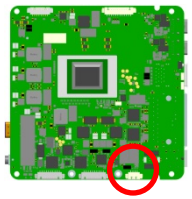
Power cable, 80 mm:
Ordering number W-NUPWON3

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

Tab. 8: Molex Power Button Connector

4.18 FAN Connectors

SoC FAN Connector



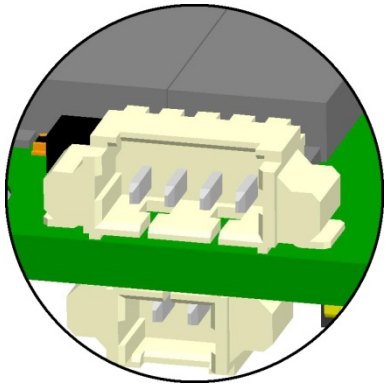


Fig. 52: Molex SoC FAN Connector Detail

SSD FAN Connector

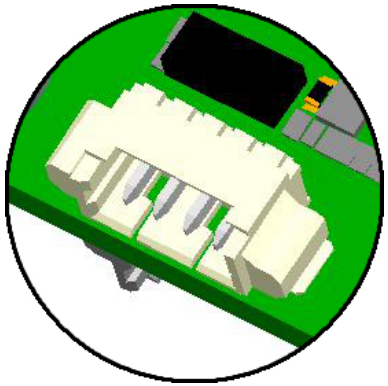


Fig. 53: Molex SSD FAN Connector Detail

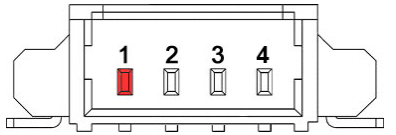


Fig. 54: Molex FAN Connector Schematic

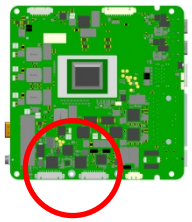
Counterpart – plug:
MOLEX Pico Blade 0510210400

Pin	Signal
1	GND
2	VDD_FAN *
3	FAN_TACHO
4	FAN_PWM

Tab. 9: Molex FAN Connectors

*Voltage depends on board variant (applies to SoC and SSD FAN connector):
NUCE**C-D** = 5V +/- 5%
NUCE**H-I** = 12V +/- 5%

4.19 RS232/485 Connectors



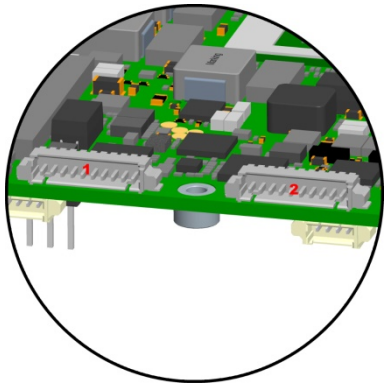


Fig. 55: Molex RS232/485 Connector Detail

Fig. 56: Molex RS232/485 Connector Schematic

Counterpart – plug:
MOLEX Pico Blade 0510211000

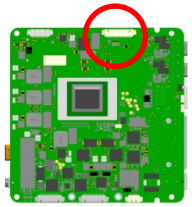
RS232 cable ordering number: W-RS232M1B
RS485 cable ordering number: W-RSXXXM1A

Pin	Signal
1	DCD_m
2	DSR_m
3	RXD
4	RTS_m
5	TXD
6	CTS_m
7	DTR_m
8	RI_m
9	VCC 5V +/- 5% (not fused)
10	GND

Tab. 10: Molex RS232/485 Connectors

4.20 Feature Connector

Status LED and GPIO Connector.



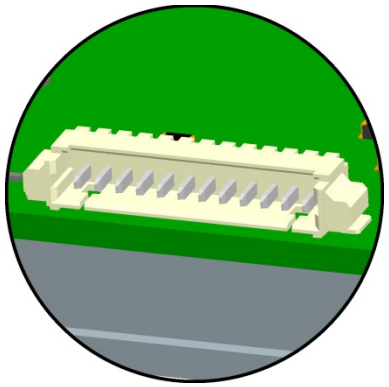


Fig. 57: Molex Feature Connector Detail

Fig. 58: Molex Feature Connector Schematic

Counterpart – plug:
MOLEX Pico Blade 0510211200

Pin	Signal
1	3.3V +/- 5%
2	P12V_FAN / N.C. *
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 3.3 V +/- 5% with 100 Ohm series resistor
11	STATUS_LED_CATHODE
12	GND

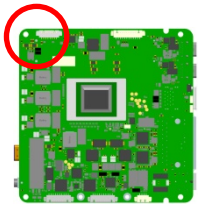
Tab. 11: Molex Feature Connector

* depends on board variant:
NUCE**C-D** = N.C.
NUCE**H-I** = 12V +/- 5%

*2 GPIO [0:3]: max. 3.3V

*3 GPO [4:6]: max. voltage = PVIN max. -> 26.4V
series resistor depends on board variant:
NUCE**C-D** = 0 Ohm
NUCE**H-I** = 422 Ohm

4.21 USB Internal Connector



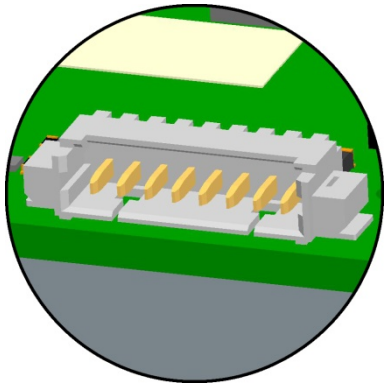


Fig. 59: Molex USB internal Connector Detail

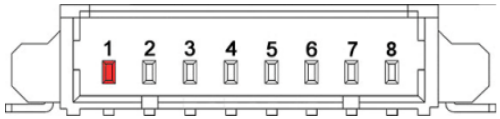


Fig. 60: Molex USB internal Connector Schematic

Counterpart – plug:
MOLEX Pico Blade 0510210800

Pin	Signal
1	VCC_USB2_6_INT -> 5V +/- 5% fused, 900mA
2	USB2_6_INT_N
3	USB2_6_INT_P
4	GND
5	VCC_USB2_7_INT -> 5V +/- 5% fused, 900mA
6	USB2_7_INT_N
7	USB2_7_INT_P
8	GND

Tab. 12: Molex USB internal Connector

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.

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

5.1 Entering Setup

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

5.2 Main Menu

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

Fig. 61: Main Menu 1

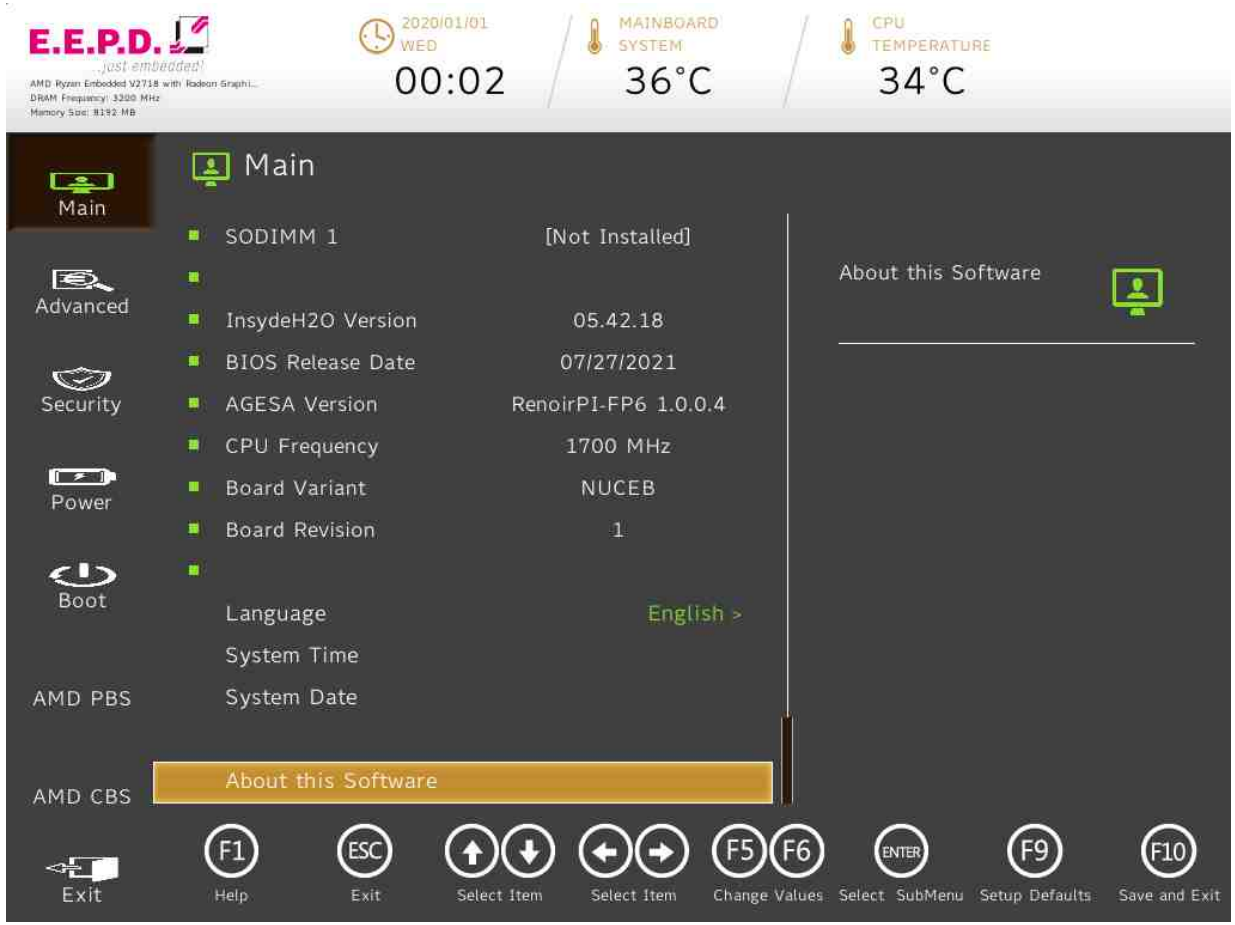


Fig. 62: Main Menu 2

BIOS Settings	Options	Description
Language	<English>*	Select the current default language used by the InsydeH2O.
System Time	No options	This is the help for the hour, minute, second field. Valid range is from 0 to 23, 0 to 59, 0 to 59. INCREASE/REDUCE: +/-.
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: +/-.
About this Software		

Tab. 13: Main Menu

5.3 Advanced Menu

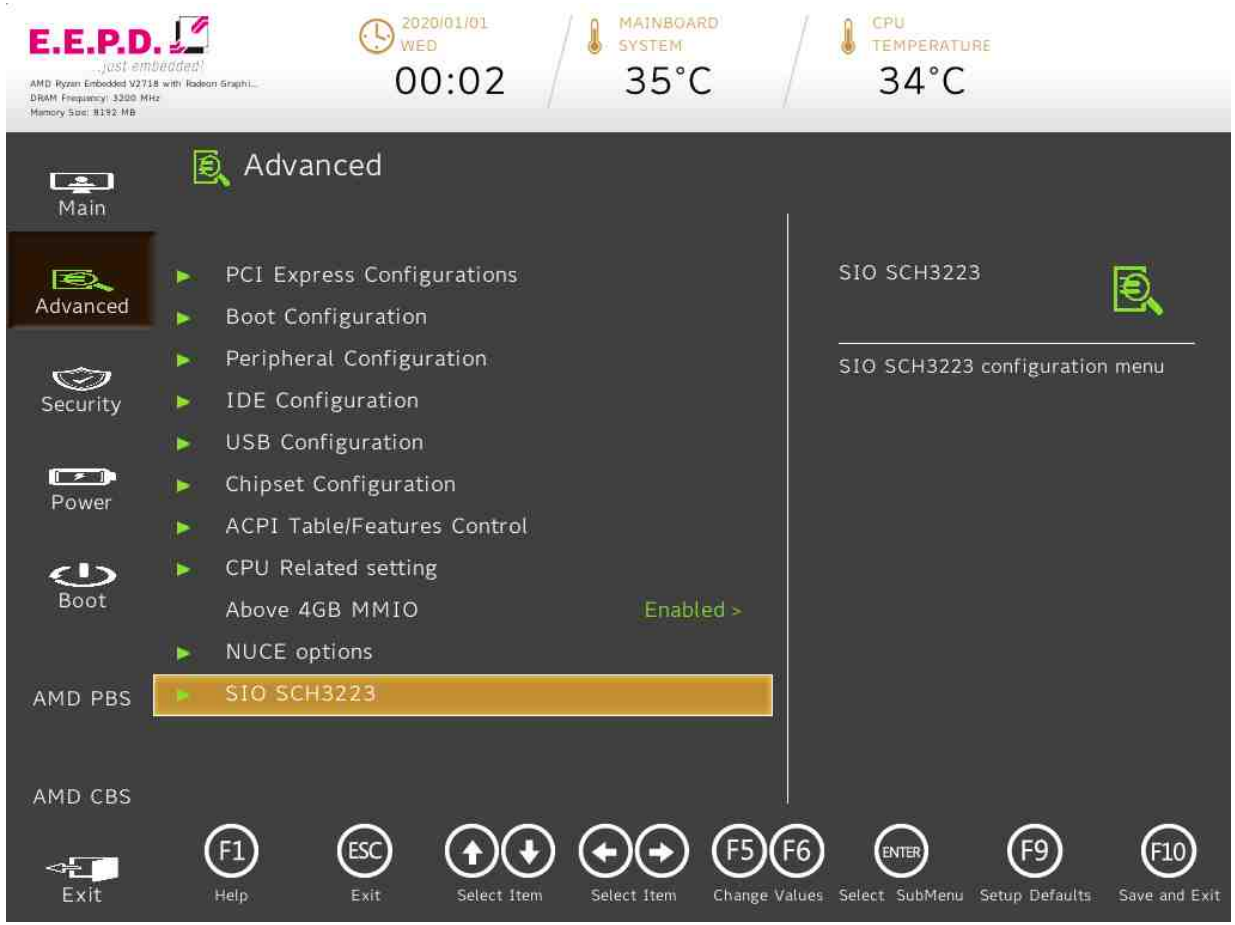


Fig. 63: Advanced Menu

BIOS Settings	Options	Description
PCI Express Configurations	No options	PCI Express Configurations
Boot Configuration	No options	Configures Boot Settings.
Peripheral Configuration	No options	Configures the peripheral devices.
IDE Configuration	No options	Select the IDE controller and hard disk drive type installed in your system
USB Configuration	No options	Configure the USB support
Chipset Configuration	No options	Advanced Chipset Configuration Options.
ACPI Table/Features Control	No options	Configures ACPI Tables/Features setting.
CPU Related setting	No options	CPU Related setting
Above 4GB MMIO	<Disabled> <Enabled>*	Enable/Disable above 4GB MemoryMappedIO BIOS assignment. It's only available with Uefi Boot Mode.
NUCE options	No options	NUCE options: Configure PIC watchdog!
SIO SCH3223	No options	SIO SCH3223 configuration menu

