OXY5741B

Ruggedized Open-Standard EBX SBC

Expansion, Extend Temperature -40°C~85°C

User's Manual

Revision Date: Apr. 10. 2023

Safety Information

Electrical safety

- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
- When adding or removing devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.
- Before connecting or removing signal cables from the motherboard, ensure that all power cables are unplugged.
- Seek professional assistance before using an adapter or extension cord. These devices could interrupt the grounding circuit.
- Make sure that your power supply is set to the correct voltage in your area.
- If you are not sure about the voltage of the electrical outlet you are using, contact your local power company.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your local distributor.

Operation safety

- Before installing the motherboard and adding devices on it, carefully read all the manuals that came with the package.
- Before using the product, make sure all cables are correctly connected and the power cables are not damaged. If you detect any damage, contact your dealer immediately.
- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.
- Avoid dust, humidity, and temperature extremes. Do not place the product in any area where it may become wet.
- Place the product on a stable surface.
- If you encounter any technical problems with the product, contact your local distributor

Statement

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- All trademarks are the properties of the respective owners.
- All product specifications are subject to change without prior notice

Revision History

Revision	Date (yyyy/mm/dd)	Changes
V1.0	2023/04/10	First release
V2.0	2023/8/10	

Packing List

Item	Description	Q'ty
1	OXY5741B EBX SBC	1
2	CD(Driver + User's manual)	1

Ordering information

OXY5741B

Ruggedized Open-Standard EBX SBC Expansion, Extend Temperature -40°C~85°C

If any of the above items is damaged or missing, please contact your local distributor.

RoHS Compliance

Perfectron RoHS Environmental Policy and Status Update

Perfectron is a global citizen for building the digital infrastructure. We are committed to providing green products and services, which are compliant with European Union RoHS (Restriction on Use of Hazardous Substance in Electronic Equipment) directive 2011/65/EU, to be your trusted green partner and to protect our environment.

In order to meet the RoHS compliant directives, Perfectron has established an engineering and manufacturing task force to implement the introduction of green products. The task force will ensure that we follow the standard Perfectron development procedure and that all the new RoHS components and new manufacturing processes maintain the highest industry quality levels for which Perfectron are renowned.

The model selection criteria will be based on market demand. Vendors and suppliers will ensure that all designed components will be RoHS compliant.

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Chapter 1 : Product Introduction

1.1 Specifications

System	
CPU	Intel® Core™ i7-9850HE Processor (6 Cores/12 Threads, 9M Cache, up to 4.40 GHz), 45W Intel® Core i7-9850HL Processor (6 Cores/12 Threads, 9M Cache, up to 4.10 GHz), 25W XEON E-2276ME Processor (6 Cores/12 Threads, 12M Cache, up to 4.50 GHz), 45W XEON E-2276ML Processor (6 Cores/12 Threads, 12M Cache, up to 4.20 GHz), 25W Intel® Core™ i5-8400H Processor (6 Cores/12 Threads, 8M Cache, up to 4.20 GHz), 45W
Memory type	4 x 260 Pin DDR4 2666MHz SO-DIMM (up to 128GB, Xeon® Sku Support ECC)
Chipset	CM246
BIOS Code	AMI UEFI BIOS
BIOS Flash	SPI Flash
Super I/O	ITE 8786
TPM	TPM2.0 (SLB9665)
iAMT	iAMT12.0
WatchDog	1-255 sec. or 1-255 min. software programmable and can be generate system reset
Display	
Display Port	Resolution up to 4096 x 2304 @ 60Hz
Chipset	Intel®UHD Graphics 630
Multi-Display	Triple simultaneous display with 48-bit LVDS + 2x Mini-DP
LVDS	Dual Channel 24-bit LVDS, max resolution up to 1920 x 1080 @60Hz
Audio	
Codec	ALC888S
Expansion	
M.2	1x M.2(M-key,Type : 2280, SATA/PCIe 3.0 x4 NVMe)
mPCIe	2x Full size(USB/PCIe and 1 x Micro SIM Card)
PCIe/104	1xType2
FPE	1x FPE slot

Ethernet

Chipset	Intel®I210 & I219LM GbE LAN(10/100/1000 Mbps support)
WOL	Yes
Boot from LAN	Yes for PXE

Internal I/O Header (no edge I/O needed)

Display Port	2x Mini DP Display Port
SATA	4xSATAIII (RAID 0,1,5)
SATA power	4
LVDS connector	1x (30 pins) or equal
LVDS Inverter	1x (10 pins) box header
8 bit GPIO	1x (4in/4out) in a (10 pins) box header
Serial	2x RS232/422/485 (10 pins) box header
SIM card holder	1x (Micro SIM) in mini-PCIe slot
LAN	2x 10/100/1000 Base (20 x 1.0 wire to Board connector)
USB 3.0	4x USB3.0 (2 x 20GU 2.0x2.0mm box header)
USB2.0	4x USB2.0 (2x10 Pins) box header
LPC	1x LPC (10 pins) box header
Front Panel	1x (2x5 pins) Power BTN/HDD LED/Reset BTN/PWR LED
Smart Fan	1x CPU Fan → 1x 4 pins for CPU(PWM mode)
Audio	1x MIC-IN / LINE OUT (10 pins) box header
Battery	1x RTC battery holder
DC-IN	1x (4x2pin) horizontal type

Mechanical and environmental

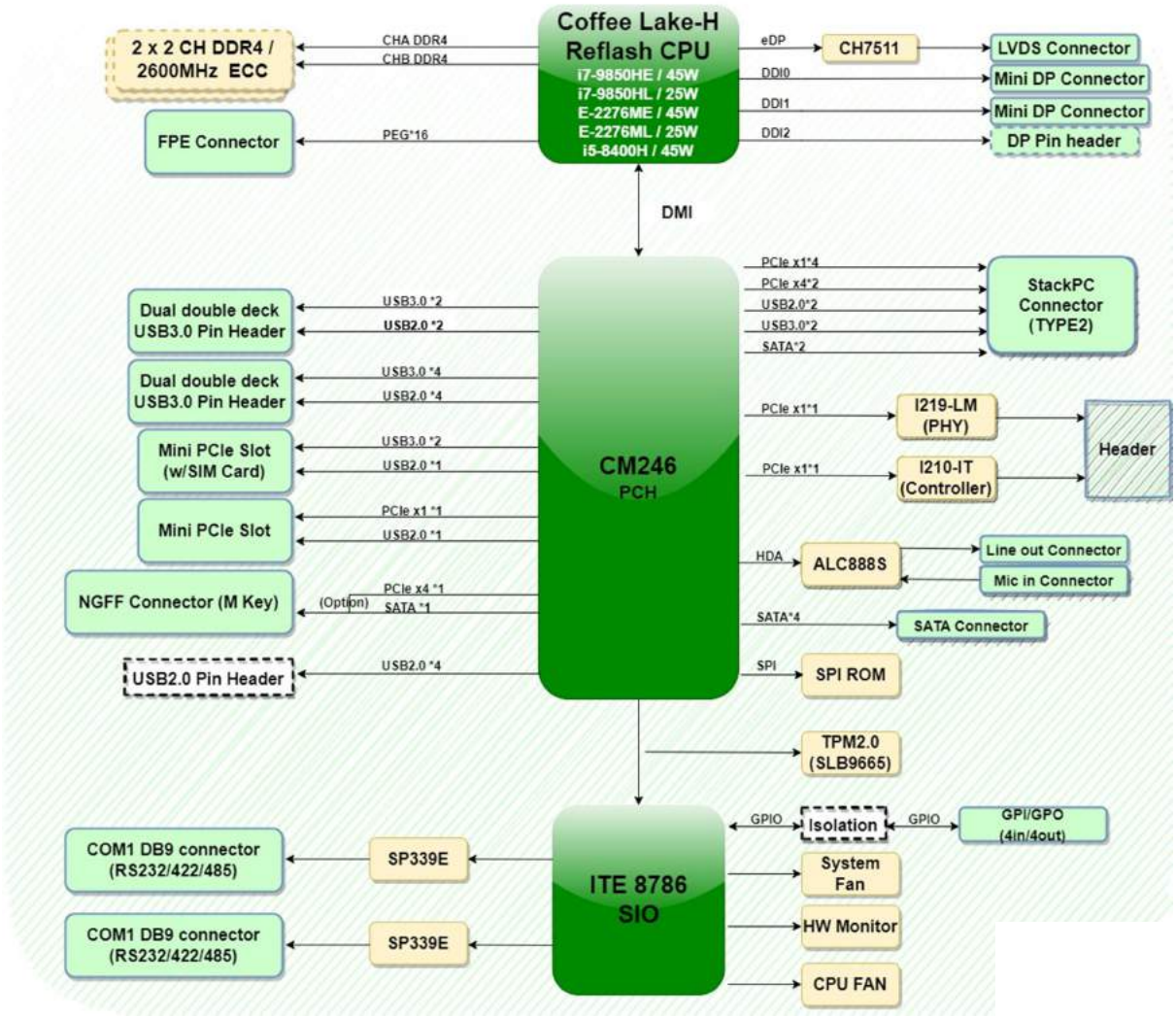
Form Factor	EBX
Dimension	146mm x 243mm
Power Type	12V DC-IN
Power Consumption	180W
Operation Temperature	-40 to 85°C
Storage Temperature	-40 to 85°C
Relative Humidity	10% to 90%, non-condensing

Standard Compliance

Standard Compliance	CE / FCC

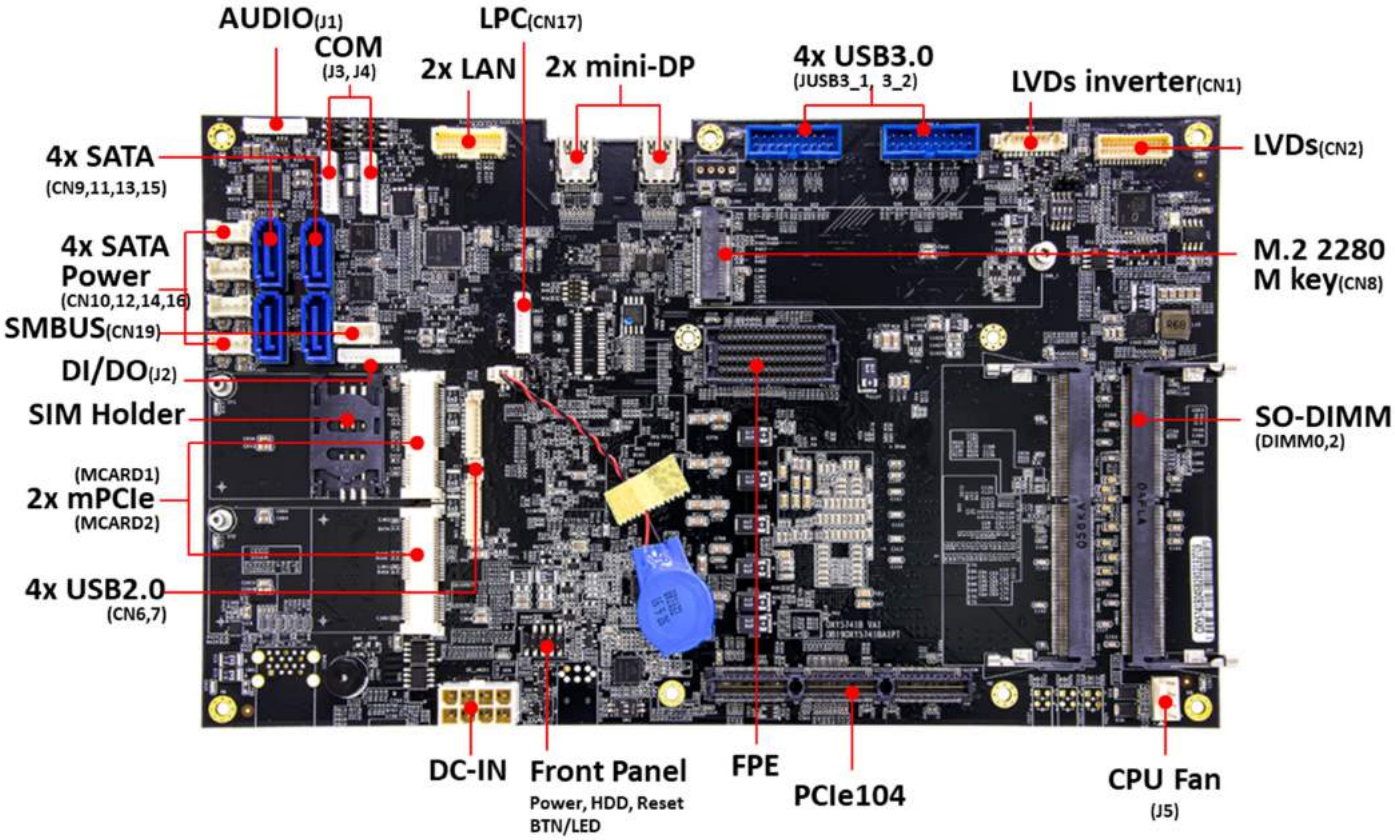
OS	
OS Support	Windows® 10 64-bit Linux (Support by request)
Modular Architecture	
PCIe/104	PCIe/104 (PCIe v3.0, Type2)bus-2x Gen3.0 x4 lanes plus 4x Gen3.0 x 1 lanes Supports integration with stackable PCIe/104 and /or PCI/104-Express I/O cards PCI-PCIe bridge adapter required to support PCI-104 and/or PC/104-Plus I/O cards.
FPE	FPE B2B connector to support PCIe Gen3.0 x16 lanes Use this feature configures the PCI-E port Bifuraction setting for a PCI-E port Specified by user. The options are x8x4x4, x8x8 and x16(SK229) 3 cards slots available for PCIe/104 or PCIe adapter cards example: 1. FPE/PCIe 104 to 4 mini-SAS connectors (SK229) 2. Mini-SAS PCIe x16 slot(x8 signal_SK228) 3. Mini-SAS to PCIe x16 slot (x16 signal_SK226/SK230) 4. Mini-SAS to MXM adapter board(SK224)
Mini PCI/e	2x Full size mini PCIe slot 1x slot dedicated for Mini-PCIe card I/O module (i.e. MIL-STD-1553, ARINC 429, serial, Ethernet, GPS, etc.)
M.2	M.2 2280 slot to support PCIe Gen3.0 x4 or NVMe SSD storage device by jumper setting.
Expansion I/O Support	5 to 6 card slot to support available for PCIe/104 or PCI/104 -Express cards example: 1. HD-SDI/PAL/NTSCH.264 frame grabber (mPCIe by SK401) 2. H.264 video recorder/network streaming card (mPCIe SK401) 3. MIL-STD-1553/ARINC429 (mPCIe by SK401) 4. CAN data-bus module (mPCIe by SK401) 5. Ethernet NIC/10GbE LAN switch (SK506, SK502)
Data Storage	4x SATA controllers for SATA III and 1x NVMe SSD can support Data Storage function. (1) SATA LAN 0 / (2) SATA LAN 1 (3) SATA LAN 2 (4) SATA LAN 3 / (5) M.2 2280 NVMe SSD

1.2 Block Diagram

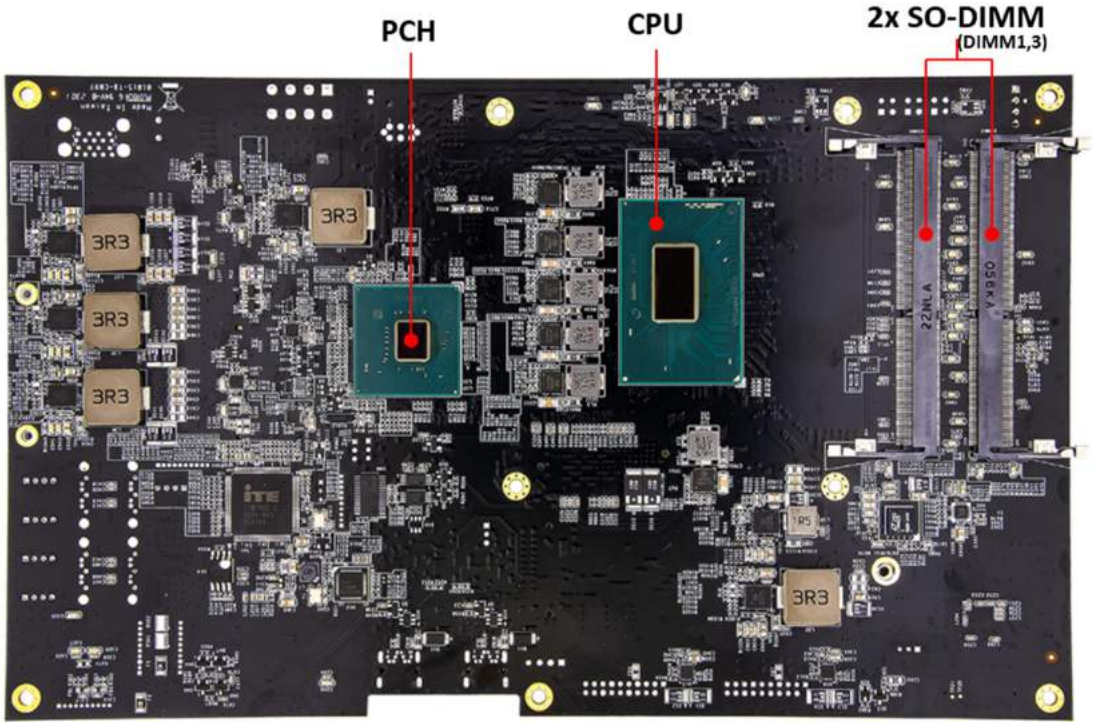


1.3 Board Placement

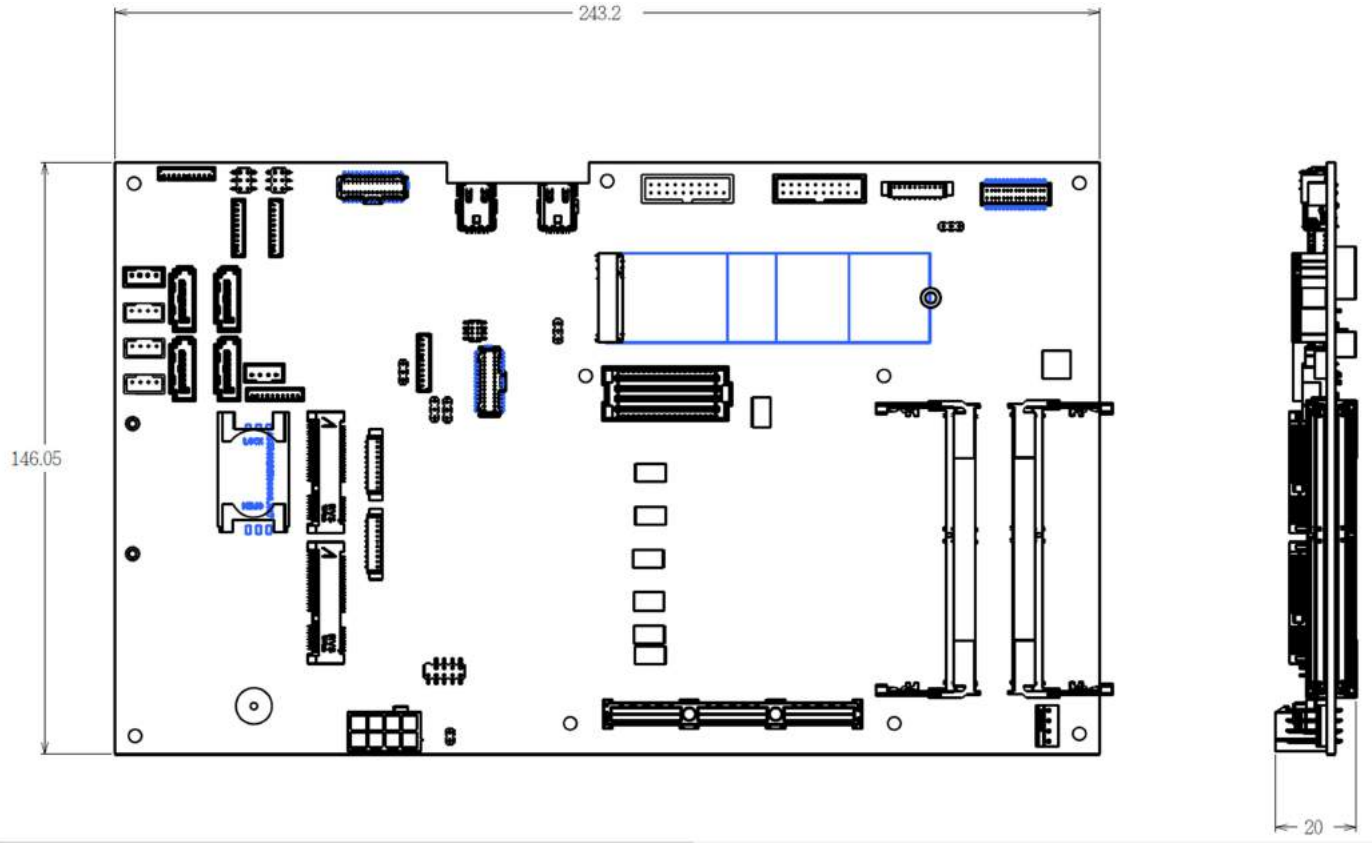
OXY5741B TOP Side



OXY5741B Bottom Side



1.4 Mechanical Dimensions



Chapter 2 : Jumpers and Connectors Location

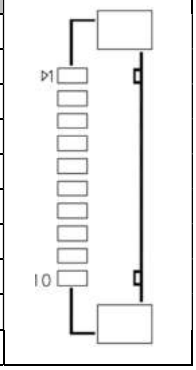
2.1 Jumpers and connectors list

Label	Function
CN1	Inverter connector
CN2	LVDS connector
JP1	LVDS_VDD select
JUSB3_1/3_2	USB3.0 x 2 (Total 4 Port)
CN6/CN7	USB2.0 (Total 4 Port)
CN8	M.2 M KEY Connector
CN9/CN11/CN13/CN15	Serial ATA Connectors
CN10/CN12/CN14/CN16	SATA Power
DC_JACK1	ATX12V DC connector
DIMM0	DDR4 SO DIMM Socket
DIMM1	DDR4 SO DIMM Socket
DIMM2	DDR4 SO DIMM Socket
DIMM3	DDR4 SO DIMM Socket
MCARD1	Mini PCIE Card Slot<Full size Co-lay mSATA>
MCARD2	Mini PCIE Card Slot<Full size Co-lay mSATA>
MDP1	Mini DISPLAY PORT
MDP2	Mini DISPLAY PORT
DP3	DISPLAY PORT HEADER
CN17	LPC connector (Update BIOS)
CN19	SMBUS
LAN1+ LAN2	INTEL I219-LM + INTEL I210-IT SD-501190 connector
J4	RS232/422/485 with 5V/12V selectable
J3	RS232/422/485 with 5V/12V selectable
J2	Digital I/O Box Head
J1	Front side MIC-In/ Line-Out Connector
JP4	COM2 +12/+5V selection
JP3	COM1 +12/+5V selection
JM2	M.2 Signal select
JCMOS1	ME Flash Security
JCMOS2	RTC Reset
BAT1	BATTERY connector
SIM_CARD1	SIM card socket
JP5	AT/ATX Mode
FPE1	FPE Top connector
STACKPC1	PCIe/104 connector
LED3	LAN2 LED STATUS
LED2	LAN1 LED STATUS
LED4	Power/HDD LED
J5	SYSTEM FAN CONNECTOR
SW1	LVDS Resolution selection
SW2	Power Button
SW3	PCIE CFG[5:6]
FP1	Front Panel

