MITAC COMPUTING TECHNOLOGY CORP.

MX1-10FEP Series

User Manual V1.9

Master Series Embedded System

Intel® Coffee Lake Xeon-E / Core-i Processors

Powerful, Versatile, and Rugged & Reliable

PREFACE

Copyright Notice

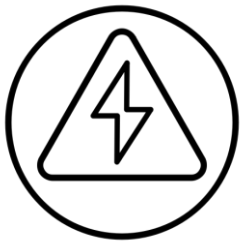
Disclaimer

We reserve the right to make changes, without notice, to any product, including circuits and/or software described or contained in this manual in order to improve design and/or performance. We assume no responsibility or liability for the use of the described product(s) conveys no license or title under any patent, copyright, or masks work rights to these products, and make no representations or warranties that these products are free from patent, copyright, or mask work right infringement, unless otherwise specified. Applications that are described in this manual are for illustration purposes only. We make no representation or guarantee that such application will be suitable for the specified use without further testing or modification.

Declaration of Conformity

FC	**FCC** This equipment has been tested and found to comply with the limits for a class "A" digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at him own expense.
CE	**CE** This equipment is in conformity with the requirement of the following EU legislations and harmonized standards. Product also complies with the Council directions.

Safety Information

	**WARNING! / AVERTISSEMENT!** Always completely disconnect the power cord from your chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges. Only experienced electronics personnel should open the PC chassis.
	**CAUTION/ATTENTION** Always ground yourself to remove any static charge before touching the CPU card. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components in a static-dissipative surface or static-shielded bag when they are not in the chassis.

Safety Precautions

For your safety, please carefully read all the safety instructions before using the device. All cautions and warnings on the equipment should be noted. Keep this user manual for future reference.

***Let service personnel to check the equipment in case any of the following problems appear:**

- The power cord or plug is damaged.
- Liquid has penetrated into the equipment.
- The equipment has been exposed to moisture.
- The equipment does not work well or you cannot get it to work according to the user manual.
- The equipment has been dropped and damaged.
- The equipment has obvious signs of breakage on the surface.

Ordering Information

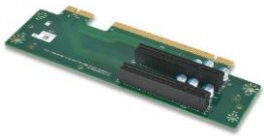
Model Number	Description
MX1-10FEP-C246 	Fanless Embedded System with Intel® C246 Chipset. 2x260Pin DDR4 SO-DIMM 2666Mhz up to 32GB, 1xHDMI, 1xDisplayPort, 1xDVI-I, 2xGbE LANs, 6xUSB3.0, 2xUSB2.0, 2xCOM, 9~48V DC-in, L6 System w/o AC Adaptor
MX1-10FEP-C246-AC300 	Fanless Embedded System with Intel® C246 Chipset. 2x260Pin DDR4 SO-DIMM 2666Mhz up to 32GB, 1xHDMI, 1xDisplayPort, 1xDVI-I, 2xGbE LANs, 6xUSB3.0, 2xUSB2.0, 2xCOM, 9~48V DC-in, L6 System with 300W AC Adaptor, EU + US power cords
MX1-10FEP-C246-AC220 	Fanless Embedded System with Intel® C246 Chipset. 2x260Pin DDR4 SO-DIMM 2666Mhz up to 32GB, 1xHDMI, 1xDisplayPort, 1xDVI-I, 2xGbE LANs, 6xUSB3.0, 2xUSB2.0, 2xCOM, 9~48V DC-in, L6 System with 220W AC Adaptor, EU + US power cords
MX1-10FEP-D-C246-FL 	Fanless Embedded System with Intel® C246 Chipset. 2x260Pin DDR4 SO-DIMM 2666Mhz up to 32GB, 1xHDMI, 1xDisplayPort, 1xDVI-I, 2xGbE LANs, 6xUSB3.0, 2xUSB2.0, 2xCOM, PCIe X1+X16, 9~48V DC-in, L6 System w/o AC Adaptor
MX1-10FEP-D-C246-FL-AC300 	Fanless Embedded System with Intel® C246 Chipset. 2x260Pin DDR4 SO-DIMM 2666Mhz up to 32GB, 1xHDMI, 1xDisplayPort, 1xDVI-I, 2xGbE LANs, 6xUSB3.0, 2xUSB2.0, 2xCOM, PCIe X1+X16, 9~48V DC-in, L6 System with 300W AC Adaptor, EU + US power cords
MX1-10FEP-D-C246-IF-AC300 	Embedded System with Intel® C246 Chipset. 2x260Pin DDR4 SO-DIMM 2666Mhz up to 32GB, 1xHDMI, 1xDisplayPort, 1xDVI-I, 2xGbE LANs, 6xUSB3.0, 2xUSB2.0, 2xCOM, PCIe X1+X16, 9~48V DC-in, L6 System with 300W AC Adaptor, EU + US power cords, and 2x pre-installed Internal System Fan
MX1-10FEP-D-C246-IEF-AC300 	Embedded System with Intel® C246 Chipset. 2x260Pin DDR4 SO-DIMM 2666Mhz up to 32GB, 1xHDMI, 1xDisplayPort, 1xDVI-I, 2xGbE LANs, 6xUSB3.0, 2xUSB2.0, 2xCOM, PCIe X1+X16, 9~48V DC-in, L6 System with 300W AC Adaptor, EU + US power cords, and 2x pre-installed Internal System Fan + 1xExternal System Fan in AK box

Packing List

Item	Description	Q'ty
1	MX1-10FEP or MX1-10FEP-D Embedded System	1
2	CPU Cooler (passive)	1
3	Quick Installation Guide (1 page)	2
4	Wall Mount Brackets (2 pcs in 1 set)	1
5	Driver CD	1
6	Screw Pack (For HDD, SATA cable, and Wall Mount Bracket)	1
7	3-pin Terminal Block Power Connector (For DC Power Input)	1
8	4-pin Terminal Block Power Connector (For PWM fan)	1
9	2-pin Terminal Block Power Connector (For Remote Power Control)	2
10	DVI to VGA converter	1
11	SATA Y cable	1

Optional Xpansion Modules and Accessories

Model Number	Description
MS-48CDN-DT10 	Expansion Module with 4 x RS232 / 422 / 485, 8-bit Isolated DIDO (4 x DI, 4 x DO)
MS-04LAN-R10 	Expansion Module with 4 x Intel i210-IT Giga LAN, RJ45 Port
MS-04LAN-M10 	Expansion Module with 4 x Intel i210-IT Giga LAN, M12 Port
MS-04POE-R10 	Expansion Module with 4 x PoE+, Intel i210-IT Giga LAN, RJ45 Port
MS-04POE-M10 	Expansion Module with 4 x PoE+, Intel i210-IT Giga LAN, M12 Port
ME-02POE-R10 	Expansion Module with 2 x PoE+, Intel i210-IT Giga LAN, RJ45 Port
MS-01IGN-S10 	Vehicle Power Ignition Card, 12V/24V and Power ON/OFF Timing Selectable

MX1D-02INFAN-GFX	Internal 4020 FAN Kit for GFX Card (for MX1-10FEP-D Model)
MX1D-02INFAN-TP4	Internal 4028 FAN with FAN duct Kit for T4/P4 Card (for MX1-10FEP-D Model)
MX1-01EXFAN	External FAN Kit (for both MX1-10FEP and MX1-10FEP-D Models)
MP-116RCN-P10 	MP-116RCN-P10_(PCIEX1 + PCIEX16) Riser Card w/ Single Packing (for MX1-10FEP-D Model) *This is option. MX1-10FEP-D BOM already has one default PCIeX16+PCIeX1 riser card
MP-088RCN-P10 	MP-088RCN-P10_(PCIEX8+PCIEX8) Riser Card w/ Single Packing (for MX1-10FEP-D Model) *This is option. BOM already has one default PCIeX16+PCIeX1 riser card
MPE-300W24-3TUE	AC/DC 24V/12.5A, 300W 3PIN Terminal Block Power Adaptor with EU+US power cords
MPE-220W24-3TUE	AC/DC 24V/9.2A, 220W 3PIN Terminal Block Power Adaptor with EU+US power cords
MPC-180W12-4DUE	AC/DC 12V/15A, 180W DIN4PIN Power Adaptor with internal power cable, and EU+US power cords (2nd AC adaptor for MX1-10FEP-D Model with 120W GFX card power solution)

Revision History

Version	Date	Note
V1.0	2019 / 08 / 16	First release
V1.1	2019 / 09 / 04	Add RTC battery maintenance guide Add notes about PXE application, Xpansion module matrix, USB2.0 device dimension, and HDD installation guide Add the warning notes
V1.2	2019 / 09 / 18	Add the notes about BIOS update
V1.3	2019 / 10 / 09	Add external fan installation guide
V1.4	2019 / 11 / 11	Add MX1-10FEP-D model Add the notes about MX1-10FEP-D
V1.5	2019 / 12 / 10	Add the CPU Options Add the notes about MX1-10FEP-D GFX Card Add MX1-10FEP-D GFX Options Installation and SATA Storage limitation Add COM/DIO/M12 PoE/Power Ignition Xpansion Module Spec
V1.6	2020 / 02 / 07	Add accessory items
V1.7	2020 / 11 / 18	Update MS-48CDN-DT10 DIO pinout
V1.8	2021 / 02 / 01	Add items to Optional Xpansion Modules and Accessories Correct Xpansion Matrix table and add notes
V1.9	2021 / 04 / 19	Add the spec description for mPCIe and M.2 E key slots

CONTENTS

INTRODUCTION

1

This chapter provides the MX1-10FEP Embedded System product overview, including features, hardware and mechanical specifications.

CHAPTER 1: INTRODUCTION

This chapter provides the MX1-10FEP Embedded System product overview, including features, hardware, mechanical specifications, and I/O placement.

1.1 Overview

MiTAC's MX1-10FEP embedded system is the next generation embedded system with Intel® Coffee Lake C246 workstation chipset which can support Xeon and Core-i LGA1151 socket type processor. The excellent performance, powerful processor, OCP/OVP power protection, and expandable design provide the solution for every complicated task and most types of application.

1.2 Product Features

MX1-10FEP Embedded System offers the following features:

- 8th & 9th Generation Intel® Xeon-E, Core™ i7 / i5 / i3 Processors
- Triple Display with HDMI, DisplayPort, and DVI-I Interface
- Fan-less chassis and Expandable module design
- Support COM/DIO/LAN/PoE via Xpansion Modules
- Support Power Ignition for Vehicle Application via Xpansion Module
- 9-48V Wide Power Voltage
- -40 to 70 Celsius degrees Wide Temperature with 35W CPU
  -40 to 50 Celsius degrees Wide Temperature with 51-65W CPU
  -40 to 40 Celsius degrees Wide Temperature with 71-80W CPU

1.3 MX1-10FEP & MX1-10FEP-D CPU Options

Processor Name	Cores	Threads	TDP
Intel® Xeon® E Processor			
Intel® Xeon® E-2226GE Processor, 12M Cache, up to 4.60 GHz	6	6	80W
Intel® Xeon® E-2176G Processor, 12M Cache, up to 4.70 GHz	6	12	80W
Intel® Xeon® E-2124G Processor, 8M Cache, up to 4.50 GHz	4	4	71W
Intel® Coffee Lake Refresh 9th Generation			
Intel® Core™ i7-9700TE Processor, 12M Cache, up to 3.80 GHz	8	8	35W
Intel® Core™ i5-9500E Processor, 9M Cache, up to 4.20 GHz	6	6	65W
Intel® Core™ i5-9500TE Processor, 9M Cache, up to 3.60 GHz	6	6	35W
Intel® Core™ i3-9100E Processor, 6M Cache, up to 3.70 GHz	4	4	65W
Intel® Core™ i3-9100TE Processor, 6M Cache, up to 3.20 GHz	4	4	35W
Intel® Coffee Lake 8th Generation			
Intel® Core™ i7-8700 Processor, 12M Cache, up to 4.60 GHz	6	12	65W
Intel® Core™ i7-8700T Processor, 12M Cache, up to 4.00 GHz	6	12	35W
Intel® Core™ i5-8500 Processor, 9M Cache, up to 4.10 GHz	6	6	65W
Intel® Core™ i5-8500T Processor, 9M Cache, up to 3.50 GHz	6	6	35W
Intel® Core™ i3-8100 Processor, 6M Cache, 3.60 GHz	4	4	65W
Intel® Core™ i3-8100T Processor, 6M Cache, 3.10 GHz	4	4	35W

1.4 Hardware Specification

SYSTEM	
CPU	8th Gen Intel® Coffee Lake Xeon-E / Core-i LGA1151 Socket Processor TDP Max. 80W
Chipset	Intel® C246
System Memory	DDR4 2666MHz, 2 x 260-pin SO-DIMM, Max. 32GB (Xeon: ECC; Core-i: Non-ECC)
Graphics	Intel® HD Graphics
Display Interface	HDMI, DisplayPort, DVI-I
Storage Slot	3 x 2.5 HDD / SSD (1 w/ Removable HDD Bay; 2 w/ Internal HDD Bracket, 1st SATA cable as Default, 2nd SATA cable as Option) 2 x mSATA
Ethernet	Intel® I219-LM Giga LAN + I210-IT Giga LAN
Audio	Realtek® ALC662
I/O Chipset	Nuvoton NCT6116D
TPM	Nuvoton NPCT750AAAYX
Expansion Slot	Storage: M.2 2242 / 2260 / 2280 M key (PCIe X4 / SATAIII) Storage/LTE/Wireless: 2 x Mini PCIe Full / Half size (USB2.0 / PCIe X1 / SATAIII), w/ SIM Card Holder Wireless: M.2 2230 E key (PCIe X1 / USB2.0) a. PCIe 3.0 x16 (MX1-10FEP) b. PCIe 3.0 x16 + PCIe 3.0 x1 (MX1-10FEP-D Default) PCIe 3.0 x8 + PCIe 3.0 x8 (MX1-10FEP-D Option)
Indicator	Power LED, HDD LED, DIO LED, LAN1 & 2 ACT / SPEED
FRONT I/O	2 x USB 3.0 1 x HDMI 1.4 2 x SIM Card Slot w/ Cover 1 x 2.5" SATAIII HDD / SSD Bay
REAR I/O	4 x USB 3.1 Gen 2 (Gbps), 2 x USB 2.0, 2 x RJ-45 , 1 x DisplayPort 1.2, 1 x DVI-I, 1 x PS/2 2 x RS232 / 422 / 485 (Support Power 5V / 12V), 1 x Mic-in, 1 x Line-out 1 x 2-pin Terminal Block Remote Power on / off 1 x 2-pin Terminal Block Remote Power reset 1 x 4-pin Terminal Block External Fan Connector 1 x 3-pin Terminal Block Power Input 4 x SMA Antenna (Optional for WiFi/LTE function)
Watchdog Timer	1~255 Steps by Software Program

POWER REQUIREMENT	
Power Input	9~48V Wide Rage DC Input w/ Terminal Block Connectivity **For DC source in directly, the maximum operating ambient temperature is 70℃.* *For using with External AC adaptor model: EA13001N-240 (for 12.5A rating), the maximum ambient operating temperature is 40℃ if the system will be for using with external AC adaptor model: EA13001N-240.*
MECHANICAL	
Thermal Design	a. MX1-10FEP: Fanless b. MX1-10FEP-D: Fanless or with 2 x 40m x 20cm Internal System Fan (External System Fan Kit as Option in Accessories)
Mounting	Wall mount
Dimension	a. MX1-10FEP: 10.6” x 9.7” x 4.3” (268 mm x 246 mm x 108 mm) b. MX1-10FEP-D: 10.6” x 9.7” x 5” (268 mm x 246 mm x 128 mm)
Material	Top cover: Aluminum Alloy , Bezel and chassis: Steel
ENVIRONMENTAL	
Operating Temperature	**a. MX1-10FEP & MX1-10FEP-D Fanless Design:** 35W TDP Processor: -40°C to 70°C 51~65W TDP Processor: -40°C to 50°C 71~80W TDP Processor: -40°C to 40°C (with 0.7m/s Air Flow and Wide Temperature Memory/Storage) **b. MX1-10FEP-D Fan Design, for max. 120W GFX Card thermal design, add Internal 40x20 System Fan x 2:** 35W TDP Processor: -20°C to 50°C 51~65W TDP Processor: -20°C to 45°C 71~80W TDP Processor: -20°C to 40°C (with 0.7m/s Air Flow and Wide Temperature Memory/Storage) **c. MX1-10FEP-D Fan Design, for max. 120W GFX Card thermal design, add Internal 40x20 System Fan x 2 & External System Fan:** 35W TDP Processor: -20°C to 55°C 51~65W TDP Processor: -20°C to 50°C 71~80W TDP Processor: -20°C to 45°C (with 0.7m/s Air Flow and Wide Temperature Memory/Storage) **d. MX1-10FEP-D Fan Design, for Nvidia 70W T4 and 75W P4 Card, add Internal 40x28 System Fan x 2:** 35~80W TDP Processor: -20°C to 50°C (with 0.7m/s Air Flow and Wide Temperature Memory/Storage)
Operating Humidity	10%~90% R/H (Non-condensing)
Vibration Resistance	Operating, 5 Grms, 5-500 Hz, 3 Axes (w/ SSD, according to IEC60068-2-64; w/o GFX Card)
Shock Resistance	Operating, 50 Grms, Half-sine 11 ms Duration

	(w/ SSD, according to IEC60068-2-27; w/o GFX Card)
Certification	EMC: CE & FCC Safety: compliant with LVD, EN62368-1 EN50155/EN50121/E-mark
OS	
OS Support	Windows® 10 64-bit, Linux (support by request)

**Notes[1]: Installation in Restricted Access Location (RAL)*
A restricted access location is a designated area within an incident area (High or Low temperature environment)
With authorized people can enter for a period of time and for a specific purpose.