Tab. 14: Advanced Menu

PCI Express Configurations

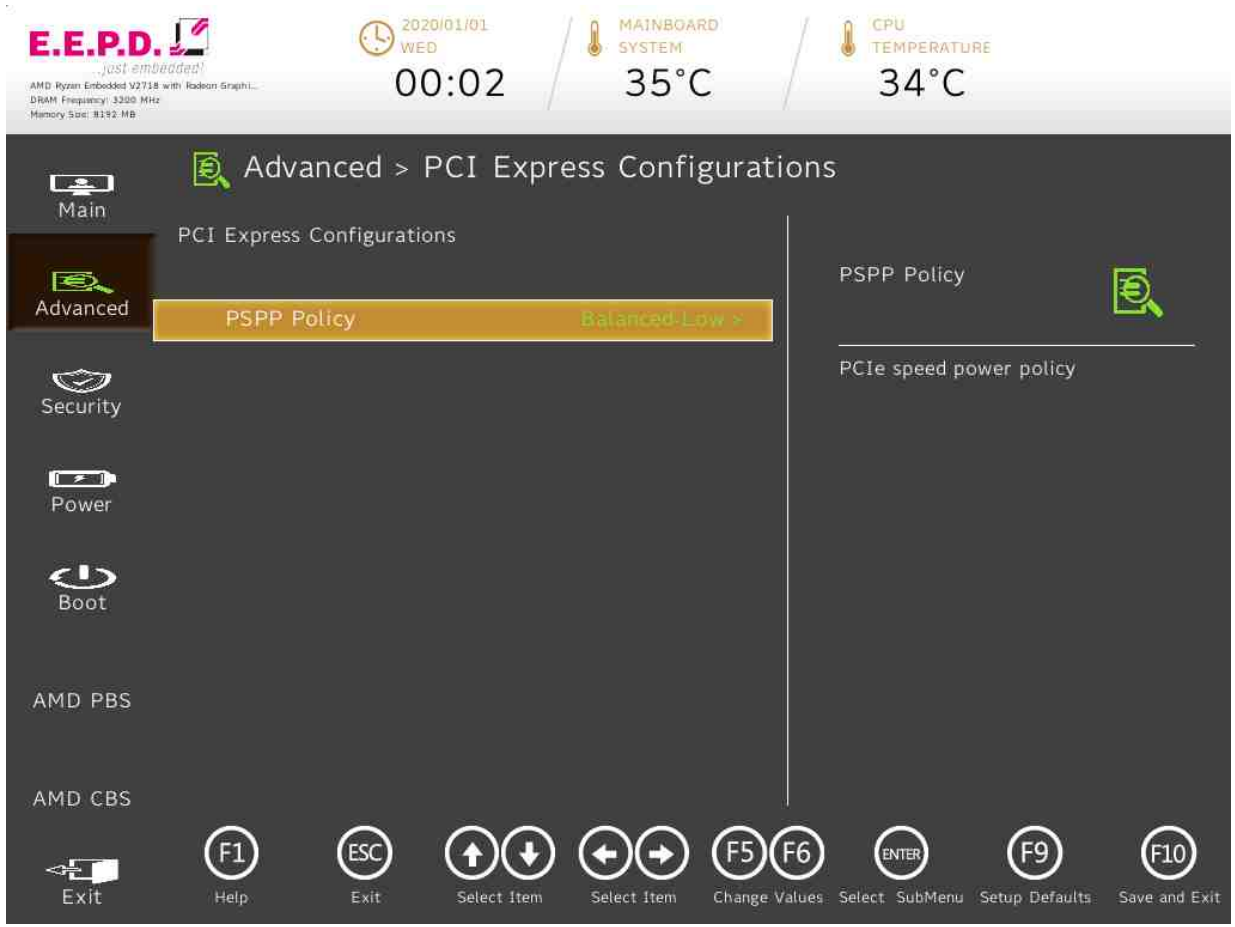


Fig. 64: PCI Express Configurations

BIOS Settings	Options	Description
PSPP Policy	<Disabled> <Performance> <Balanced-High> <Balanced-Low>* <Power Saving> <Auto>	PCIe speed power policy

Tab. 15: PCI Express Configuration

Boot Configuration

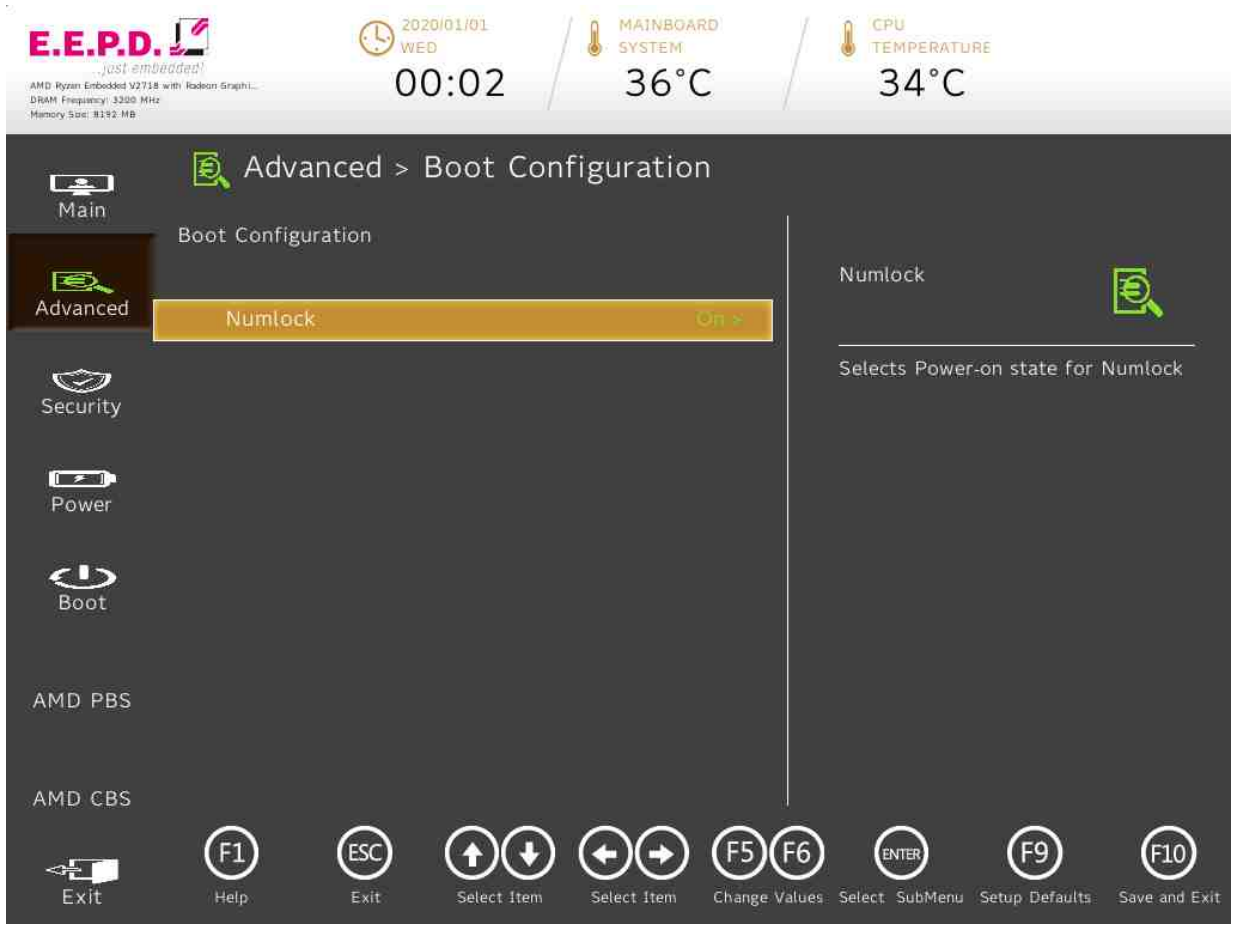


Fig. 65: Boot Configuration

BIOS Settings	Options	Description
Numlock	<Off> <On>*	Selects Power-on state for Numlock

Tab. 16: Boot Configuration

Peripheral Configuration

Fig. 66: Peripheral Configuration

BIOS Settings	Options	Description
Trust Platform Module	<Disabled>* <Enable discrete TPM> <Enable firmware TPM>	Enable/Disable TPM physical presence. Need to reboot when set from disable to enable before selecting TPM Operation.
Erase fTPM NV for factory reset	<Disabled> <Enabled>*	Control if need to erase the TPM NV when fTPM factory reset flag set.

Tab. 17: Peripheral Configuration

IDE Configuration

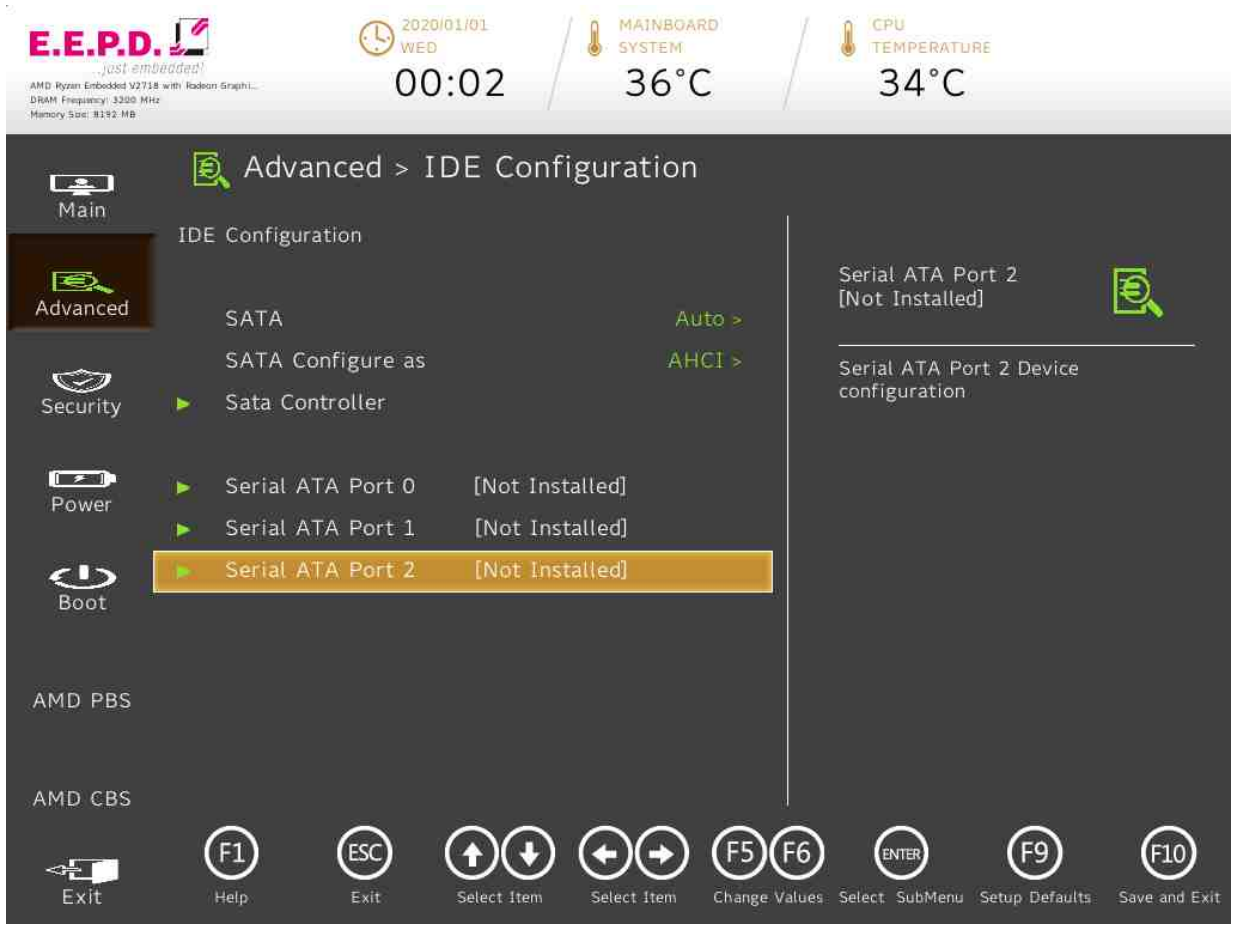


Fig. 67: IDE Configuration

BIOS Settings	Options	Description
SATA	<Disabled> <Auto>*	AUTO: Auto detect the SATA controller. DISABLED: Disable the SATA controller
SATA Configure as	<IDE> <AHCI>*	Set SATA Configure Type
Sata Controller	No options	Enable/Disable SATA Controller
Serial ATA Port 0 [Not Installed]	No options	Serial ATA Port 0 Device configuration
Serial ATA Port 1 [Not Installed]	No options	Serial ATA Port 1 Device configuration
Serial ATA Port 2 [Not Installed]	No options	Serial ATA Port 2 Device configuration