2.2 Jumper Settings

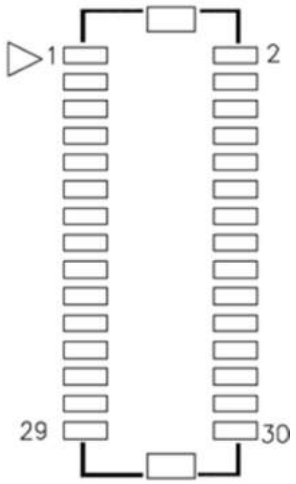
CN1: Inverter connector

PIN	DEFINITION
1	12V
2	12V
3	12V
4	5VS
5	5VS
6	GND
7	GND
8	BL_EN
9	LVDS0_BKL_CTRL_R
10	GND

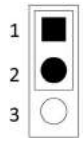
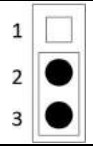


CN2: LVDS CONNECTOR

PIN	DEFINITION	PIN	DEFINITION
1	LVDS_BCLK	2	GND
3	LVDS_BCLK#	4	LVDS_A3
5	GND	6	LVDS_A3#
7	LVDS_B3	8	GND
9	LVDS_B3#	10	LVDS_ACLK
11	LVDS_B2	12	LVDS_ ACLK #
13	LVDS_B2#	14	GND
15	LVDS_B1	16	LVDS_A2
17	LVDS_B1#	18	LVDS_A2#
19	LVDS_B0	20	LVDS_A1
21	LVDS_B0#	22	LVDS_A1#
23	GND	24	LVDS_A0
25	LVDS_DCC_SC	26	LVDS_A0#
27	LVDS_DCC_SD	28	GND
29	LVDS_VDD	30	LVDS_VDD

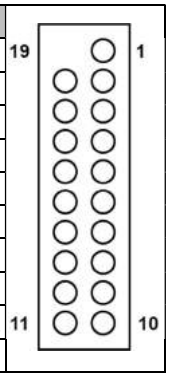


JP1: LVDS_VDD select

Jumper	Function description	Setting
1-2	3.3V	
2-3	5V	
Default setting: 2-3		

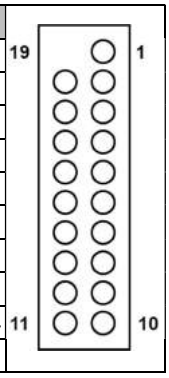
JUSB3_1(CN3): USB3.0 *2

PIN	DEFINITION	PIN	DEFINITION
1	+USB3_VCC1	11	USB2_P2
2	USB3_RXN1	12	USB2_N2
3	USB3_RXP1	13	USB_GND
4	USB_GND	14	USB3_TXP2
5	USB3_TXN1	15	USB3_TXN2
6	USB3_TXP1	16	USB_GND
7	USB_GND	17	USB3_RXP2
8	USB2_N1	18	USB3_RXN2
9	USB2_P1	19	+USB3_VCC2
10	NC		



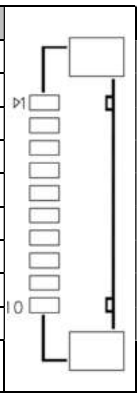
JUSB3_2(CN4): USB3.0 *2

PIN	DEFINITION	PIN	DEFINITION
1	+USB3_VCC3	11	USB2_P4
2	USB3_RXN3	12	USB2_N4
3	USB3_RXP3	13	USB_GND
4	USB_GND	14	USB3_TXP4
5	USB3_TXN3	15	USB3_TXN4
6	USB3_TXP3	16	USB_GND
7	USB_GND	17	USB3_RXP4
8	USB2_N3	18	USB3_RXN4
9	USB2_P3	19	+USB3_VCC4
10	NC		



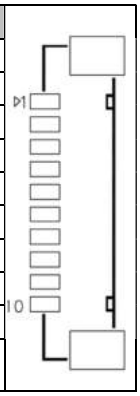
CN6: USB 2.0

PIN	DEFINITION
1	USB2_VCC7
2	USB2_N7_C
3	USB2_P7_C
4	GND
5	GND
6	USB2_VCC8
7	USB2_N8_C
8	USB2_P8_C
9	GND
10	GND



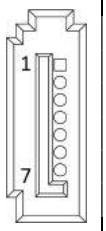
CN7: USB 2.0

PIN	DEFINITION
1	USB2_VCC9
2	USB2_N9_C
3	USB2_P9_C
4	GND
5	GND
6	USB2_VCC10
7	USB2_N10_C
8	USB2_P10_C
9	GND
10	GND



CN9/CN11/CN13/CN15: Serial ATA Connectors

PIN	DEFINITION
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND

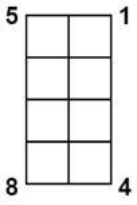


CN10/CN12/CN14/CN16: SATA POWER Connector

PIN	DEFINITION
1	12V
2	GND
3	GND
4	5VS

DC_JACK1: DC-IN

PIN	DEFINITION	PIN	DEFINITION
1	GND	2	GND
3	GND	4	GND
5	+12VSB	6	+12VSB
7	+12VSB	8	+12VSB

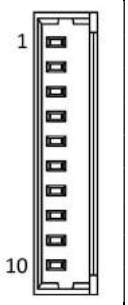


DP3: DISPLAY PORT HEADER (Removed)

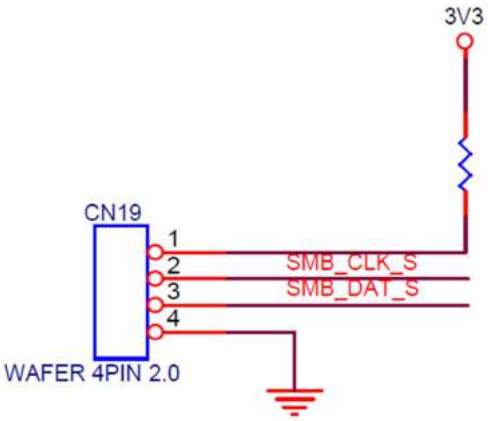
PIN	DEFINITION	PIN	DEFINITION
1	GND	2	GND
3	DDI3_TXP0_DP-C	4	NC
5	DDI3_TXN0_DP-C	6	NC
7	DDI3_TXP1_DP-C	8	NC
9	DDI3_TXN1_DP-C	10	NC
11	DDI3_TXP2_DP-C	12	NC
13	DDI3_TXN2_DP-C	14	NC
15	DDI3_TXP3_DP-C	16	NC
17	DDI3_TXN3_DP-C	18	NC
19	DDI3_AUX_P_C	20	NC
21	DDI3_AUX_N_C	22	NC
23	GND	24	GND
25	DDI3_DDC_AUX_SEL	26	NC
27	DP3_DET	28	NC
29	DP3_PWR	30	NC
31	GND	32	GND

CN17: LPC

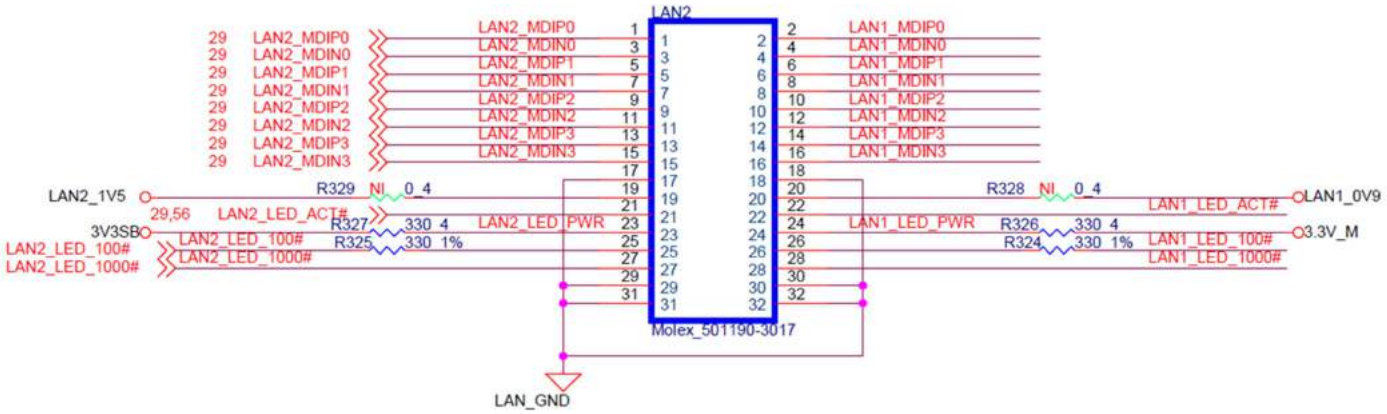
PIN	DEFINITION
1	GND
2	INT_SERIRQ
3	3.3V
4	LPC_AD0
5	LPC_AD1
6	LPC_AD2
7	LPC_AD3
8	LPC_FRAME#
9	CHIP_PLTRST#
10	CLK



CN19 SMBUS



LAN1: Intel I219LM &
LAN2: Intel I210IT in SD-501190 connector



J4: RS232/422/485 with 5V/12V selectable

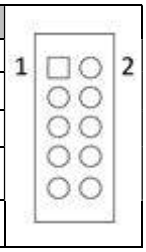
PIN	DEFINITION
1	5VS
2	GND
3	COM2P9SEL
4	DTR-
5	CTS-
6	TXD-
7	RTS-
8	RXD-
9	DSR-
10	DCD-

J3: RS232/422/485 with 5V/12V selectable

PIN	DEFINITION
1	5VS
2	GND
3	COM1P9SEL
4	DTR-
5	CTS2-
6	TXD2-
7	RTS2-
8	RXD-
9	DSR-
10	DCD-

J2: Digital I/O Box Head

PIN	DEFINITION	PIN	DEFINITION
1	VCC	2	GND
3	DI_0	4	DI_1
5	DI_2	6	DI_3
7	DI_4	8	DI_5
9	DO_0	10	DO_1

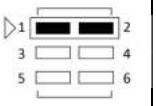


J1: Audio Connector

PIN	DEFFINIITION	CONNECTOR
1	GND	
2	MIC1_JD	
3	MIC1_R	
4	MIC1_L	
5	FRONT_JD	
6	FRONT_R	
7	FRONT_L	
8	NC	
9	NC	
19	NC	

JP4: COM2 5V/12V selection

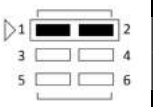
PIN	DEFINITION	PIN	DEFINITION
1	RI1#_OPTO	2	COM2P9SEL
3	5V	4	COM2P9SEL
5	12V	6	COM2P9SEL



Default :1-2 short

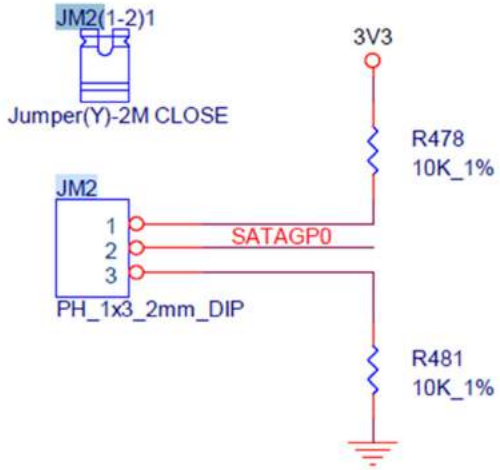
JP3: COM1 5V/12V selection

PIN	DEFINITION	PIN	DEFINITION
1	RI1#_OPTO	2	COM1P9SEL
3	5V	4	COM1P9SEL
5	12V	6	COM1P9SEL



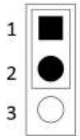
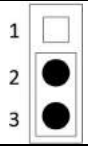
Default :1-2 short

JM2:M.2 Signal select

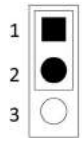
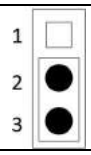


Low : SATA
NC : PCIe

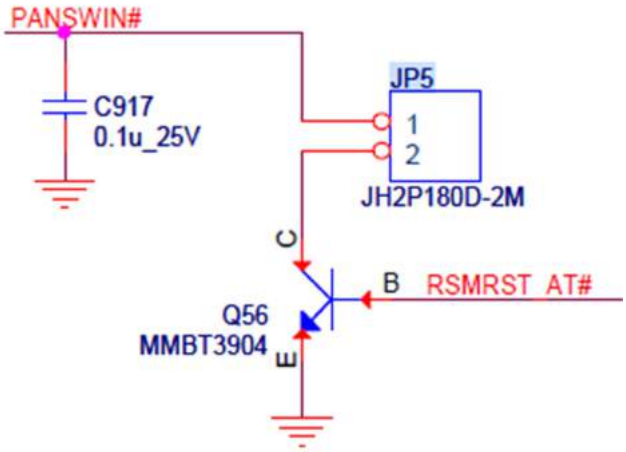
JCMOS1: ME Flash Security

Jumper	Function description	Setting
1-2	ME Lock	
2-3	ME Unlock	
Default setting: 1-2		

JCMOS2: RTC Reset

Jumper	Function description	Setting
1-2	Default	
2-3	Clear CMOS	
Default setting: 1-2		

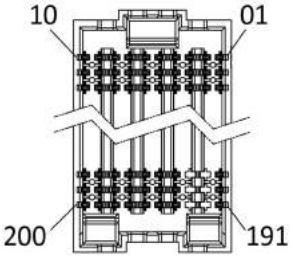
JP5 : AT/ATX Mode Selection, Default: 1-2 or OPEN TBD on VA2 Stage



FPE1: FPE Top Connector

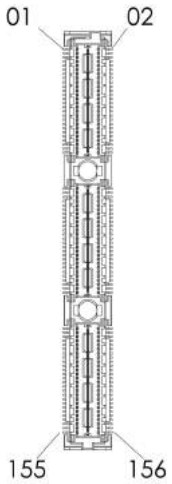
PIN	DEFINITION	PIN	DEFINITION	PIN	DEFINITION	PIN	DEFINITION	PIN	DEFINITION
1	NC	2	NC	3	NC	4	NC	5	NC
11	GND	12	NC	13	GND	14	NC	15	GND
21	NC	22	NC	23	NC	24	GND	25	NC
31	NC	32	NC	33	NC	34	NC	35	NC
41	GND	42	NC	43	GND	44	NC	45	GND
51	NC	52	GND	53	NC	54	GND	55	NC
61	NC	62	NC	63	NC	64	NC	65	NC
71	GND	72	NC	73	GND	74	NC	75	GND
81	PEG_TXP0	82	NC	83	PEG_TXP2	84	GND	85	PEG_TXP4
91	PEG_TXN0	92	PEG_TXP1	93	PEG_TXN2	94	PEG_TXP3	95	PEG_TXN4
101	GND	102	PEG_TXN1	103	GND	104	PEG_TXN3	105	GND
111	PEG_RXP_0	112	GND	113	PEG_RXP_2	114	GND	115	PEG_RXP_4
121	PEG_RXN_0	122	PEG_RXP_1	123	PEG_RXN_2	124	PEG_RXP_3	125	PEG_RXN_4
131	GND	132	PEG_RXN_1	133	GND	134	PEG_RXN_3	135	GND
141	PEG_TXP8	142	GND	143	PEG_TXP10	144	GND	145	PEG_TXP12
151	PEG_TXN8	152	PEG_TXP9	153	PEG_TXN10	154	PEG_TXP11	155	PEG_TXN12
161	GND	162	PEG_TXN9	163	GND	164	PEG_TXN11	165	GND
171	PEG_RXP_8	172	GND	173	PEG_RXP_10	174	GND	175	PEG_RXP_12
181	PEG_RXN_8	182	PEG_RXP_9	183	PEG_RXN_10	184	PEG_RXP_11	185	PEG_RXN_12
191	GND	192	PEG_RXN_9	193	GND	194	PEG_RXN_11	195	GND

PIN	NAME	PIN	NAME	PIN	NAME	PIN	NAME	PIN	NAME
6	NC	7	NC	8	NC	9	NC	10	NC
16	NC	17	GND	18	NC	19	NC	20	NC
26	GND	27	NC	28	GND	29	NC	30	NC
36	NC	37	NC	38	NC	39	NC	40	NC
46	NC	47	GND	48	NC	49	GND	50	NC
56	GND	57	NC	58	GND	59	NC	60	NC
66	NC	67	NC	68	NC	69	SPKR	70	NC
76	NC	77	GND	78	NC	79	GND	80	NC
86	GND	87	PEG_TXP6	88	GND	89	NC	90	CFG5
96	PEG_TXP5	97	PEG_TXN6	98	PEG_TXP7	99	NC	100	CFG6
106	PEG_TXN5	107	GND	108	PEG_TXN7	109	GND	110	BUF_PLT_RST-
116	GND	117	PEG_RXP_6	118	GND	119	PEG_A_CLK_P	120	GND
126	PEG_RXP_5	127	PEG_RXN_6	128	PEG_RXP_7	129	PEG_A_CLK_N	130	3V3_DU
136	PEG_RXN_5	137	GND	138	PEG_RXN_7	139	GND	140	3V3_DU
146	GND	147	PEG_TXP14	148	GND	149	PEG_B_CLK_P	150	GND
156	PEG_TXP13	157	PEG_TXN14	158	PEG_TXP15	159	PEG_B_CLK_N	160	GND
166	PEG_TXN13	167	GND	168	PEG_TXN15	169	GND	170	NC
176	GND	177	PEG_RXP_14	178	GND	179	NC	180	12V
186	PEG_RXP_13	187	PEG_RXN_14	188	PEG_RXP_15	189	NC	190	12V
196	PEG_RXN_13	197	GND	198	PEG_RXN_15	199	NC	200	12V



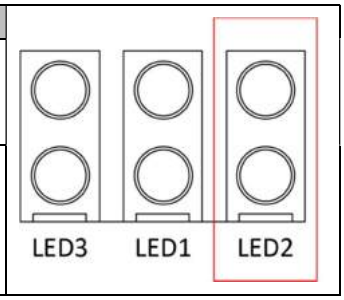
STACKPC1: CONNECTOR A TOP

PIN	DEFINITION	PIN	DEFINITION	PIN	DEFINITION	PIN	DEFINITION	PIN	DEFINITION	PIN	DEFINITION
1	USB_OC#6	2	BUF_PLT_RST-	53	3V3_DU	54	3V3_DU	105	GND	106	CLK_LPC_UART
3	3.3V	4	3.3V	55	3V3_DU	56	GND	107	NC	108	GND
5	USBD7+	6	USBD6+	57	ST_LAN1_MDIP0	58	NC	109	ST_LAN1_MDIP2	110	
7	USBD7-	8	USBD6-	59	ST_LAN1_MDIN0	60	NC	111	ST_LAN1_MDIN2	112	
9	GND	10	GND	61	GND	62	GND	113	GND	114	GND
11	PCIE_TXP5	12	PCIE_TXP7	63	ST_LAN2_MDIP0	64	NC	115	ST_LAN2_MDIP2	116	
13	PCIE_TXN5	14	PCIE_TXN7	65	ST_LAN2_MDIN0	66	NC	117	ST_LAN2_MDIN2	118	
15	GND	16	GND	67	GND	68	GND	119	GND	120	GND
17	PCIE_TXP6	18	PCIE_TXP8	69	ST_LAN1_MDIP1	70	NC	121	ST_LAN1_MDIP3	122	
19	PCIE_TXN6	20	PCIE_TXN8	71	ST_LAN1_MDIN1	72	NC	123	ST_LAN1_MDIN3	124	
21	GND	22	GND	73	GND	74	GND	125	GND	126	GND
23	PCIE_RXP5	24	PCIE_RXP7	75	ST_LAN2_MDIP1	76	NC	127	ST_LAN2_MDIP3	128	ST_LAN2_MDIP3
25	PCIE_RXN5	26	PCIE_RXN7	77	ST_LAN2_MDIN1	78	NC	129	ST_LAN2_MDIN3	130	ST_LAN2_MDIN3
27	GND	28	GND	79	ST_LAN2_ACT#	80	ST_LAN1_ACT#	131	PE_PRSNT1_A-	132	PE_PRSNT0_A
29	PCIE_RXP6	30	PCIE_RXP8	81	SATATXP5	82	SATATXP4	133	SATSRXP5	134	SATARXP5
31	PCIE_RXN6	32	PCIE_RXN8	83	SATATXN5	84	SATATXN4	135	SATSRXN5	136	SATARXN5
33	GND	34	GND	85	GND	86	GND	137	GND	138	GND
35	PEX5_PCIE_CLK	36	PEX7_PCIE_CLK	87	USBD9+	88	USBD11+	139	NC	140	
37	PEX5_PCIE_CLK#	38	PEX7_PCIE_CLK#	89	USBD9-	90	USBD11-	141	NC	142	
39	5V_DU	40	5V_DU	91	GND	92	GND	143	GND	144	GND
41	PEX6_PCIE_CLK	42	PEX8_PCIE_CLK	93	NC	94	USBD10+	145	LPC_AD0	146	LPC_LDRO0
43	PEX6_PCIE_CLK#	44	PEX8_PCIE_CLK#	95	NC	96	USBD10-	147	LPC_AD1	148	INT_SERIRQ
45	GND	46	5VS	97	GND	98	GND	149	GND	150	GND
47	SMB_DATA_MAIN	48	NC	99	ETH_1_CTREF	100	ETH_0_CTREF	151	LPC_AD2	152	LPC_FRAME
49	SMB_CLK_MAIN	50	NC	101	SPI_MISO_AA	102	SPI_CE0#_F	153	LPC_AD3	154	VRTC
51	SMBALERT#	52	BUS_PS_ON#	103	SPI_SI_F	104	SPI_CE1#_F	155	FUSB_1RTS-	156	FUSB_ORTS



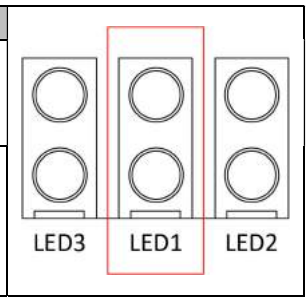
LED3: LAN2 LED STATUS (Removed)

LED2	Light	Dark	Flash
RED	1000M	100M	NA
GREEN	Link	Un-link	Activity



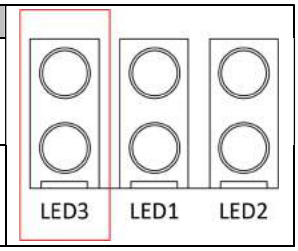
LED2: LAN1 LED STATUS (Removed)

LED1	Light	Dark	Flash
RED	1000M	100M	NA
GREEN	LINK	UNLINK	ACTIVITY



LED4: POWER/HDD LED (Removed)

LED2	Light	Dark	Flash
RED	NA	HDD un-access	HDD access
GREEN	Power On	Power Off	NA

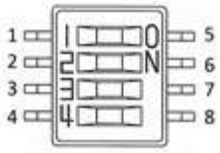


J5: SYSTEM FAN Connector

PIN	DEFINITION
1	CPUFAN_PWN
2	CPUFAN_IO
3	CPUFAN_VCC
4	GND

SW1: LVDS Resolution select

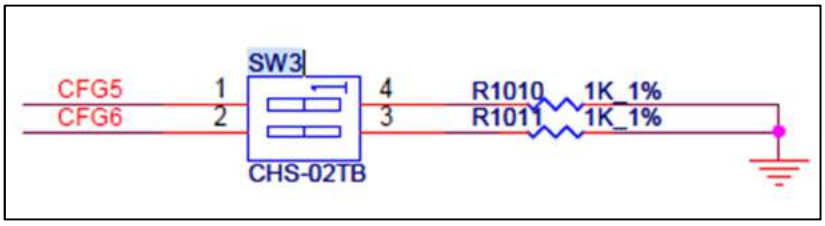
SW1				
1	2	3	4	DEFINITION
off	off	off	off	800*600/18bit (single)
off	off	off	on	1024*768/18bit (single)
off	off	on	off	1024*768/24bit (single)
off	off	on	on	1280*800/18bit (single)
off	on	off	off	1280*1024/24bit (dual)
off	on	off	on	1366*768/24bit (single)
off	on	on	off	1440*900/24bit (dual)
off	on	on	on	1920*1080/24bit (dual)



SW2: POWER BUTTON (Removed)

PIN	DEFINITION
ON	NO LIGHT
OFF	BLUE LIGHT

SW3 : CFG5/CFG6



CFG [6:5]:

00=1 x8, 2 x4 PCI Express.