1. *Access can only be gained by service people or by users who have been instructed about the reasons for the Restrictions applied to the location and about any precautions that shall be taken.*
2. *Access is through the use of a tool or lock and key, or other means of security, and is controlled by the authority Responsible for the location.*

**Notes[2]: Please make sure that the power consumption is in the spec of the power supply output capability from AC adaptor (220W or 300W). Please choose the suitable AC adaptor for your application.*

AC/DC 24V/12.5A, 300W 3PIN Terminal Block Power Adaptor

AC/DC 24V/9.16A, 220W 3PIN Terminal Block Power Adaptor

**Note[3]: The safety ambient operating temperature is 40 degree C if the external AC adapter model: EA12501J or EA13001N will be placed in the same high temperature area with the embedded system.*

**Note[4]: In the PXE application, please install i219-LM driver in OS image in advance before installing OS via PXE server.*

**Note[5]: CAUTION - Lithium battery is included in this embedded system. Please do not puncture, mutilate, or dispose of battery in fire. There will be danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by manufacturer. Dispose of used battery according to manufacturer instructions and in accordance with your local regulations.*

**Note[6]: The following configurations in ultimate use might cause system shut down unexpectedly.*

- 12 x LANs or 10 x PoE LANs with some NVMe SSD models (Please check the available list with our sales contact window)

- 12 x LANs or 10 x PoE LANs with mPCIe or M.2 Wifi Card (Not include CNVi Wifi Card. Please check the available list with our sales contact window)

**Note[7]: Please read the BIOS release note before re-flashing BIOS. If the BIOS notes mention the BIOS will be loaded default after re-flashing BIOS, please check the BIOS setting again before boot up. For example, inconsistent RAID setting might cause system boot up issue.*

**Note[8]: When MX1-10FEP-D is installed with PCIe GFX card, the BIOS setup menu will only have display output via external graphic card.*

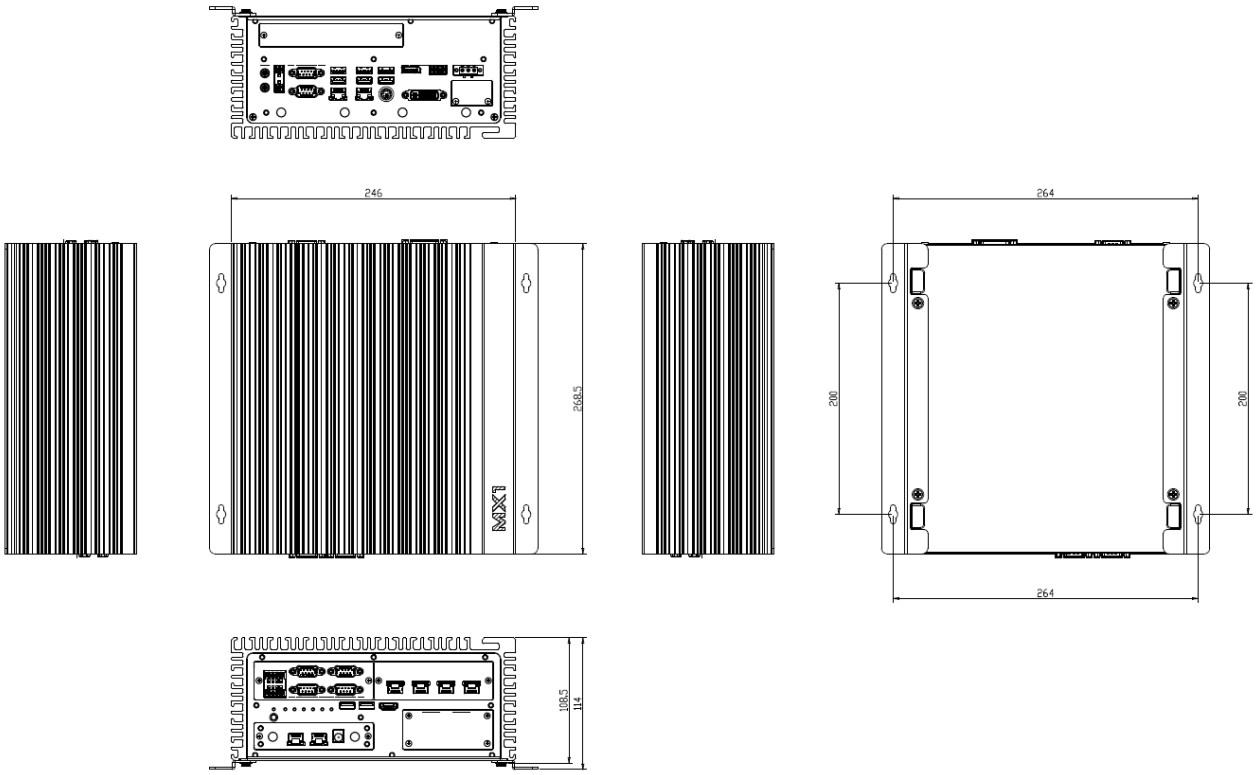
**Note[9]: When MX1-10FEP-D is installed with dual layer PCIe GFX card, it can only be installed with 1 internal HDD/SSD (not include removable HDD/SSD) instead of 2 due to mechanical limitation. The SATA cable connector needs to insert to the SATA connector beside the 2*40x40x20mm internal system fan. The cable clip might also need to be removed due to mechanical concern with GFX card.*

**Note[10]: When MX1-10FEP-D is installed with NVIDIA T4 or P4 AI card, 2*40x40x28mm internal system fan, and fan duct, it can only be installed with 1 internal HDD/SSD (not include removable HDD/SSD) instead of 2 in avoid of fan duct interference. The SATA cable connector needs to insert to the internal SATA connector.*

1.5 Mechanical Specification

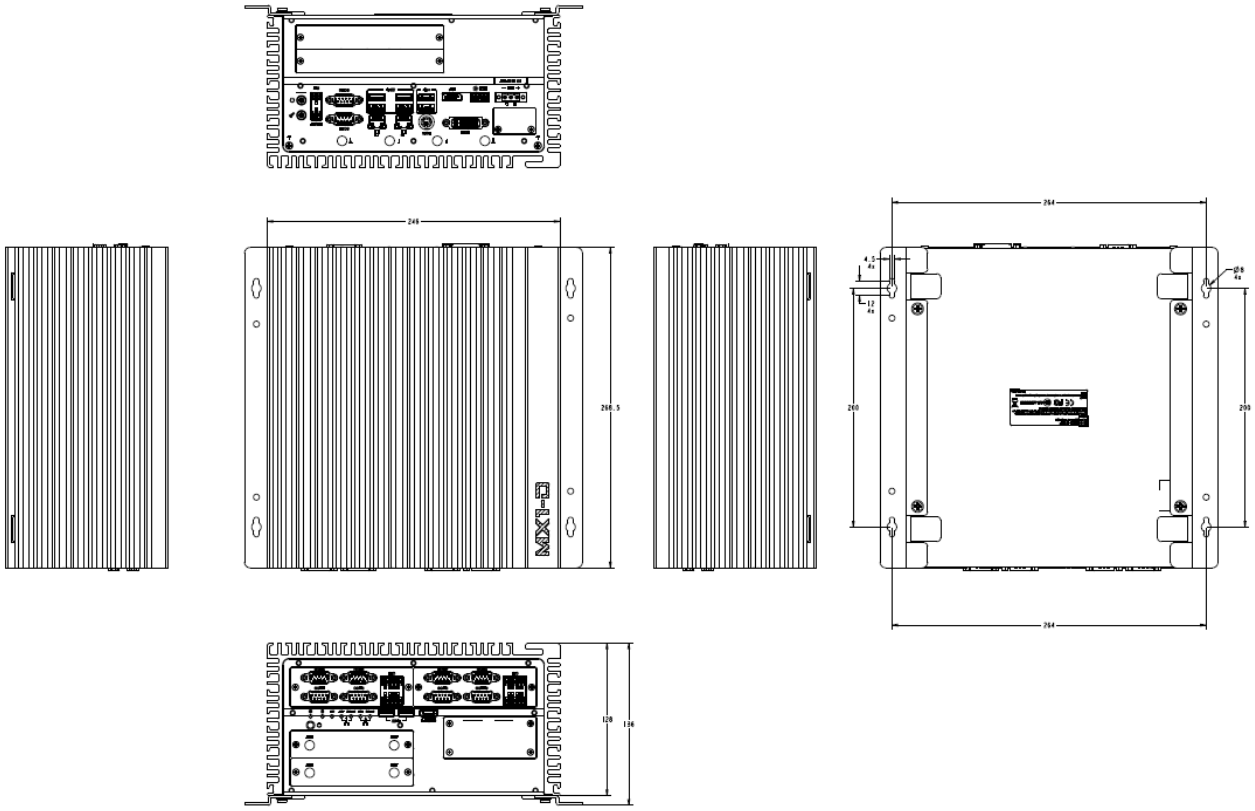
MX1-10FEP

- Mechanical Dimension: 268 mm x 246 mm x 108 mm
- PCI Express x16 Slot Maximum Card Dimension:
  111.15 x 200 x 18.7mm with mPCIe PoE Module
  111.15 x 230 x 18.7mm w/o mPCIe PoE Module



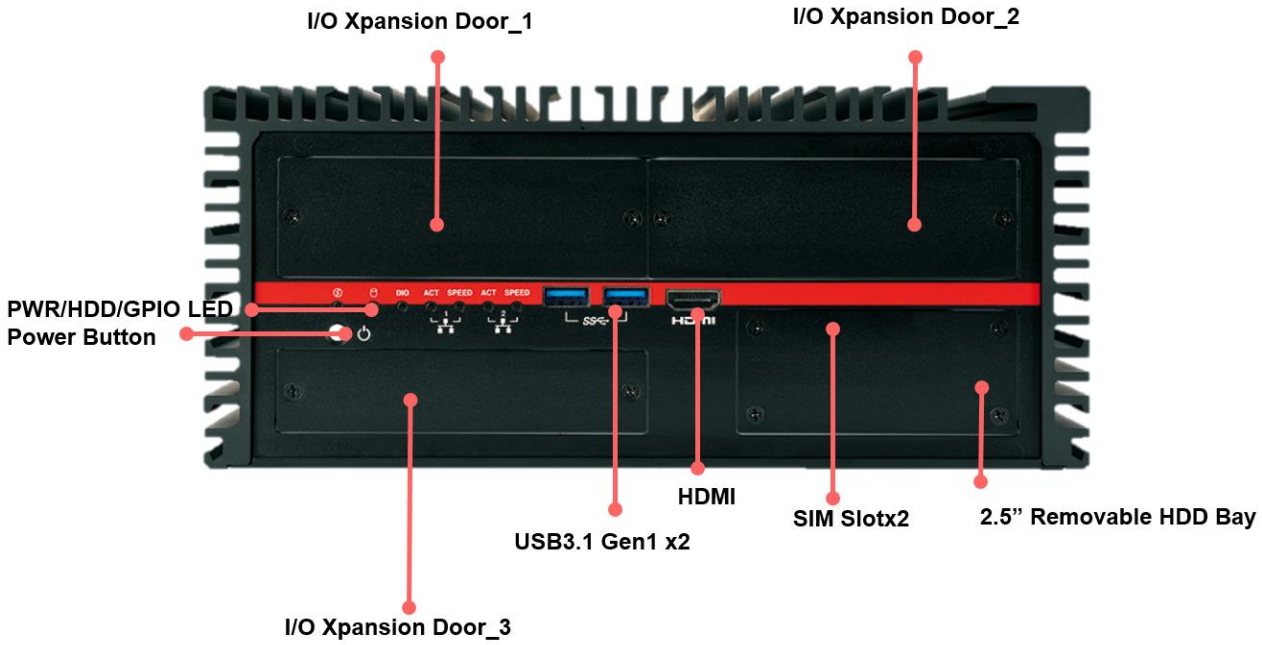
MX1-10FEP-D

- Mechanical Dimension: 268 mm x 246 mm x 128 mm
- PCI Express x16 Slot Maximum Card Dimension:
  145 x 221 x 43mm w/o mPCIe PoE Module
- PCI Express X16 + X1 Dual Slot (Default)
- PCI Express X8 + X8 Dual Slot (Optional)
- AI / Graphic Card Support List
  - ✓ NVIDIA Quadro P400 (30W)
  - ✓ NVIDIA Quadro P620 (40W)
  - ✓ NVIDIA Quadro P2000 (75W)
  - ✓ Nvidia Tesla T4 / P4 (75W)
  - ✓ Aetina GTX1050 N1050-J9FX, 2GB (75W)
  - ✓ Leadtek WinFast GTX1650, 4GB (75W)
  - ✓ Leadtek WinFast GTX1660 HURRICANE, 6GB (120W) with 2nd 12V, 180W AC Adaptor
  - ✓ Leadtek WinFast GTX1660 Ti HURRICANE, 6GB (120W) with 2nd 12V, 180W AC Adaptor

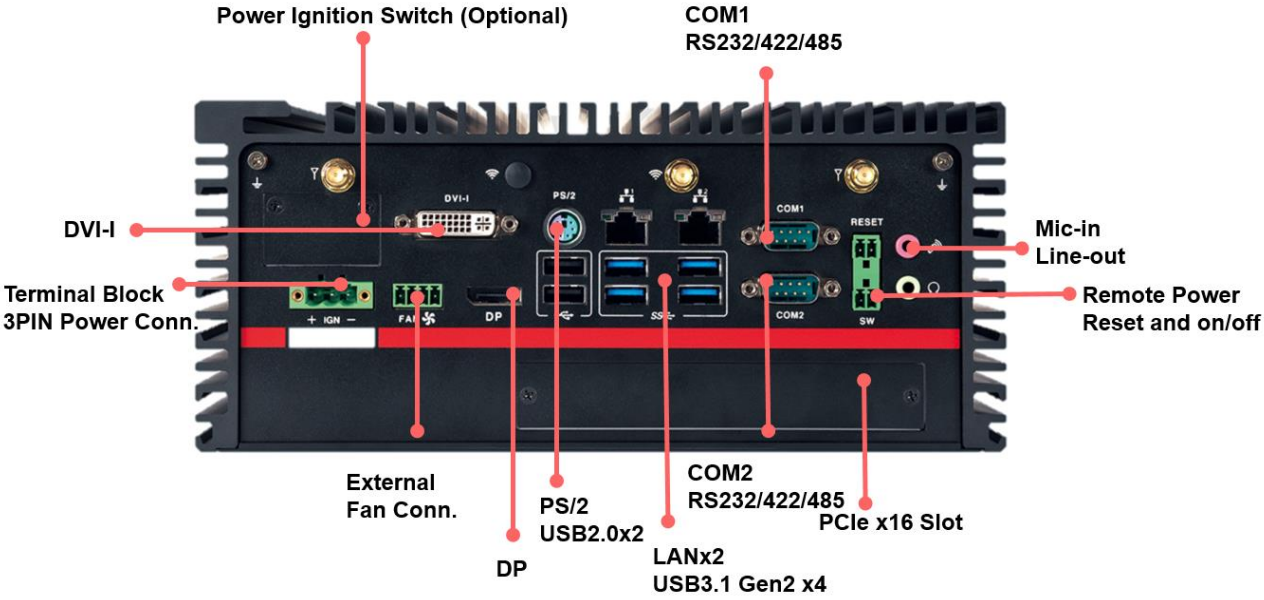


1.6 System I/O Placement

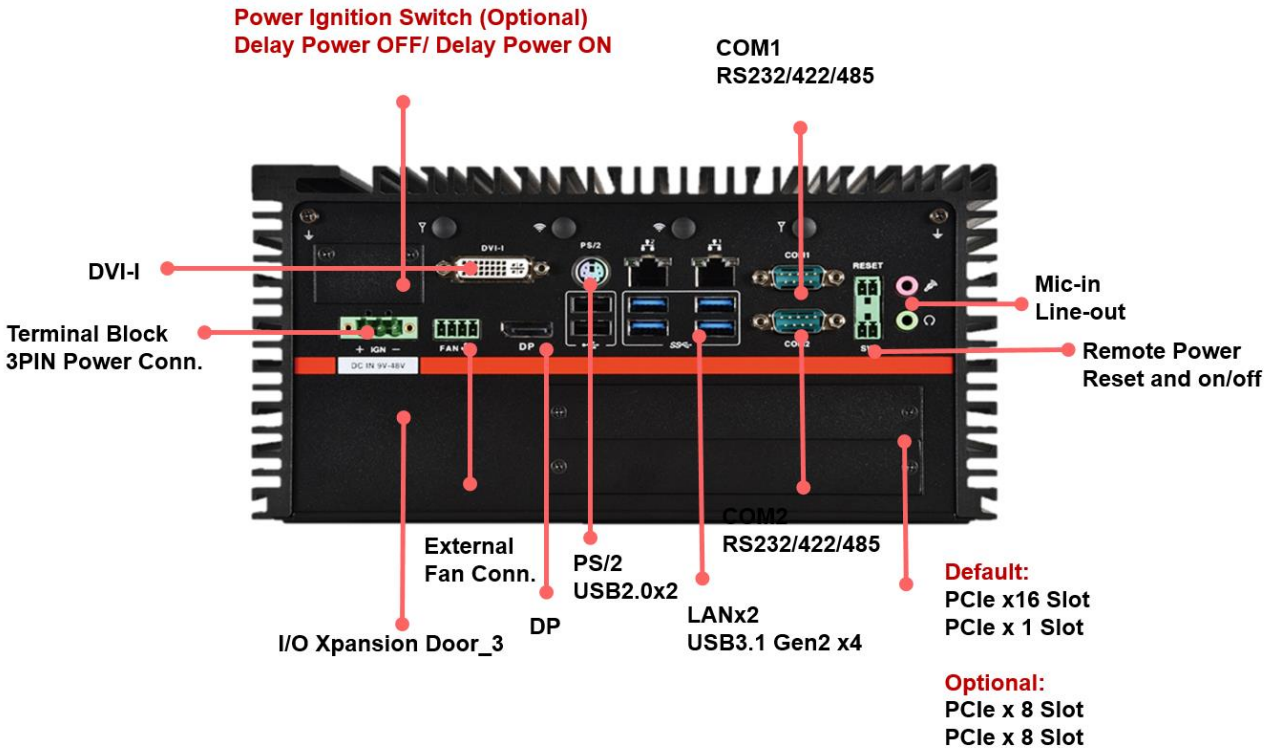
■ **Front I/O:**



■ **Rear I/O (MX1-10FEP):**



■ Rear I/O (MX1-10FE-D):



**Notes: The recommended dimension of USB cable connector or device for USB2.0 ports is 9mm height x 19mm width when all the other I/O ports are occupied. It still needs to depend on the DisplayPort connector and other devices' dimension to aviod the interference.*

■ **Xpansion Module (Optional) Configuration Table**

Model Number	Function	1	2	3	4
MS-48CDN-DT10 	4 x COM; 8 x DIDO	V	V		
MS-04LAN-R10 	4 x GbE LAN (RJ45)	V	V		
MS-04LAN-M10 	4 x GbE LAN (M12)	V	V		
MS-04POE-R10 	4 x PoE LAN (RJ45)	V	V		
MS-04POE-M10 	4 x PoE LAN (M12)	V	V		
ME-02POE-R10	2 x PoE LAN (RJ45)			*V	
MS-01IGN-S10 	Vehicle Power Ignition				V

**Notes: ME-02POE-R10 cannot be installed in door#3 of MX1-10FEP-D-C246-IF and MX1-10FEP-D-C246-IEF models due to interference with internal system fan at the same location.*

DIP SWITCH SETTING AND PIN DEFINITION

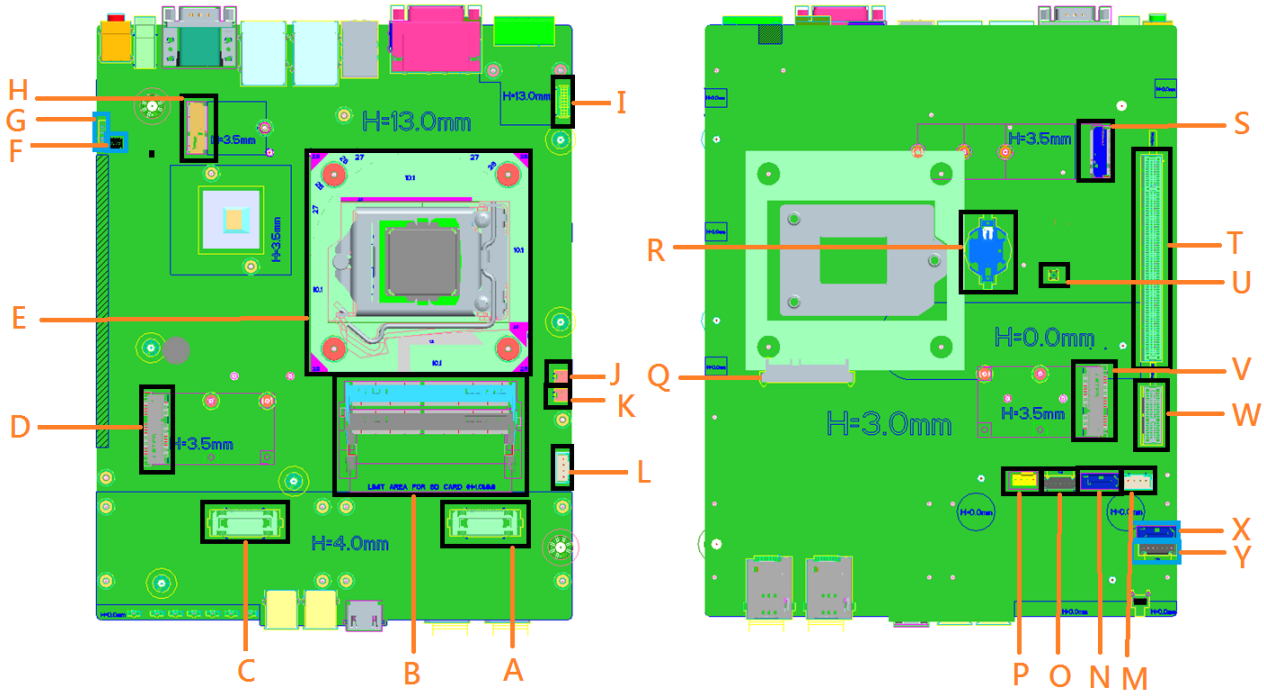
2

This chapter provides information about how to set up the dip switch and use internal I/Os of MX1-10FEP Embedded System hardware.