Tab. 18: IDE Configuration

SATA-Controller

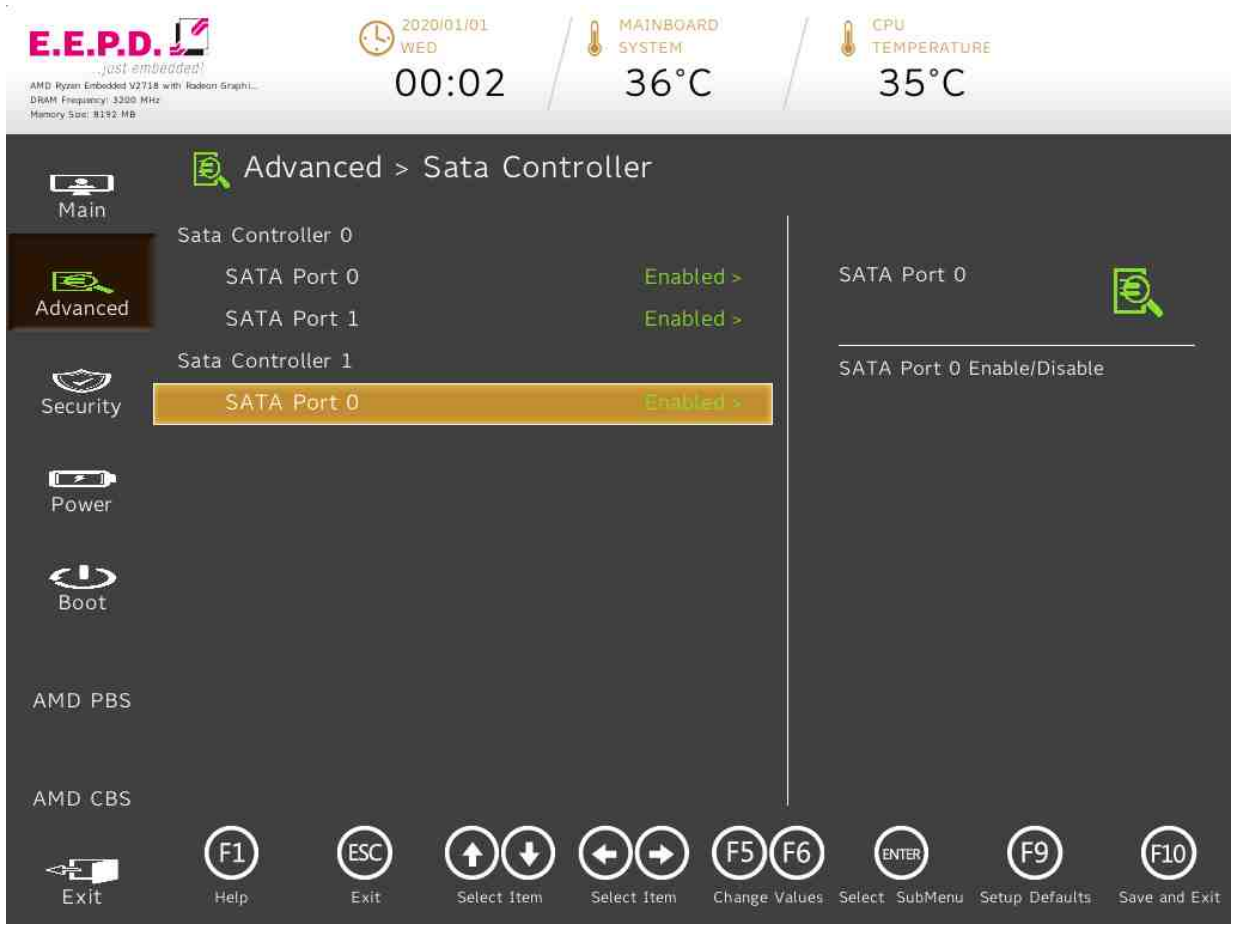


Fig. 68: SATA Controller

BIOS Settings	Options	Description
SATA Port 0	<Disabled> <Enabled>*	SATA Port 0 Enable/Disable
SATA Port 1	<Disabled> <Enabled>*	SATA Port 1 Enable/Disable
SATA Port 0	<Disabled> <Enabled>*	SATA Port 0 Enable/Disable

Tab. 19: SATA Controller 0

USB Configuration

Fig. 69: USB Configuration

BIOS Settings	Options	Description
Enable/Disable – VCC of USB Jacks	No options	Enable/Disable – USB VCC

Tab. 20: USB Configuration

Enable/Disable – VCC of USB Jacks

Fig. 70: USB Ports

BIOS Settings	Options	Description
USB 3.1 Rear VCC	<Disabled> <Enabled>*	In order to not exclude yourself from using input device in OS, at least one USB port should be enabled at all times!
USB C Front VCC	<Disabled> <Enabled>*	In order to not exclude yourself from using input device in OS, at least one USB port should be enabled at all times!
USB 2.0 Internal VCC	<Disabled> <Enabled>*	In order to not exclude yourself from using input device in OS, at least one USB port should be enabled at all times!

Tab. 21: USB Ports

Chipset Configuration

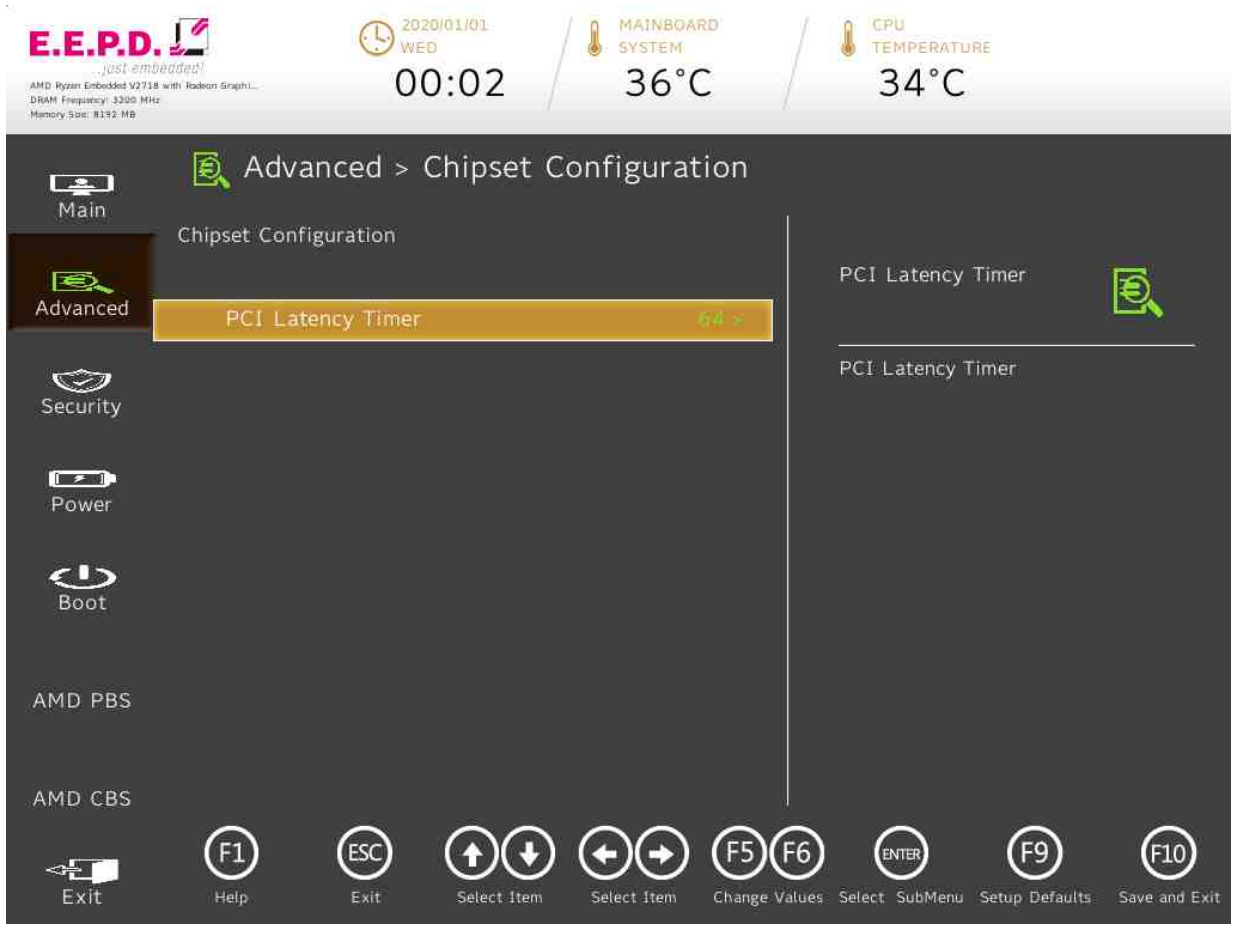


Fig. 71: Chipset Configuration

BIOS Settings	Options	Description
PCI Latency Timer	<32> <64>* <96> <128> <160> <192> <224> <248>	PCI Latency Timer

Tab. 22: Chipset Configuration

ACPI Table

Fig. 72: ACPI Table

BIOS Settings	Options	Description
HPET - HPET Support	<Disabled> <Enabled>*	High Precision Event Timer is supported in Windows Vista or above. HPET controller should not been seen in Windows XP no matter enable/disable in SCU. If this feature is enabled, the HPET table will be added into ACPI Tables.

Tab. 23: ACPI Table

CPU Related setting

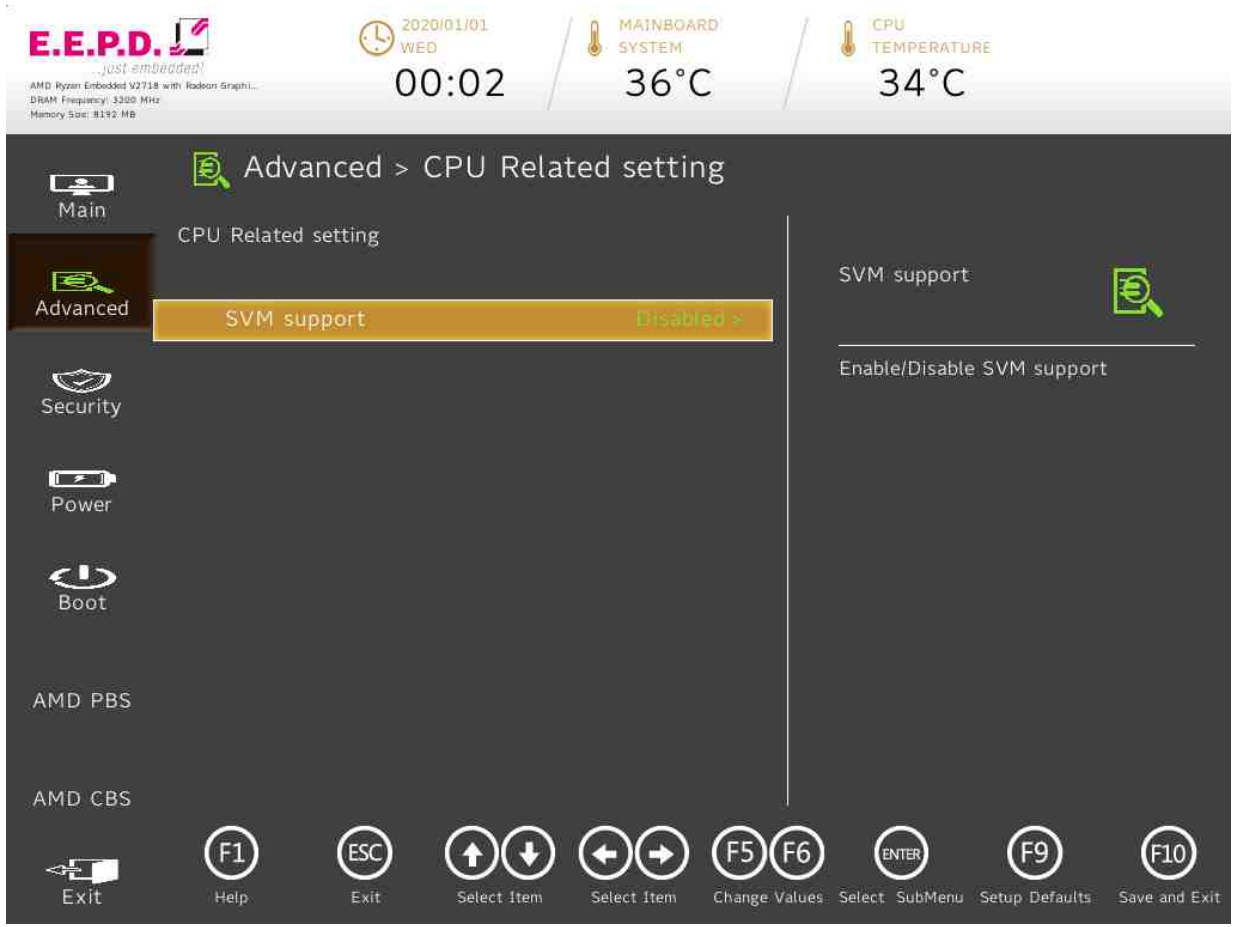


Fig. 73: CPU related setting

BIOS Settings	Options	Description
SVM support	<Disabled>* <Enabled>	Enable/Disable SVM support