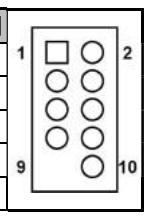
01=Reserved.

10=2 x8 PCI Express.

*11=1 x16 PCI Express.

FP1: Front Panel

PIN	DEFINITION	PIN	DEFINITION
1	HDLED+	2	PLED+
3	HDLED-	4	GND
5	GND	6	PANSWIN
7	EXT_RESET#	8	GND
9	NC	10	NC



Chapter 3: AMI BIOS UTILITY

This chapter provides users with detailed descriptions on how to set up a basic system configuration through the AMI BIOS setup utility.

3.1 Starting

To enter the setup screens, perform the following steps:

• Turn on the computer and press the <Del> key immediately.

• After the <Del> key is pressed, the main BIOS setup menu displays. Other setup screens can be accessed from the main BIOS setup menu, such as the Chipset and Power menus.

3.2 Navigation Keys

The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process.

Some of the hot keys are <F1>, <F10>, <Enter>, <ESC>, and <Arrow> keys.

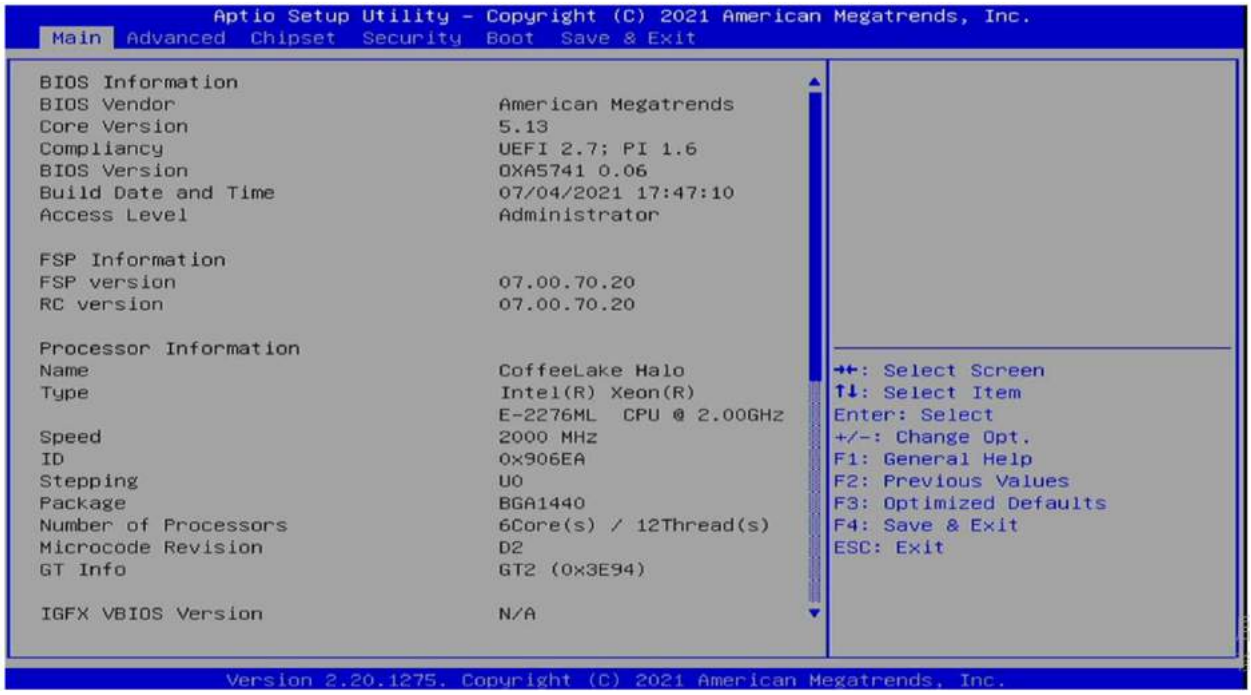
Some of the navigation keys may differ from one screen to another.

Left/Right	The Left and Right <Arrow> keys moves the cursor to select a menu.
Up/Down	The Up and Down <Arrow> keys moves the cursor to select a setup screen or sub-screen.
+− Plus/Minus	The Plus and Minus <Arrow> keys changes the field value of a particular setup setting.
Tab	The <Tab> key selects the setup fields.
F1	The <F1> key displays the General Help screen.
F10	The <F10> key saves any changes made and exits the BIOS setup utility.
Esc	The <Esc> key discards any changes made and exits the BIOS setup utility.
Enter	The <Enter> key displays a sub-screen or changes a selected or highlighted option in each menu.

3.3 Main Menu

The Main menu is the screen that first displays when BIOS Setup is entered, unless an error has occurred.

When you first enter the BIOS Setup Utility, you will encounter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. There are two Main Setup options. They are described in this section. The Main BIOS Setup screen is shown below.



The Main BIOS setup screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured; options in blue can. The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

- **System Date**

Use this function to change the system date.

Select System Date using the Up and Down <Arrow> keys. Enter the new values through the keyboard. Press the Left and Right <Arrow> keys to move between fields.
The date setting must be entered in MM/DD/YY format.

- **System Time**

Use this function to change the system time.

Select System Time using the Up and Down <Arrow> keys. Enter the new values through the keyboard. Press the Left and Right <Arrow> keys to move between fields.
The time setting is entered in HH:MM:SS format.
Note: The time is in 24-hour format. For example, 5:30 A.M. appears as 05:30:00, and 5:30 P.M. as 17:30:00.

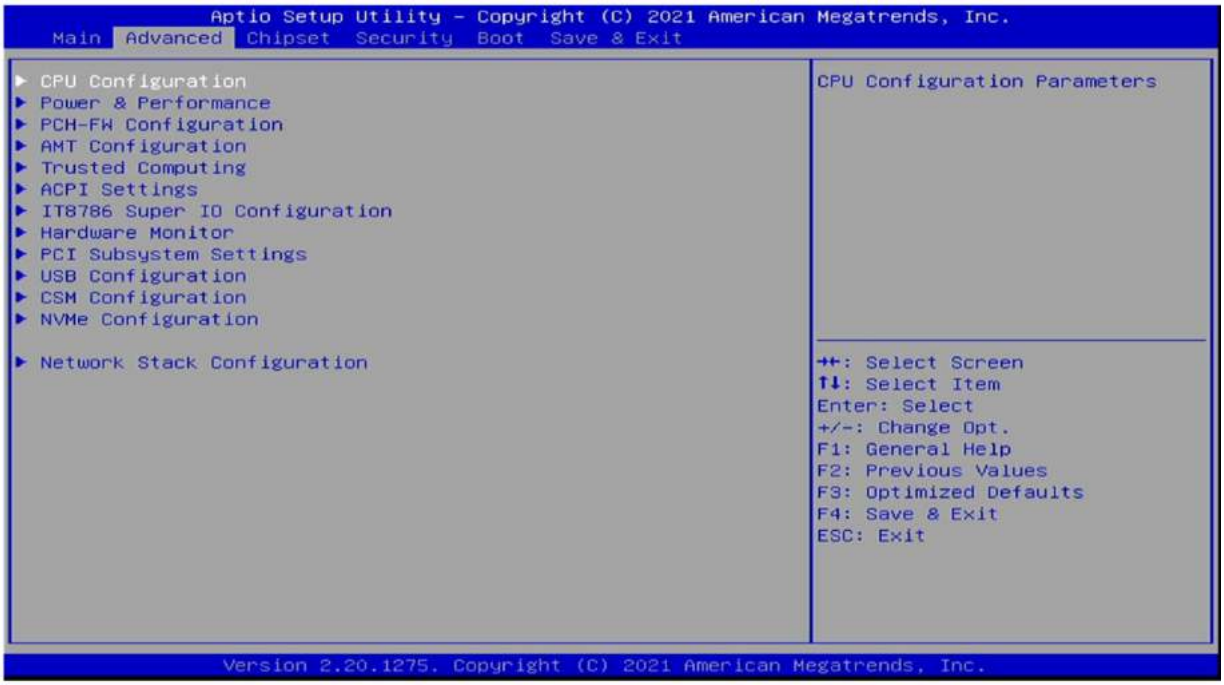
- **Access Level**

Display the access level of the current user in the BIOS.

3.4 Advanced Menu

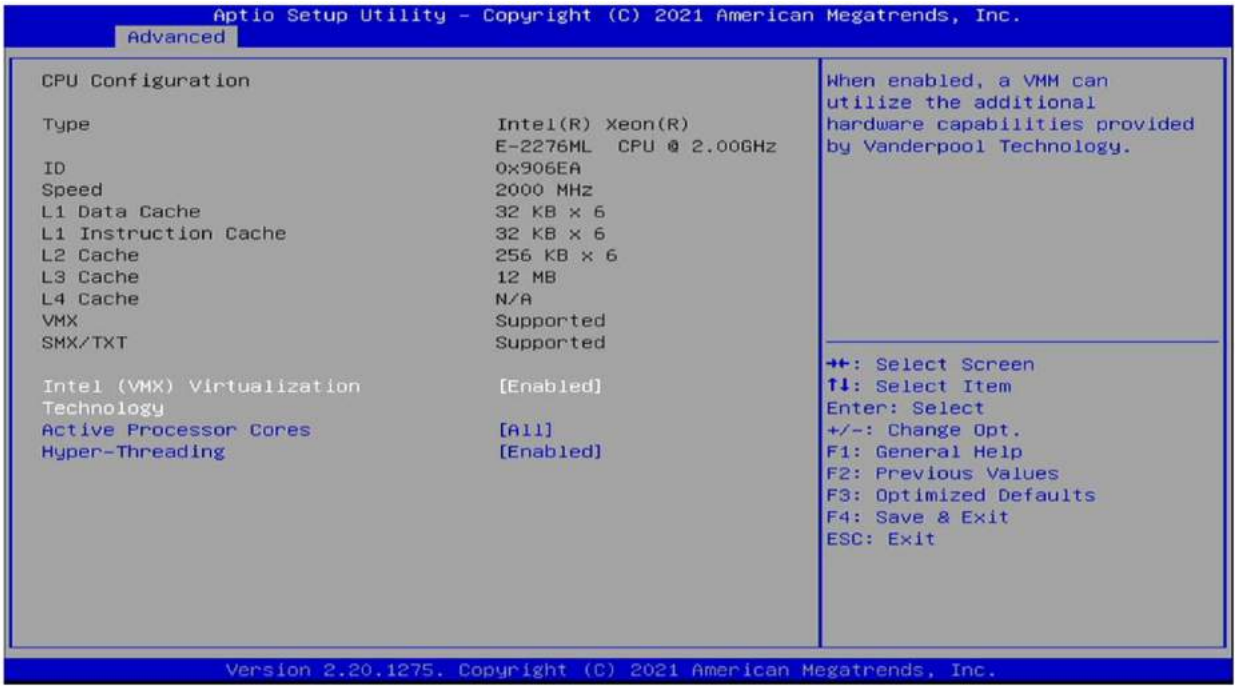
The Advanced Menu allows you to configure your system for basic operation. Some entries are defaults required by the system board, while others, if enabled, will improve the performance of your system or let you set some features according to your preference.

Setting incorrect field values may cause the system to malfunction.



3.4.1 CPU Configuration

This section is used to view CPU status and configure CPU parameters.

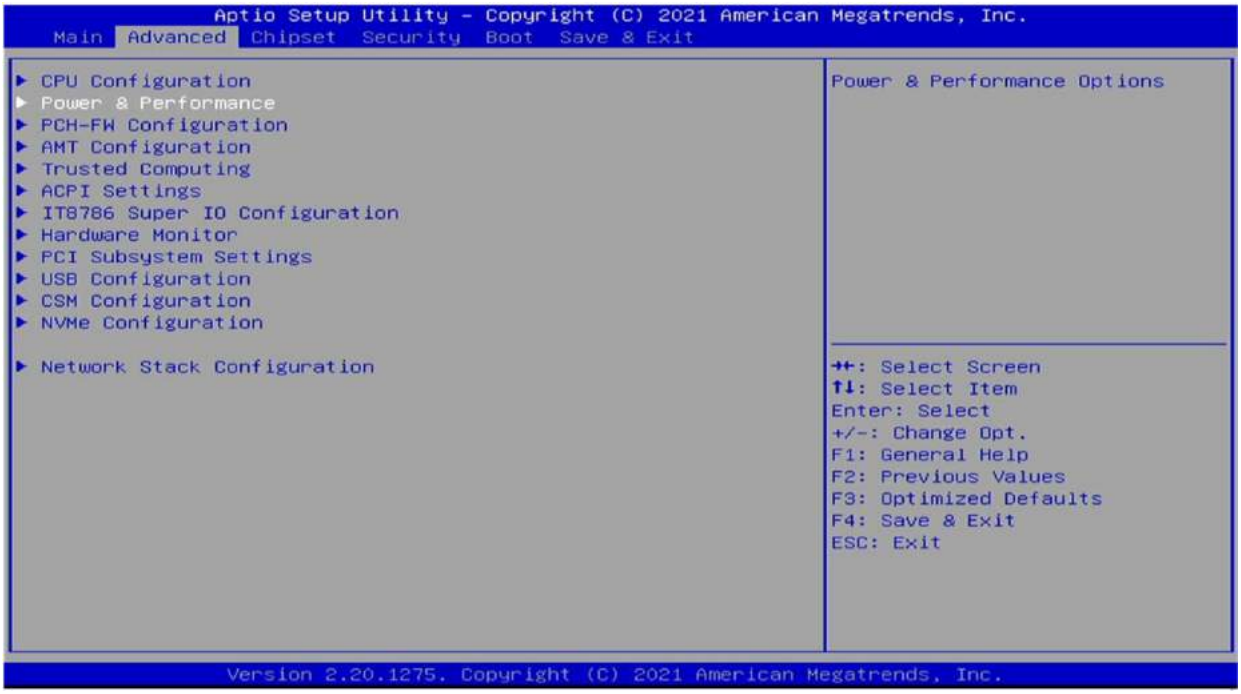


Field Name	Intel(VMX) Virtualization Technology
Default Value	[Enabled]
Possible Value	Disabled Enabled

Field Name	Active Processor Cores
Default Value	[A11]
Possible Value	A11 1 2 3 4 5

Field Name	Hyper-Threading
Default Value	[Enabled]
Possible Value	Disabled Enabled

3.4.2 Power & Performance

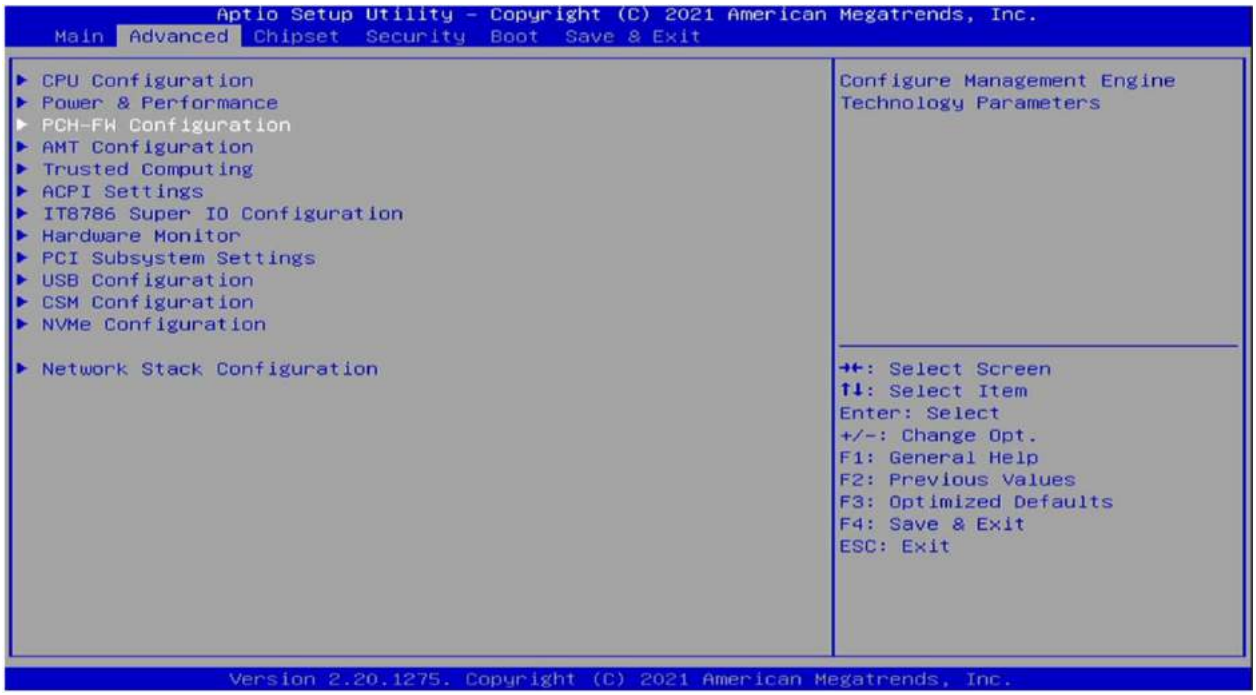


Field Name	Intel® SpeedStep™
Default Value	[Enabled]
Possible Value	Disabled Enabled

Field Name	Turbo Mode
Default Value	[Enabled]
Possible Value	Disabled Enabled

Field Name	C States
Default Value	[Disabled]
Possible Value	Disabled Enabled

3.4.3 PCH-FW Configuration

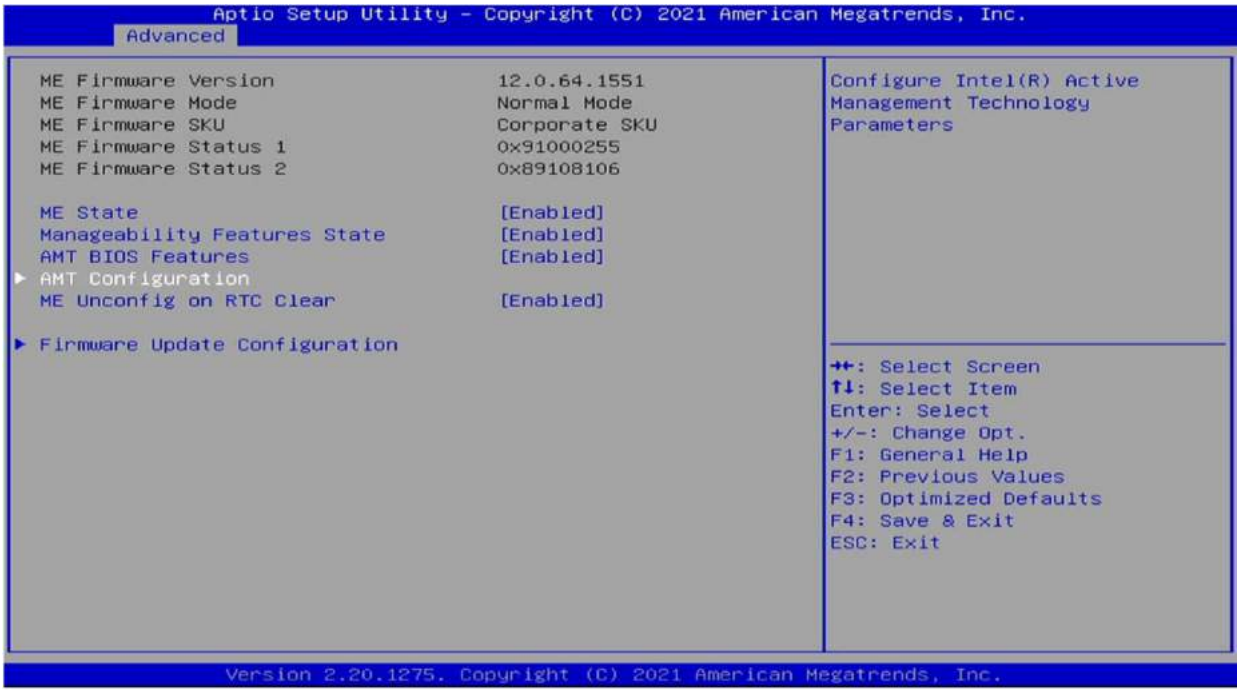


Field Name	ME State
Default Value	[Enabled]
Possible Value	Disabled Enabled

Field Name	Manageability Feature State
Default Value	[Enabled]
Possible Value	Disabled Enabled

Field Name	AMT BIOS Features
Default Value	[Enabled]
Possible Value	Disabled Enabled