CHAPTER 2: DIP SWITCH SETTING AND PIN DEFINITION

This chapter provides information about how to set up the dip switch, and use internal I/Os of MX1-10FEP Embedded System hardware.

2.1 Jumper and Internal Connector Overall Placement

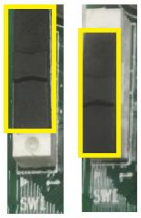


A	**1st Board to Board connector**
B	**DIMM sockets**
C	**2nd Board to Board connector**
D	**Mini PCIe slot 2**
E	**CPU socket**
F	**DIP Switch for Power COM**
G	**AT/ATX mode switch**
H	**M.2 KEY E connector**
I	**Board to Board connector for power Ignition**
J	**5V power header**
K	**5V power header**
L	**12V power header for POE module of Mini PCIe**
M	**12V power header for POE module of Mini PCIe**
N	**2nd SATA Signal Header**
O	**2nd SATA Power Header**
P	**FAN Header**

Q	**1ST SATA Connector**
R	**Coin Battery Connector**
S	**M.2 KEY M**
T	**PCIE X16**
U	**Clear CMOS switch**
V	**Mini PCIe Slot 1**
W	**PCIE X1**
X	**3rd SATA Signal Header**
Y	**3rd SATA Power Header**

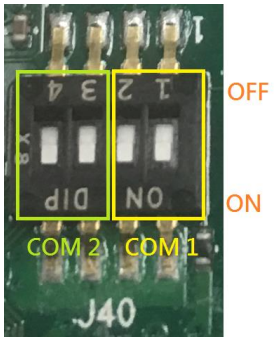
2.2 DIP Switch Setting

■ Location #G



Pin	Signal
UP	ATX mode
Down	AT mode

■ Location #F



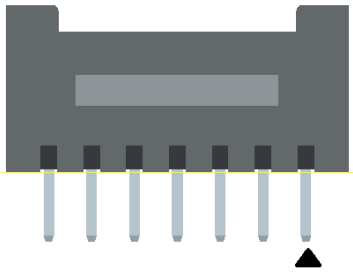
Switch setting	Mode	1	2
1-2➔ COM 1	RI	ON	ON
	5V	ON	OFF
	12V	OFF	ON
Switch setting	**Mode**		
3-4➔ COM 2	RI	ON	ON
	5V	ON	OFF
	12V	OFF	ON

2.3 Internal Connector Pin Definition

■ Location #Q – 1st SATA Connector

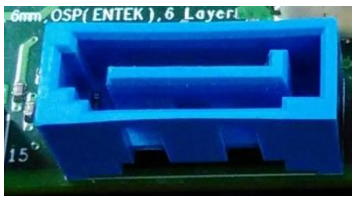
Pin	Signal Name
P1	VCC3
P2	VCC3
P3	VCC3
P4	GND
P5	GND
P6	GND
P7	VCC
P8	VCC
P9	VCC
P10	GND
P11	RES
P12	GND
P13	+12V
P14	+12V
P15	+12V
S1	GND
S2	SATAHDR_TXP0_C
S3	SATAHDR_TXN0_C
S4	GND
S5	SATAHDR_RXN0_C
S6	SATAHDR_RXP0_C
S7	GND

■ Location #O/#Y – 2nd and 3rd SATA Power Header



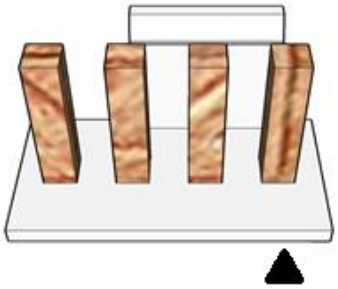
Pin	Signal Name
1	VCC3
2	GND
3	VCC
4	VCC
5	GND
6	+12V
7	+12V

■ Location #N/#X – 2nd and 3rd SATA Signal Header



Pin	Signal Name	Description
1	GND	Ground
2	SATAHDR_TXP_C	SATA DATA Transmit(positive)
3	SATAHDR_TXN_C	SATA DATA Transmit(negative)
4	GND	Ground
5	SATAHDR_RXN_C	SATA DATA Receive(negative)
6	SATAHDR_RXP_C	SATA DATA Receive(positive)
7	GND	Ground
8	G1	GND
9	G2	GND

■ Location #P – Fan Header

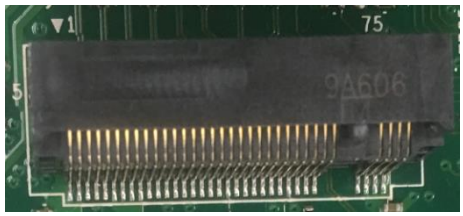


Pin	Signal
1	Ground
2	+12V
3	CPU_FAN_TACH
4	CPU_FAN_CTRL

■ Location #H – M.2 Key E Slot

	Standard M.2 Key E	LcP Signals	LcP Signals	Standard M.2 Key E	
			GND		75
			WT_CLKP	REFCLKN1	73
			WT_CLKN	REFCLKP1	71
			GND		69
			WT_D0P	PERn1	67
			WT_D0N	PERp1	65
			GND		63
			WT_D1P	PETn1	61
			WT_D1N	PETp1	59
			GND		57
			PEWake0# (IO)(0/3.3V)		55
			CLKREQ0# (IO)(0/3.3V)		53
			GND		51
			REFCLKN0		49
			REFCLKP0		47
			GND		45
			PERn0		43
			PERp0		41
			GND		39
			PETn0		37
			PETp0		35
			GND		33
			Connector Key		
			Connector Key		
			Connector Key		
			Connector Key		
			WGR_CLKP	SDIO Reset#(O)(0/1.8V)	23
			WGR_CLKN	SDIO Wake#(I)(0/1.8V)	21
			GND	SDIO DAT3(IO)(0/1.8V)	19
			WGR_D0P	SDIO DAT2(IO)(0/1.8V)	17
			WGR_D0N	SDIO DAT1(IO)(0/1.8V)	15
			GND	SDIO DAT0(IO)(0/1.8V)	13
			WGR_D1P	SDIO CMD(IO)(0/1.8V)	11
			WGR_D1N	SDIO CLK(O)(0/1.8V)	9
			GND		7
			USB_D-		5
			USB_D+		3
			GND		1
74	+V3P3A				
72	+V3P3A				
70	PEWake 1# (IO)(0/3.3V)				
68	CLKREQ1# (IO)(0/3.3V)				
66	PERST1# (O)(0/3.3V)				
64	RESERVED	REFCLK0 (I)(1V@38.4MHz)			
62	ALERT# (I)(0/1.8)	A4WP_IRQ#			
60	I2C_CLK (O)(0/1.8V)	A4WP_I2C_CLK			
58	I2C_DATA (IO)(0/1.8)	A4WP_I2C_DATA			
56	W_DISABLE1# (O)(0/3.3V)				
54	W_DISABLE2# (O)(0/3.3V)				
52	PERST0# (O)(0/3.3V)				
50	SUSCLK(32kHz) (O)(0/3.3V)	C_P32K (3.3V Tolerant)			
48	COEX_TXD (O)(0/1.8V)				
46	COEX_RXD (O)(0/1.8V)				
44	COEX3 (IO)(0/1.8V)				
42	CLink CLK				
40	CLink DATA				
38	CLink RESET (O)(0/3.3V)				
36	LPSS UART RTS (O)(0/1.8V)	/ BRI_DT (MUX'd in PCH/SoC)			
34	LPSS UART CTS (I)(0/1.8V)	/ RGI_RSP (MUX'd in PCH/SoC)			
32	LPSS UART Tx (O)(0/1.8V)	/ RGI_DT (MUX'd in PCH/SoC)			
E	Connector Key				E
	Connector Key				
	Connector Key				
	Connector Key				
22	LPSS UART Rx (I)(0/1.8V)	/ BRI_RSP (MUX'd in PCH/SoC)			
20	UART Wake# (I)(0/3.3V)				
18	GND	GND/LNA_EN (LcP Production)			
16	LED2# (I)(OD)				
14	PCM_OUT (O)(0/1.8V)	/ CLKREQ0 (MUX'd in PCH/SoC)			
12	PCM_IN (I)(0/1.8V)				
10	PCM_SYNC (OI)(0/1.8V)	/RF_RESET_B (MUX'd in PCH/SoC)			
8	PCM_CLK (OI)(0/1.8V)				
6	LED1# (I)(OD)				
4	+V3P3A				
2	+V3P3A				

■ Location #S – M.2 Key M Slot

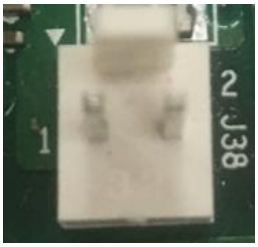


74	3.3Vaux	GND	75
72	3.3Vaux	GND	73
70	3.3Vaux	GND	71
68	SUSCLK(32kHz) (O)(0/3.3V)	PEDET (OC-PCIe/GND-SATA)	69
	Key	N/C	67
	Key	Key	
	Key	Key	
	Key	Key	
	Key	Key	
58	N/C	GND	57
56	N/C	REFCLKP	55
54	PEWake# (IO)(0/3.3V) or N/C	REFCLKN	53
52	CLKREQ# (IO)(0/3.3V) or N/C	GND	51
50	PERST# (O)(0/3.3V) or N/C	PERp0/SATA-A+	49
48	N/C	PERn0/SATA-A-	47
46	N/C	GND	45
44	N/C	PETp0/SATA-B-	43
42	N/C	PETn0/SATA-B+	41
40	N/C	GND	39
38	DEVSLP (O)(0/3.3V)	PERp1	37
36	N/C	PERn1	35
34	N/C	GND	33
32	N/C	PETp1	31
30	N/C	PETn1	29
28	N/C	GND	27
26	N/C	N/C	25
24	N/C	N/C	23
22	N/C	GND	21
20	N/C	N/C	19
18	3.3Vaux	N/C	17
16	3.3Vaux	GND	15
14	3.3Vaux	N/C	13
12	3.3Vaux	N/C	11
10	DAS/DSS# (I)(OD)	GND	9
8	N/C	N/C	7
6	N/C	N/C	5
4	3.3Vaux	GND	3
2	3.3Vaux	GND	1

■ **Location #L/#M – 12V Power Header for PoE Xpansion**

Pin	Signal
1	Ground
2	+12V
3	+12V
4	GND

■ **Location #J/#K – 5V Power Header for Reservation**



Pin	Signal
1	+5V
2	Ground

2.4 External Connector Pin Definition

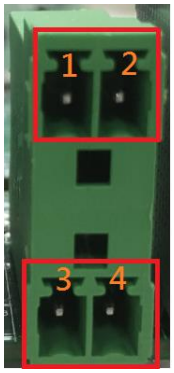
■ **3-pin terminal block for DC Input**

Pin	Signal
1	DC IN +9~48VIN
2	Ignition (IGN)
3	GND

■ 4-pin Terminal Block for PWM Fan

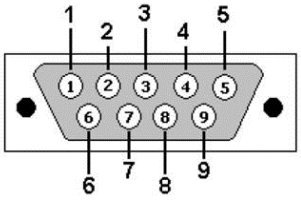
Pin	Signal
1	Ground
2	+12V
3	System_FAN_TACH
4	SYSTEM_FAN_CTRL

■ 2-pin Terminal Block for Remote Power ON/OFF and Reset



Pin	Signal
1	Ground
2	EXT Reset
3	Ground
4	EXT_PWRBT_ON/OFF

■ COM#1 / COM#2



Pin No	RS-232	RS-422	RS-485
1	DCD	TX-	DATA-
2	RX	TX+	DATA+
3	RTX	RX-	NC
4	DTR	RX+	NC
5	GND	GND	GND
6	DSR	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	RI	NC	NC

2.5 Xpansion Module MS-48CDN-DT10

This Module MS-48CDN-DT10 consists of two parts, one is Serial COM, and the other is Digital IO function.

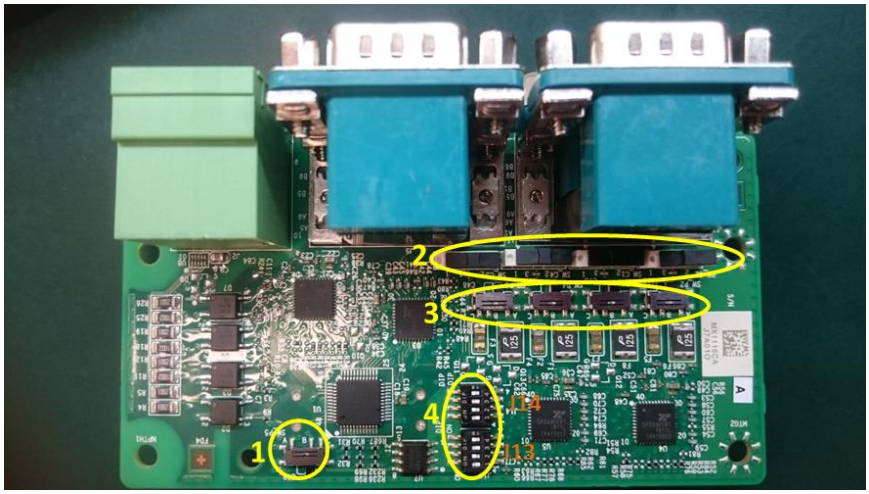
Please see the guideline about how to set up this Module correctly.

■ COM Port Setting

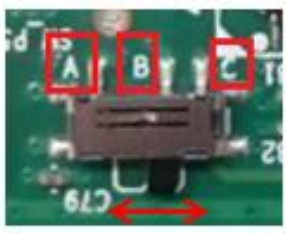
a. Location

MS-48CDN-DT10 has total 4 x COM port. These COM ports can be set to be RS232/RS485/RS422 or powered RS232. The position is as follows (A/B/C/D).

b. Dip Switch Function



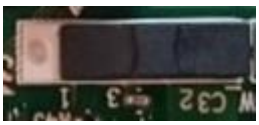
(1) COM ID selection switch



Set A-B; COM ID is determined by UART controller (default).

Set B-C; COM ID is determined by EEPROM.

(2) Powered COM enable switch



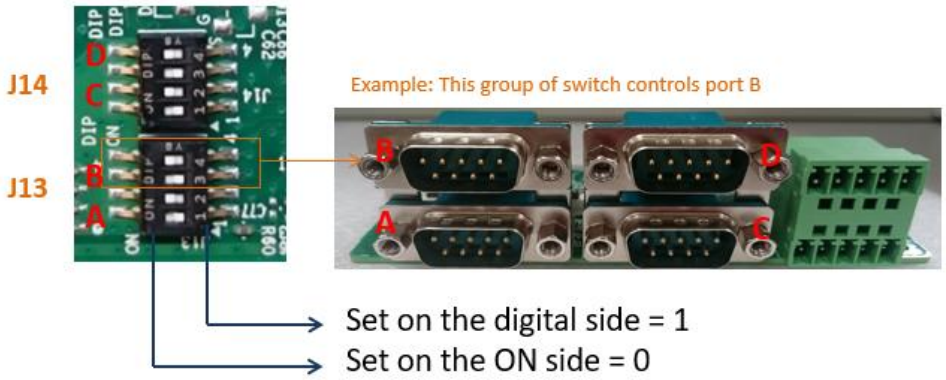
Set to the right(default)
Normal COM port (Pin9 = signal)

Set to the left
Powered COM port (Pin9 = VDD)

(3) Powered COM power source selection switch

Set A-B; VDD = 12V (Default)
Set B-C; VDD = 5V

(4) COM Mode setting switch

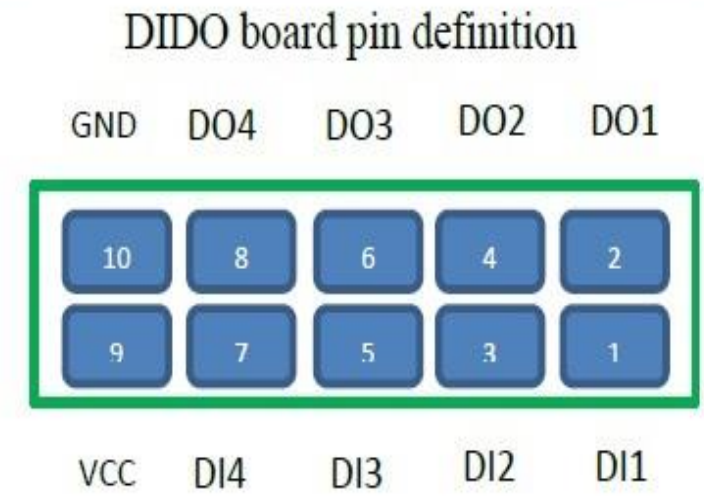


Switch	Bit	COM Port	Test Mode	RS485	RS232 (Default)	RS422
J14	4	Port D	0	1	0	1
	3		0	0	1	1
	2	Port C	0	1	0	1
	1		0	0	1	1

Switch	Bit	COM Port	Test Mode	RS485	RS232 (Default)	RS422
J13	4	Port B	0	1	0	1
	3		0	0	1	1
	2	Port A	0	1	0	1
	1		0	0	1	1

■ Digital IO Port

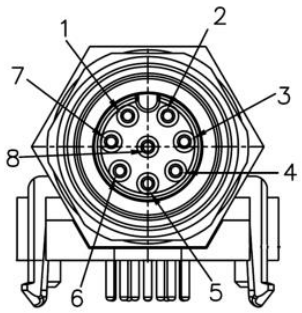
MS-48CDN-DT10 has total 8-bit GPIO, the position is as follows.



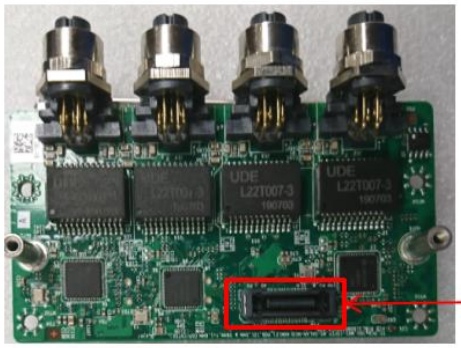
2.6 Xpansion Module MS-04LAN-M10

This Module is a Giga LAN module, which supports four M12 type interfaces.
Combined with MS-01PON-S10 to support PoE (typeA).