Tab. 24: CPU Related setting

NUCE options – Watchdog

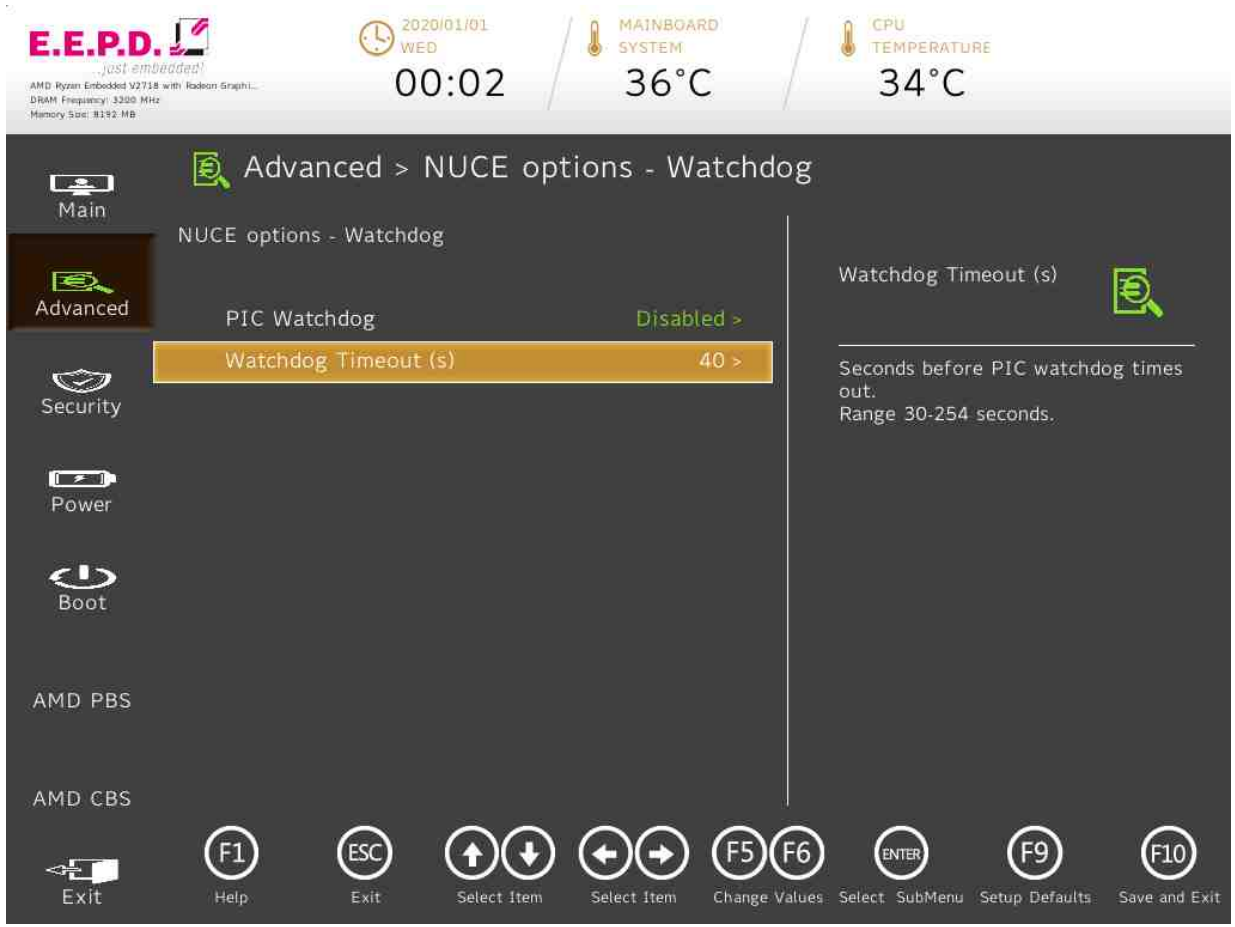


Fig. 74: NUCE options

BIOS Settings	Options	Description
PIC Watchdog	<Disabled>* <Enabled>	Enable/Disable the PIC watchdog
Watchdog Timeout (s)	Adjust value [30-254] Default value [40]	Seconds before PIC watchdog times out. Range 30-254 seconds.

Tab. 25: NUCE options

SIO SCH3223

Fig. 75: SIO SCH3223

BIOS Settings	Options	Description
UART Port 1 Configuration	No options	UART Configuration
UART Port 2 Configuration	No options	UART Configuration

Tab. 26: SIO SCH3223

UART Port 1 Configuration

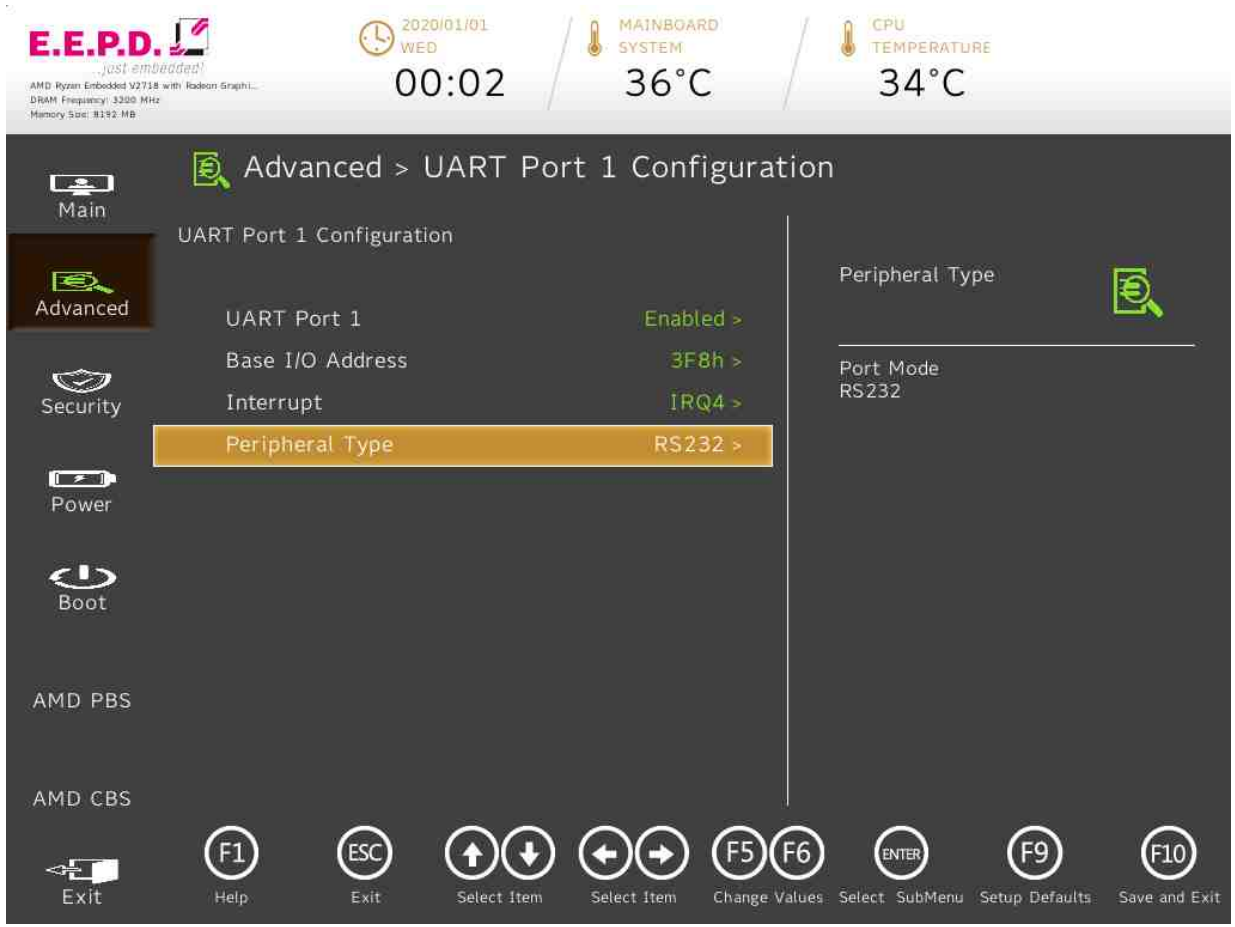


Fig. 76: UART Port 1 Configuration

BIOS Settings	Options	Description
UART Port 1	<Disabled> <Enabled>*	Configure UART port using options: [Disabled] Disable device [Enabled] Enable device and use below settings
Base I/O Address	<3F8h>* <2F8h> <3E8h> <2E8h> <338h> <228h> <220h> <238h>	System I/O base resources
Interrupt	<IRQ3> <IRQ4>* <IRQ6> <IRQ7> <IRQ11>	System interrupt resources
Peripheral Type	<RS232>*	Port Mode: RS232

Tab. 27: UART Port 1 Configuration

UART Port 2 Configuration

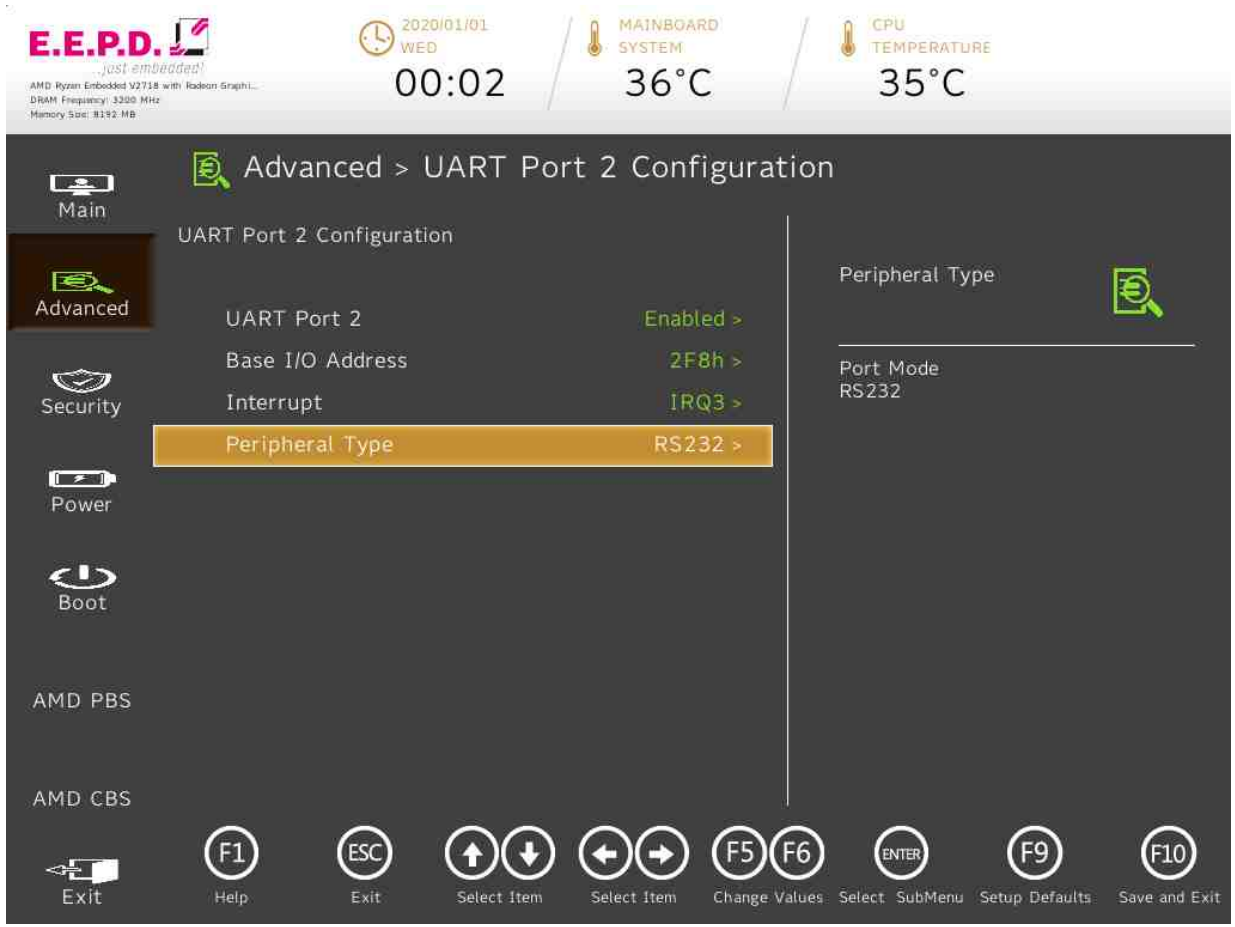


Fig. 77: UART Port 2 Configuration

BIOS Settings	Options	Description
UART Port 2	<Disabled> <Enabled>*	Configure UART port using options: [Disabled] Disable device [Enabled] Enable device and use below settings
Base I/O Address	<3F8h> <2F8h>* <3E8h> <2E8h> <338h> <228h> <220h> <238h>	System I/O base resources
Interrupt	<IRQ3>* <IRQ4> <IRQ6> <IRQ7> <IRQ11>	System interrupt resources
Peripheral Type	<RS232>*	Port Mode: RS232