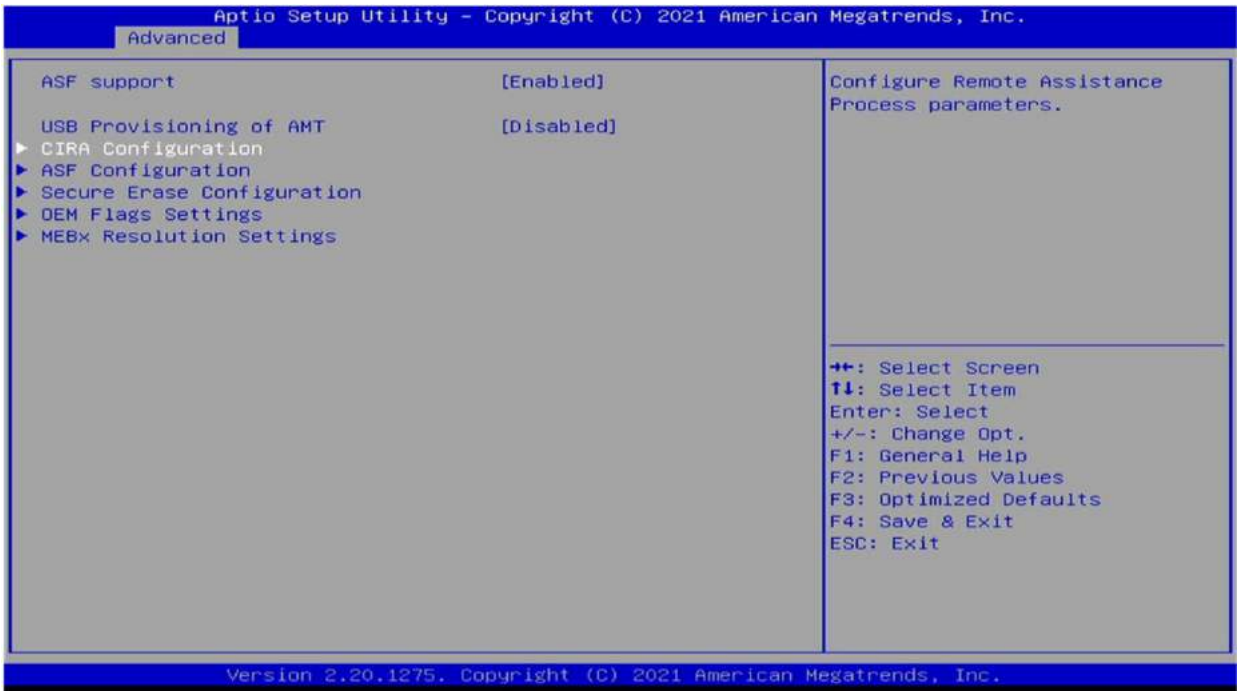
3.4.4 AMT Configuration



Field Name	ASF support
Default Value	[Enabled]
Possible Value	Disabled Enabled

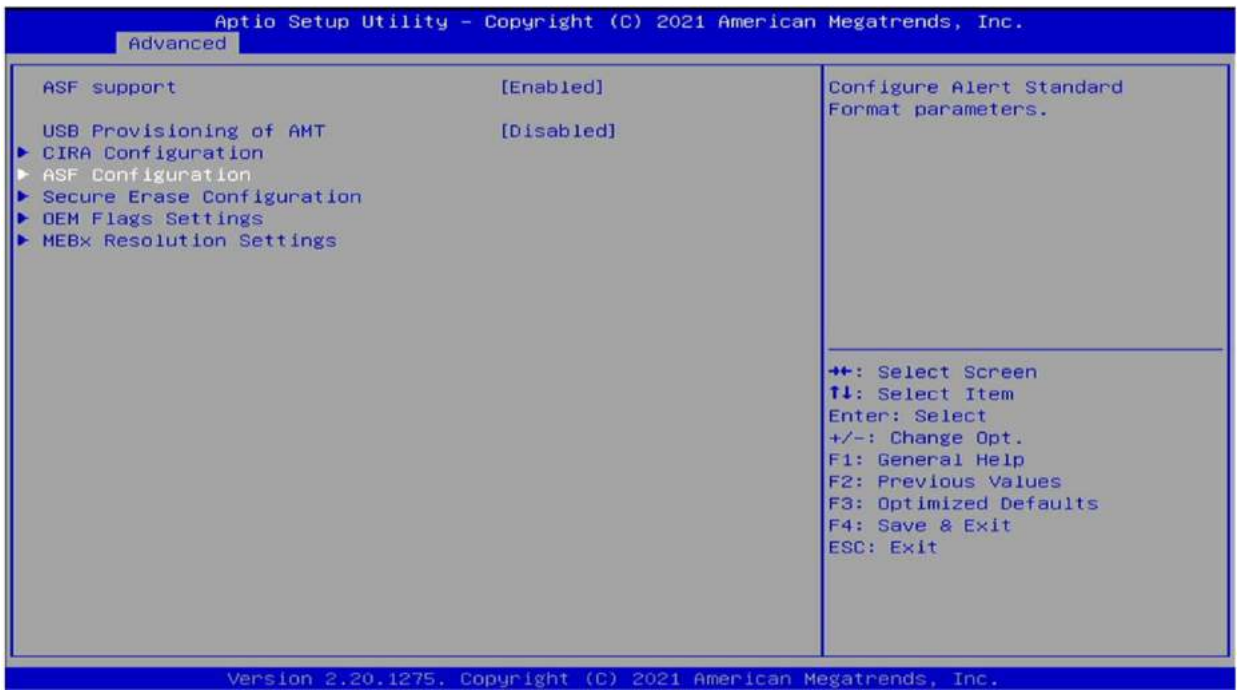
Field Name	USB Provisioning of AMT
Default Value	[Disabled]
Possible Value	Disabled Enabled

3.4.4.1 CIRA Configuration



Field Name	ASF support
Default Value	[Enabled]
Possible Value	Disabled Enabled

3.4.4.2 ASF Configuration



Field Name	PET Progress
Default Value	[Enabled]
Possible Value	Disabled Enabled

Field Name	WatchDog
Default Value	[Disabled]
Possible Value	Disabled Enabled

Field Name	ASF Sensors Table
Default Value	[Disabled]
Possible Value	Disabled Enabled

3.4.4.3 Secure Erase Configuration

Field Name	Secure Erase mode
Default Value	[Simulated]
Possible Value	Simulated Real

Field Name	Force Secure Erase
Default Value	[Disabled]
Possible Value	Disabled Enabled

3.4.4.4 OEM Flags Settings

Field Name	MEBx hotkey Pressed
Default Value	[Disabled]
Possible Value	Disabled Enabled

Field Name	MEBx Selection Screen
Default Value	[Disabled]
Possible Value	Disabled Enabled

Field Name	Hide Unconfigure ME Confirmation Prompt
Default Value	[Disabled]
Possible Value	Disabled Enabled

Field Name	MEBx OEM Debug Menu Enable
Default Value	[Disabled]
Possible Value	Disabled Enabled

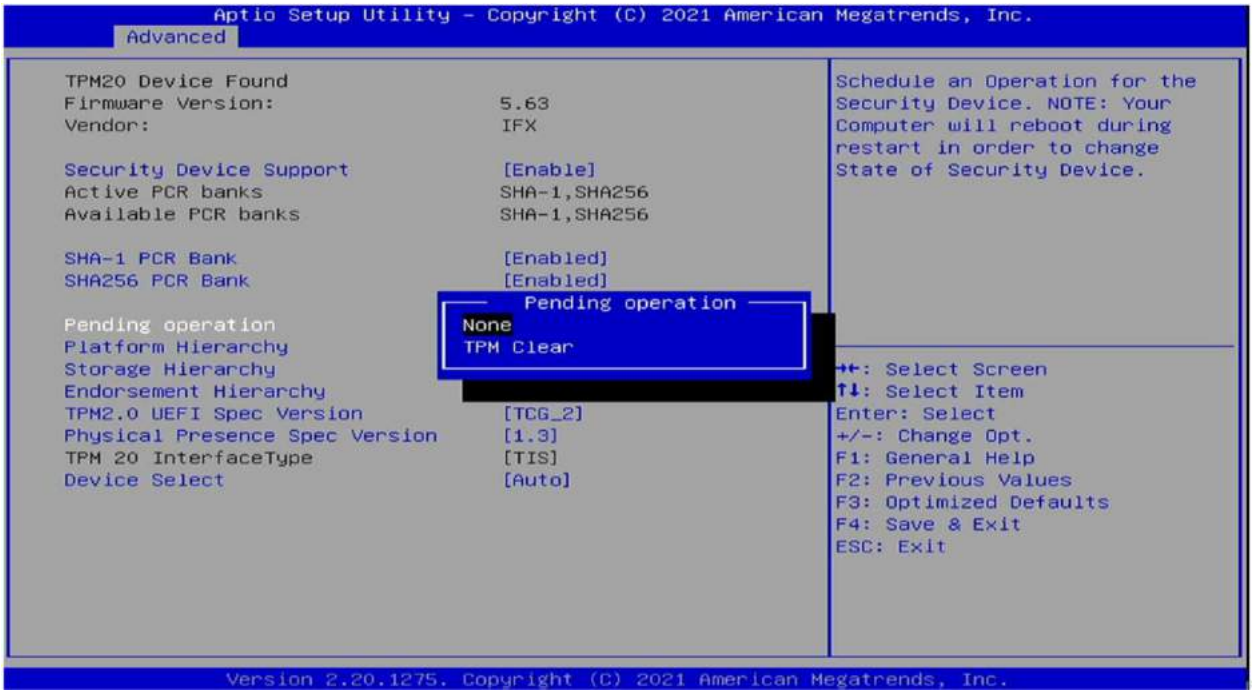
Field Name	Unconfigure ME
Default Value	[Disabled]
Possible Value	Disabled Enabled

3.4.4.5 MEBx Resolution Settings

Field Name	Non-UI Mode Resolution
Default Value	[Auto]
Possible Value	Auto 80x25 100x31

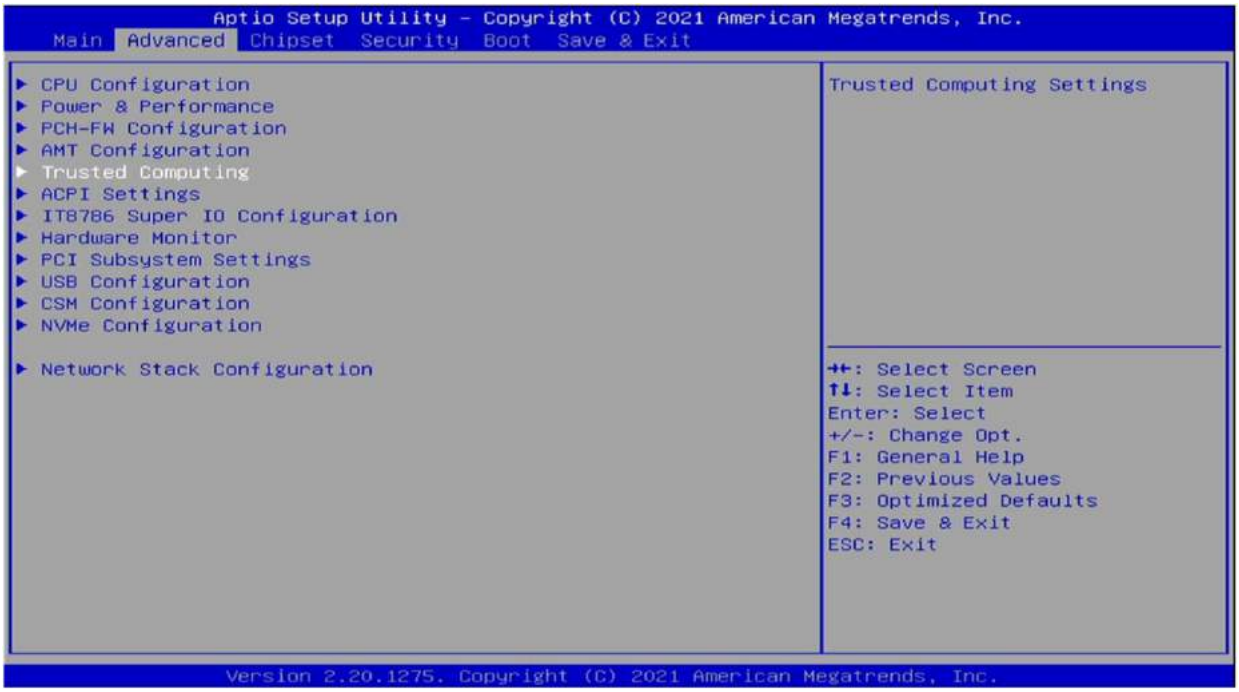
Field Name	UI Mode Resolution
Default Value	[Auto]
Possible Value	Auto 80x25 100x31

Field Name	Graphics Mode Resolution
Default Value	[Auto]
Possible Value	Auto 640x480 800x600 1024x768



Field Name	Pending operation
Default Value	[None]
Possible Value	None TPM Clear

3.4.5 Trusted Computing



Field Name	**Security Device Support**
Default Value	[Enabled]
Possible Value	Disabled Enabled

Field Name	**SHA-1 PCR Bank**
Default Value	[Enabled]
Possible Value	Disabled Enabled

Field Name	**SHA256 PCR Bank**
Default Value	[Enabled]
Possible Value	Disabled Enabled

Field Name	**Pending operation**
Default Value	[None]
Possible Value	None TPM Clear

Field Name	Platform Hierarchy
Default Value	[Enabled]
Possible Value	Disabled Enabled

Field Name	Storage Hierarchy
Default Value	[Enabled]
Possible Value	Disabled Enabled

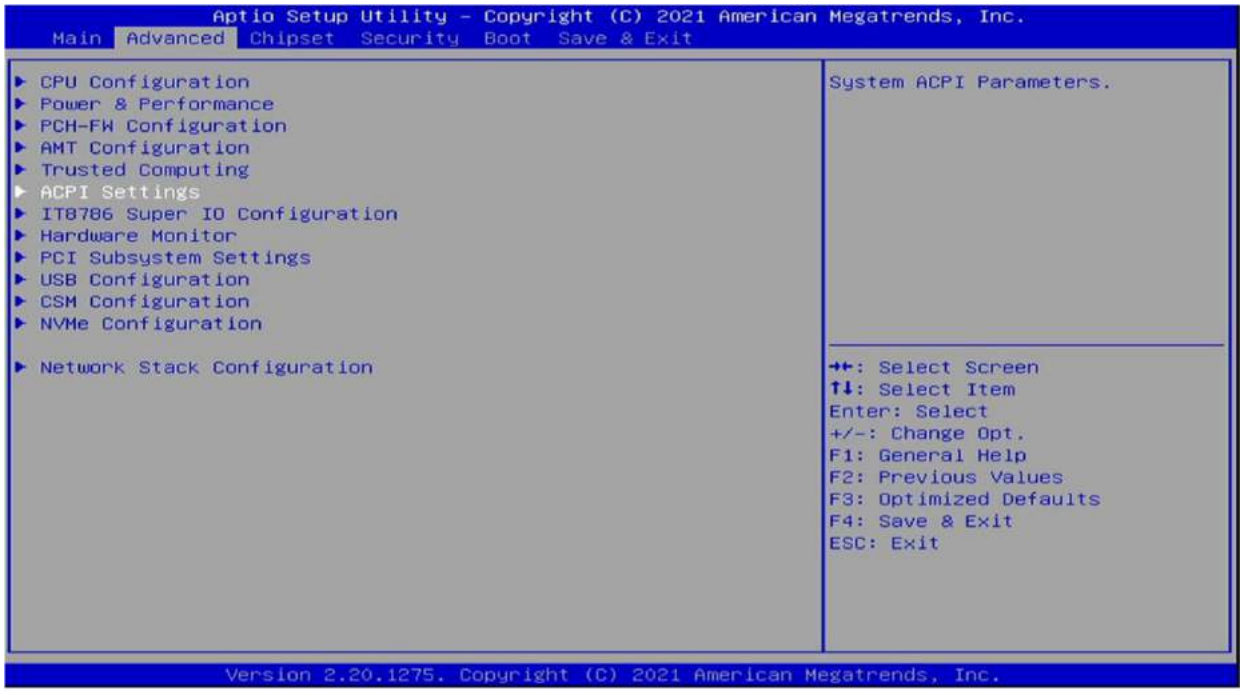
Field Name	Endorsement Hierarchy
Default Value	[Enabled]
Possible Value	Disabled Enabled

Field Name	TPM2.0 UEFI Spec Version
Default Value	[TCG_2]
Possible Value	TCG_1_2 TCG_2

Field Name	Physical Presence Spec Version
Default Value	[1.3]
Possible Value	1.2 1.3

Field Name	Device Select
Default Value	[Auto]
Possible Value	TPM 1.2 TPM 2.0 Auto

3.4.6 ACPI Setting



Field Name	**Enable ACPI Auto Configuration**
Default Value	[Disabled]
Possible Value	Disabled Enabled

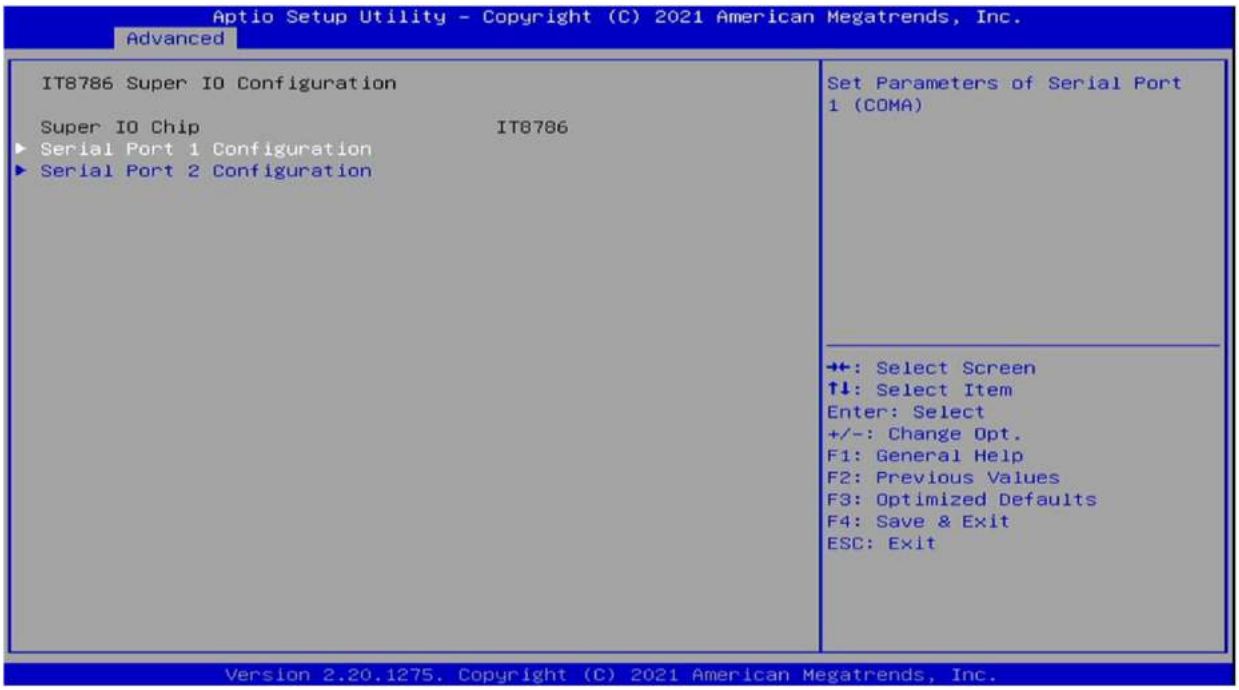
Field Name	**Enable Hibernation**
Default Value	[Enabled]
Possible Value	Disabled Enabled

Field Name	**ACPI Sleep State**
Default Value	[S3(Suspend to RAM)]
Possible Value	Suspend Disabled S3(Suspend to RAM)

Field Name	**Lock Legacy Resources**
Default Value	[Disabled]
Possible Value	Disabled Enabled

3.4.7 IT8786 Super IO Configuration

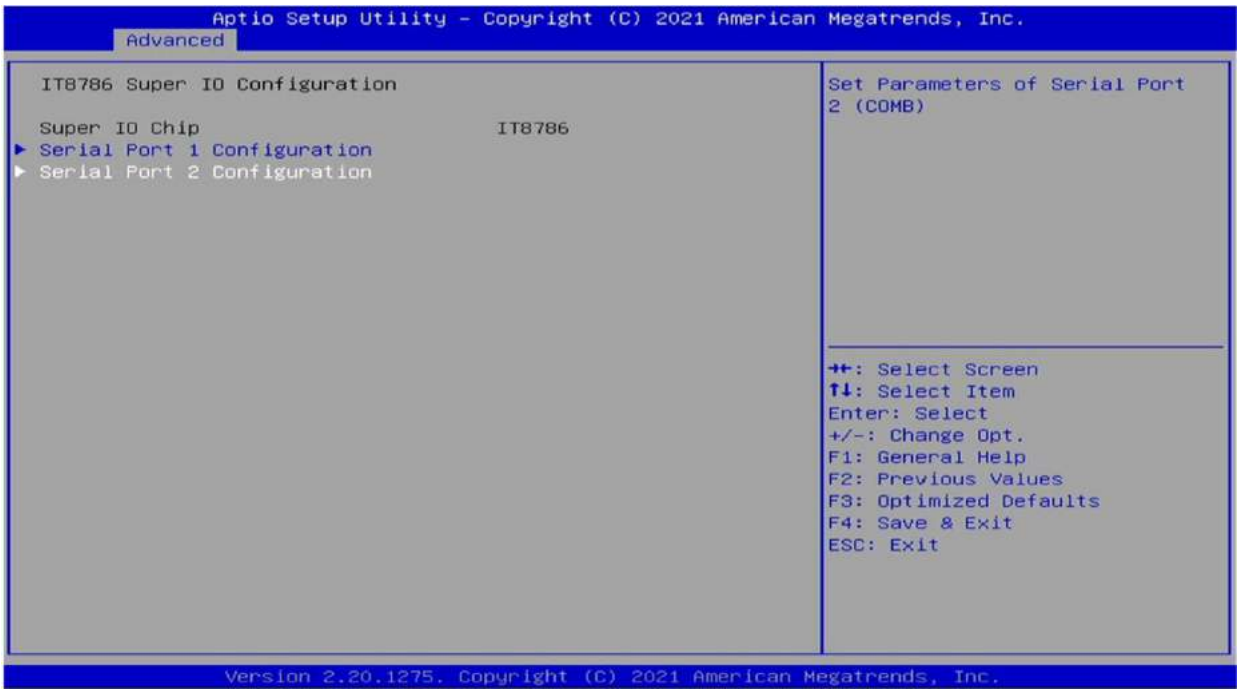
3.4.7.1 Serial Port 1 Configuration



Field Name	Serial Port
Default Value	[Enabled]
Possible Value	Disabled Enabled

Field Name	COM1 Control
Default Value	[RS232]
Possible Value	Loopback RS-232 RS-485 Half Duplex RS-485/422 Full Duplex