■ M12 Code A LAN Module Pin definitions



PIN	Signal	POE typeA
1	LAN_MDI1+	DC+
2	LAN_MDI1-	DC+
3	LAN_MD20+	DC-
4	LAN_MDI2-	
5	LAN_MDI3+	
6	LAN_MDI3-	DC-
7	LAN_MDI4+	
8	LAN_MDI4-	

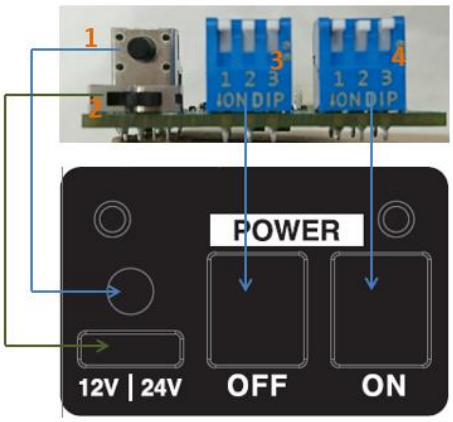


Use for connecting to MS-01PON-S10

2.7 Xpansion Module MS-01IGN-S10

This Module MS-01IGN-S10 can detect vehicle ignition status and control the on/off delay time setting. This document is used to guide how to set up this power ignition module correctly.

a. Location



(1) Emergency reset button
(2) Input power selection switch
(3) Power off delay switch
(4) Power on delay switch

b. Function

✓ **Emergency reset button**

This button is for engineering use only. The host will be reset when this button is pressed.

✓ **Input power selection switch**

Common car power supplies are DC 12V or 24V. Please set it according to your environment.

c. Delay Power On/Off Setting Switch

This feature detects the ignition signal status and allows users to control the on/off delay time setting through DIP switch.

set on up side = 0

set on down side = 1

Power Off Delay Time Table

1 2 3	
0 0 0	0 second
0 0 1	1 minute
0 1 0	3 minutes
0 1 1	5 minutes
1 0 0	10 minutes
1 0 1	30 minutes
1 1 0	1 hour
1 1 1	2 hours

Power On Delay Time Table

1 2 3	
0 0 0	0 second
0 0 1	3 seconds
0 1 0	4 seconds
0 1 1	10 seconds
1 0 0	15 seconds
1 0 1	20 seconds
1 1 0	25 second
1 1 1	30 seconds

SYSTEM SETUP

This chapter provides information about how to set up the MX1-10FEP Embedded System hardware installation.

3

CHAPTER 3: SYSTEM SETUP

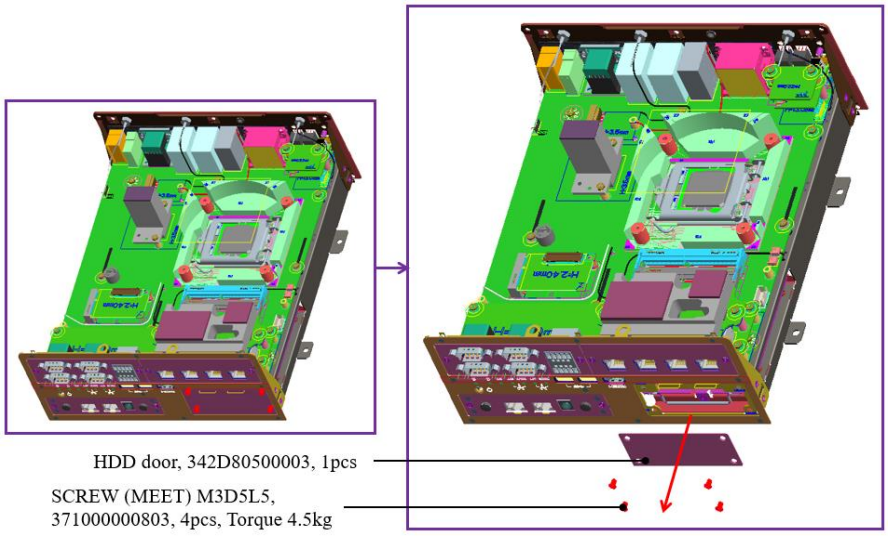
This chapter provides information about how to set up the MX1-10FEP Embedded System hardware installation.

⚠	Warning: The edge of MX1-10FEP aluminum extrusion fins is a little bit sharp. Please be careful when you move the unit, do the installation, and operate the embedded system!

3.1 1st 2.5” SATA HDD/SSD Installation

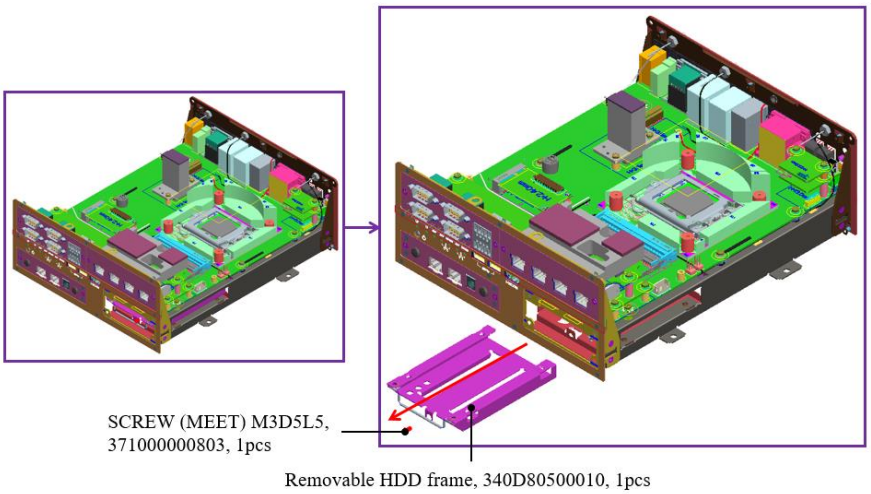
Please follow the instructions to install SATA HDD as below.

- Remove the door from front bezel

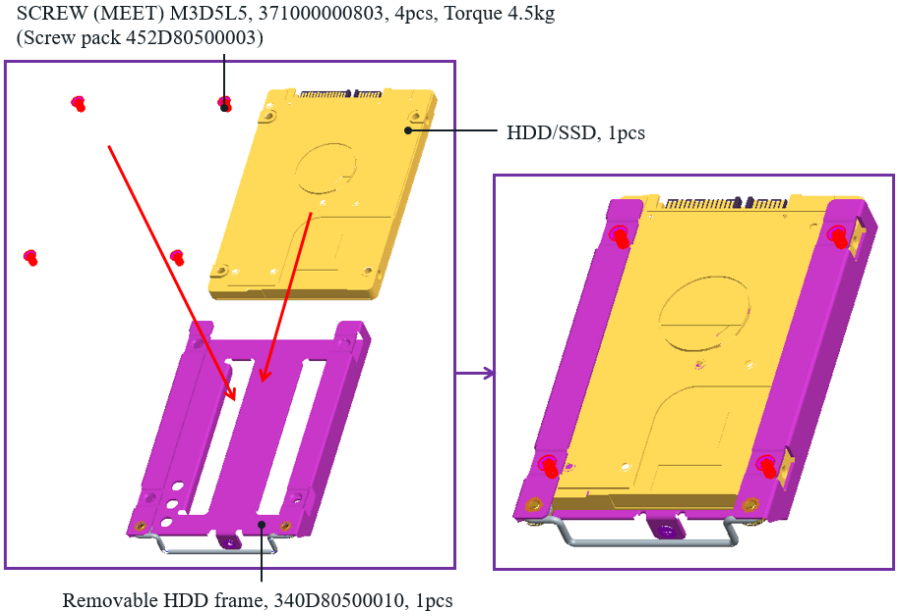


**Notes: After loosen the four screws from the expansion door, please lift the cover by fingernail slightly and be careful to take the door out of the front bezel.*

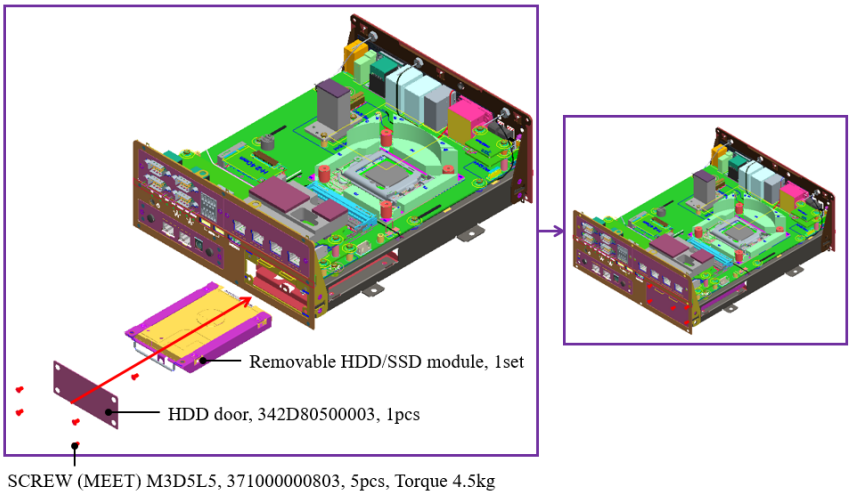
- Pull the HDD tray out from main chassis



- Fasten the screws to assemble the HDD/SSD to the bracket



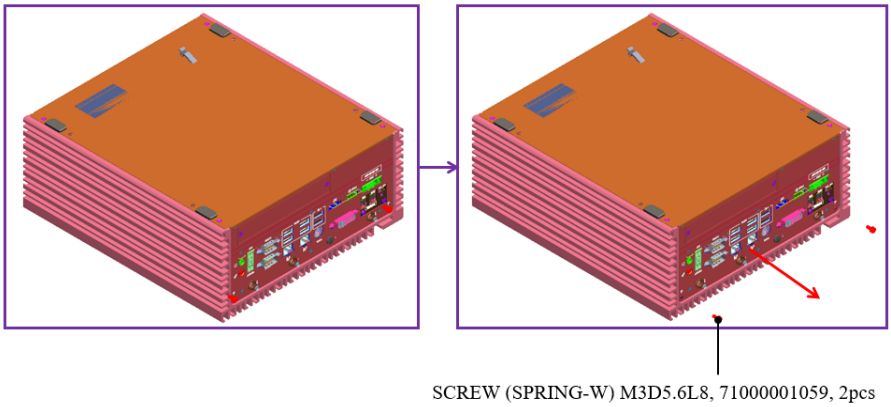
- Insert the HDD/SSD tray back to main chassis and fasten the screws on the door



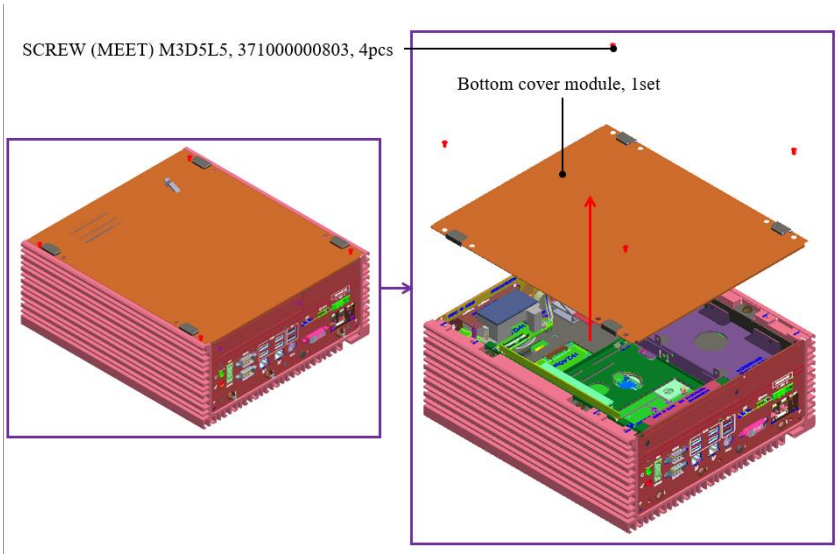
**Notes: Please keep the unit in horizontally. It will make it easierly to insert the HDD tray back to machine.*

3.2 2nd and 3rd 2.5” SATA HDD/SSD Installation

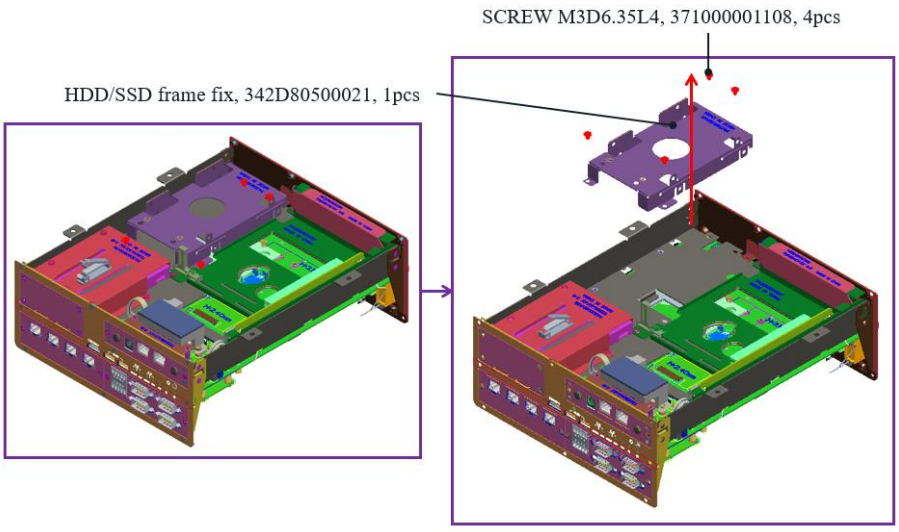
- Remove the GND screws from the rear bezel



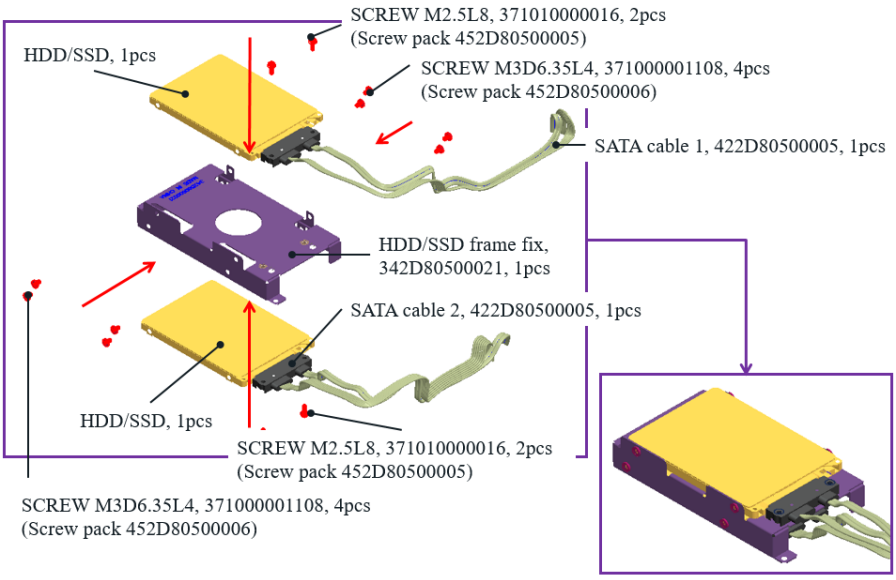
- Remove the bottom cover



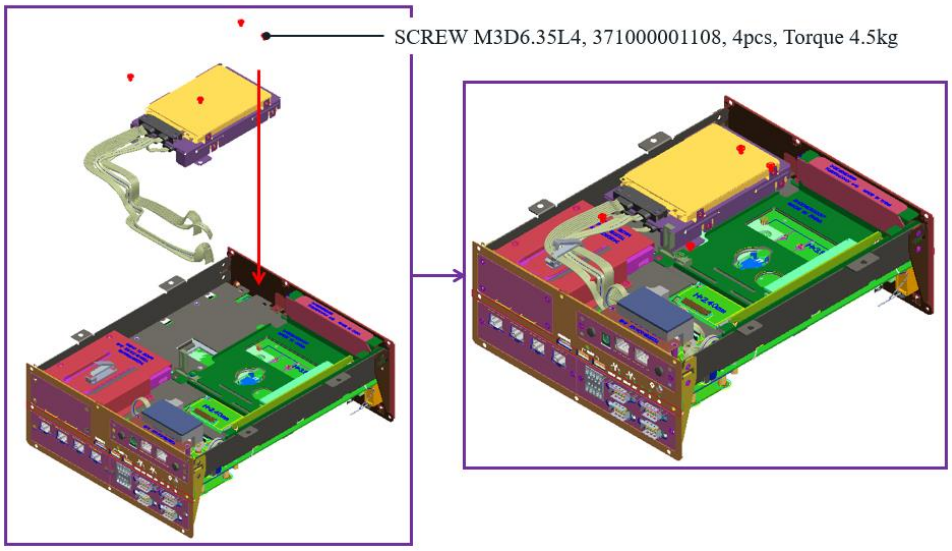
- Loosen four HDD bracket screws and pull the bracket out of the unit



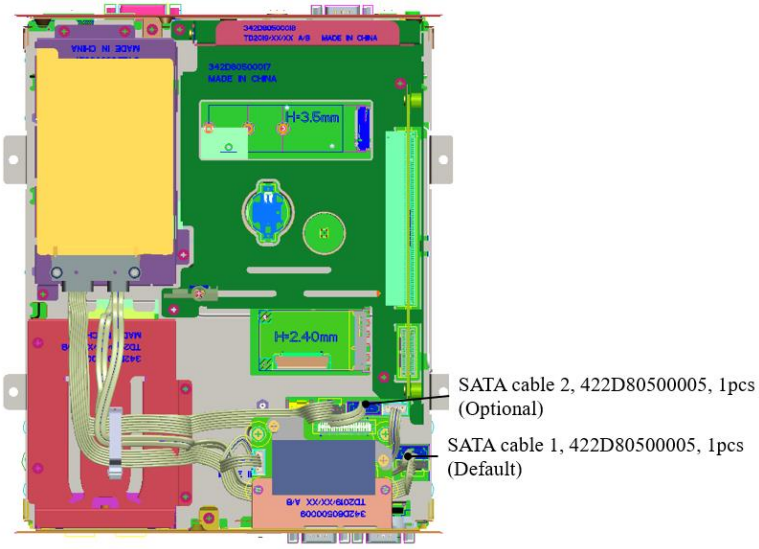
- Fasten 2nd and 3rd HDD/SSD to the bracket as following concept drawing