Tab. 28: UART Port 2 Configuration

5.4 Security Menu

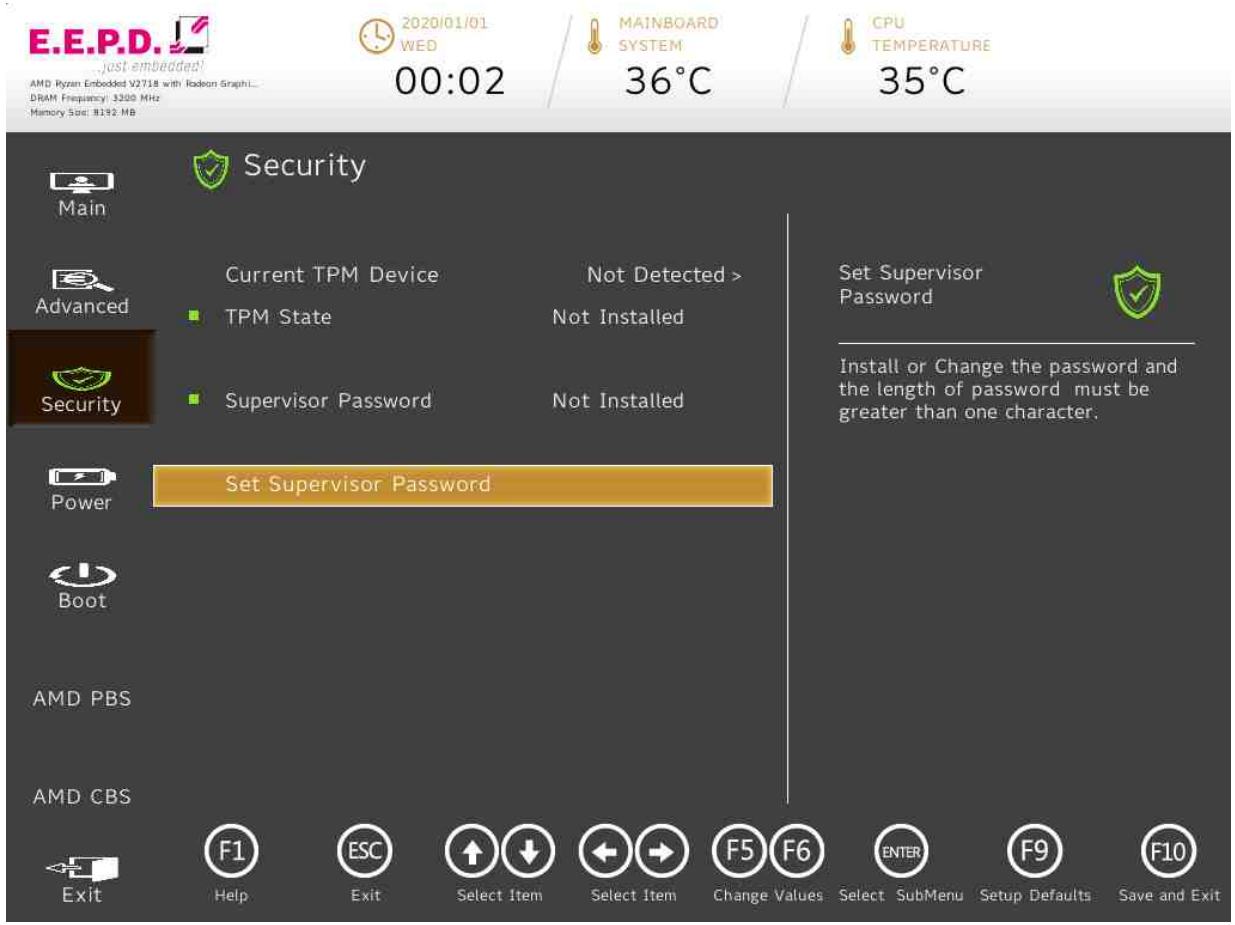


Fig. 78: Security Menu

BIOS Settings	Options	Description
Current TPM Device	<Not Detected> <TPM 1.2> <TPM 2.0>*	Current TPM Device: TPM1.2, or TPM2.0.
Set Supervisor Password	None	Install or Change the password and the length of password must be greater than one character.

Tab. 29: Security Menu 1

5.5 Power Menu

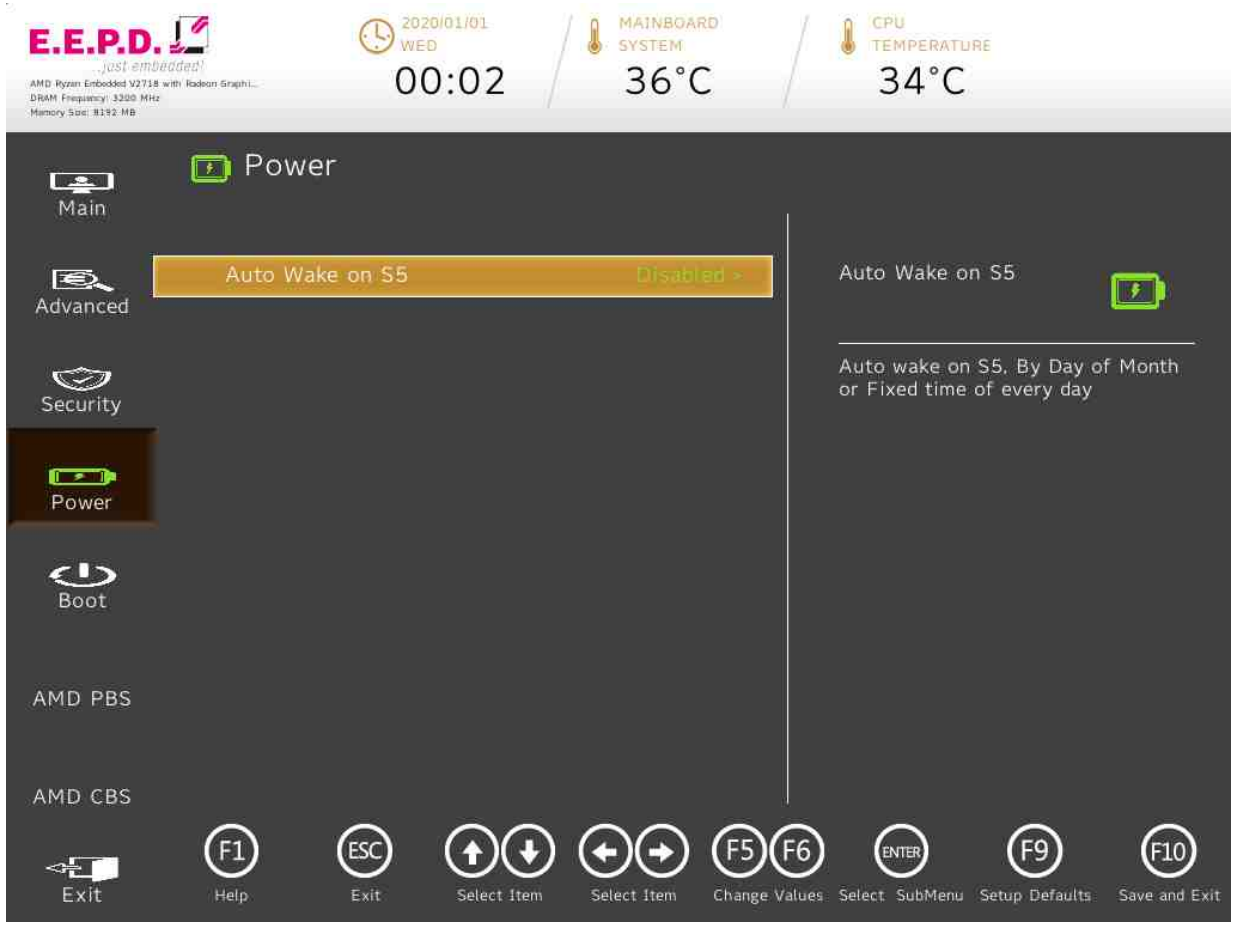


Fig. 79: Power Menu

BIOS Settings	Options	Description
Auto Wake on S5	<Disabled>* <By Every Day> <By Day of Month>	Auto wake on S5, By Day of Month or Fixed time of every day

Tab. 30: Power Menu

5.6 Boot Menu

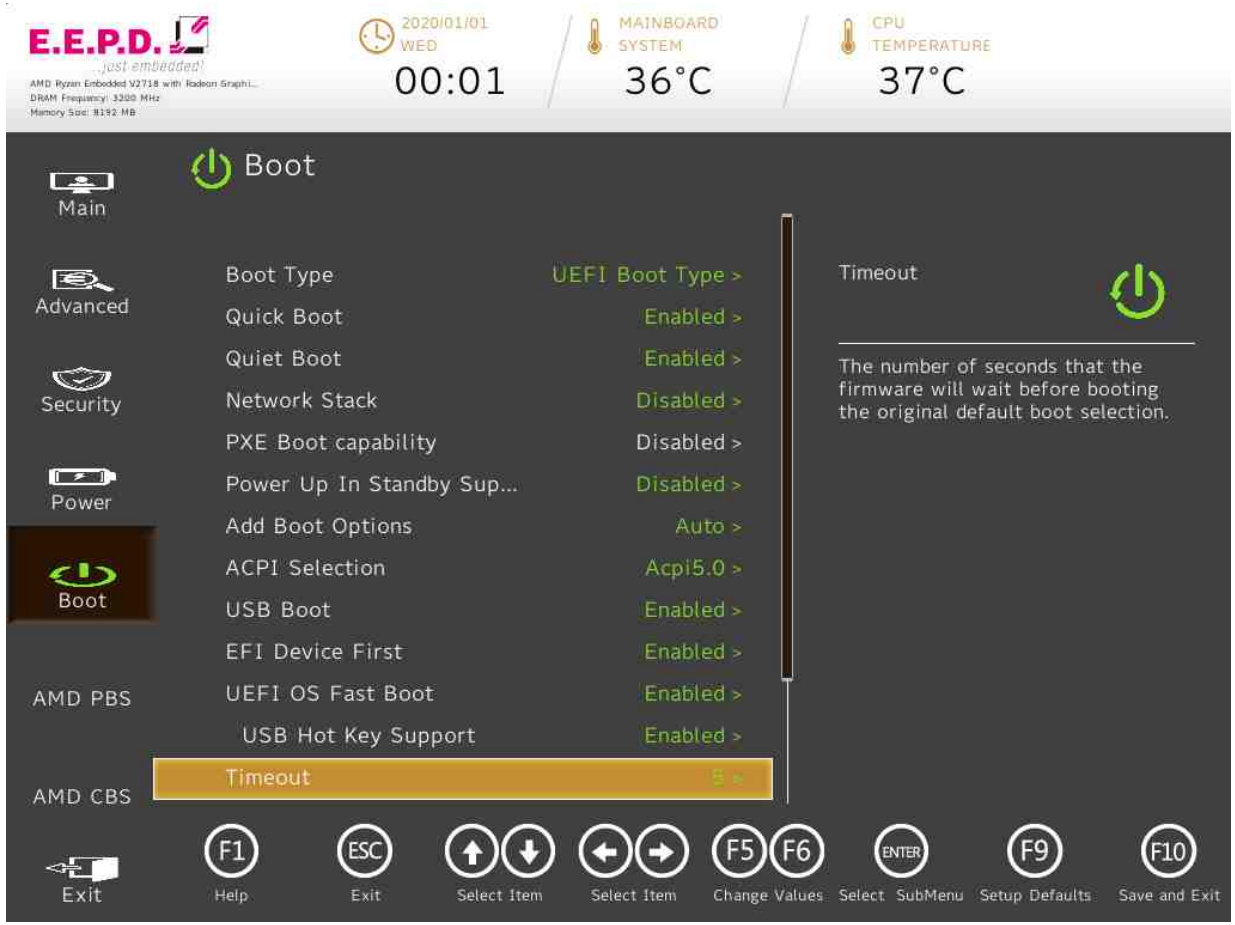


Fig. 80: Boot Menu 1

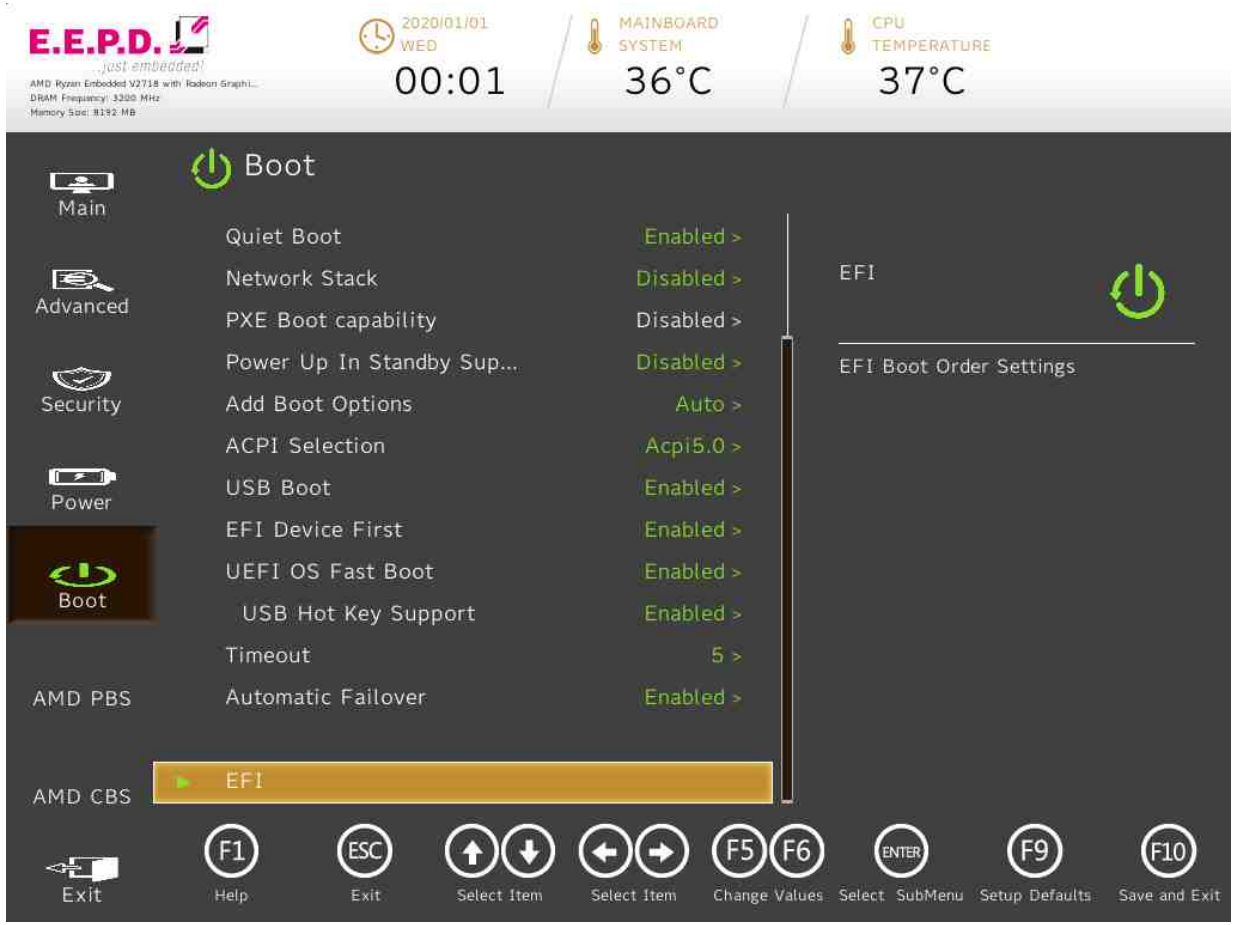


Fig. 81: Boot Menu 2

BIOS Settings	Options	Description
Boot Type	<Dual Boot Type> <Legacy Boot Type> <UEFI Boot Type>*	Select boot type to Dual type, Legacy type or UEFI type
Quick Boot	<Enabled>* <Disabled>	Allows InsydeH2O to skip certain tests while booting. This will decrease the time needed to boot the system.
Quiet Boot	<Enabled>* <Disabled>	Disables or enables booting in Text Mode.
Network Stack	<Disabled>* <Enabled>	Network Stack Support: Windows 8 BitLocker Unlock UEFI IPv4/IPv6 PXE Legacy PXE OPROM
PXE Boot capability	<Disabled>*	Disabled : Support Network Stack UEFI PXE : IPv4/IPv6 Legacy : Legacy PXE OPROM only
Power Up In Standby Support	<Enabled> <Disabled>*	Disable or enable Power Up In Standby Support. The PUIS feature set allows devices to be powered-up into the Standby power management state to minimize inrush current at power-up and to allow the host to sequence the spin-up of devices.
Add Boot Options	<First> <Last> <Auto>*	Position in Boot Order for Shell,Network and Removables
ACPI Selection	<Acpi4.0> <Acpi5.0>* <Acpi6.0> <Acpi6.1> <Acpi6.2> <Acpi6.3>	Select booting to Acpi3.0/Acpi1.0B
USB Boot	<Enabled>* <Disabled>	Disables or enables booting to USB boot devices.