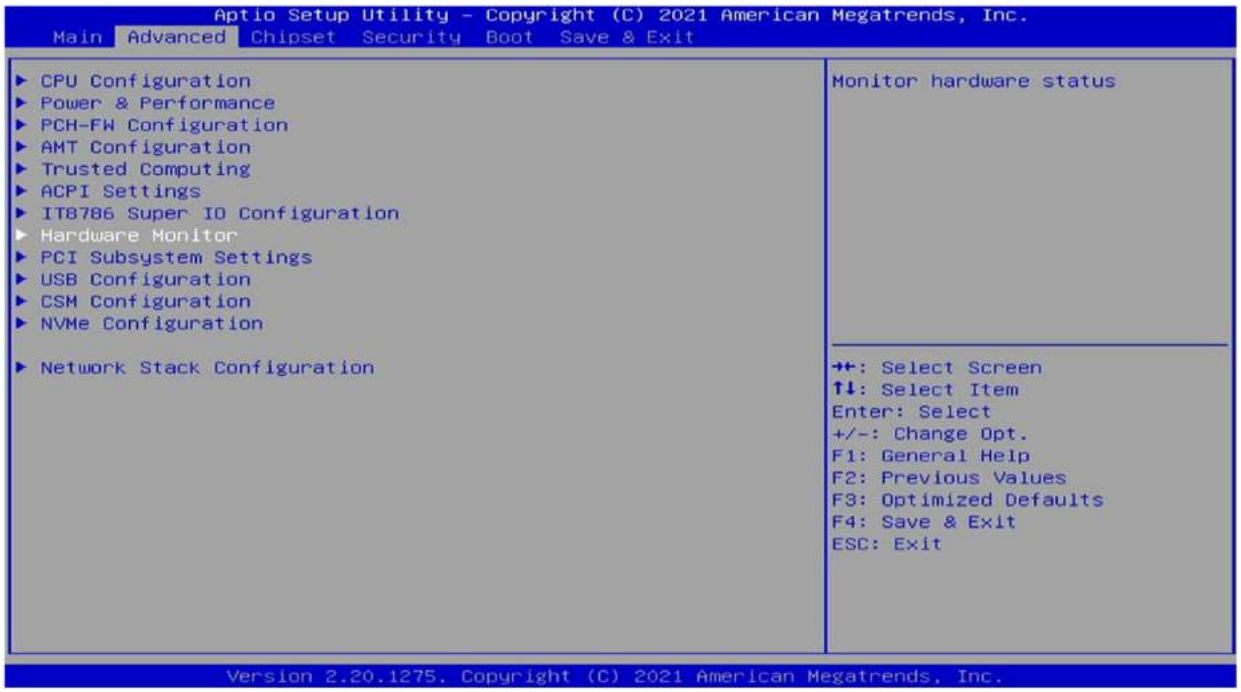
3.4.7.2 Serial Port 2 Configuration



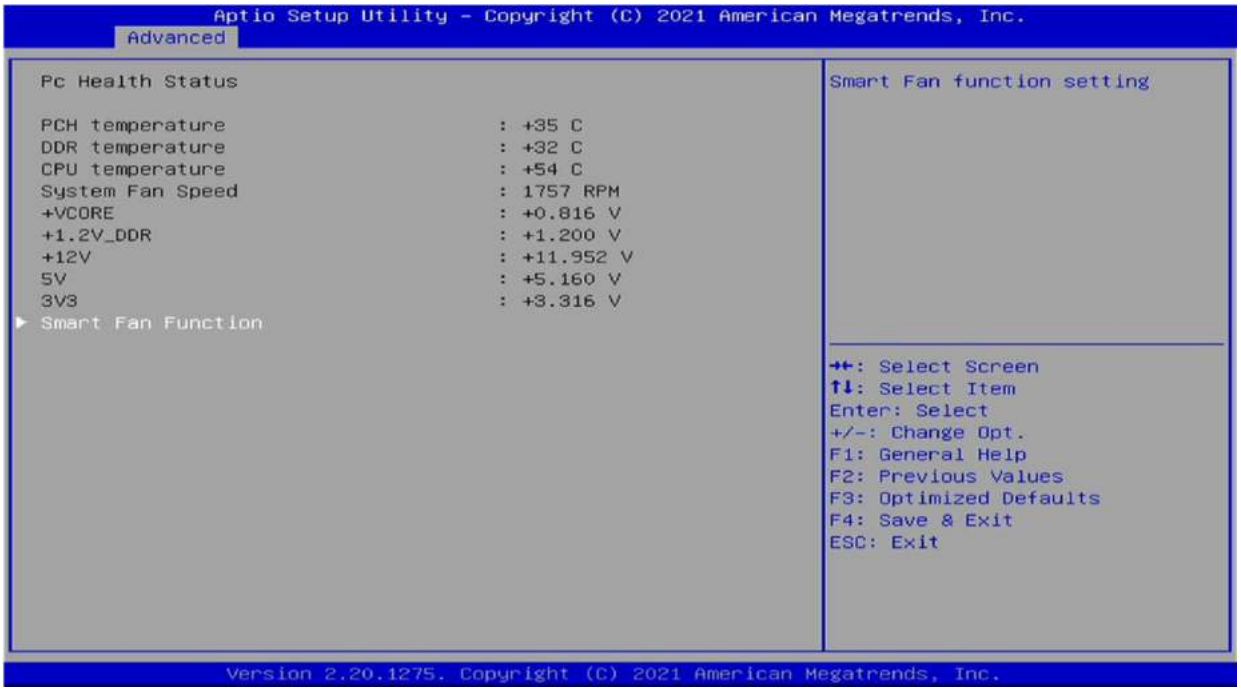
Field Name	Serial Port
Default Value	[Enabled]
Possible Value	Disabled Enabled

Field Name	COM1 Control
Default Value	[RS232]
Possible Value	Loopback RS-232 RS-485 Half Duplex RS-485/422 Full Duplex

3.4.8 Hardware Monitor



3.4.8.1 Smart Fan Function



Field Name	FAN_CTL Polarity
Default Value	[Active high]
Possible Value	Active low Active high

Field Name	Smoothing control
Default Value	[4Hz]
Possible Value	1Hz 16Hz 8Hz 4Hz

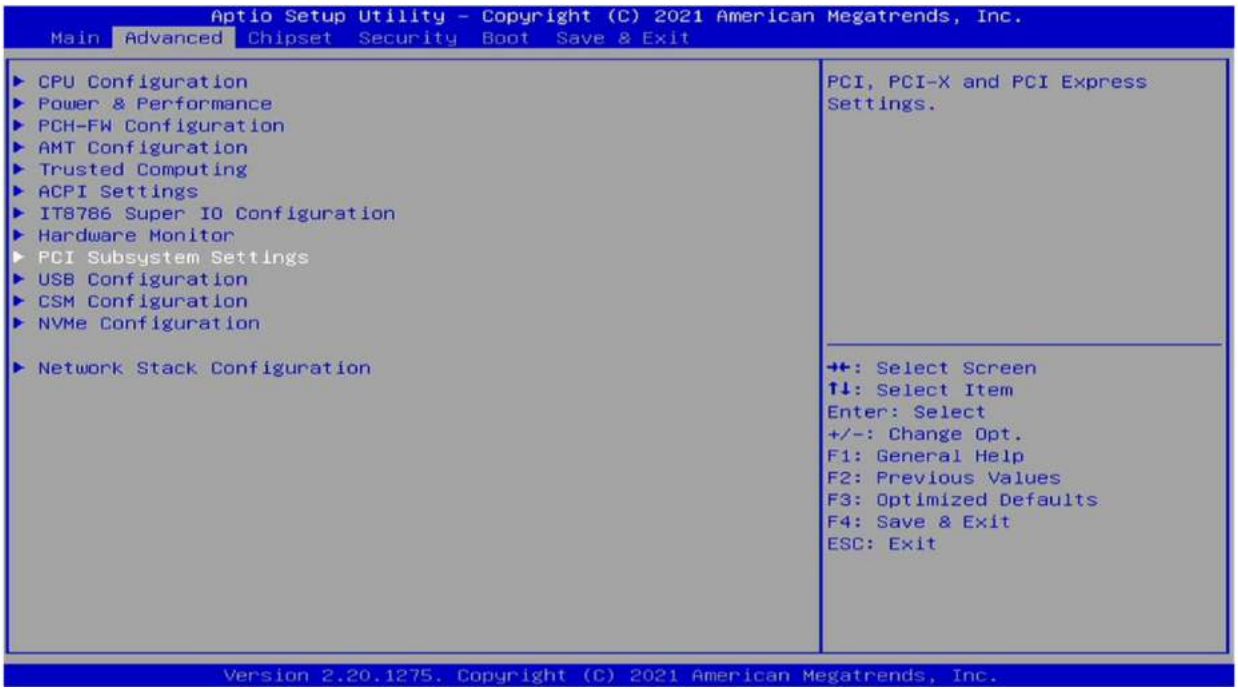
3.4.8.2 System Fan Setting

Field Name	Smart Fan Mode
Default Value	[Automatic Mode]
Possible Value	Software Mode Automatic Mode

Field Name	System Fan Type
Default Value	[PWM]
Possible Value	PWM RPM

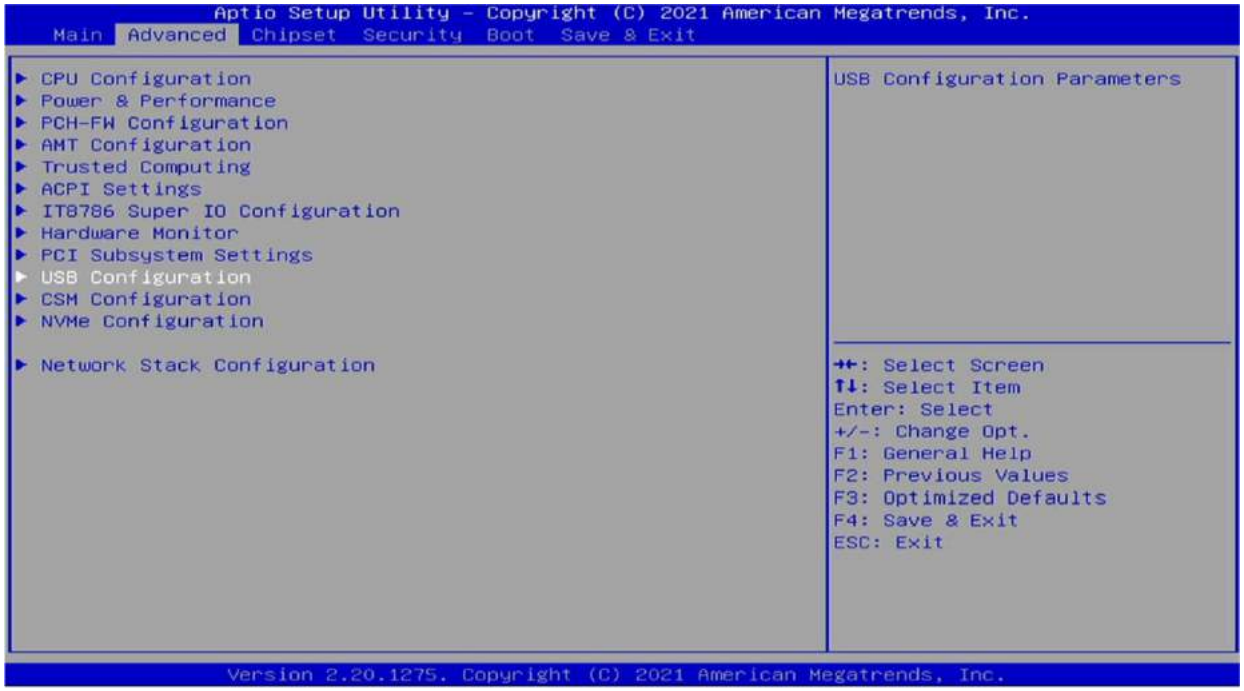
Field Name	Temperature Select
Default Value	[TMP IN3]
Possible Value	TMP IN1 TMP IN2 TMP IN3

3.4.9 PCI Subsystem Settings



Field Name	Above 4G Decoding
Default Value	[Disabled]
Possible Value	Disabled Enabled

3.4.10 USB Configuration



Field Name	Legacy USB Support
Default Value	[Enabled]
Possible Value	Enabled Disabled Auto

Field Name	XHCI Hand-Off
Default Value	[Enabled]
Possible Value	Enabled Disabled

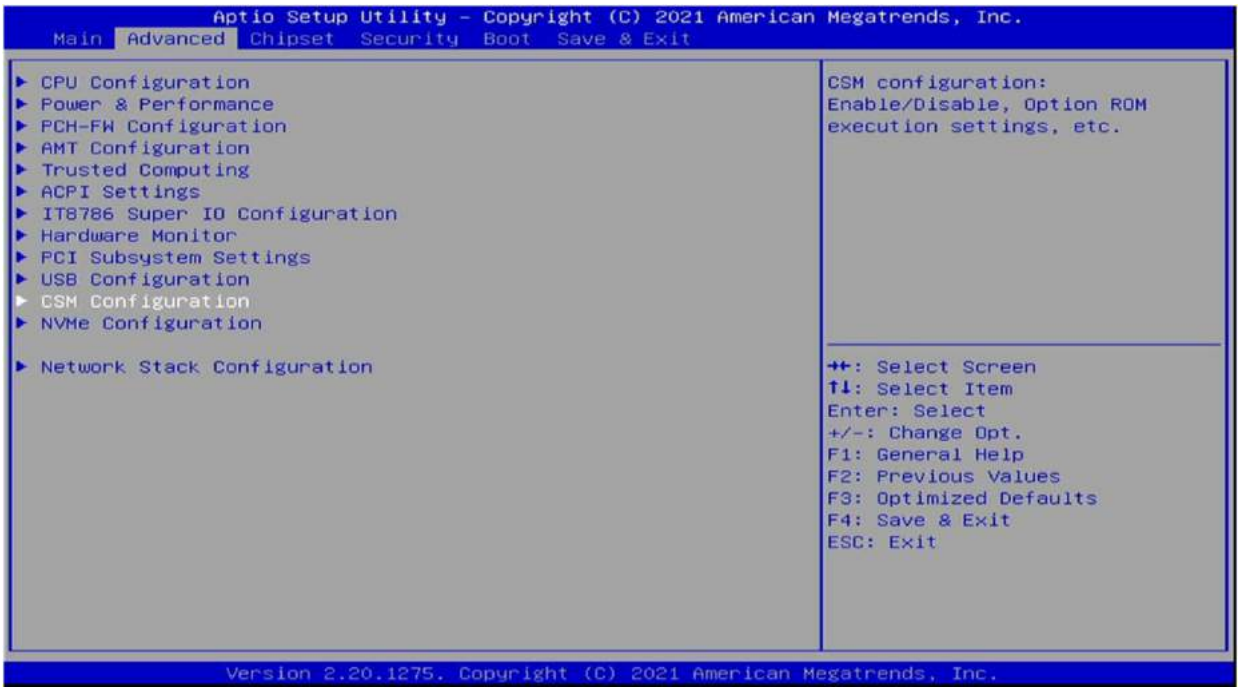
Field Name	USB Mass Storage Driver Support
Default Value	[Enabled]
Possible Value	Disabled Enabled

Field Name	USB transfer time-out
Default Value	[20 sec]
Possible Value	1 sec 5 sec 10 sec 20 sec

Field Name	Device reset time-out
Default Value	[20 sec]
Possible Value	1 sec 5 sec 10 sec 20 sec

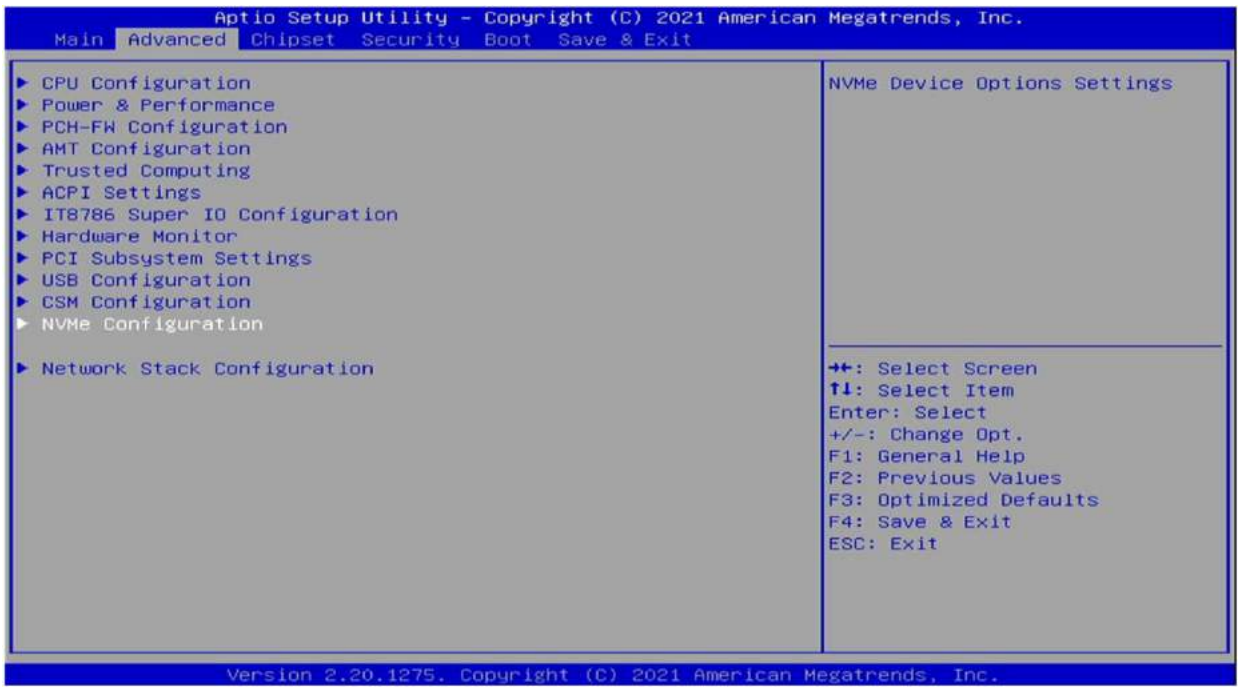
Field Name	Device Power-up delay
Default Value	[Auto]
Possible Value	Auto Manual

3.4.11 CSM Configuration

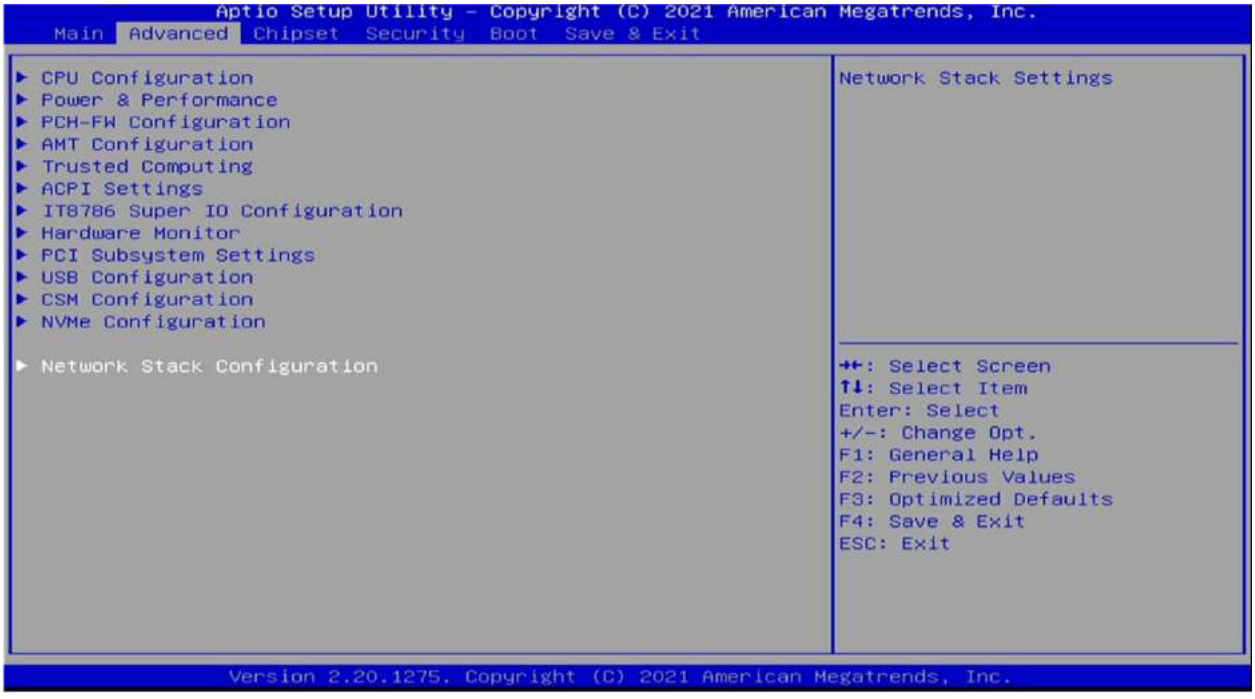


Field Name	CSM Support
Default Value	[Disabled]
Possible Value	Disabled Enabled

3.4.12 NVMe Configuration



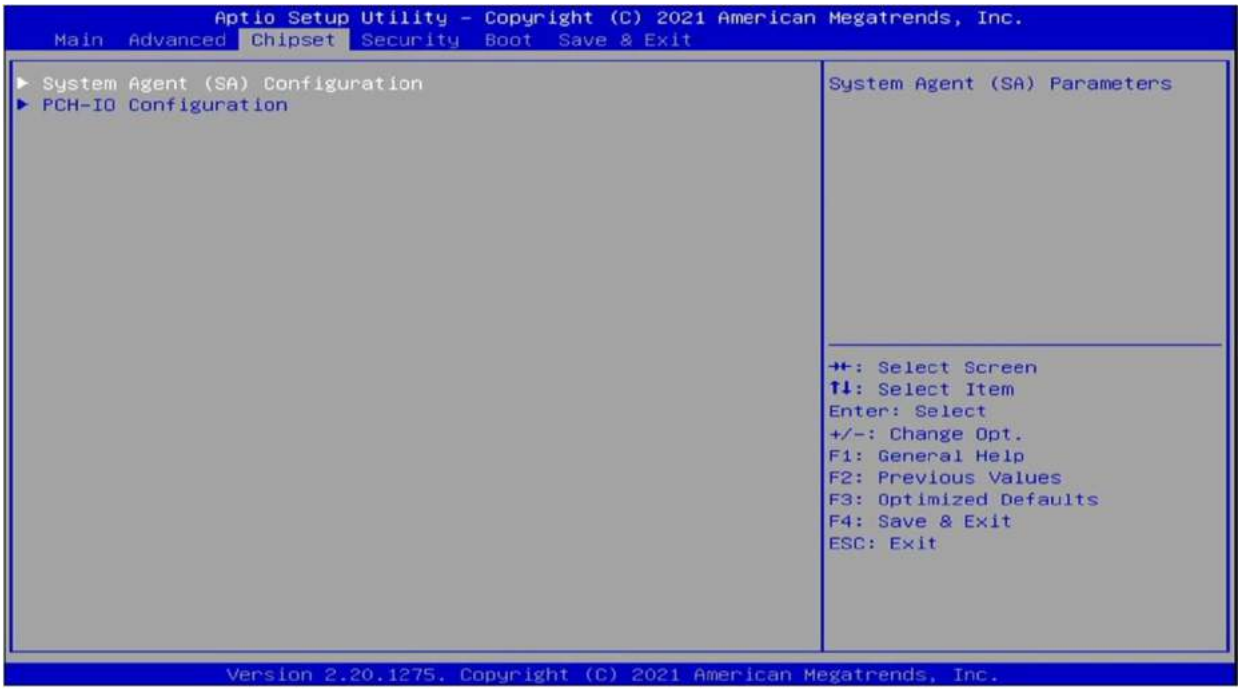
3.4.13 Network Stack Configuration

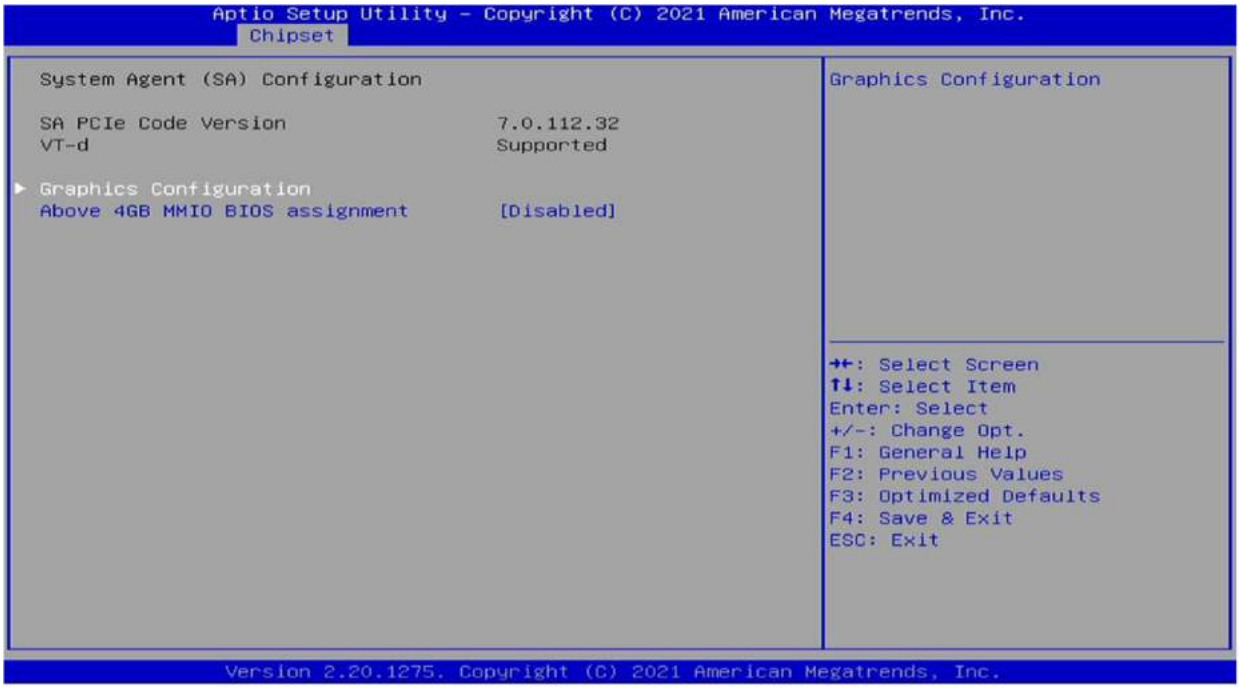


Field Name	Network Stack
Default Value	[Disabled]
Possible Value	Disabled Enabled