- Fasten four bracket screws to the main unit

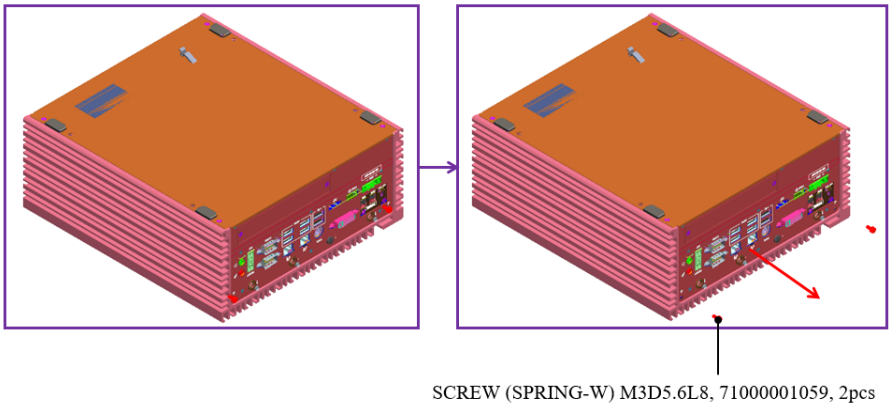


- Follow the drawing to do the SATA cable routing

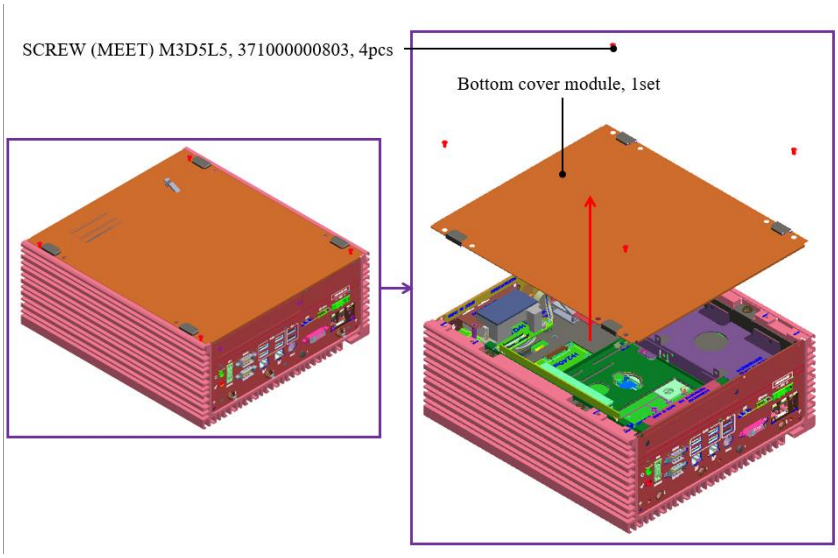


3.3 CPU/CPU Heatsink/DRAM Installation

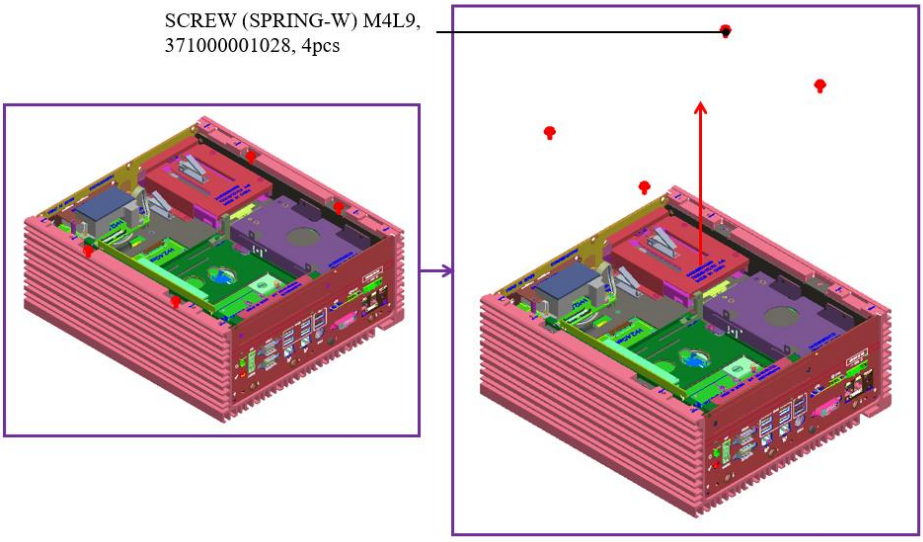
- Remove the GND screws from the rear bezel



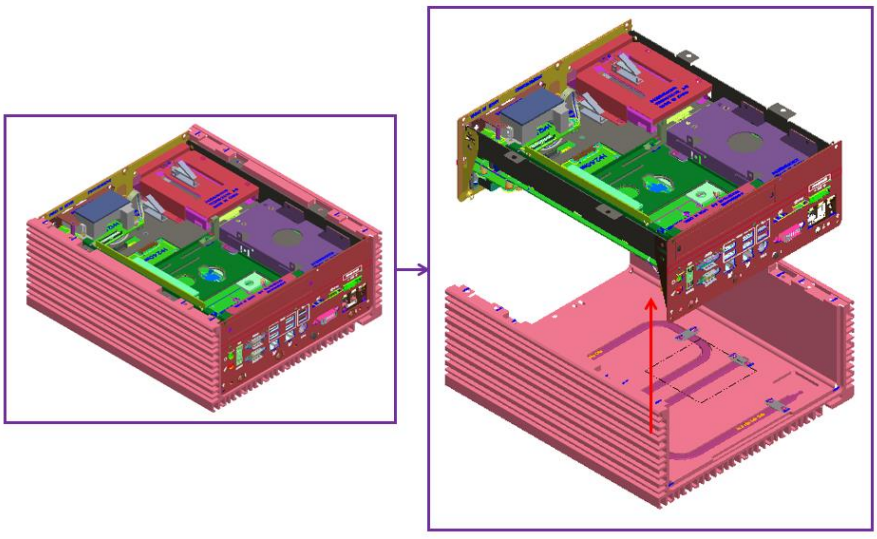
- Remove the bottom cover



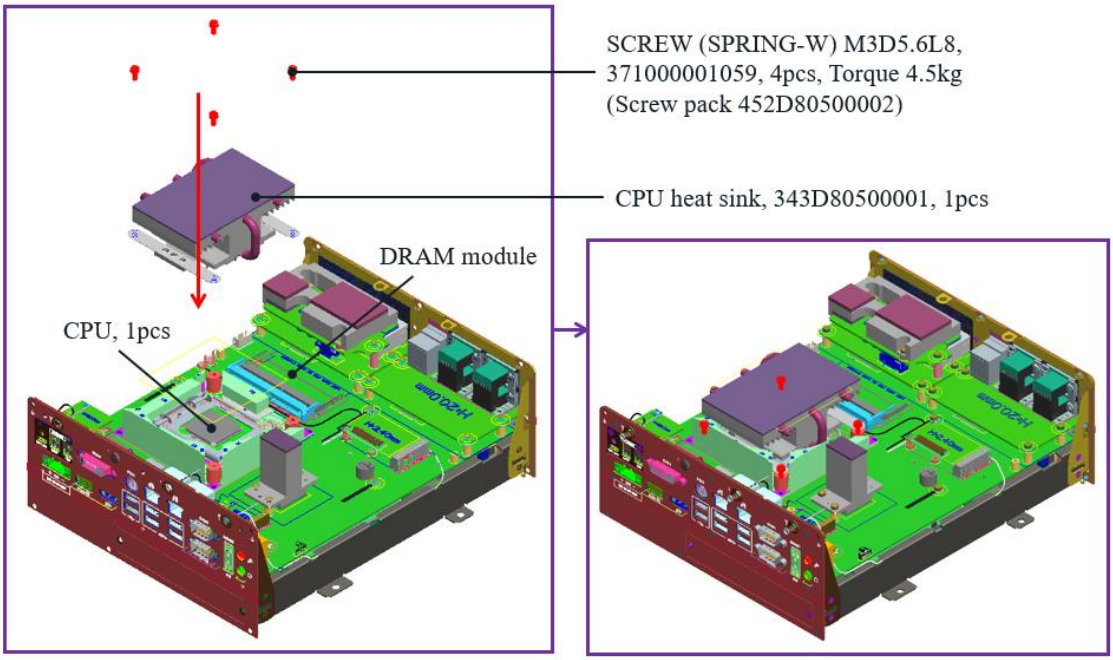
- Loosen four M4 screws from the main chassis



- Before this step, please check that you already loosen two GND screws. And then pull the main chassis from the aluminum extrusion. There are chipset thermal pads (L6), and two guide pin on the aluminum extrusion, so you need to force to pull it out.
  *Warning: Please be very careful about the sharp edge from the alu. and metal parts when force to pull the main chassis out!

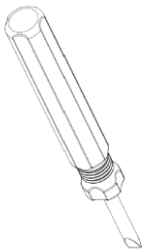


- Take the CPU passive cooler from the accessories. Then install the CPU, CPU heatsink, and DRAM modules as below picture.

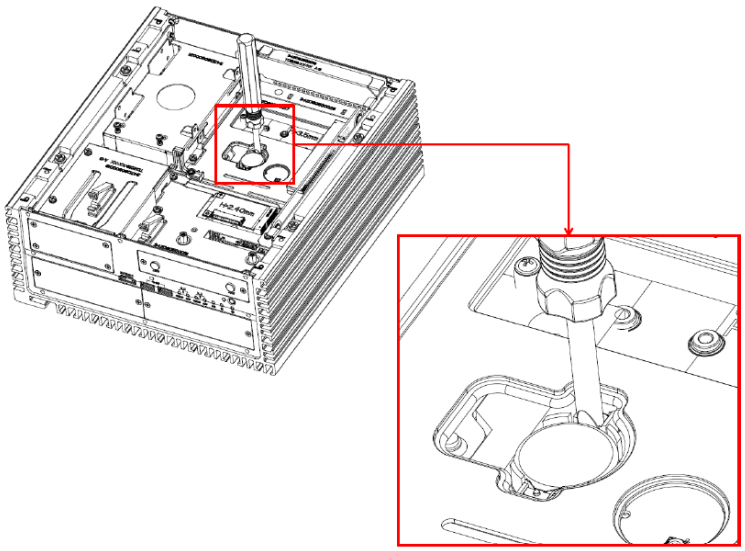

SCREW (SPRING-W) M3D5.6L8,
371000001059, 4pcs, Torque 4.5kg
(Screw pack 452D80500002)
CPU heat sink, 343D80500001, 1pcs
DRAM module
CPU, 1pcs

3.4 RTC Battery Maintenance

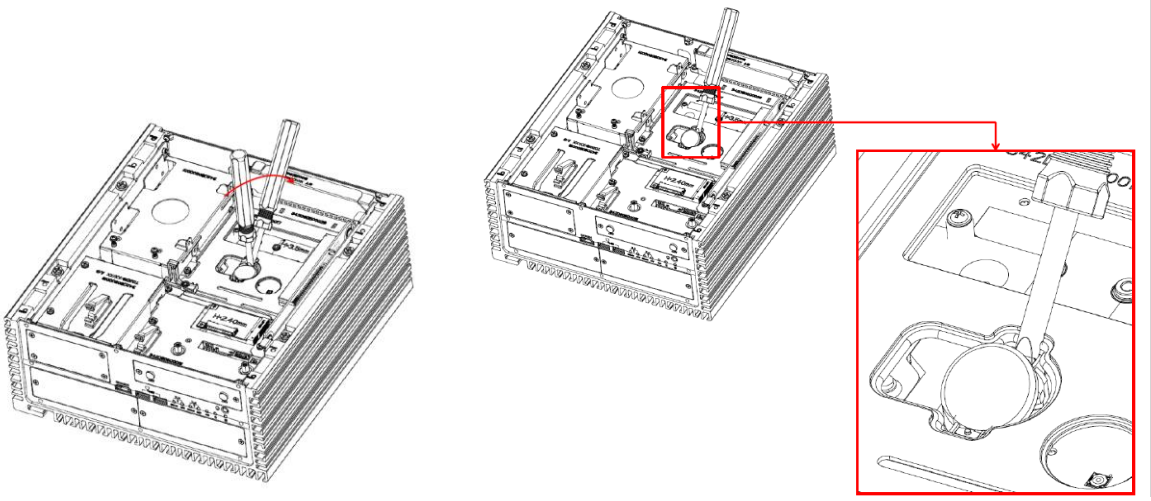
- Preparation for disassembly:

Flathead Screwdriver (The battery holder is designed for great vibration resistant and harsh environment use, so it needs to use a tool to disassemble the coin battery)	

- Insert flathead screwdriver to the gap of one side of RTC battery vertically.

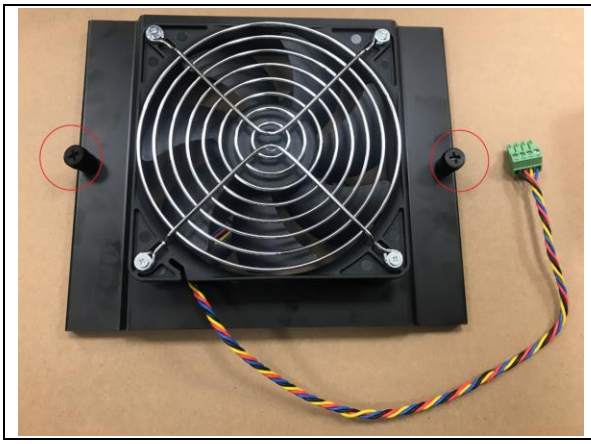


- Rotate the screwdriver at around 45 degrees to loosen the coin battery



3.5 External Fan (Optional) Installation Guide

- Twist the thumbscrews counterclockwise on external fan



- Align the edge of external fan bracket as green arrows, and align the metal latch as red arrow direction. Then insert the fan to the center of housing

- Tighten thumbscrews to fix the external fan, and connect the 4-pin cable to the PWM fan connector from rear I/O

**Notes: Please don't do any operation when the system is booted up. When the external system fan bracket is not installed properly and with system power on, operator might get unexpected hurt from the operation.*

BIOS SETUP

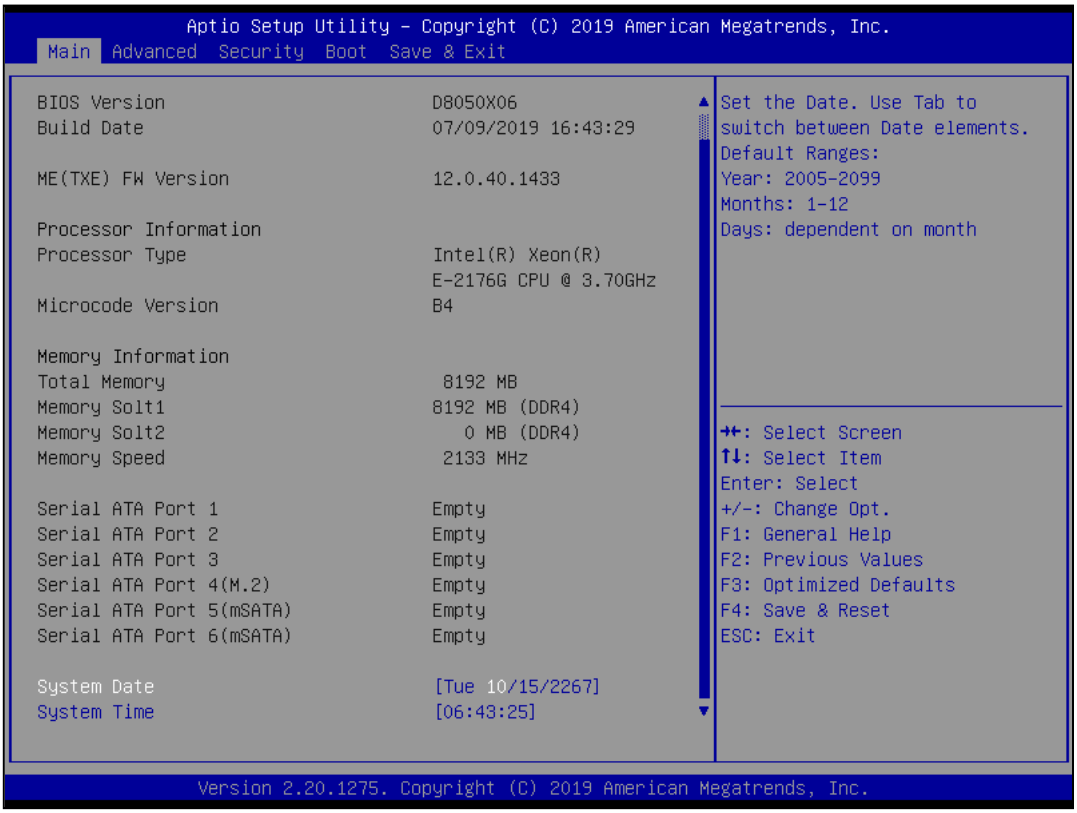
This chapter provides information about how to set up BIOS and use BIOS menu items to adjust basic function settings.

4

CHAPTER 4: BIOS SETUP

This chapter provides information about how to set up BIOS and use BIOS menu items to adjust basic function settings.

4.1 Main Page



Field Name	**BIOS Vender**
Default Value	AMI Megatrends
Comment	This field is not selectable. There is no help text associated with it.

Field Name	**BIOS Version**
Default Value	Display the version of the BIOS
Comment	This field is not selectable. There is no help text associated with it.

Field Name	**Build Date**
Default Value	Display build date of the BIOS
Comment	This field is not selectable. There is no help text associated with it.

Field Name	**ME (TXE) FW Version**
Default Value	ME Firmware Version.
Comment	This field is not selectable. There is no help text associated with it.

Field Name	**Processor Information**
Value	Display the installed CPU brand.
Comment	This field is not selectable. There is no help text associated with it.

Field Name	**Total Memory**
Value	Display the installed memory size.
Comment	This field is not selectable. There is no help text associated with it.

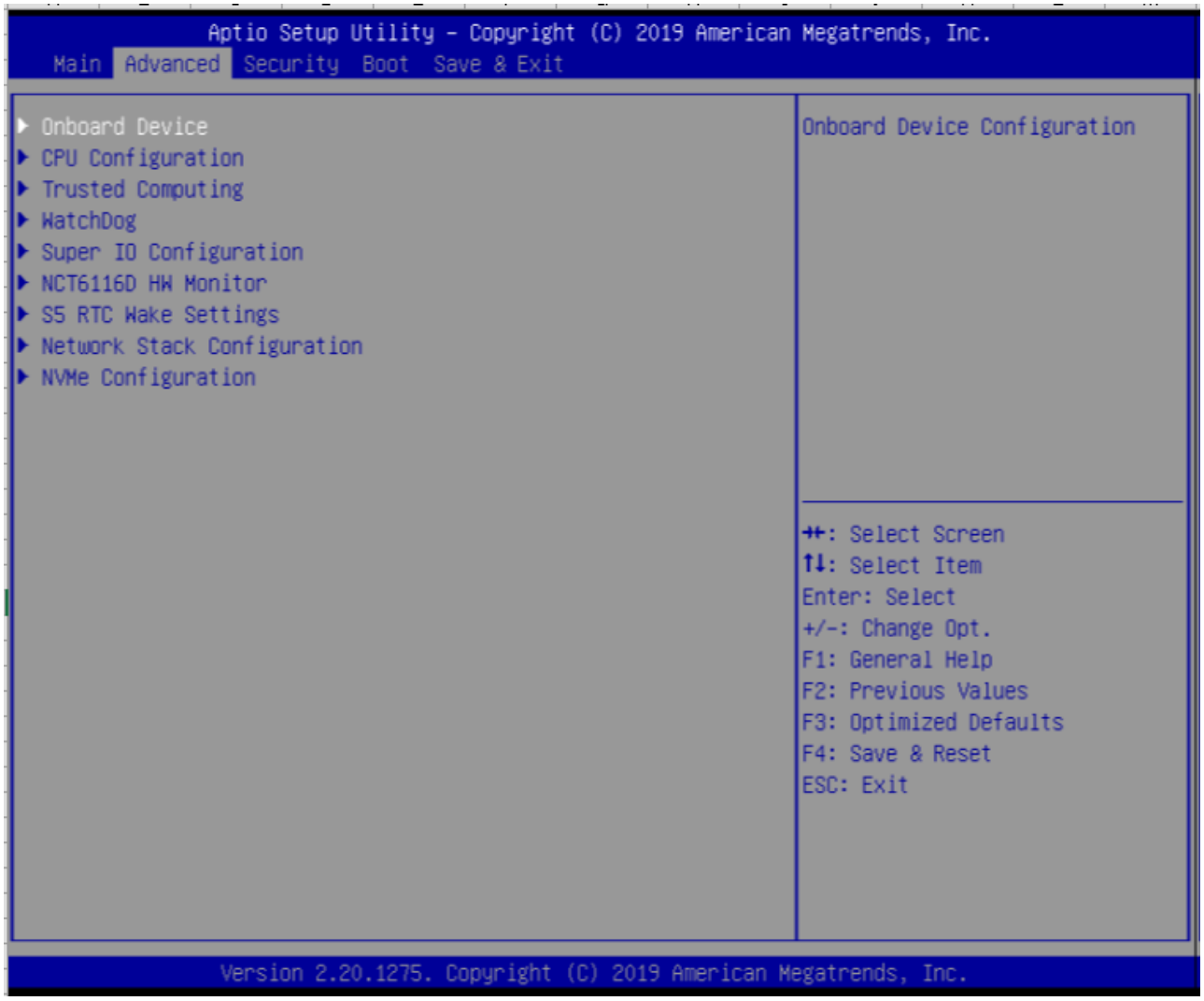
Field Name	**Memory Frequency**
Value	Display the installed memory frequency.
Comment	This field is not selectable. There is no help text associated with it.