EFI Device First	<Disabled> <Enabled>*	Determine EFI device first or legacy device first. If enable, it is EFI device first. If disable, it is Legacy device first.
UEFI OS Fast Boot	<Enabled>* <Disabled>	If enabled the system firmware does not initialize keyboard and check for firmware menu key.
USB Hot Key Support	<Disabled>* <Enabled>	Enable/Disable to support USB hot key while booting. This will decrease the time needed to boot the system.
Timeout	Adjust value [0-10] Default value [5]	The number of seconds that the firmware will wait before booting the original default boot selection.
Automatic Failover	<Disabled> <Enabled>*	Enable: if boot to default device fail, it will directly try to boot next device. Disable: if boot to default device fail, it will pop warning message then go into firmware UI.
EFI	No options	EFI Boot Order Settings

Tab. 31: Boot Menu

EFI

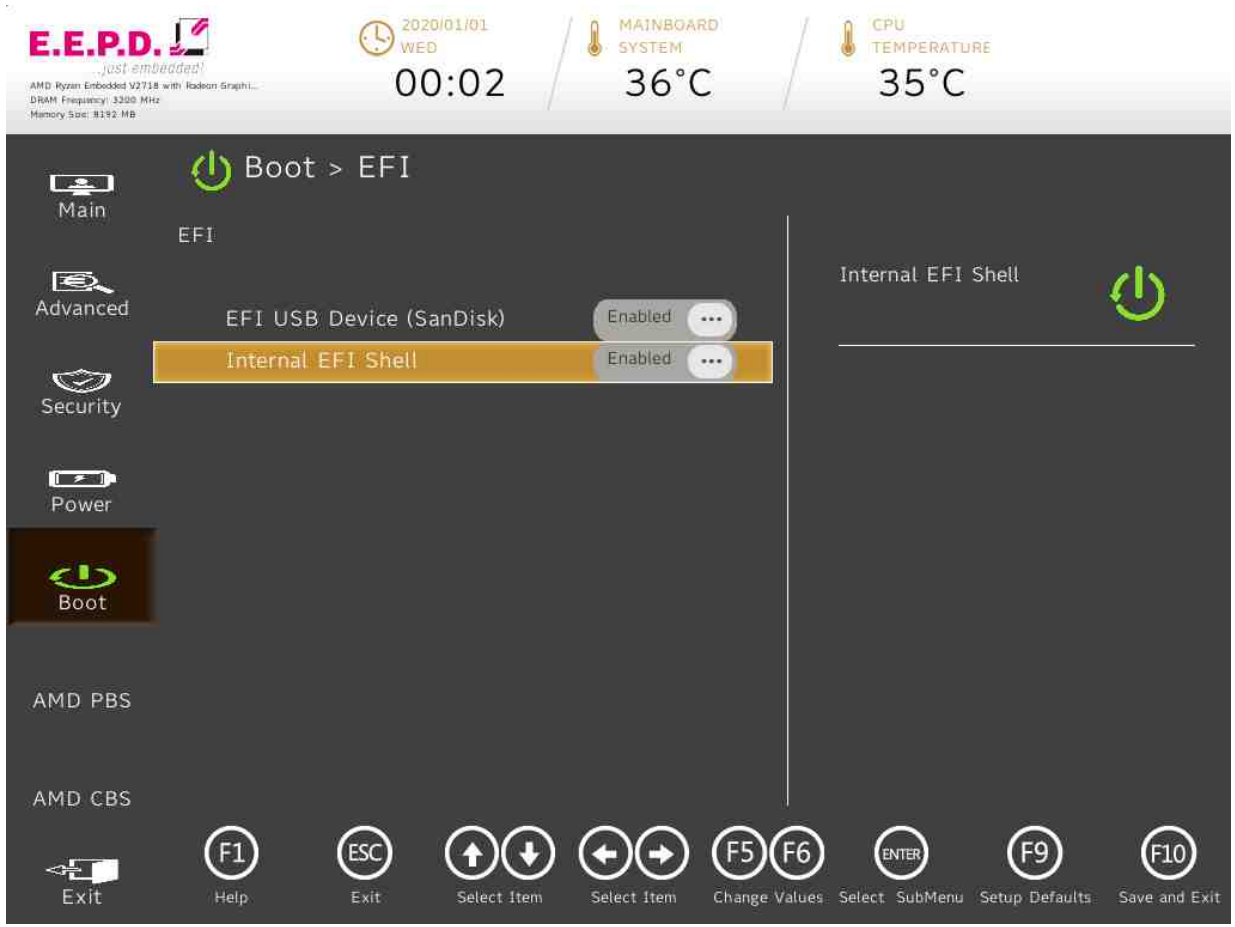


Fig. 82: EFI

BIOS Settings	Options	Description
EFI USB Device (SanDisk)	[ ]* [X]	
Internal EFI Shell	[ ]* [X]	

Tab. 32: EFI

5.7 AMD PBS Menu

Fig. 83: AMD PBS Option

BIOS Settings	Options	Description
AMD Firmware Version	No options	Show all of AMD Firmware Version
M.2 Key M SATA/PCIE Selection	<Force PCIE> <Force SATA> <Auto Detection>*	M.2 Key M SATA/PCIE Selection usage: SATA, PCIE or Auto Detection
M.2 Key B Power Enable	<Disabled> <Enabled>*	Enable/Disable power of M.2 Key B Slot
M.2 Key E Power Enable	<Disabled> <Enabled>*	Enable/Disable power of M.2 Key E Slot
Above 4GB MMIO Limit	<35bit (32GB)> <36bit (64GB)> <37bit (128GB)> <38bit (256GB)> <39bit (512GB)> <40bit (1TB)>* <41bit (2TB)> <42bit (4TB)> <43bit (8TB)> <44bit (16TB)> <45bit (32TB)> <46bit (64TB)> <47bit (128TB)> <48bit (256TB)>	Select Above 4GB MMIO Limit to 35~48bits limit.
S3/Modern Standby Support	<S3 Enable>* <Modern Standby Enable>	Switch S3/Modern Standby
Wake on PME	<Disabled> <Enabled>*	Determines the action taken when the system power is off and a PCI Power Management Enable wake up event occurs.

Tab. 33: AMD PBS Option

AMD Firmware Version

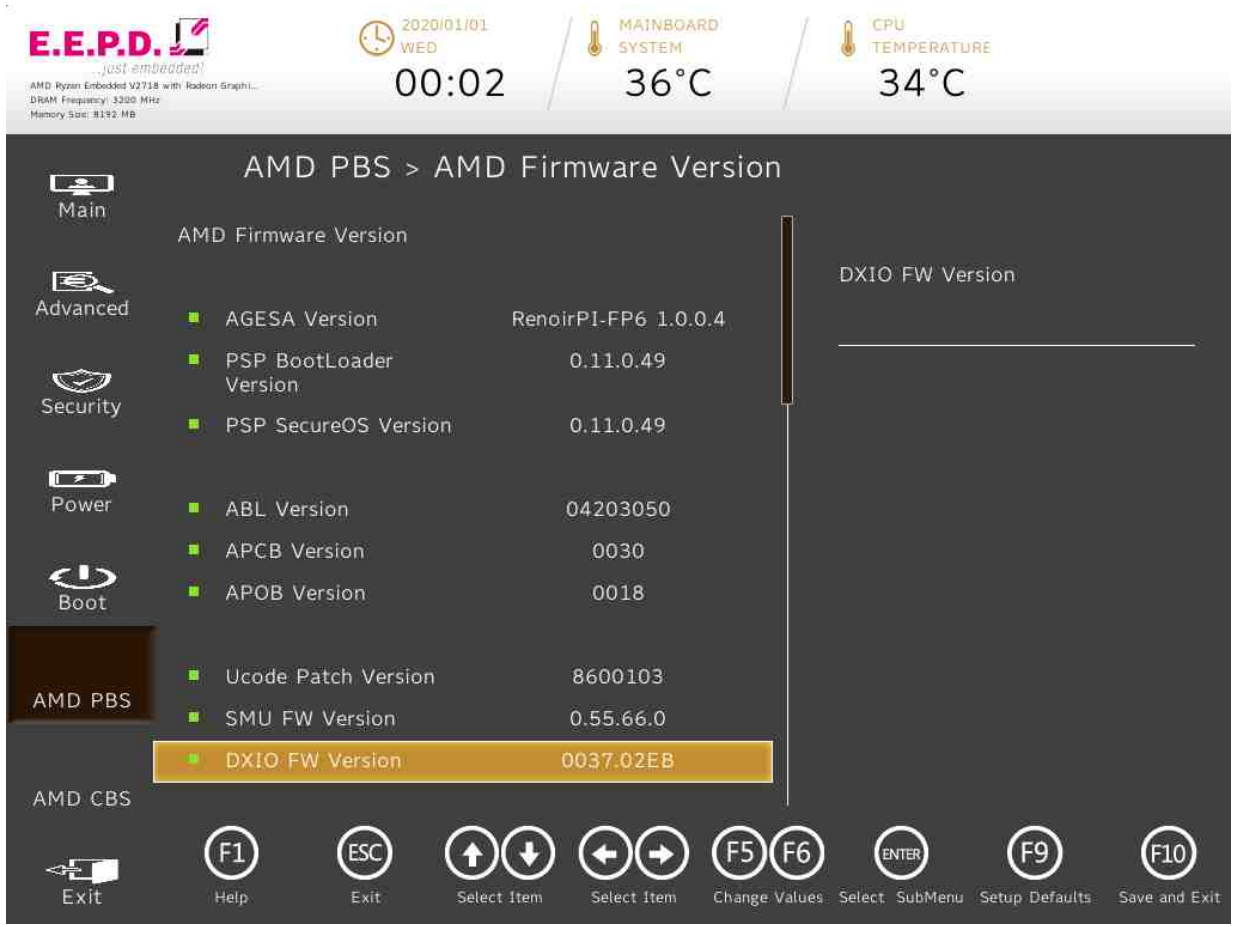


Fig. 84: AMD Firmware Version 1

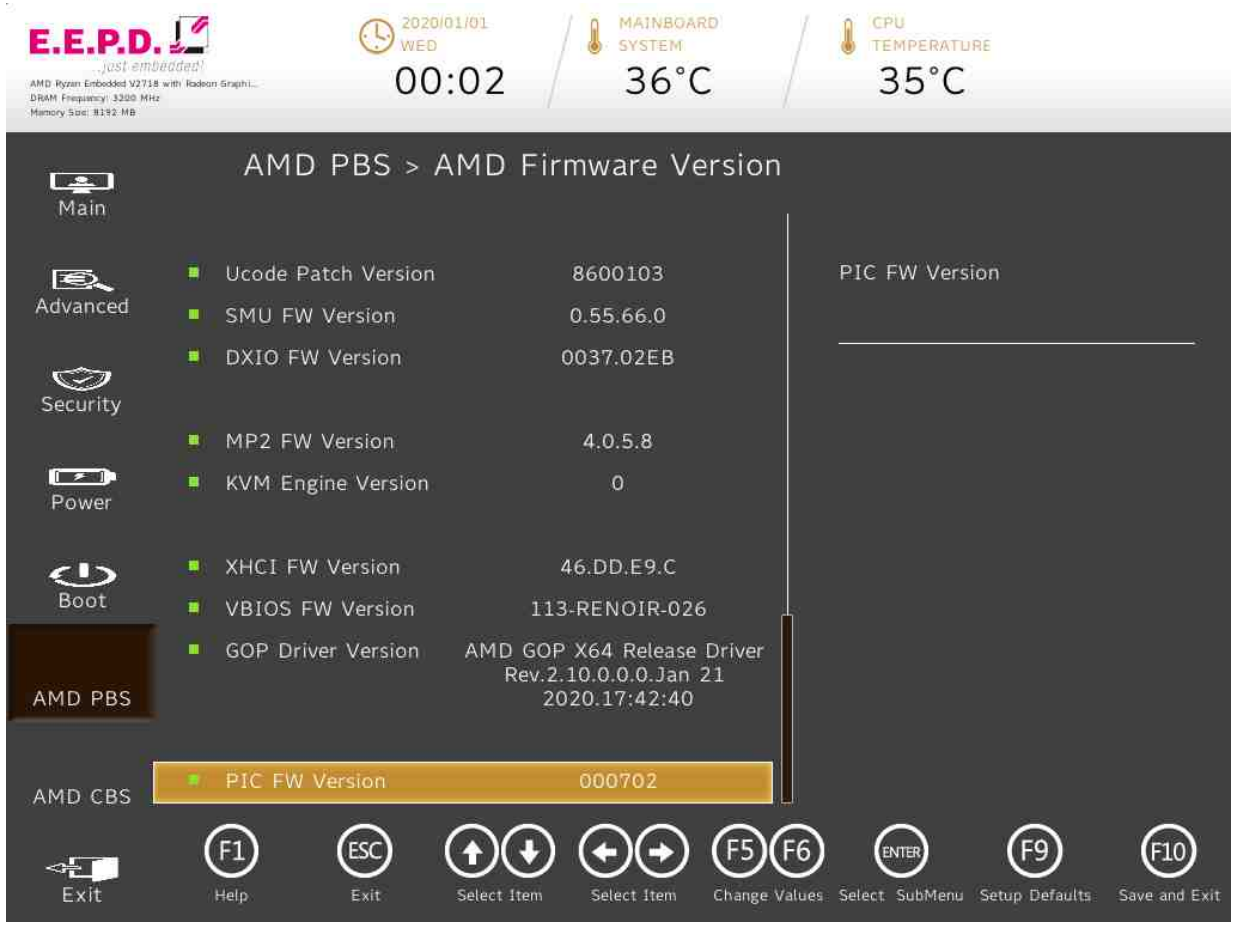


Fig. 85: AMD Firmware Version 2

5.8 AMD CBS Menu

Fig. 86: AMD CBS

BIOS Settings	Options	Description
CPU Common Options	No options	CPU Common Options
NBIO Common Options	No options	NBIO Common Options
FCH Common Options	No options	FCH Common Options