3.5 Chipset

3.5.1 System Agent (SA) Configuration





Field Name	Primary Display
Default Value	[Auto]
Possible Value	Auto IGFX PEG PCI SG

Field Name	Internal Graphics
Default Value	[Auto]
Possible Value	Auto Disabled Enabled

Field Name	GTT Size
Default Value	[8MB]
Possible Value	2MB 4MB 8MB

Field Name	Aperture Size
Default Value	[256MB]
Possible Value	128MB 256MB 512MB 1024MB 2048MB

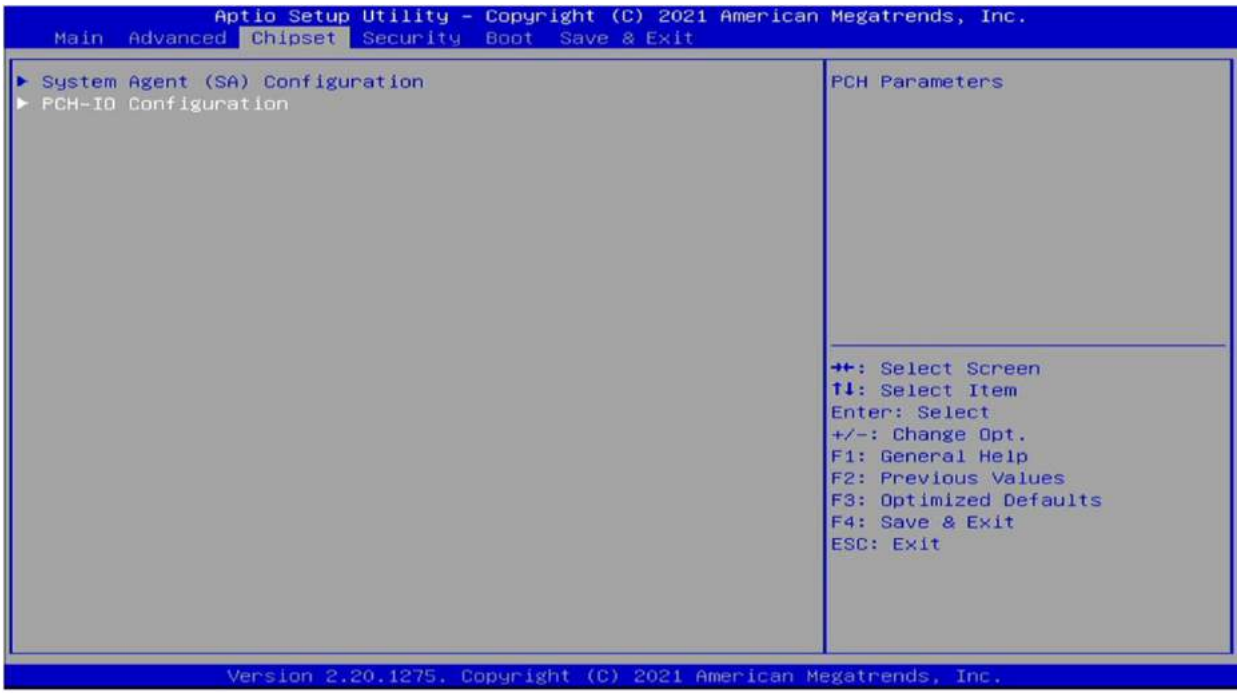
Field Name	DVMT Pre-Allocated
Default Value	[32M]
Possible Value	0M 32M 64M 4M 8M 12M 16M 20M 24M 28M 32M/F7 36M 40M 44M 48M 52M 56M

	60M

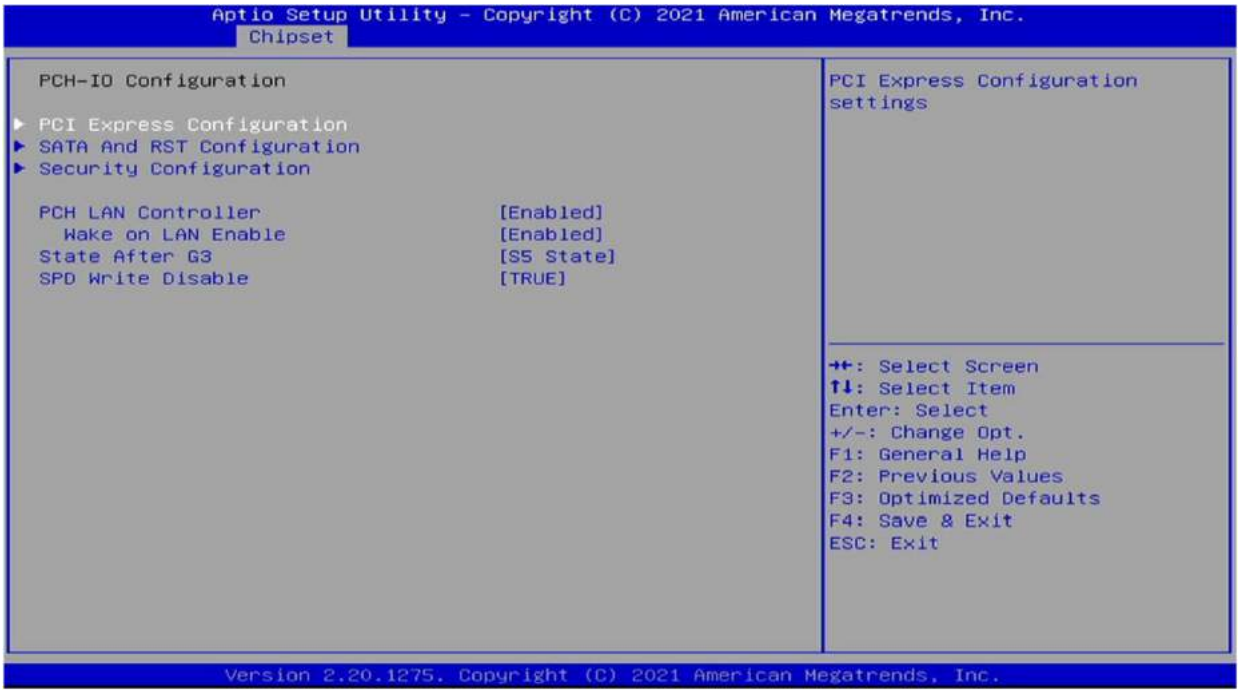
Field Name	DVMT Total Gfx Mem
Default Value	[128M]
Possible Value	128M 256M MAX

Field Name	Above 4GB MMIO BIOS assignment
Default Value	[Enabled]
Possible Value	Enabled Disabled

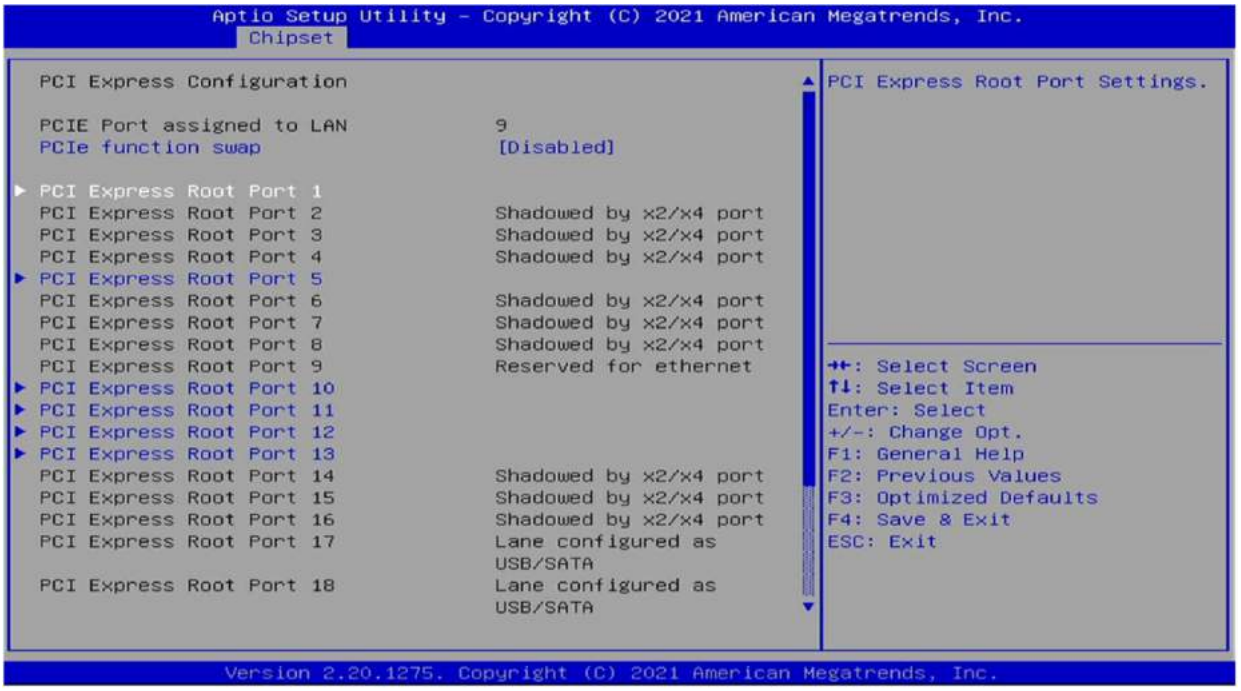
3.5.2 PCH-IO Configuration

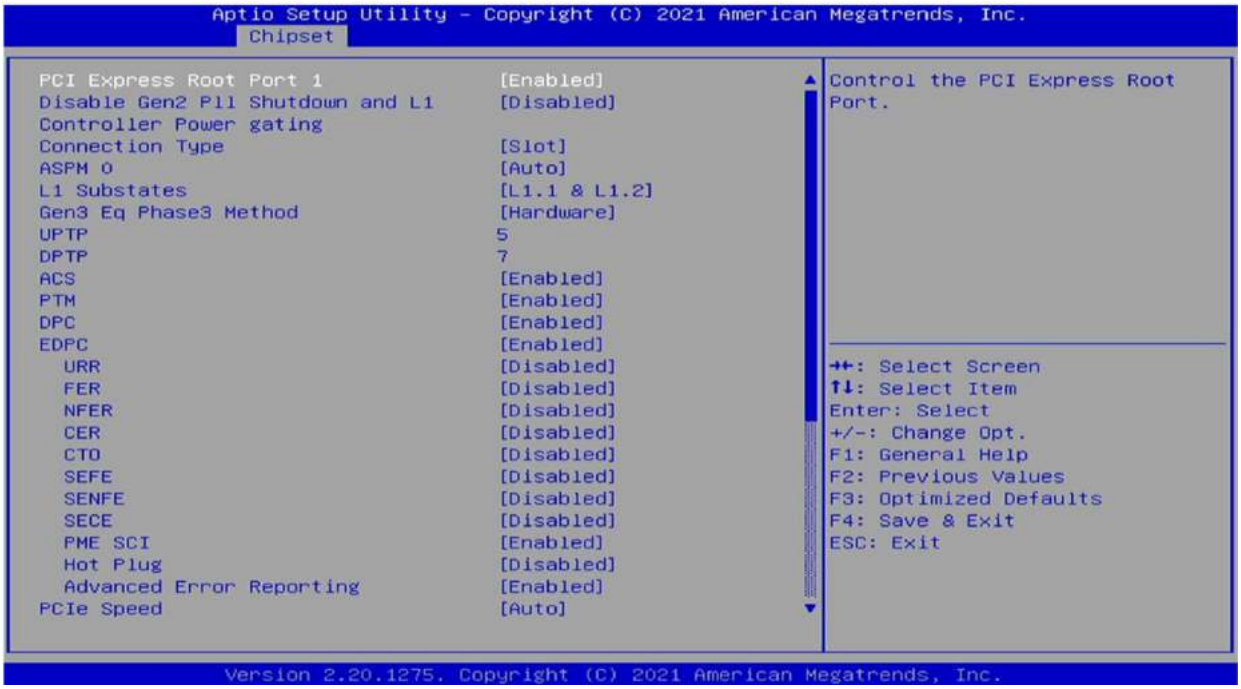


3.5.2.1 PCI Express Configuration



Field Name	PCIe function swap
Default Value	[Disabled]
Possible Value	Disabled Enabled





Field Name	**PCI Express Root Port 1**
Default Value	[Enabled]

Field Name	**PCI Express Root Port 5**
Default Value	[Enabled]

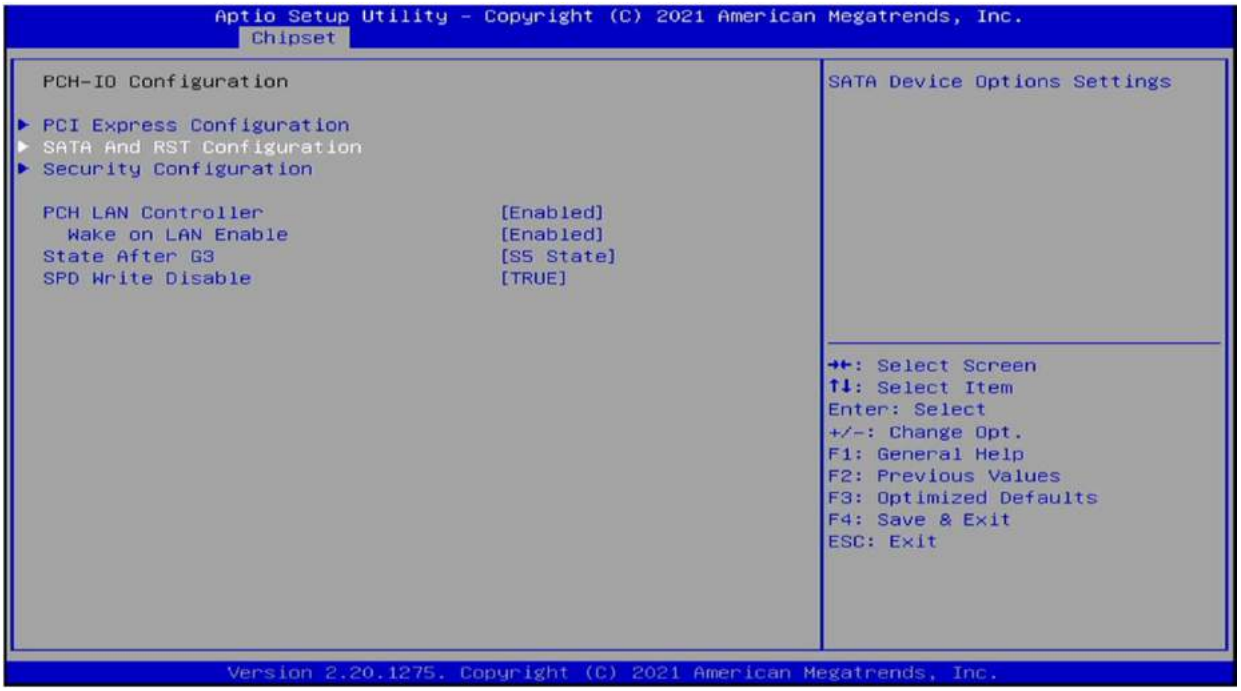
Field Name	**PCI Express Root Port 10**
Default Value	[Enabled]

Field Name	**PCI Express Root Port 11**
Default Value	[Enabled]

Field Name	**PCI Express Root Port 12**
Default Value	[Enabled]

Field Name	**PCI Express Root Port 13**
Default Value	[Enabled]

3.5.2.2 SATA And RST Configuration



Field Name	**SATA Controller(s)**
Default Value	[Enabled]
Possible Value	Enabled Disabled

Field Name	**SATA Mode Selection**
Default Value	[AHCI]
Possible Value	AHCI Intel RST Premium With Intel Optane System Acceleration

Field Name	**M.2 Port**
Default Value	[Disabled]
Possible Value	Disabled Enabled

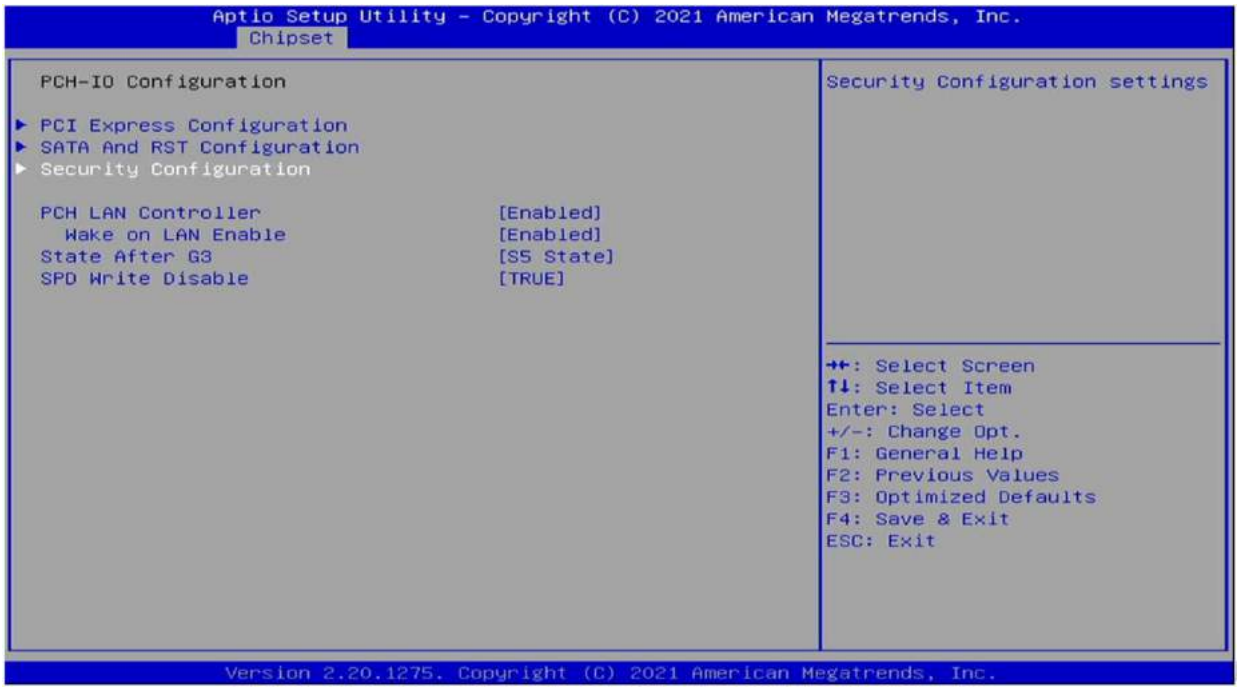
Field Name	**Port 1**
Default Value	[Enabled]
Possible Value	Disabled Enabled

Field Name	Port 2
Default Value	[Enabled]
Possible Value	Disabled Enabled

Field Name	Port 3
Default Value	[Enabled]
Possible Value	Disabled Enabled

Field Name	Port 4
Default Value	[Enabled]
Possible Value	Disabled Enabled

3.5.2.3 Security Configuration



Field Name	RTC Memory Lock
Default Value	[Enabled]
Possible Value	Disabled Enabled

Field Name	BIOS Lock
Default Value	[Enabled]
Possible Value	Disabled Enabled

Field Name	Force unlock on all GPIO pads
Default Value	[Disabled]
Possible Value	Disabled Enabled

Field Name	PCH LAN Controller
Default Value	[Enabled]
Possible Value	Enabled Disabled

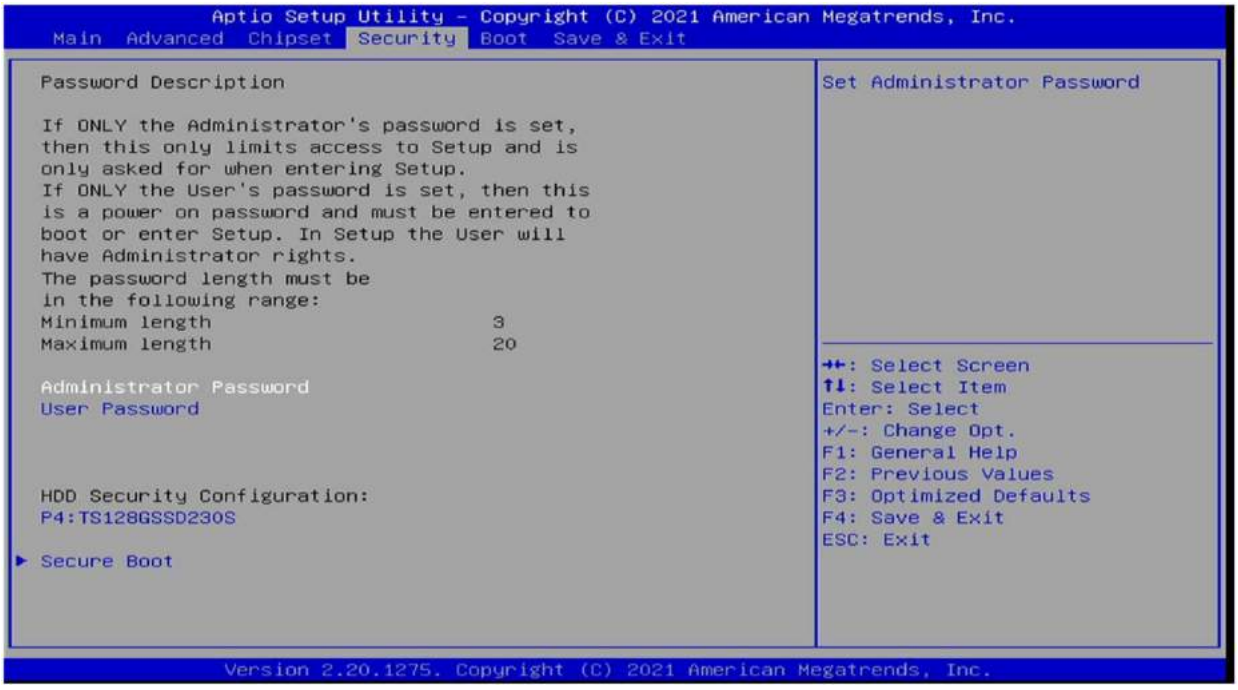
Field Name	Wake on LAN Enable
Default Value	[Enabled]
Possible Value	Enabled Disabled