Field Name	**SATA#1 / SATA#2 / SATA#3 / M.2#4 / mSATA#5 / mSATA#6**
Value	Display the installed SATA port device.
Comment	This field is not selectable. There is no help text associated with it.

Field Name	**System Date**
Default Value	[Www mm/dd/yyyy]
Possible Value	Www : Mon/Tue/Wed/Thu/Fri/Sat/Sun mm : 1-12 dd : 1-31 yyyy : 1998-9999
Help	Set the Date. Use Tab to switch between Date elements.

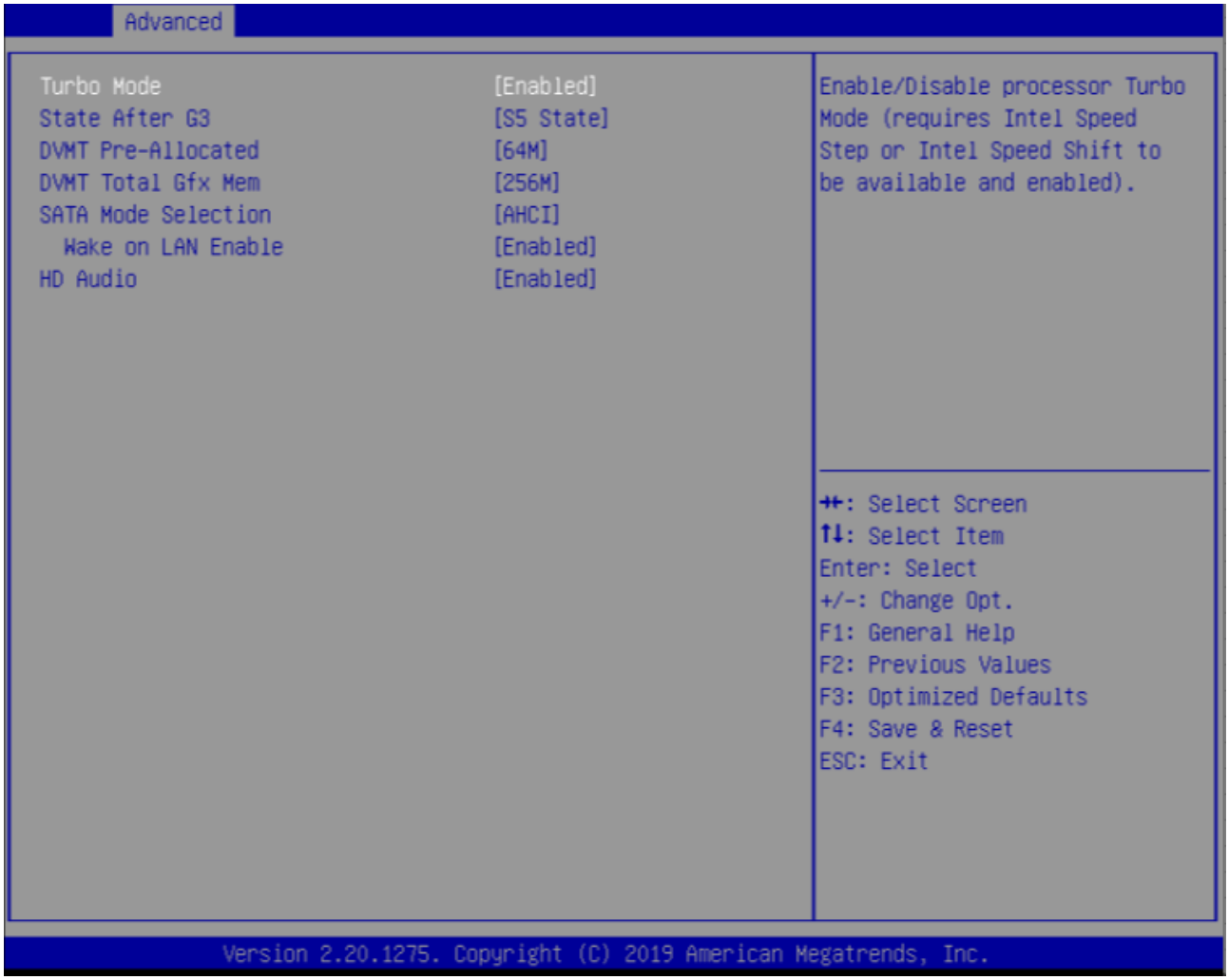
Field Name	**System Time**
Default Value	[hh :mm :ss]
Possible Value	hh : 0-23 mm : 0-59 ss : 0-59
Help	Set the Time. Use Tab to switch between Time elements.

4.2 Advance Page



Advanced	Description
▸ Onboard Devices	Onboard Device Configuration
▸ CPU Configuration	CPU Configuration Parameters
▸ Trusted Computing	Trusted Computing Settings
▸ WatchDog	WatchDog Configuration
▸ Super IO Configuration	System Super IO Chip Parameters.
▸ NCT6116D HW Monitor	Monitor hardware status
▸ S5 RTC Wake Setting	Enable System to wake from S5 using RTC alarm
▸ Network Stack Configuration	Network Stack Settings
▸ NVMe Configuration	NVMe Device Options Settings

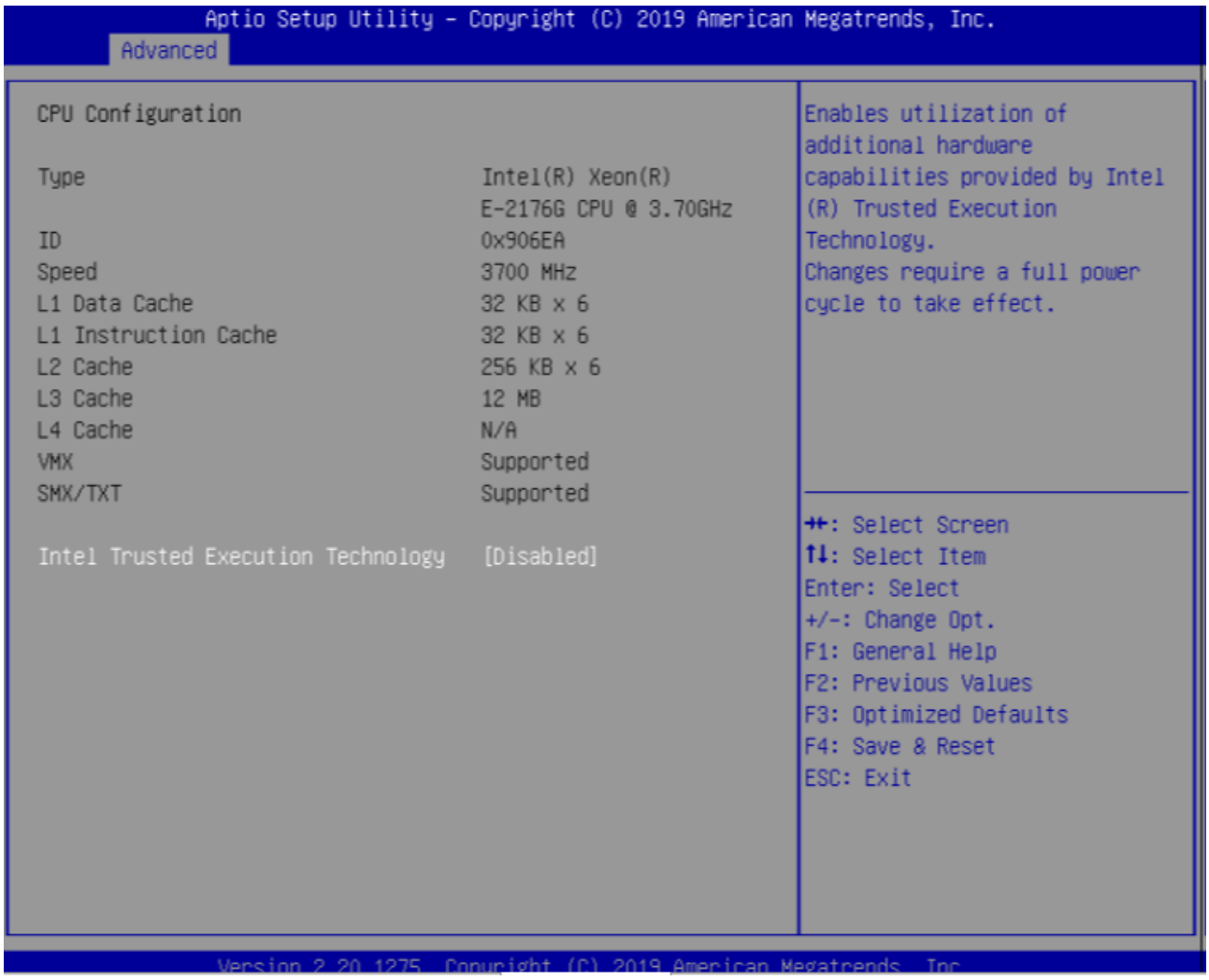
4.2.1 Onboard Device



▸ Onboard Devices	Value	Onboard Device Configuration
Turbo Mode	Disabled / [Enabled]	Enable/Disable processor Turbo Mode (requires Intel Speed Step or Intel Speed Shift to be available and enabled).
State After G3	S0 State / [S5 State]	Specify what state to go to when power is re-applied after a power failure (G3 state).
DVMT Pre-Allocated	[64M] / 32M/F7 / 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	128MB / [256MB] /Max	Select DVMT5.0 Total Graphic Menory size used by the Internal Graphics Device.
SATA Mode Selection	[AHCI] / Intel RST Premium With Intel Optane System Acceleration	Determines how SATA controller(s) operate.
Wake on LAN Enable	[Enabled] / Disabled	Enable/Disable integrated LAN to wake the system.

HD Audio	Disabled / [Enabled]	Control Detection of the HD-Audio device. Disable = HAD will be unconditionally disabled Enabled = HAD will be unconditionally enabled.

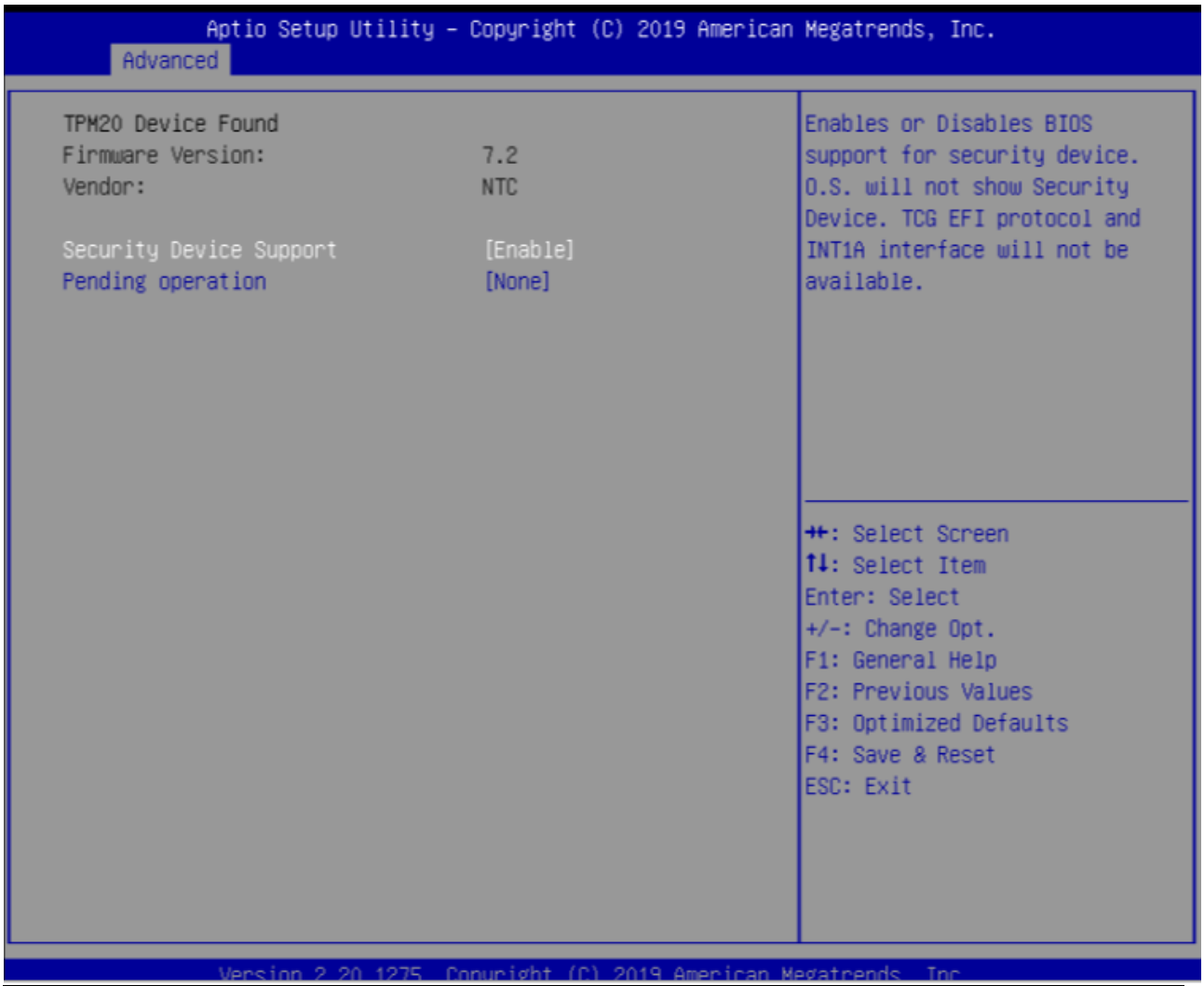
4.2.2 CPU Configuration



▸ CPU Configuration	Value	CPU Configuration Parameters
CPU Configuration		
Type	Intel® xxxx® xxxxxx xxxxxxx	
ID	0xXXXX	
Speed	XXXX MHz	
L1 Data Cache	EX. 32KB x 2	
L1 Instruction Cache	EX. 32KB x 2	
L2 Cache	EX. 256KB x 2	
L3 Cache	EX. 3MB	
L4 Cache		
VMX	Supported	
SMX/TXT	Supported	

Intel Trusted Execution Technology	[Enabled] / Disabled	Enables utilization of additional hardware capabilities provided by Intel® Trusted Execution Technology. Changes require a full power cycle to take effect.

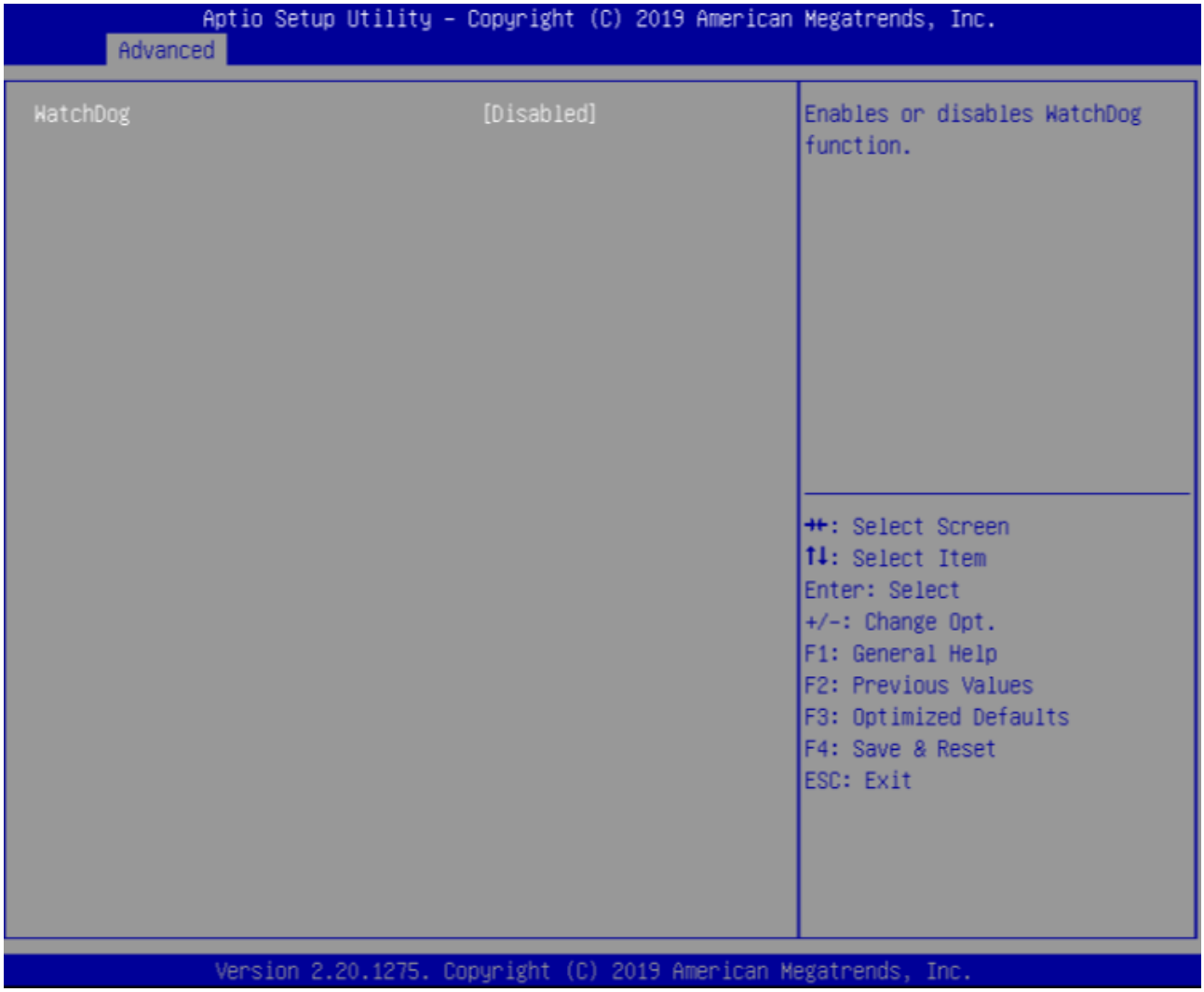
4.2.3 Trusted Computing



▸ Trusted Computing	Value	Trusted Computing Settings
TPM20 Device Found		
Firmware Version:	x.x	
Vendor:	xxxxxx	
Security Device Support	[Disabled] / Enabled	Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
Pending operation	[None] / TPM Clear	Schedule an Operation for the Security Device. NOTE: Your Computer will