Tab. 34: AMD CBS

CPU Common Options

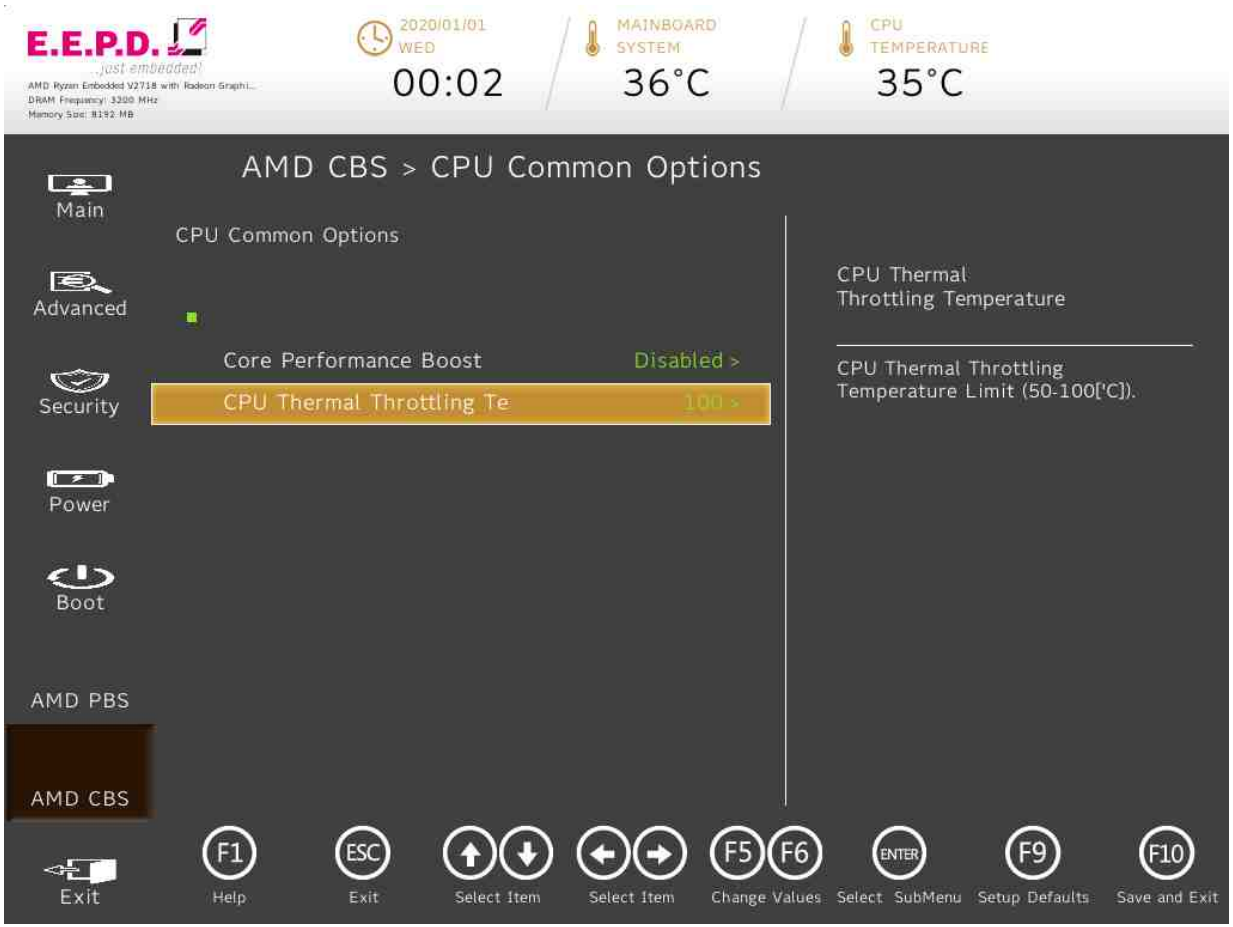


Fig. 87: CPU Common Options

BIOS Settings	Options	Description
Core Performance Boost	<Disabled>* <Auto>	Disable CPB
CPU Thermal Throttling Temperature	Adjust value [50-100] Default value [100]	CPU Thermal Throttling Temperature Limit (50-100[‘C])

Tab. 35: CPU Common Options

NBIO Common Options

Fig. 88: NBIO Common Options

BIOS Settings	Options	Description
GFX Configuration	No options	GFX Configuration
SMU Common Options	No options	SMU Common Options

Tab. 36: NBIO Common Options

GFX Configuration

Under this setting, the allocation of RAM memory to GPU memor can be changed:
iGPU Configuration → <UMA_SPECIFIED> → UMA Frame buffer size 2G.

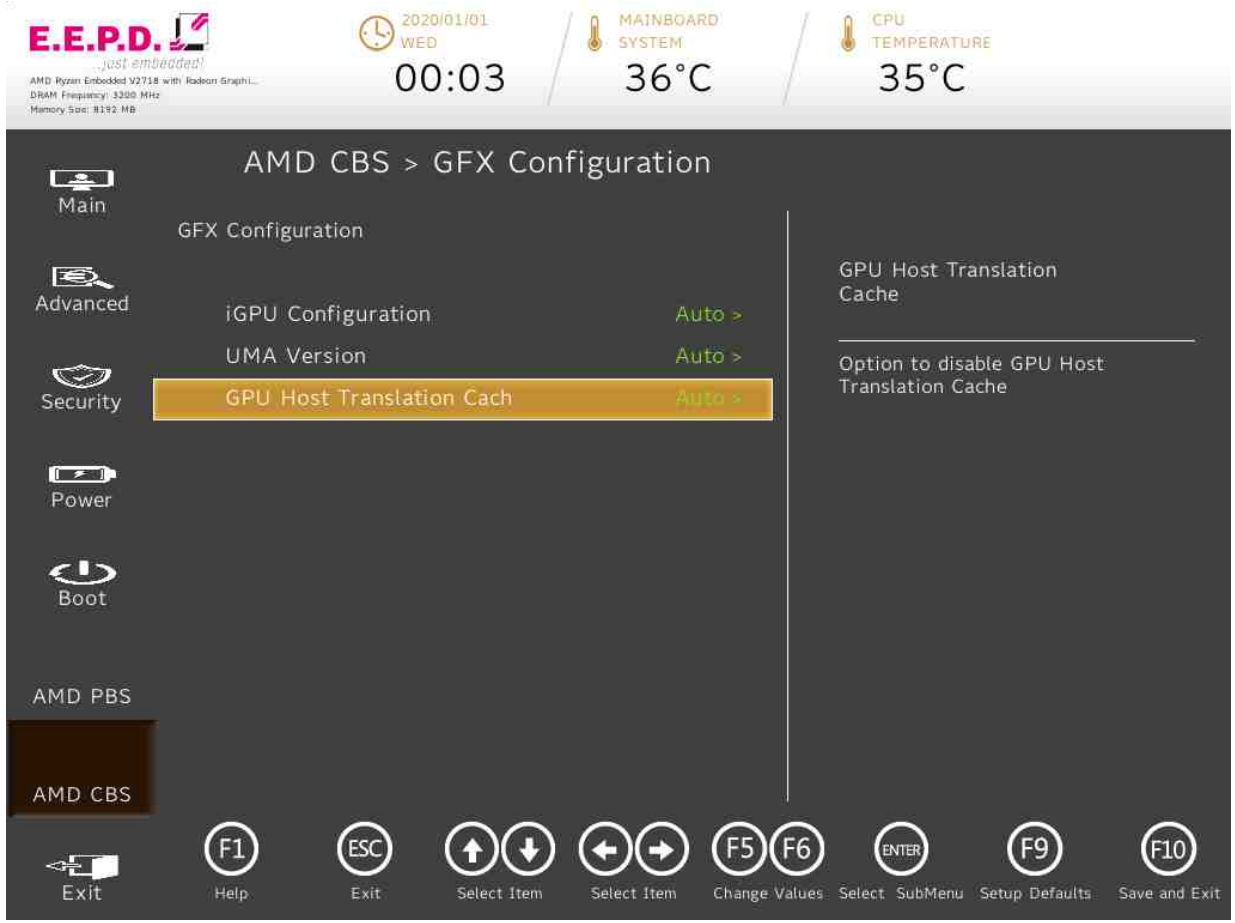


Fig. 89: GFX Configuration

BIOS Settings	Options	Description
iGPU Configuration	<Auto>* <iGPU Disabled> <UMA_SPECIFIED> <UMA_AUTO> <UMA_GAME_OPTIMIZED>	UMA Mode
UMA Version	<Legacy> <Non-Legacy> <Hybrid Secure> <Auto>*	UMA Legacy Version UMA Non Legacy Version Hybrid Secure
GPU Host Translation Cache	<Disabled> <Enabled> <Auto>*	Option to disable GPU Host Translation Cache

Tab. 37: GFX Configuration

SMU Common Options

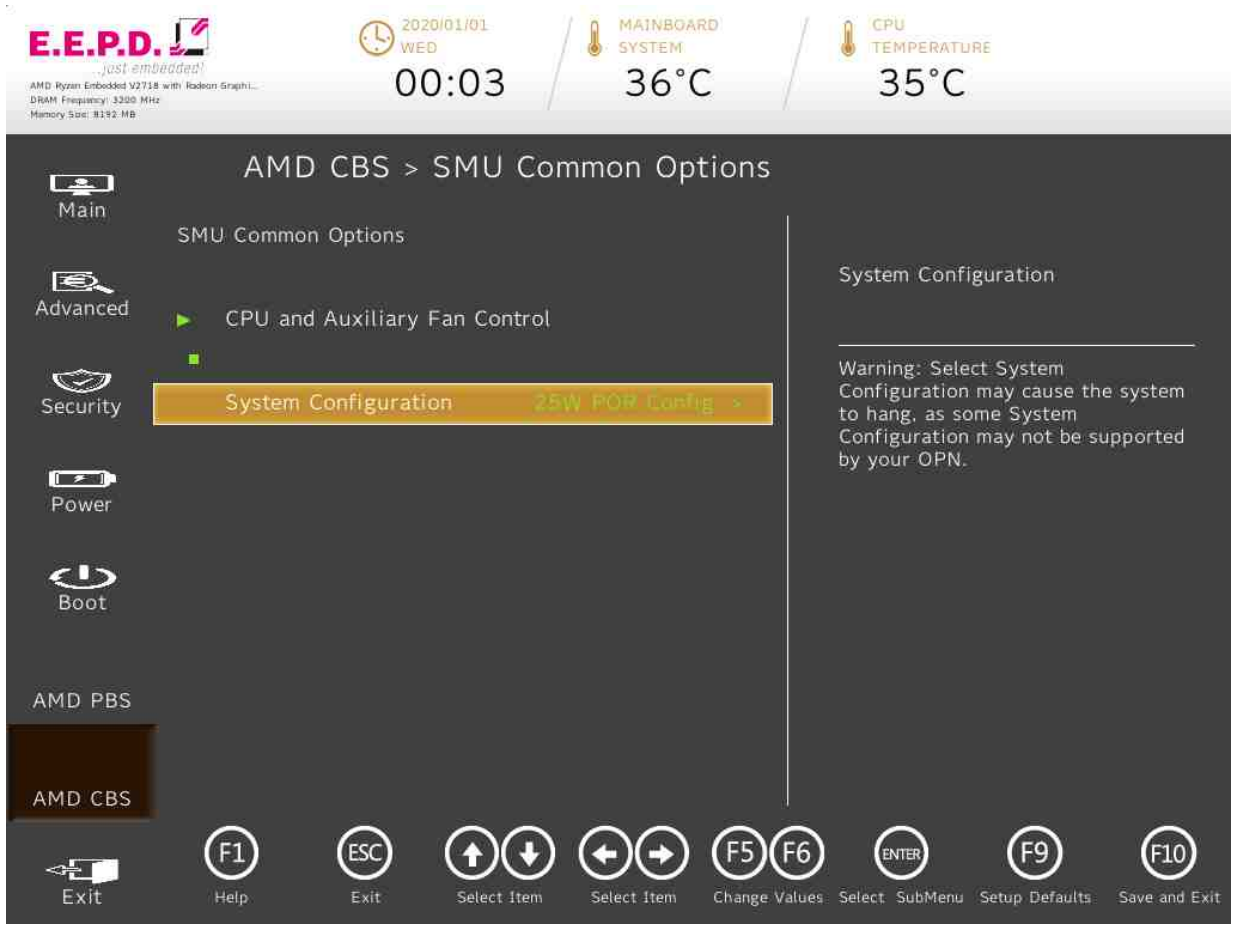


Fig. 90:SMU Common Options

BIOS Settings	Options	Description
CPU and Auxiliary Fan Control	No options	CPU and Auxiliary Fan Control
System Configuration	<15W POR Configuration> <18W POR Configuration> <25W POR Configuration>	Warning: Select System Configuration may cause the system to hang, as some System Configuration may not be supported by your OPN.