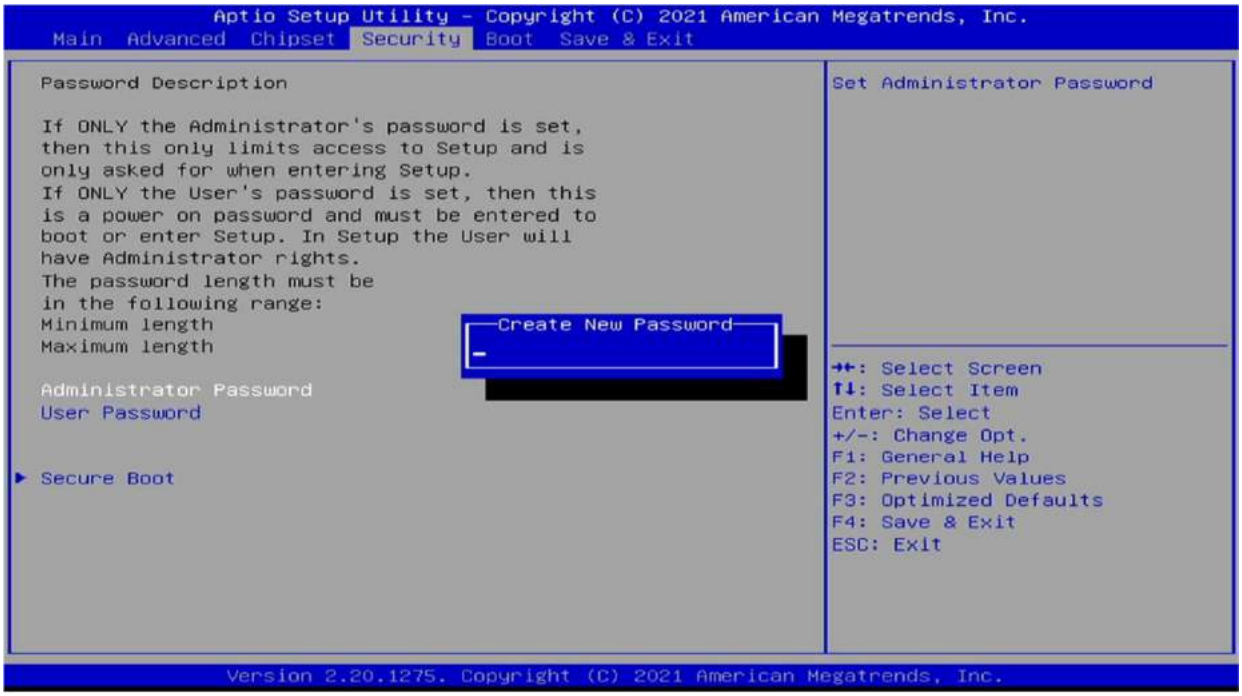
Field Name	State After G3
Default Value	[S5 State]
Possible Value	S0 State S5 State

Field Name	SPD Write Disable
Default Value	[TRUE]
Possible Value	TRUE FALSE

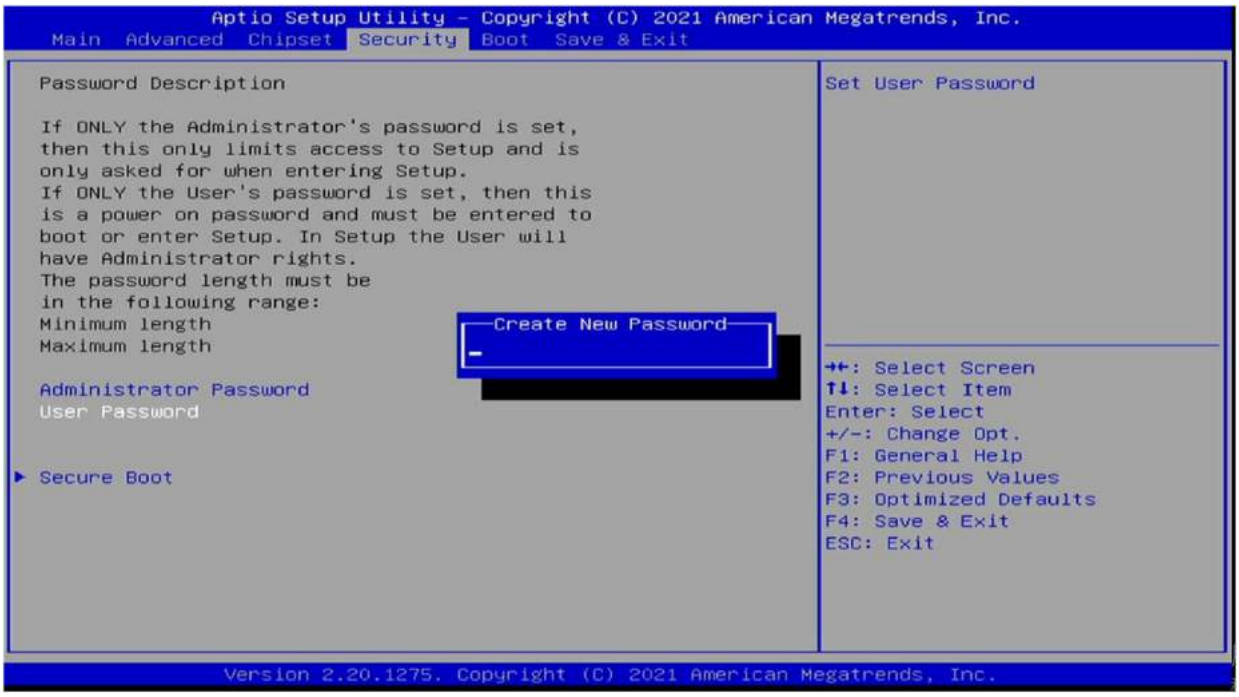
3.6 Security

3.6.1 Administrator Password

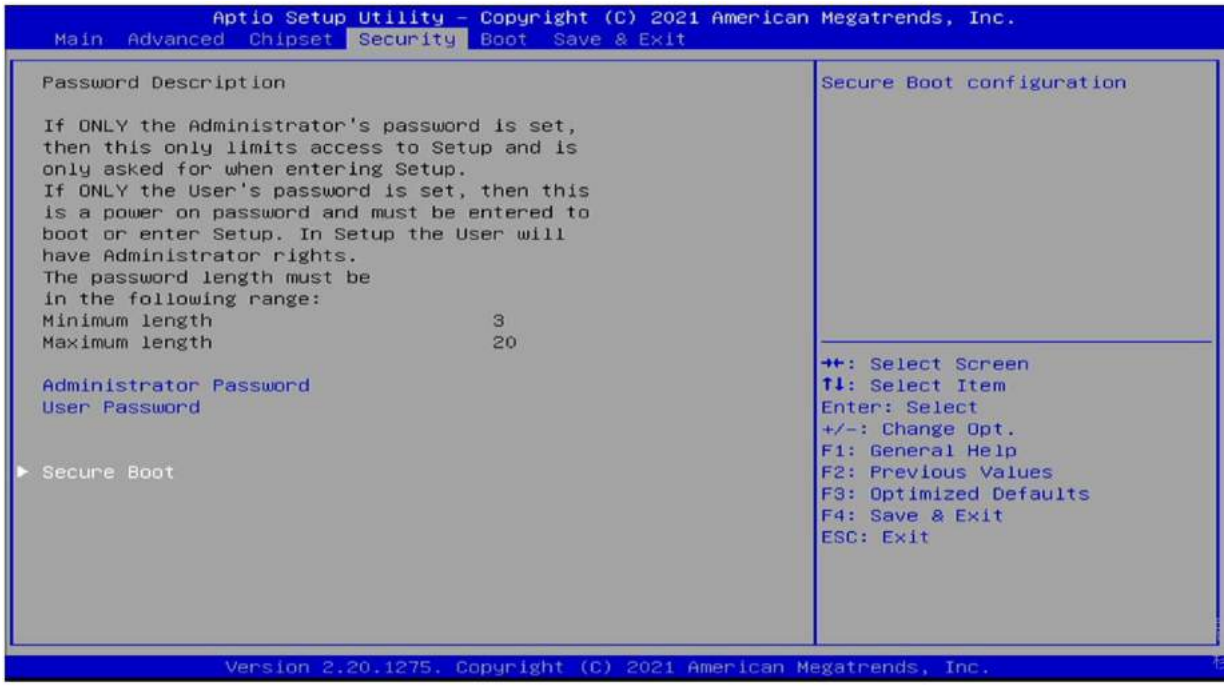




3.6.2 User Password



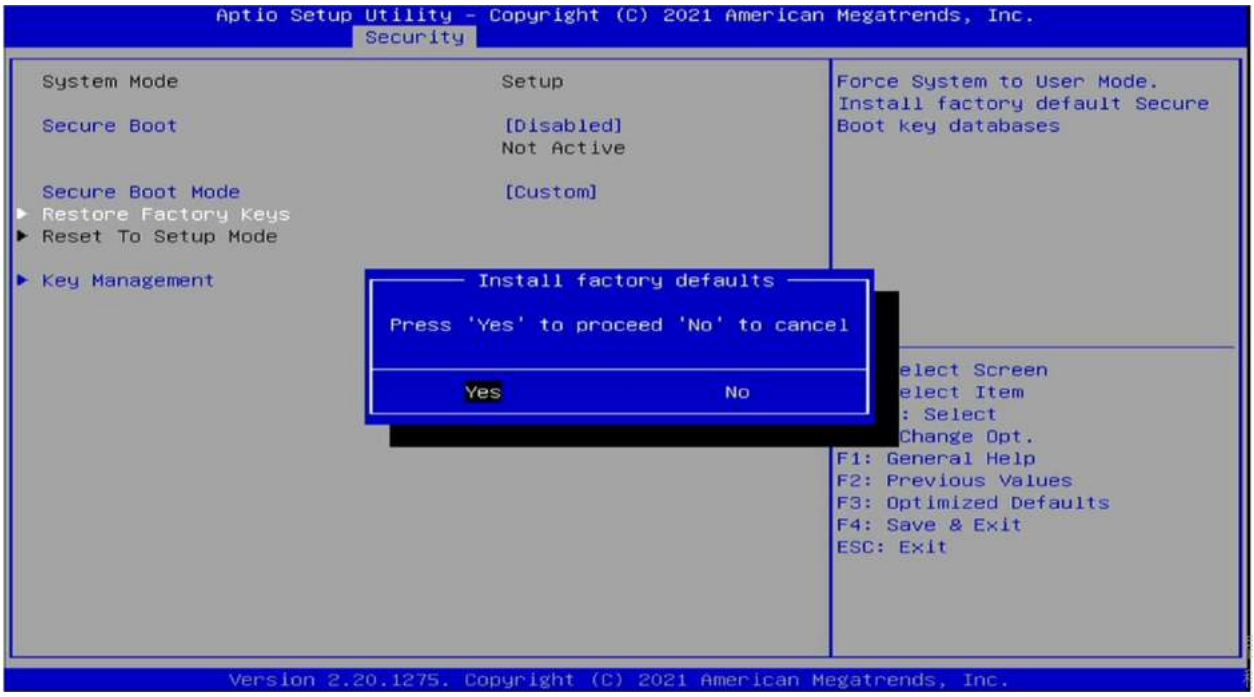
3.6.3 Secure Boot



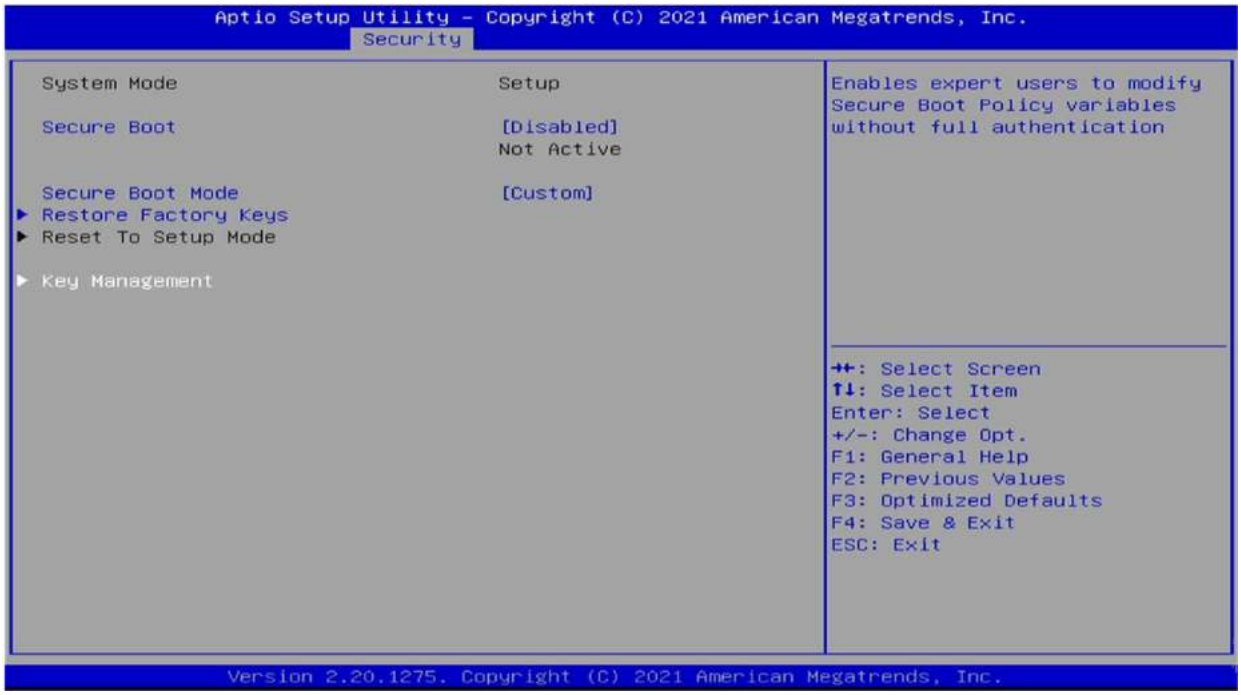
Field Name	Secure Boot
Default Value	[Enabled]
Possible Value	Disabled Enabled

Field Name	Secure Boot Mode
Default Value	[Custom]
Possible Value	Standard Custom

3.6.3.1 Restore Factory Keys

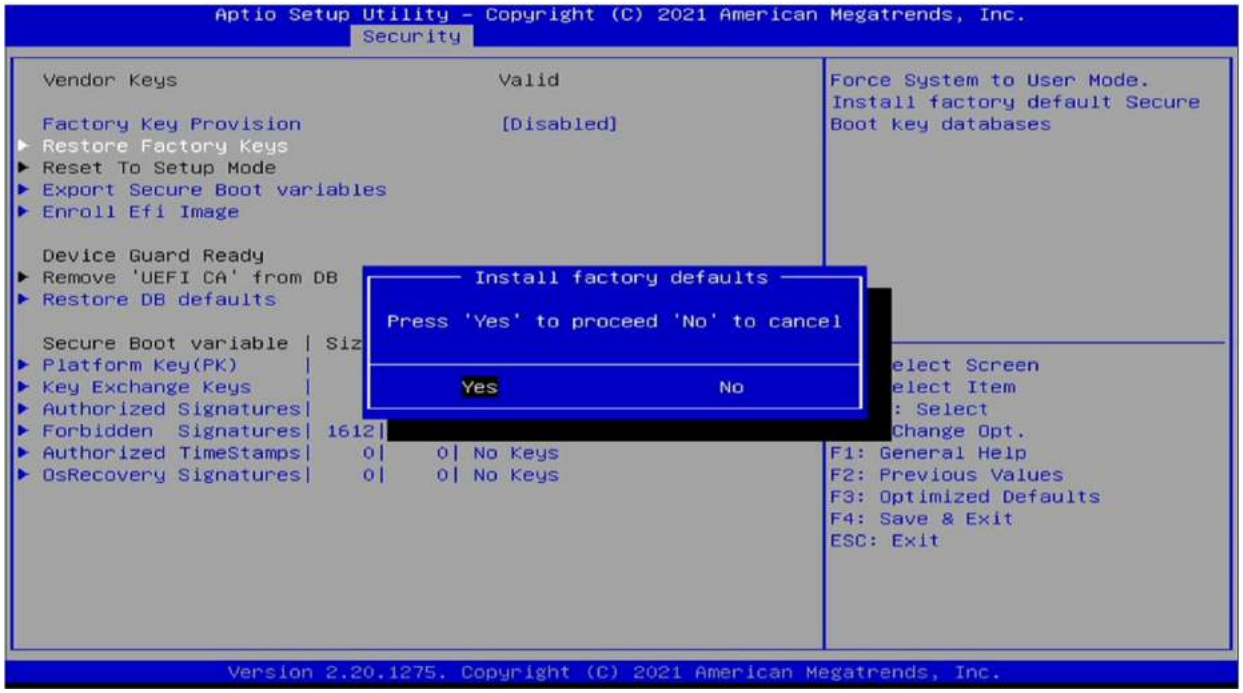


3.6.3.2 Key Management

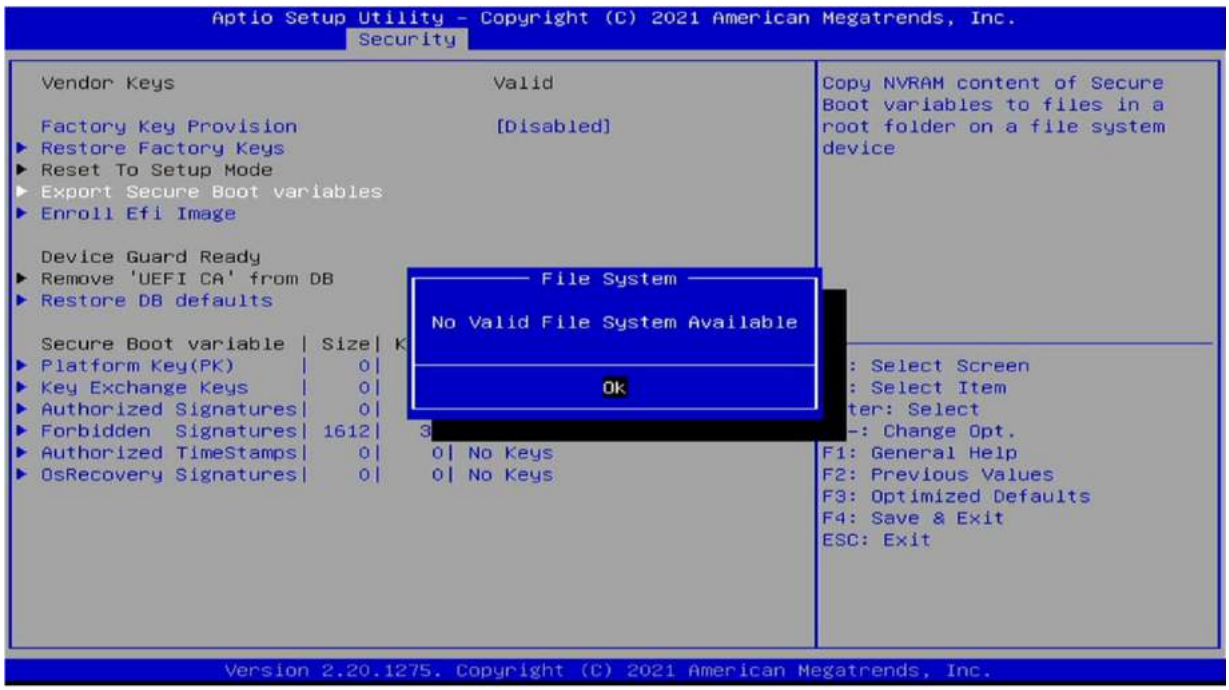


Field Name	Factory Key Provision
Default Value	[Disabled]
Possible Value	Disabled Enabled