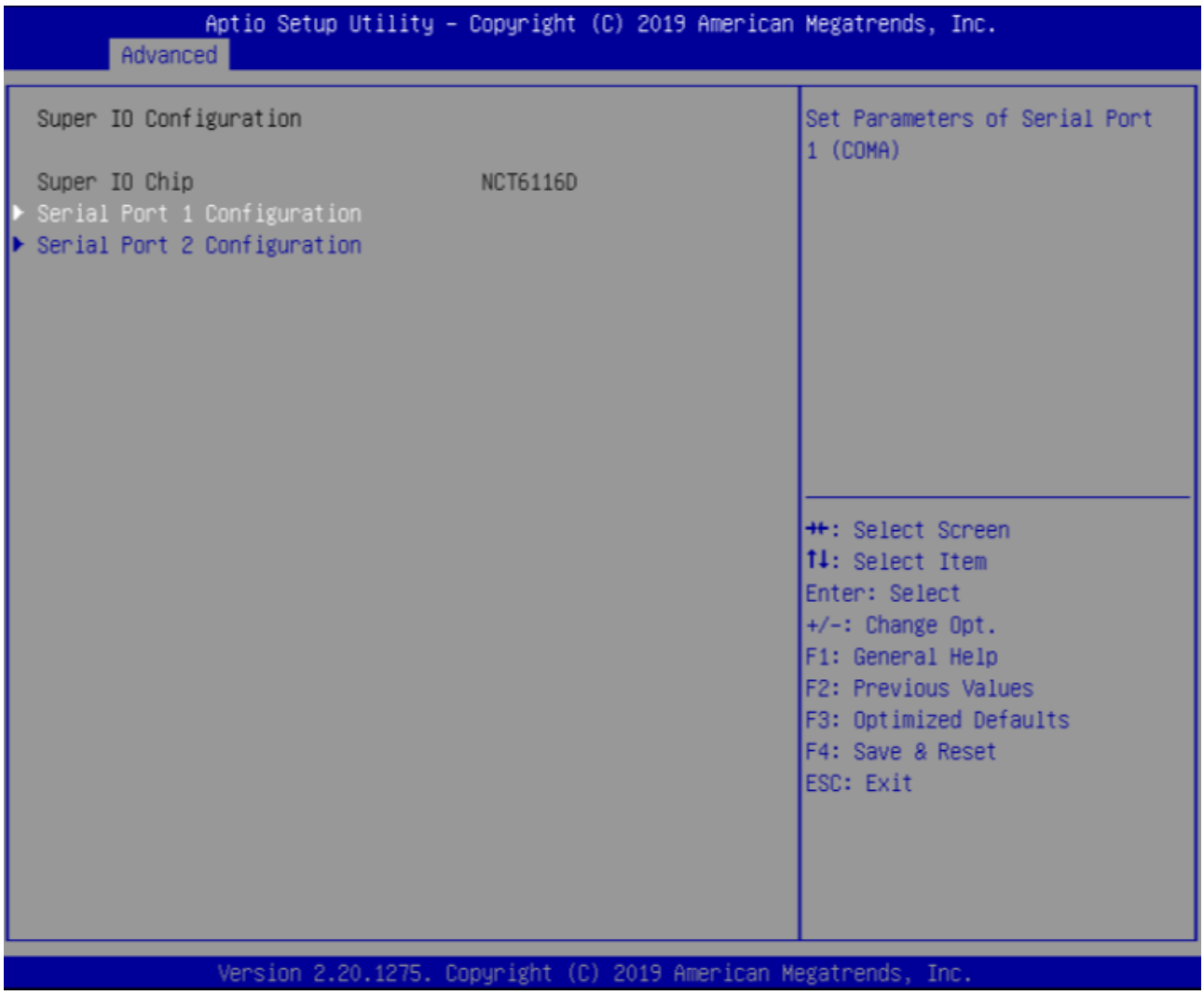
		reboot during restart in order to change State of Security Device.

4.2.4 WatchDog



▸ WatchDog	Value	WatchDog Configuration
WatchDog	[Disabled] / Enabled	Enables or Ddisables WatchDog function.

4.2.5 Super IO Configuration



▸ Super IO Configuration	Value	System Super IO Chip Parameters.
Super IO Configuration		
Super IO Chip	NCT6116D	
▸ Serial Port 1 Configuration	Value	Set Parameters of Serial Port 1 (COMA)

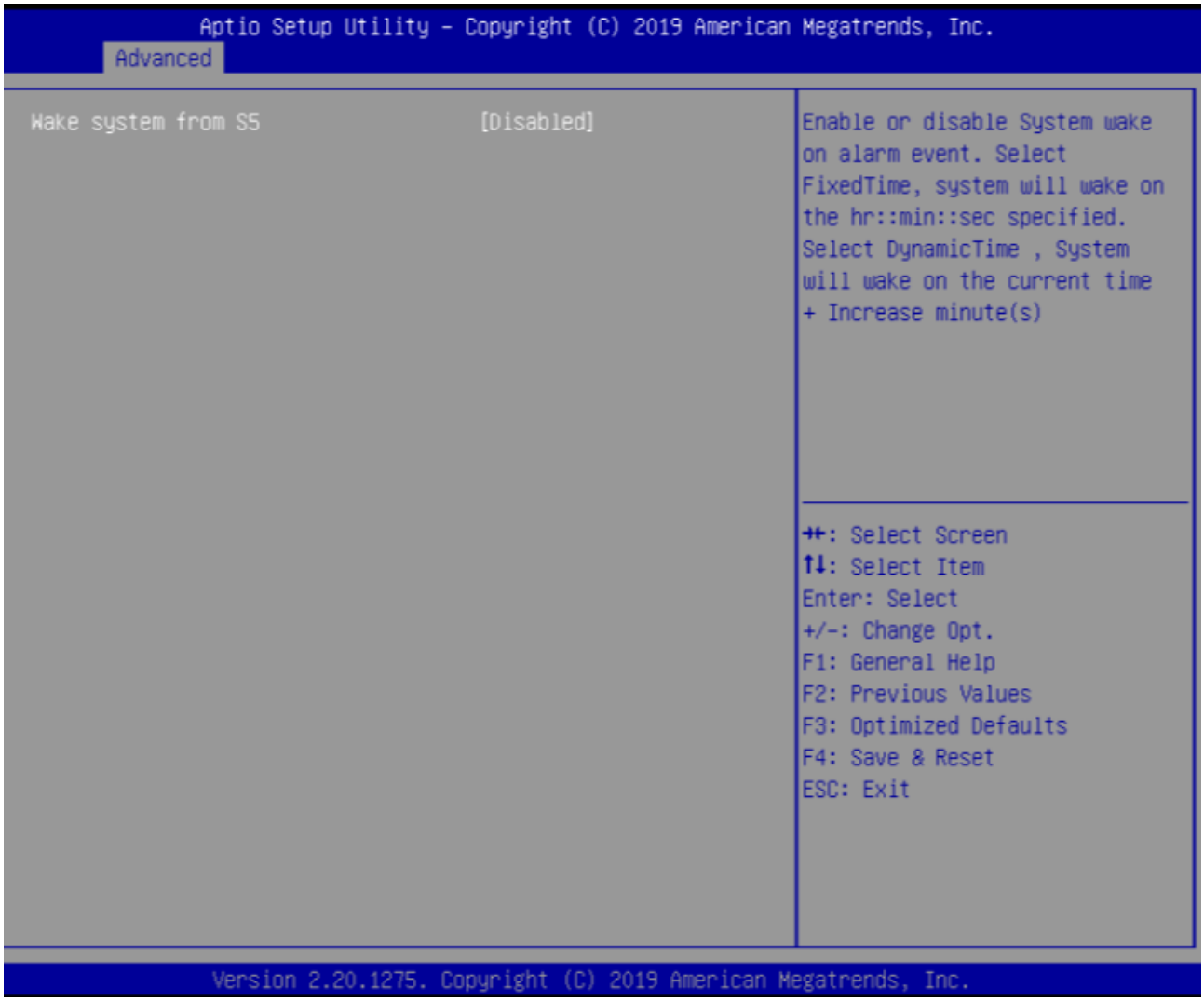
Serial Port 1 Configuration		
Serial Port	Disabled / [Enabled]	Enable or Disable Serial Port (COM)
Device Settings	IO=3F8h; IRQ=4	
Change settings	[Auto] / IO=3F8h; IRQ=4 / IO=3F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12 / IO=2F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12 / IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12 / IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12	Select an optimal settings for Super IO Device
Mode Configuration	[RS232] / RS485 / RS422	Configure serial port as RS232/RS422/RS485.
▸ Serial Port 2 Configuration	Value	Set Parameters of Serial Port 2 (COMB)
Serial Port 2 Configuration		
Serial Port	Disabled / [Enabled]	Enable or Disable Serial Port (COM)
Device Settings	IO=2E8h; IRQ=4	
Change settings	[Auto] / IO=2E8h; IRQ=7 / IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12 / IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12 / IO=2F0h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12 / IO=2E0h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12	Select an optimal settings for Super IO Device
Mode Configuration	[RS232] / RS485 / RS422	Configure serial port as RS232/RS422/RS485.

4.2.6 NCT6116D HW Monitor

▸ NCT6116D HW Monitor	Value	Monitor hardware status
PC Health Status		
Hardware Monitor Alert Enable	[Disabled] / Enabled	If Enabled, POST monitors voltage, temperature, and fan status. If these values are out of range, BIOS display warning message and turn on beep sound.
CPU Temperature	xx ℃	
CPU VR Temperature	xx ℃	
DIMM Temperature	xx ℃	
System Fan_Internal Speed	xx RPM	
System Fan_External Speed	xx RPM	
VCORE	xx V	
PCH IO volt	xx V	
System Memory	xx V	
AVSB	xx V	

VSB3V	xx V	

4.2.7 S5 RTC Wake Setting

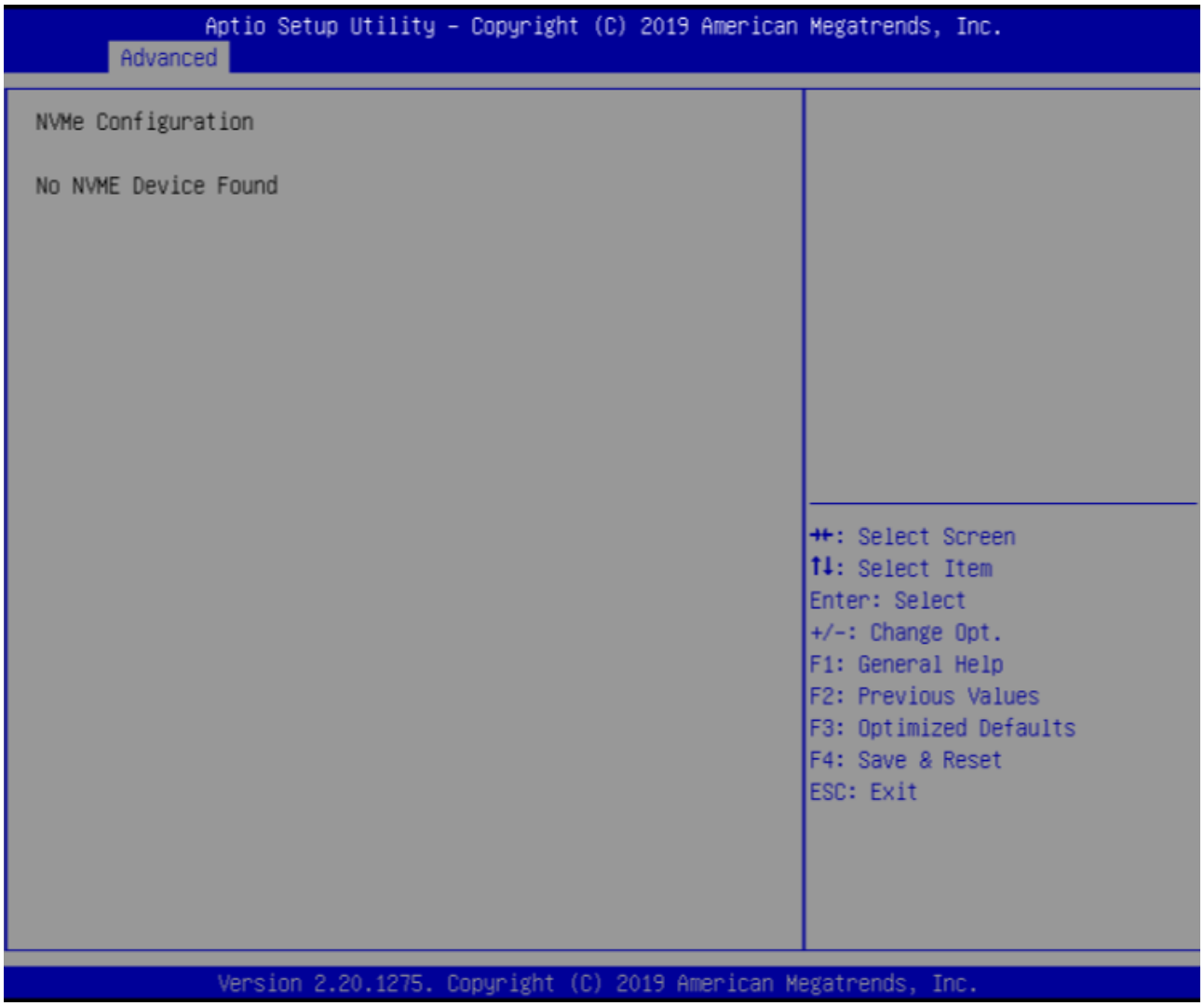


▸ S5 RTC Wake Setting	Value	Enable System to wake from S5 using RTC alarm
Wake System with Fixed Time from S5	[Disabled] / Fixed Time / Dynamic Time	Enable or disable System wake on alarm event. Select FixedTime, system will wake on the hr::min::sec specified. Select DynamicTime , System will wake on the current time + Increase minute(s)

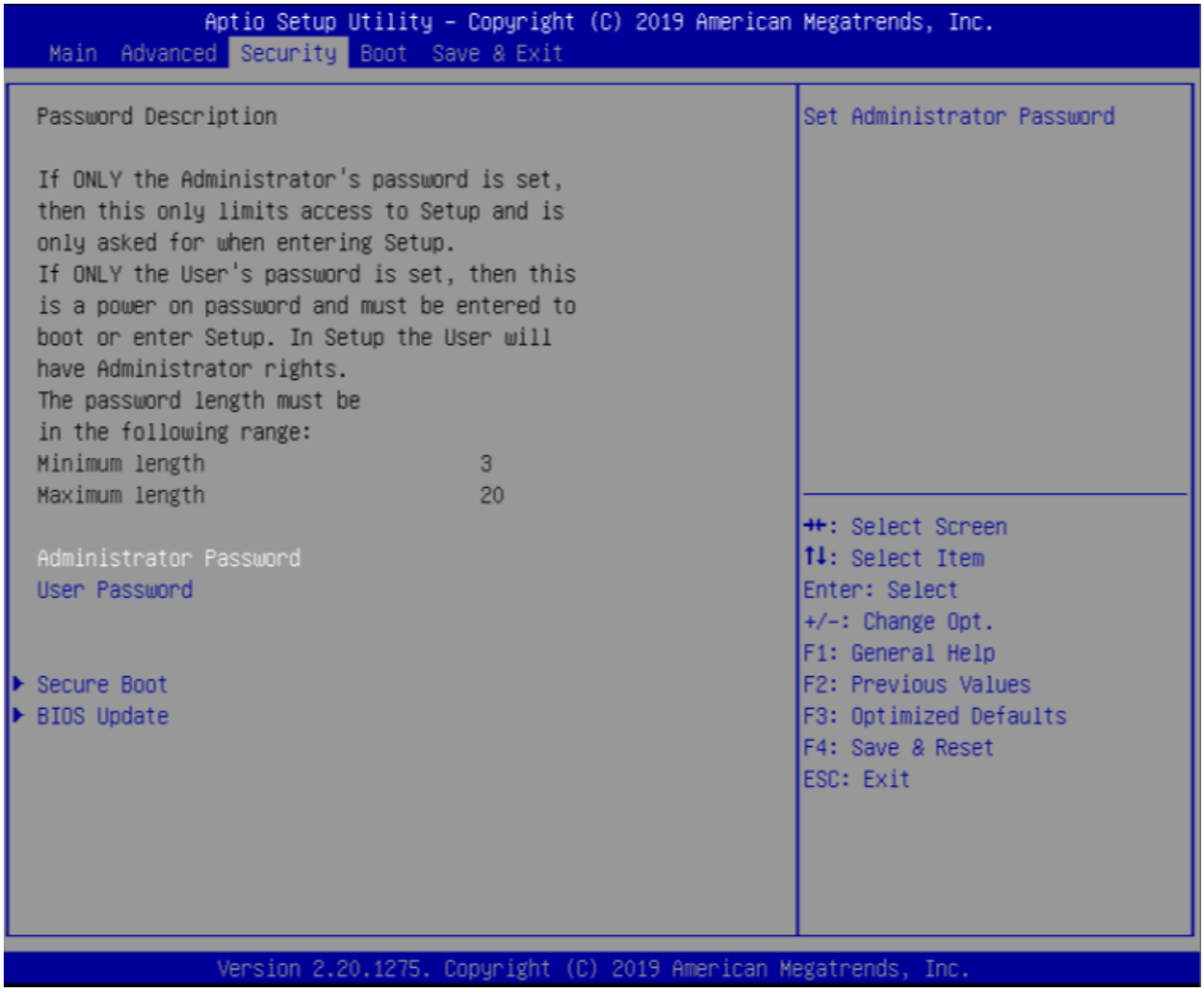
4.2.8 Network Stack Configuration

▸ Network Stack Configuration	Value	Network Stack Settings
Network Stack	[Disabled] / Enabled	Enable/Disable UEFI Network Stack

4.2.9 NVMe Configuration


Aptio Setup Utility – Copyright (C) 2019 American Megatrends, Inc.
Advanced
NVMe Configuration
No NVME Device Found
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Reset
ESC: Exit
Version 2.20.1275. Copyright (C) 2019 American Megatrends, Inc.

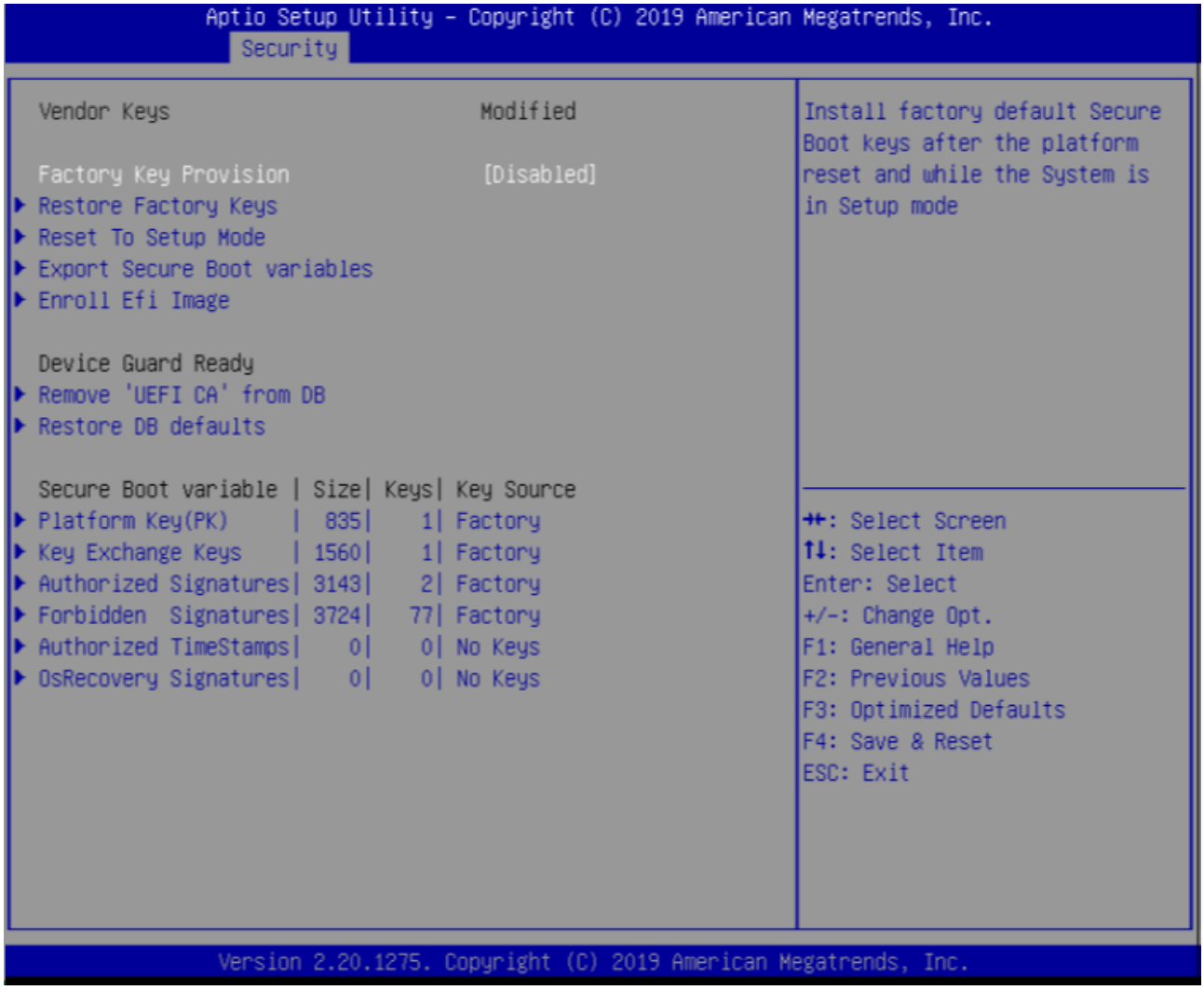
4.3 Security Page



Security	Value	Description
Password Description		
Administrator Password	xxxx	Set Administrator Password
User Password	xxxx	Set User Password
▸ HDD Security drive(EX: xxxxxxxxxxxx)		HDD Security Configuration for selected drive
▸ Secure Boot		Secure Boot configuration
▸ BIOS Update		BIOS Update support

4.3.1 Secure Boot


Aptio Setup Utility – Copyright (C) 2019 American Megatrends, Inc.
Security
System Mode
User
Secure Boot
[Disabled]
Not Active
Secure Boot Mode
[Custom]
Restore Factory Keys
Reset To Setup Mode
Key Management
Secure Boot feature is Active if Secure Boot is Enabled, Platform Key(PK) is enrolled and the System is in User mode. The mode change requires platform reset
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Reset
ESC: Exit
Version 2.20.1275. Copyright (C) 2019 American Megatrends, Inc.