Tab. 38: SMU Common Options

CPU and Auxiliary Fan Control

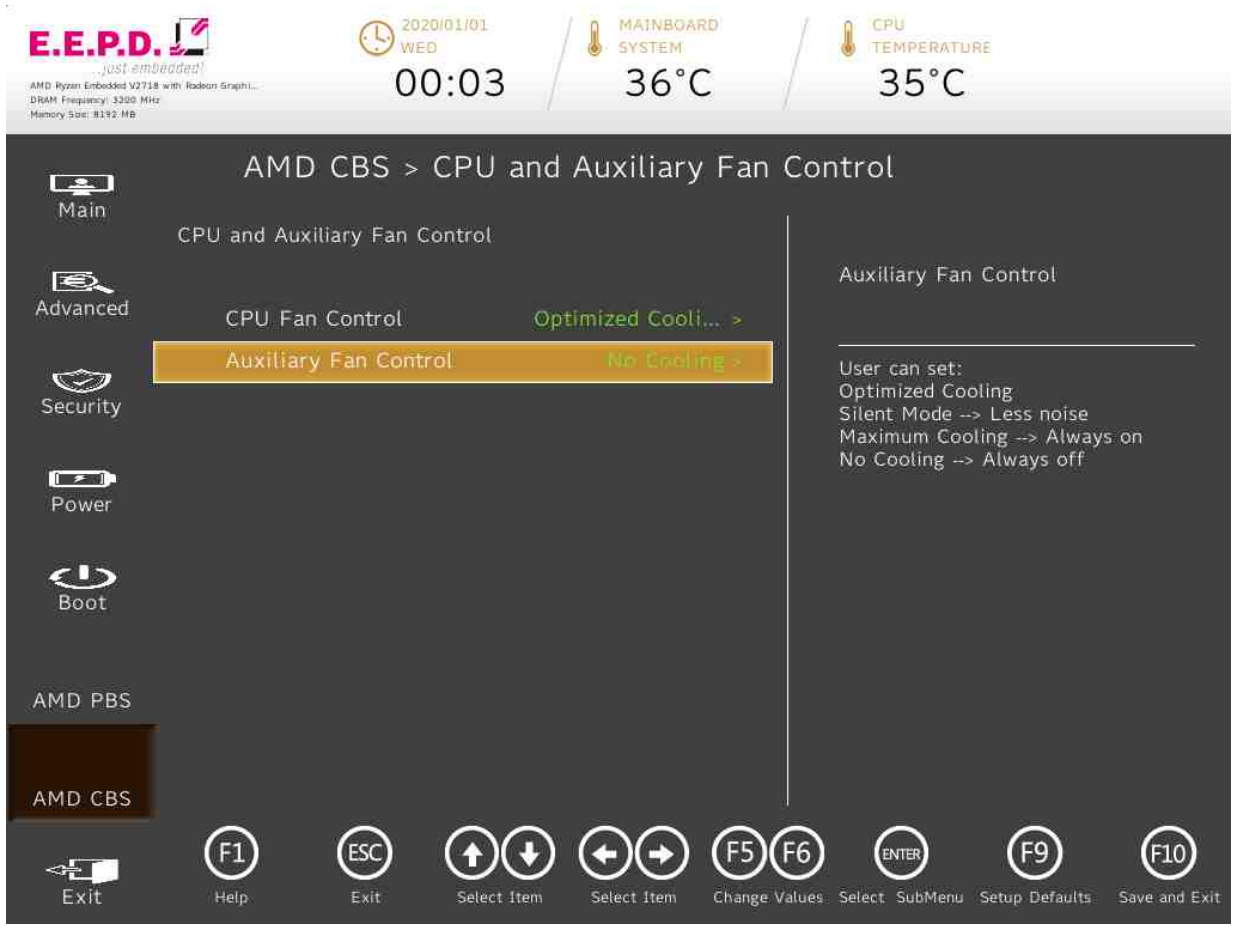


Fig. 91: CPU and Auxiliary Fan Control

BIOS Settings	Options	Description
CPU Fan Control	<Optimized Cooling>* <Silent Mode> <Maximum Cooling> <No Cooling>	User can set: Optimized Cooling Silent Mode → Less noise Maximum Cooling → Always on No Cooling → Always off
Auxiliary Fan Control	<Optimized Cooling> <Silent Mode> <Maximum Cooling> <No Cooling>*	User can set: Optimized Cooling Silent Mode → Less noise Maximum Cooling → Always on No Cooling → Always off

Tab. 39: CPU and Auxiliary Fan Control

FCH Common Options

Fig. 92: FCH Common Options

BIOS Settings	Options	Description
USB Configuration Options	No options	USB Configuration Options
Ac Power Loss Options	No options	Ac Power Loss Options

Tab. 40: FCH Common Options

USB Configuration Options

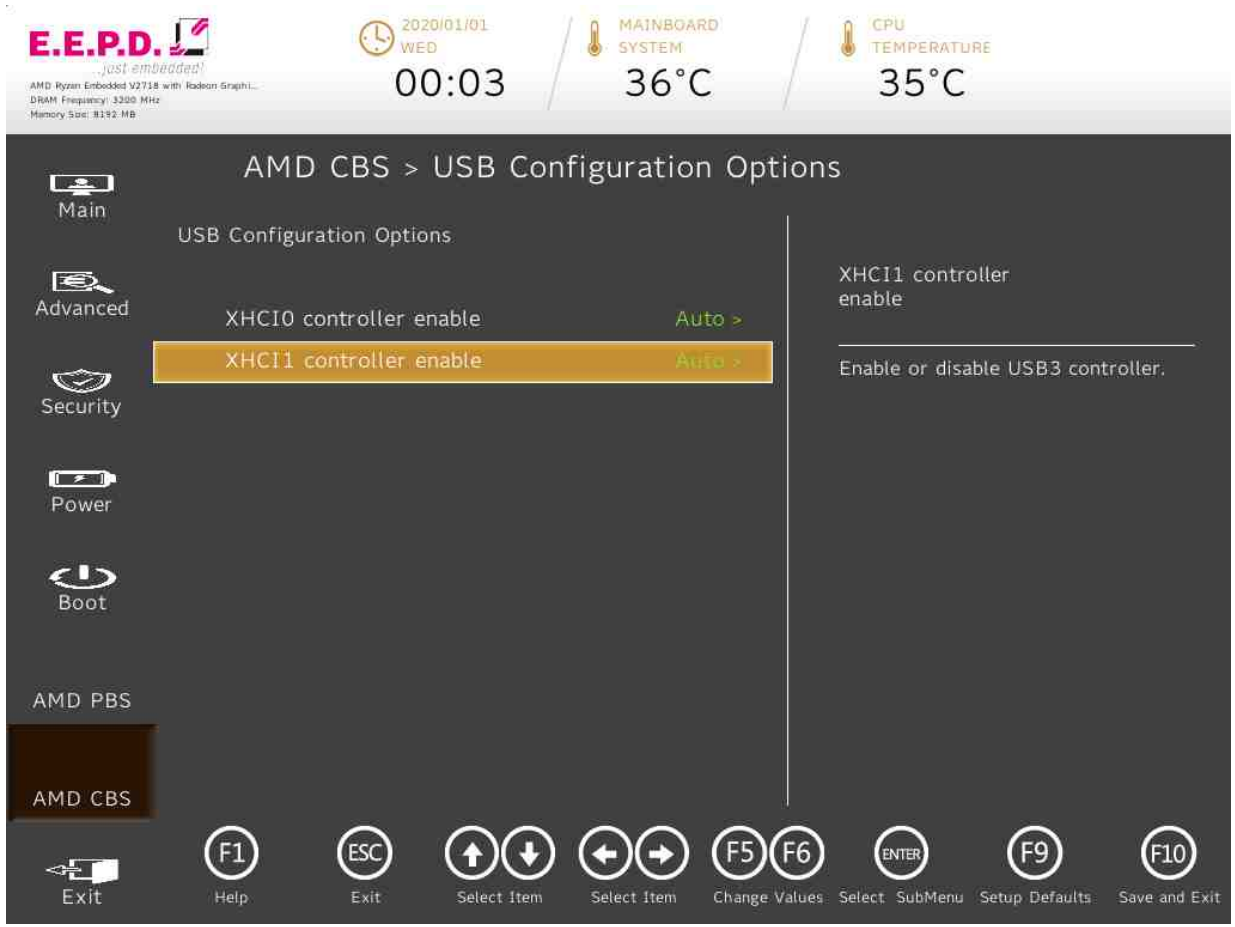


Fig. 93: USB Configuration Options

BIOS Settings	Options	Description
XHCI0 controller enable	<Enabled> <Disabled> <Auto>*	Enable or disable USB3 controller.
XHCI1 controller enable	<Enabled> <Disabled> <Auto>*	Enable or disable USB3 controller.

Tab. 41: USB Configuration Options

Ac Power Loss Options

Fig. 94: Ac Power Loss Options

BIOS Settings	Options	Description
Ac Loss Control	<Always Off> <Always On> <Reserved> <Previous>* <Auto>	Select Ac Loss Control Method

Tab. 42: Ac Power Loss Options

5.9 Exit Menu

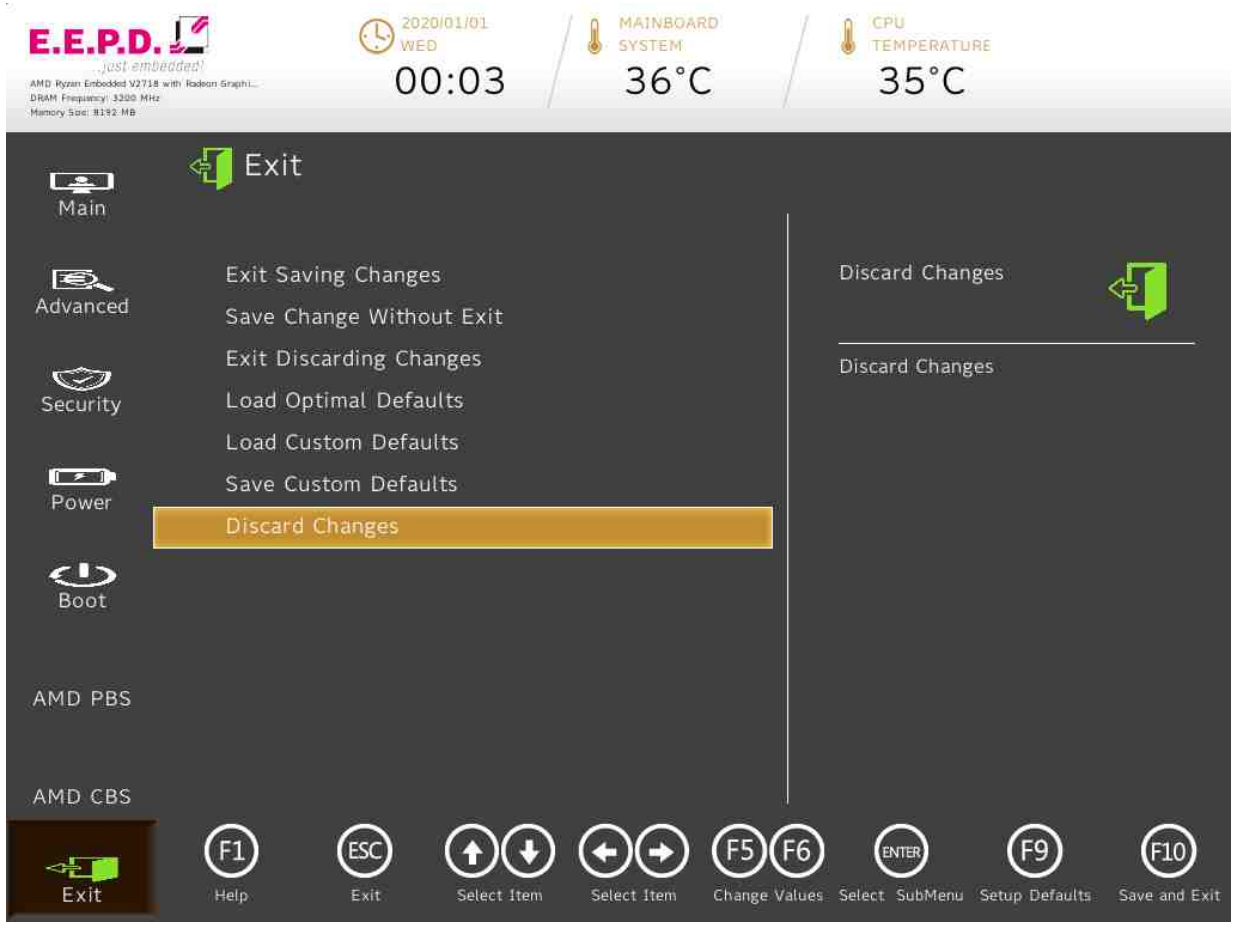


Fig. 95: Exit Menu

BIOS Settings	Options	Description
Exit Saving Changes		Exit system setup and save your changes.
Save Change Without Exit		Save your changes and without exiting system.
Exit Discarding Changes		Exit system setup and without saving your changes.
Load Optimal Defaults		Load Optimal Defaults.
Load Custom Defaults		Load Custom Defaults.
Save Custom Defaults		Save Custom Defaults
Discard Changes		Discard Changes

Tab. 43: Exit Menu

Revision History

Date	Version	Changes
26.02.2021	1.0	First release
08.04.2021	1.1	BIOS Update
13.04.2021	1.2	BIOS Update
16.04.2021	1.3	Some corrections and updates
01.06.2021	1.4	BIOS Update
30.06.2021	1.5	BIOS Update and some corrections
31.08.2021	1.6	BIOS Update and splitting in 25W and 54W version
20.10.2021	1.7	Some corrections and updates

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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

Classified Index

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