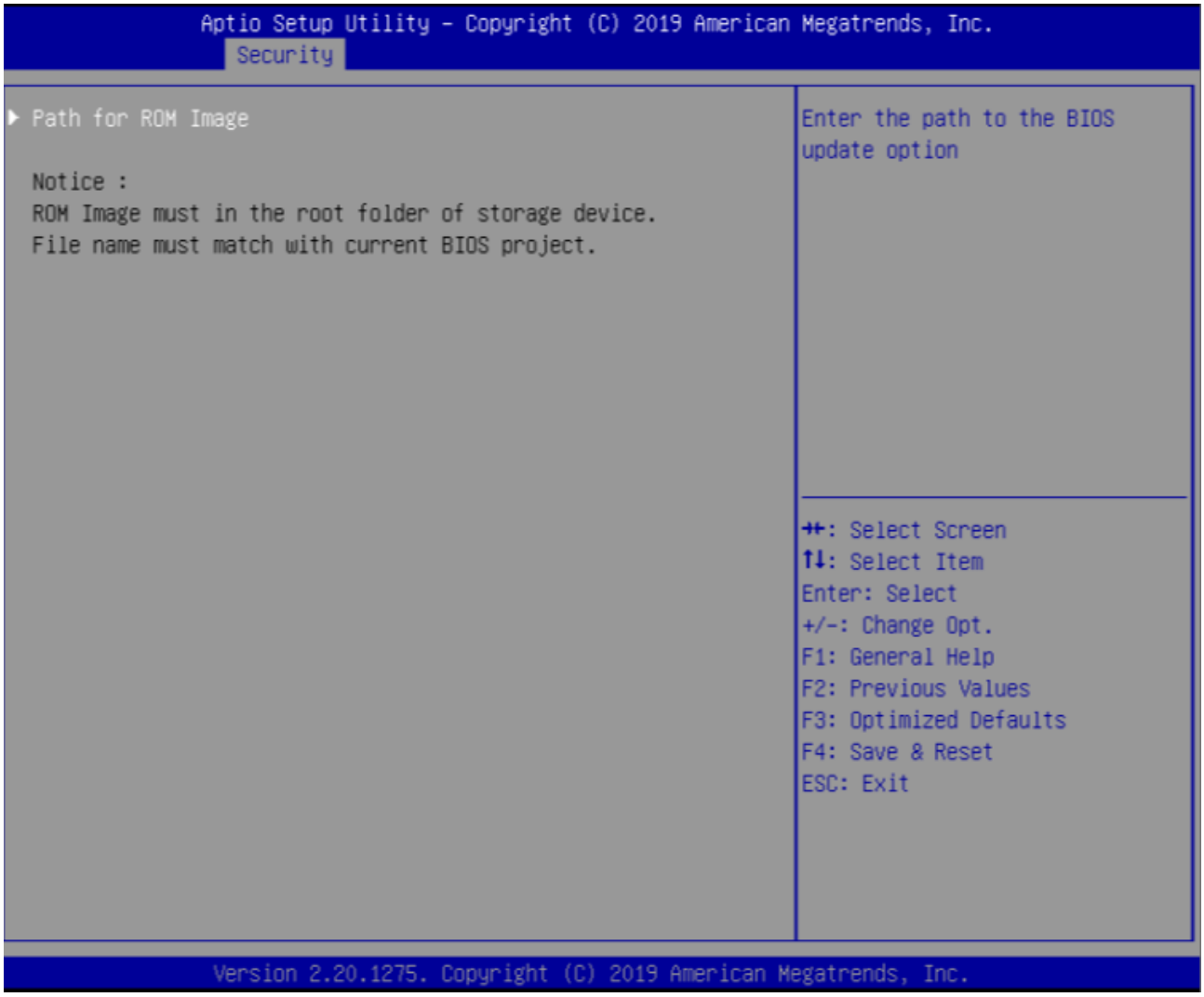
▸ Secure Boot	Value	Secure Boot configuration
System Mode	xxxx	
Secure Boot	[Disabled] / Enabled	Secure Boot feature is Active if Secure Boot is Enable, Platform Key(PK) is enrolled and the System is in User mode. The mode change requires platform reset
Secure Boot Mode	Standard / [Customer]	Secure Boot mode options: Standard or Custom. In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full aythentication
► Restore Factory Keys	[Yes] / No	Force System to User Mode. Install factory default Secure Boot key database
► Reset To Setup Mode	[Yes] / No	Delete all Secure Boot key databases from NVRAM
▸ Key Management		**Enables expert users to modify Secure Boot Policy variables without full authentication**
Vendor Keys	Invalid / Valid	

Factory Key Provision	[Disabled] / Enabled	Install factory default Secure Boot keys after the platform reset and while the System is in Setup mode
► Restore Factory Keys	[Yes] / No	Force System to User Mode. Install factory default Secure Boot key database
► Reset To Setup Mode	[Yes] / No	Delete all Secure Boot key databases from NVRAM
► Export Secure Boot variables	Drive: \Path	Copy NVRAM content of Secure Boot variables to files in a root folder on a file system device
► Enroll Efi Image	xxxxxxxxxxxxxxxxxx	Allow the image to run in Secure Boot mode. Enroll SHA256 Hash certificate of a PE image into Authorized Signature Database (db)
Device Guard ready		
► Remove 'UEFI CA' from DB		Device Guard ready system must not list 'Microsoft UEFI CA' Certificate in Authorized Signature database (db)
► Remove DB defaults	[Yes] / No	Restore DB variable to factory defaults
Secure Boot variables | Size | Keys | Key Source		
► Platform Key(PK)	[Details] / Export / Update / Delete	Enroll Factory Defaults or load certificates from a file: 1.Public Key Certificate: a)EFI_SIGNATURE_LIST b)EFI_CERT_X509 (DER) c)EFI_CERT_RSA2048 (bin) d)EFI_CERT_SHAXXX 2.Authenticated UEFI Variable 3. EFI PE/COFF Image(SHA256) Key Source: Factory, External,Mixed
► Key Exchange Keys	[Details] / Export / Update / Append / Delete	Enroll Factory Defaults or load certificates from a file: 1.Public Key Certificate: a)EFI_SIGNATURE_LIST b)EFI_CERT_X509 (DER) c)EFI_CERT_RSA2048 (bin) d)EFI_CERT_SHAXXX 2.Authenticated UEFI Variable

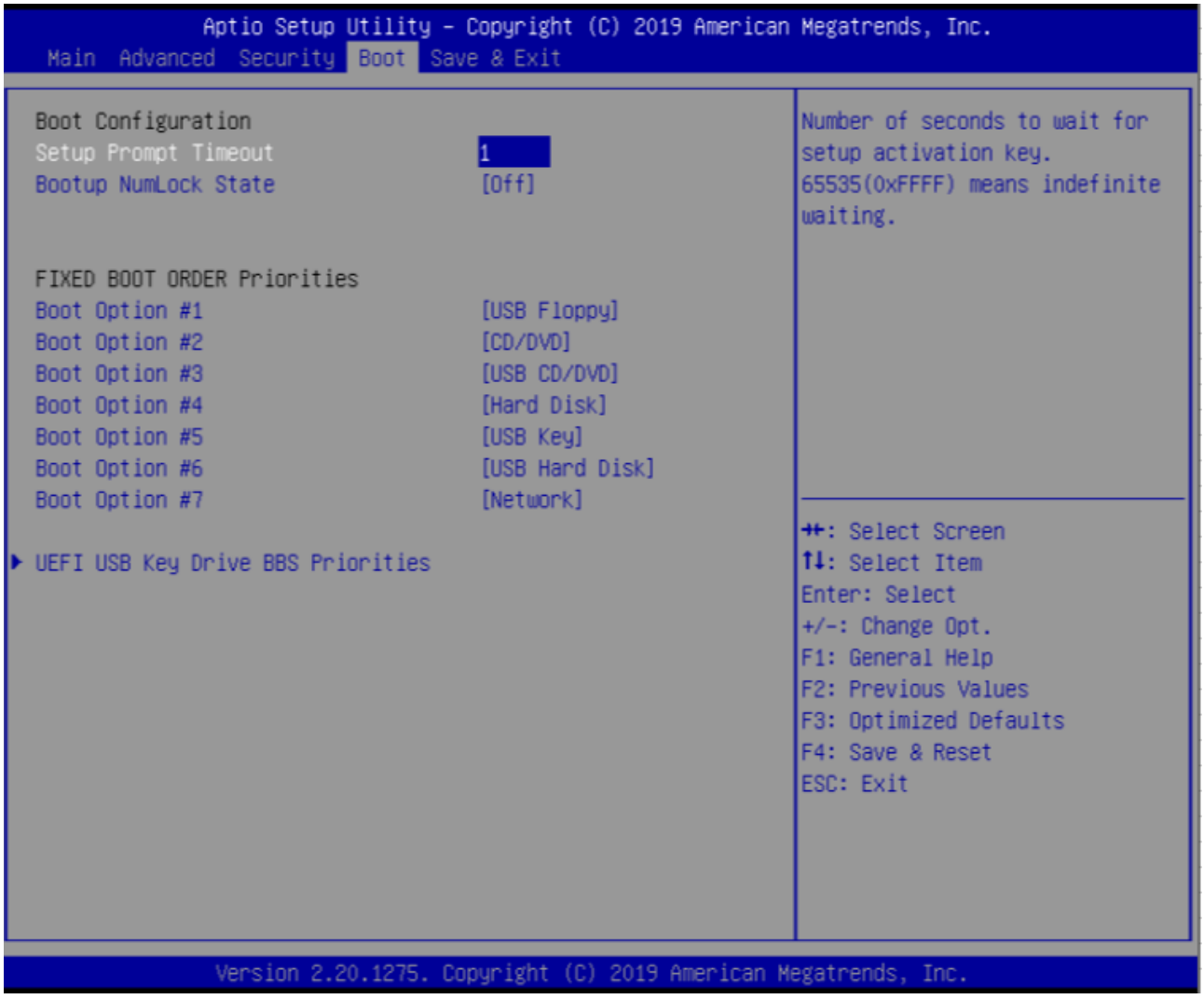
		3. EFI PE/COFF Image(SHA256) Key Source: Factory, External,Mixed
► Authorized Signatures	[Details] / Export / Update / Append / Delete	Enroll Factory Defaults or load certificates from a file: 1.Public Key Certificate: a)EFI_SIGNATURE_LIST b)EFI_CERT_X509 (DER) c)EFI_CERT_RSA2048 (bin) d)EFI_CERT_SHAXXX 2.Authenticated UEFI Variable 3. EFI PE/COFF Image(SHA256) Key Source: Factory, External,Mixed
► Forbidden Signatures	[Details] / Export / Update / Append / Delete	Enroll Factory Defaults or load certificates from a file: 1.Public Key Certificate: a)EFI_SIGNATURE_LIST b)EFI_CERT_X509 (DER) c)EFI_CERT_RSA2048 (bin) d)EFI_CERT_SHAXXX 2.Authenticated UEFI Variable 3. EFI PE/COFF Image(SHA256) Key Source: Factory, External,Mixed
► Authorized TimeStamps	[Details] / Export / Update / Append / Delete	Enroll Factory Defaults or load certificates from a file: 1.Public Key Certificate: a)EFI_SIGNATURE_LIST b)EFI_CERT_X509 (DER) c)EFI_CERT_RSA2048 (bin) d)EFI_CERT_SHAXXX 2.Authenticated UEFI Variable 3. EFI PE/COFF Image(SHA256) Key Source: Factory, External,Mixed
► OsRecovery Signatures	[Details] / Export / Update / Append / Delete	Enroll Factory Defaults or load certificates from a file: 1.Public Key Certificate: a)EFI_SIGNATURE_LIST

		b)EFI_CERT_X509 (DER) c)EFI_CERT_RSA2048 (bin) d)EFI_CERT_SHAXXX 2.Authenticated UEFI Variable 3. EFI PE/COFF Image(SHA256) Key Source: Factory, External,Mixed

4.3.2 BIOS Update



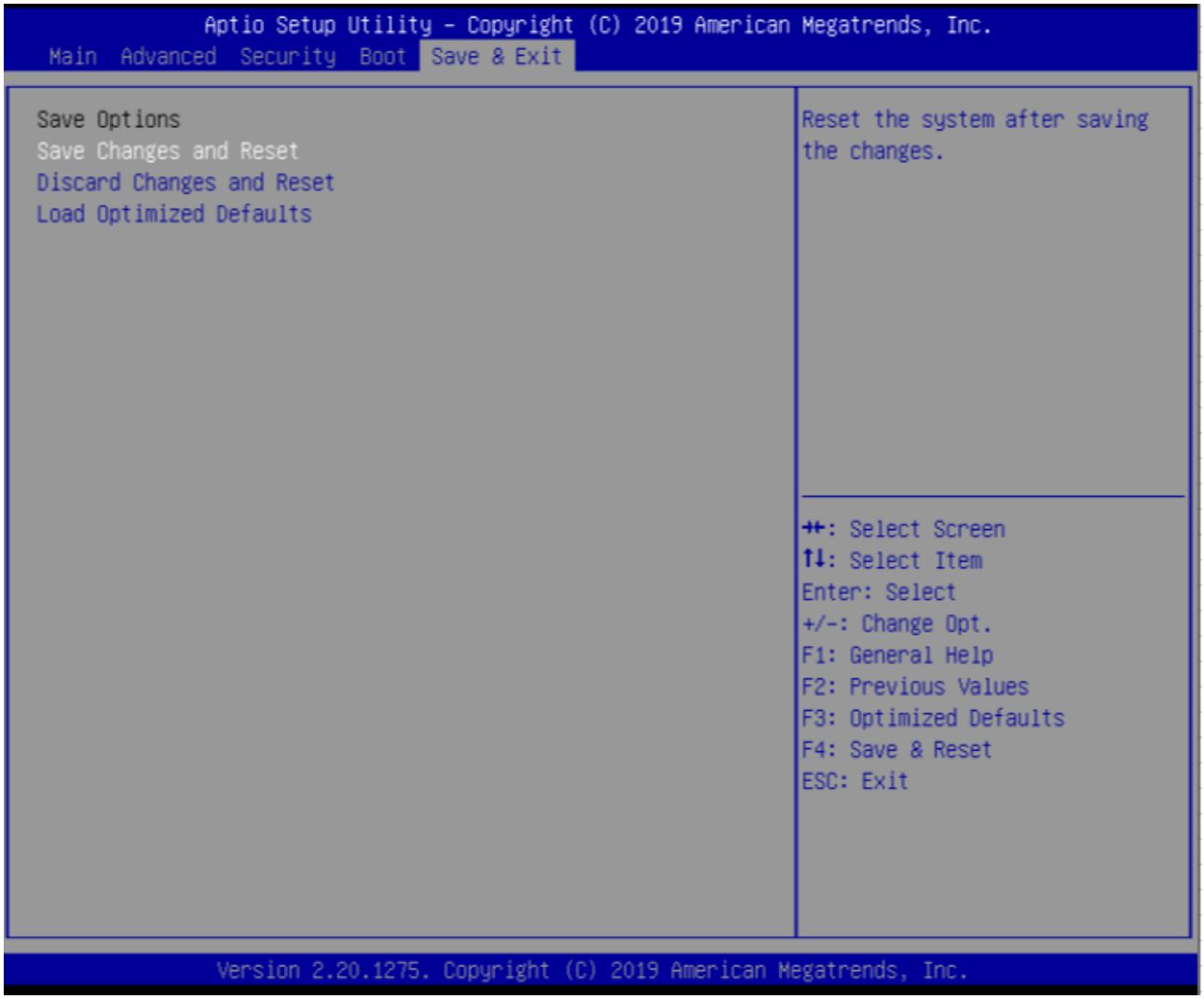
4.4 Boot Page



Boot	Value	Description
Setup Prompt Timeout	1	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
Bootup NumLock State	On / [Off]	Select the keyboard NumLock state
FIXED BOOT ORDER Priorities		
Boot Optoin #1	[USB Floppy] / CD/DVD / USB CD/DVD / Hard Disk / USB Key / USB Hard Disk / Network / Disable	Sets the system boot orfer
Boot Optoin #2	USB Floppy / [CD/DVD] / USB CD/DVD / Hard Disk / USB Key /	Sets the system boot orfer

	USB Hard Disk / Network / Disable	
Boot Optoin #3	USB Floppy / CD/DVD / [USB CD/DVD] / Hard Disk / USB Key / USB Hard Disk / Network / Disable	Sets the system boot orfer
Boot Optoin #4	USB Floppy / CD/DVD / USB CD/DVD / [Hard Disk] / USB Key / USB Hard Disk / Network / Disable	Sets the system boot orfer
Boot Optoin #5	USB Floppy / CD/DVD / USB CD/DVD / Hard Disk / [USB Key] / USB Hard Disk / Network / Disable	Sets the system boot orfer
Boot Optoin #6	USB Floppy / CD/DVD / USB CD/DVD / Hard Disk / USB Key / [USB Hard Disk] / Network / Disable	Sets the system boot orfer
Boot Optoin #7	USB Floppy / CD/DVD / USB CD/DVD / Hard Disk / USB Key / USB Hard Disk / [Network] / Disable	Sets the system boot orfer

4.5 Save & Exit Page



Save & Exit	Description
Save Changes and Reset	Reset the system after saving the changes.
Discard Changes and Reset	Reset system setup without saving any changes.
Load Optimized Defaults	Restore/Load Default values for all the setup options.