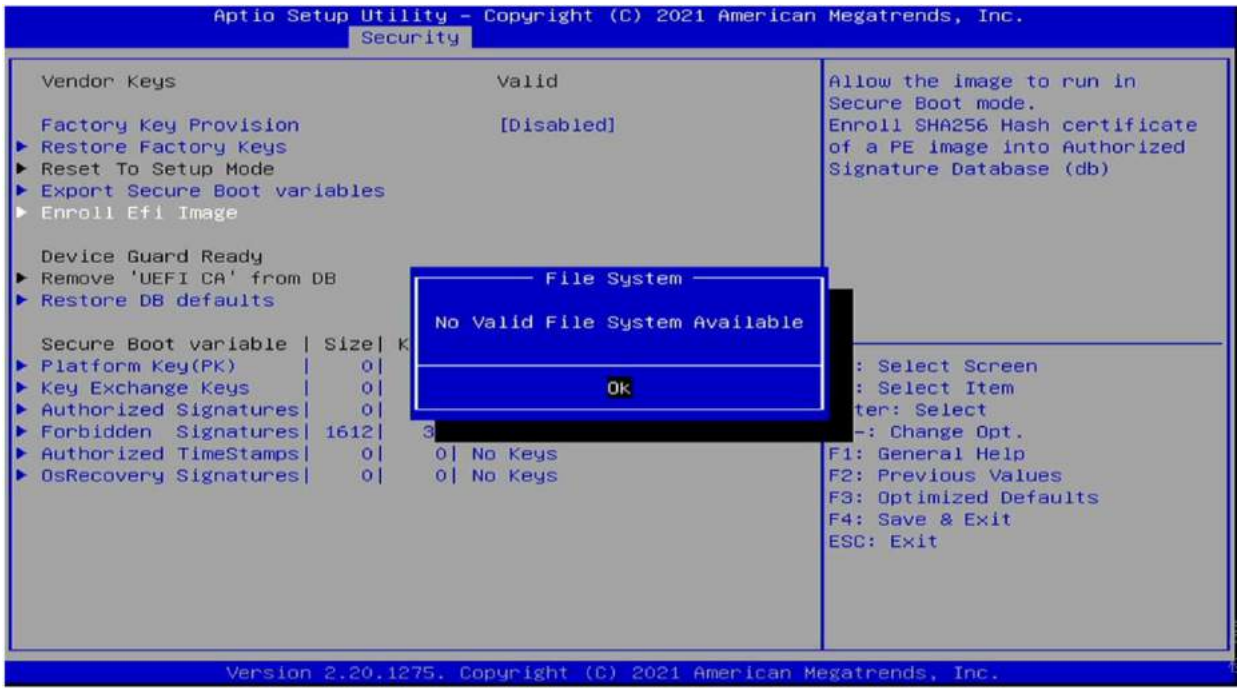
3.6.3.3 Install factory defaults



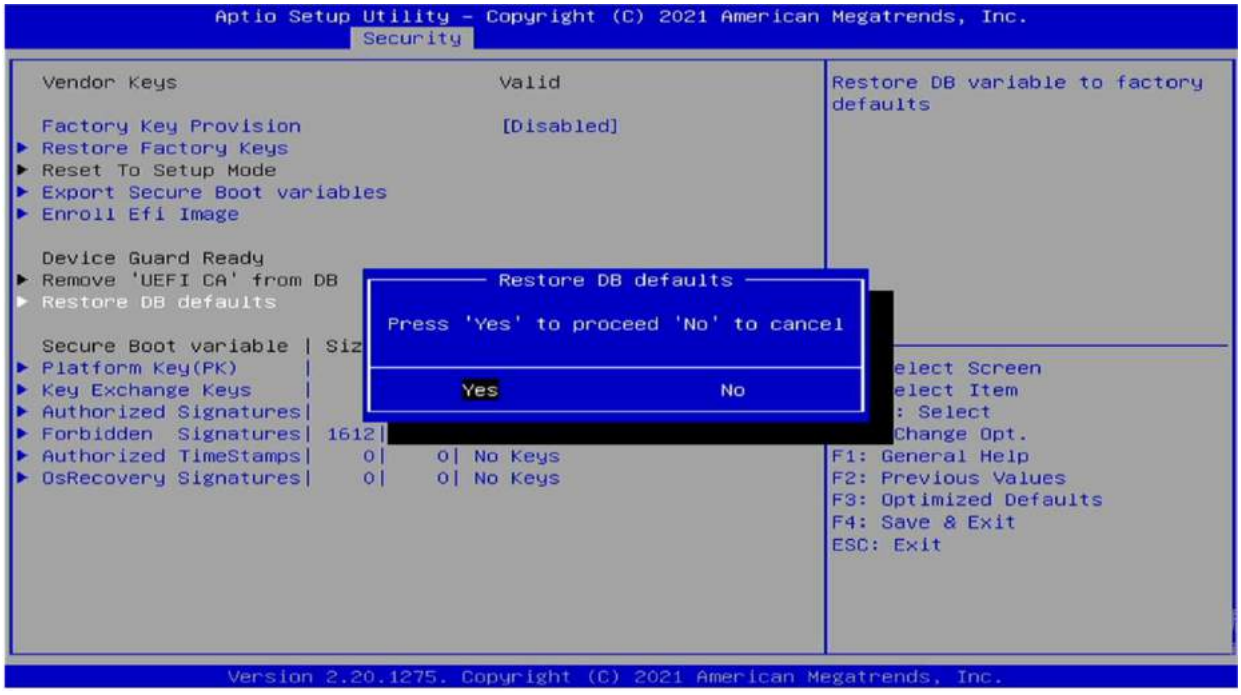
3.6.3.4 File System



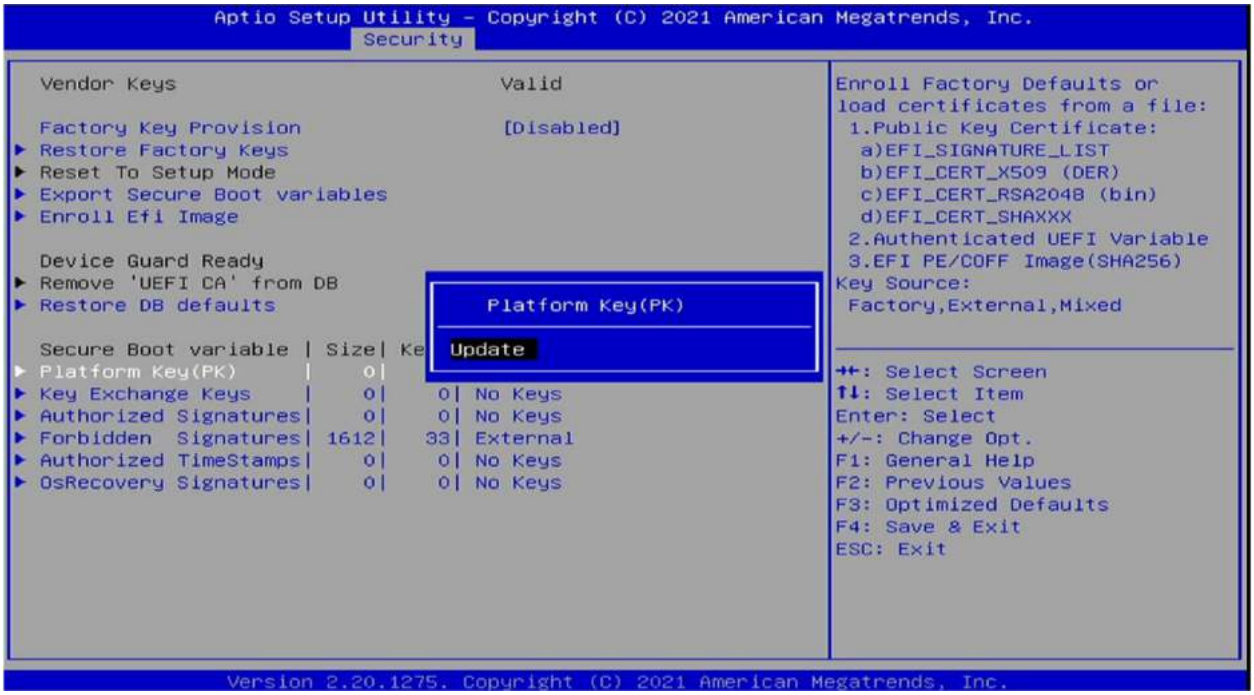
3.6.3.5 File System



3.6.3.6 Restore DB defaults

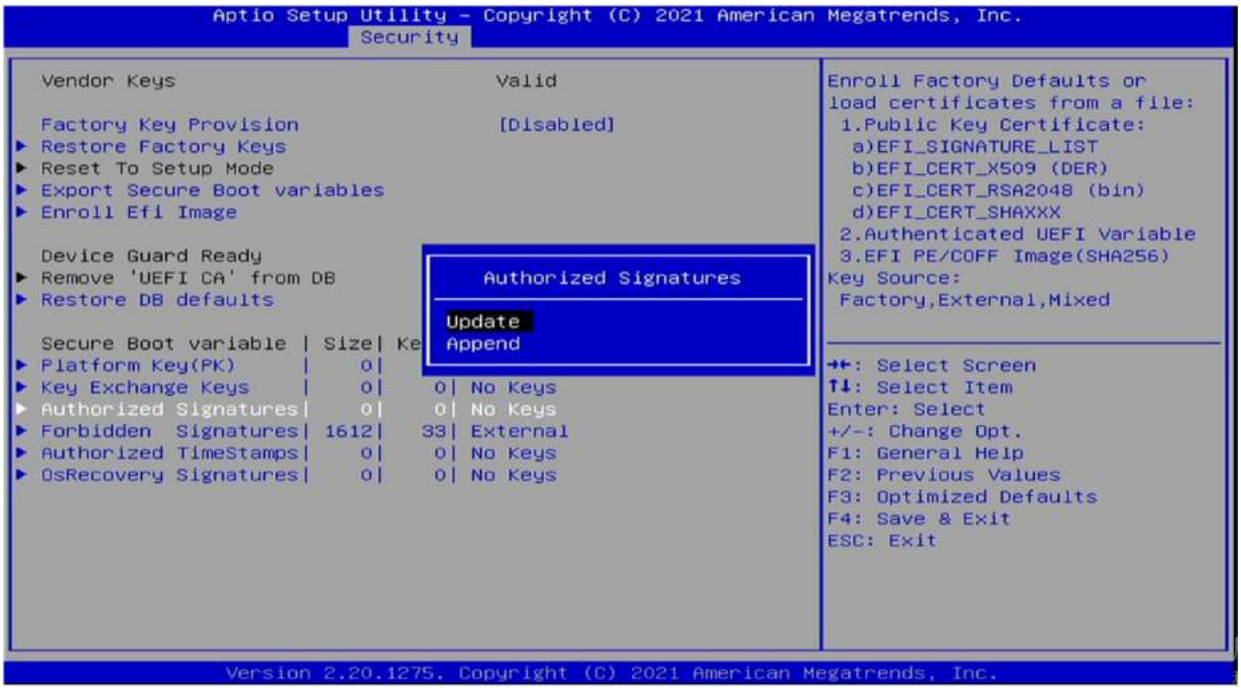


3.6.3.7 Platform Key (PK)

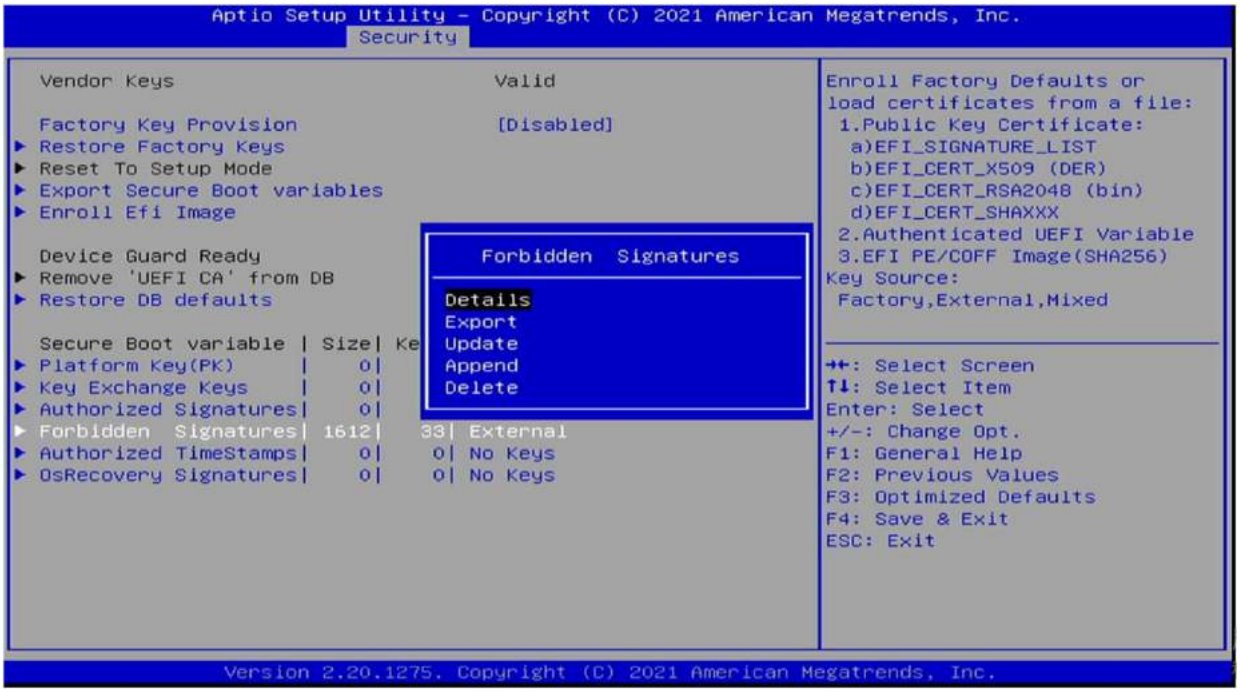


3.6.3.8 Key Exchange keys

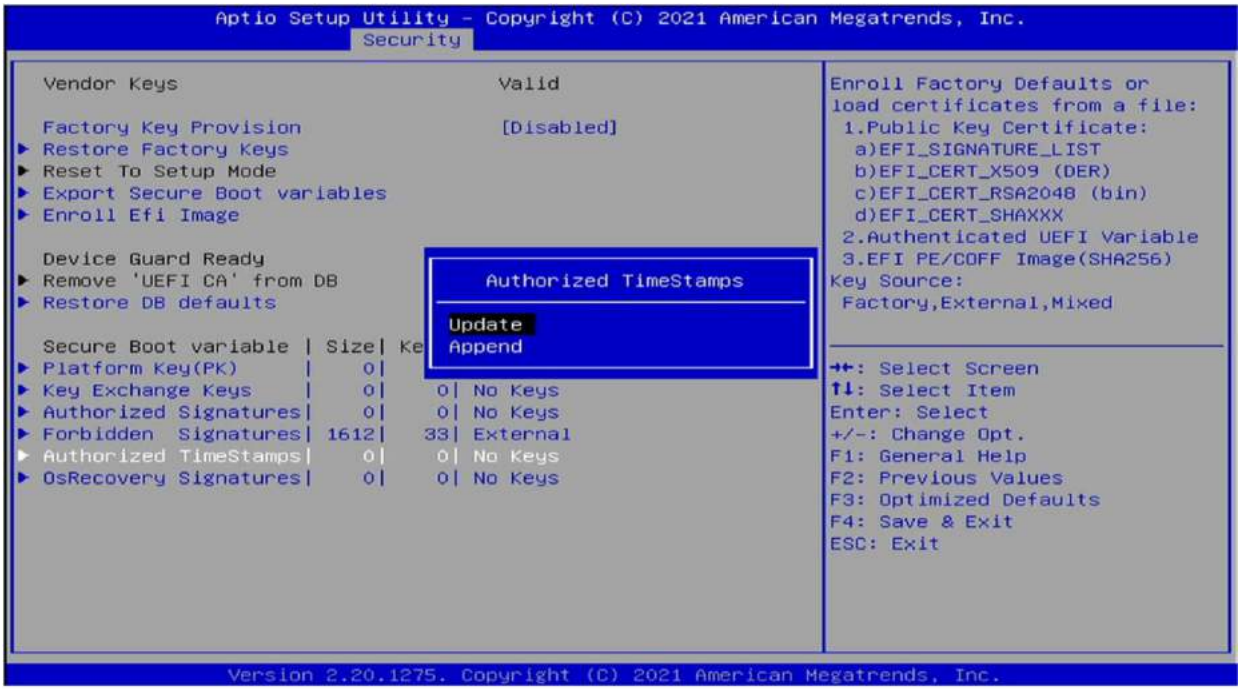
3.6.3.9 Authorized Signatures



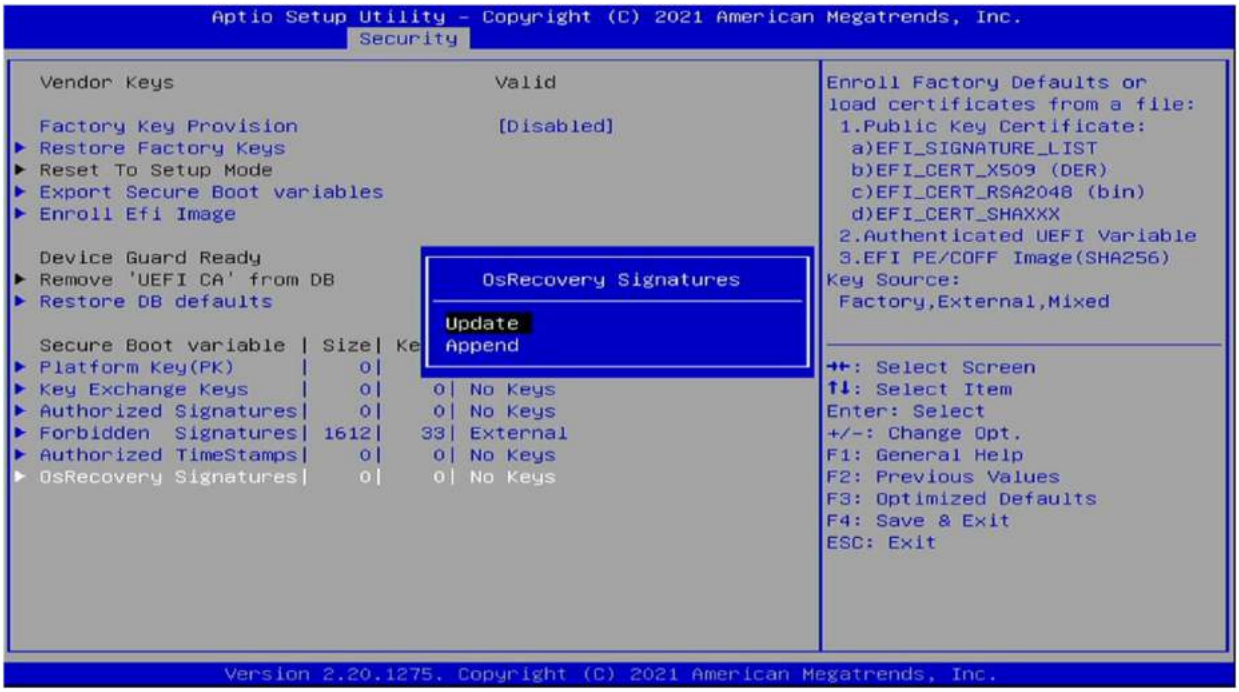
3.6.3.10 Forbidden Signatures



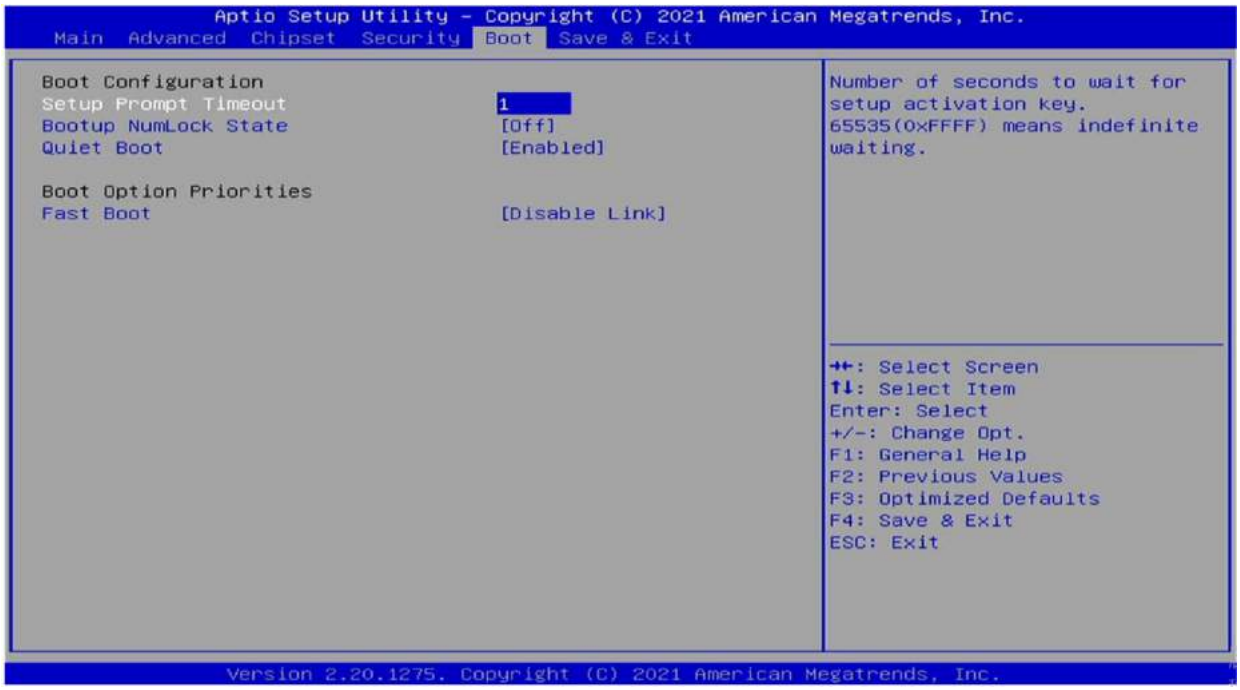
3.6.3.11 Authorized Time Stamps



3.6.3.12 OS Recovery Signatures



3.7 Boot



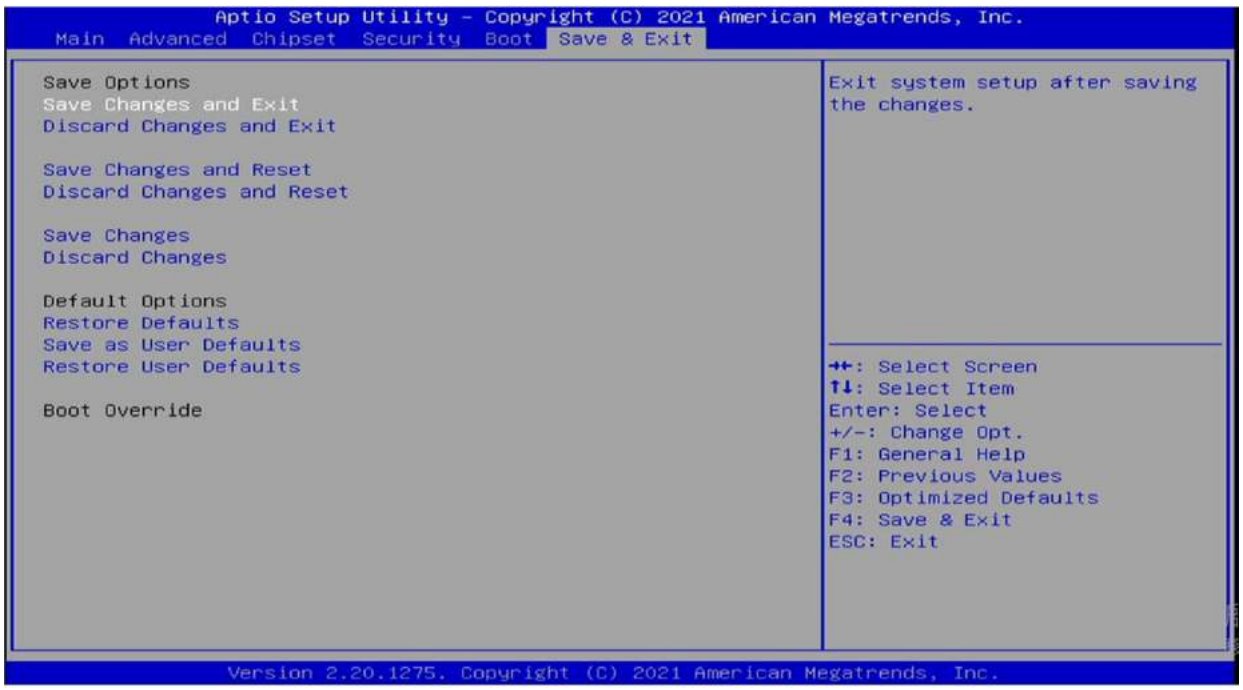
Field Name	**Bootup NumLock State**
Default Value	[Off]
Possible Value	On Off

Field Name	**Quiet Boot**
Default Value	[Enabled]
Possible Value	Disabled Enabled

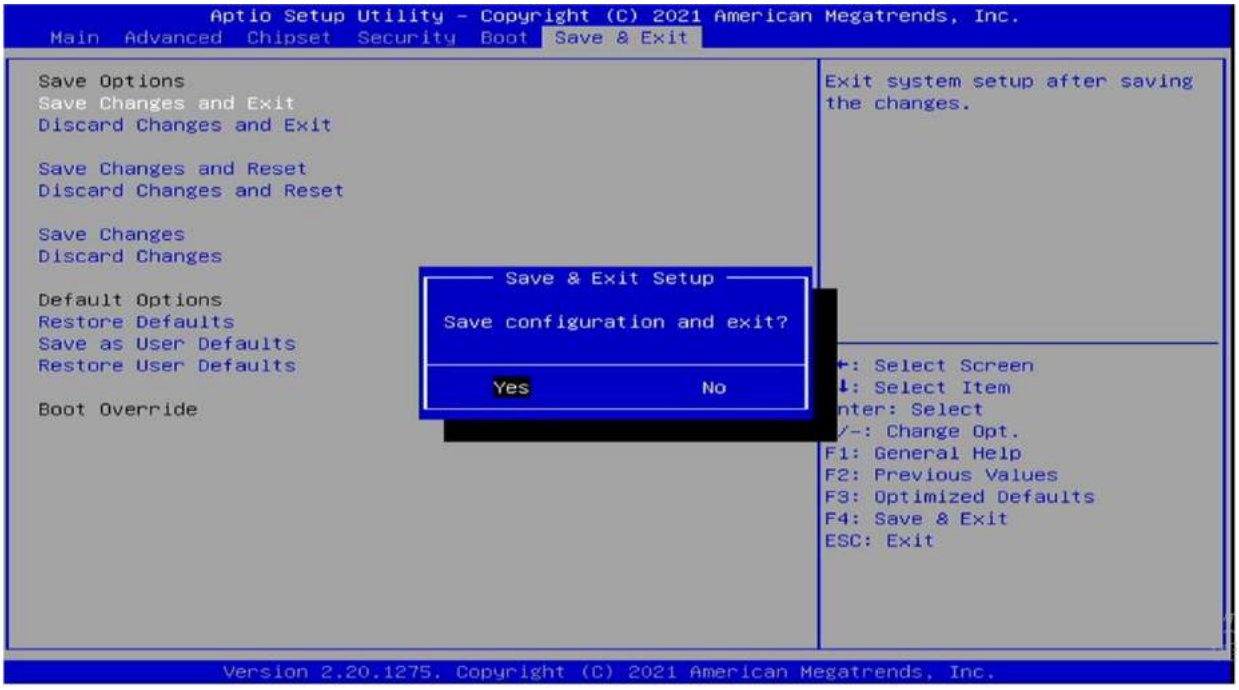
Field Name	**Fast Boot**
Default Value	[Disable Link]
Possible Value	Disable Link Enabled

3.8 Save & Exit

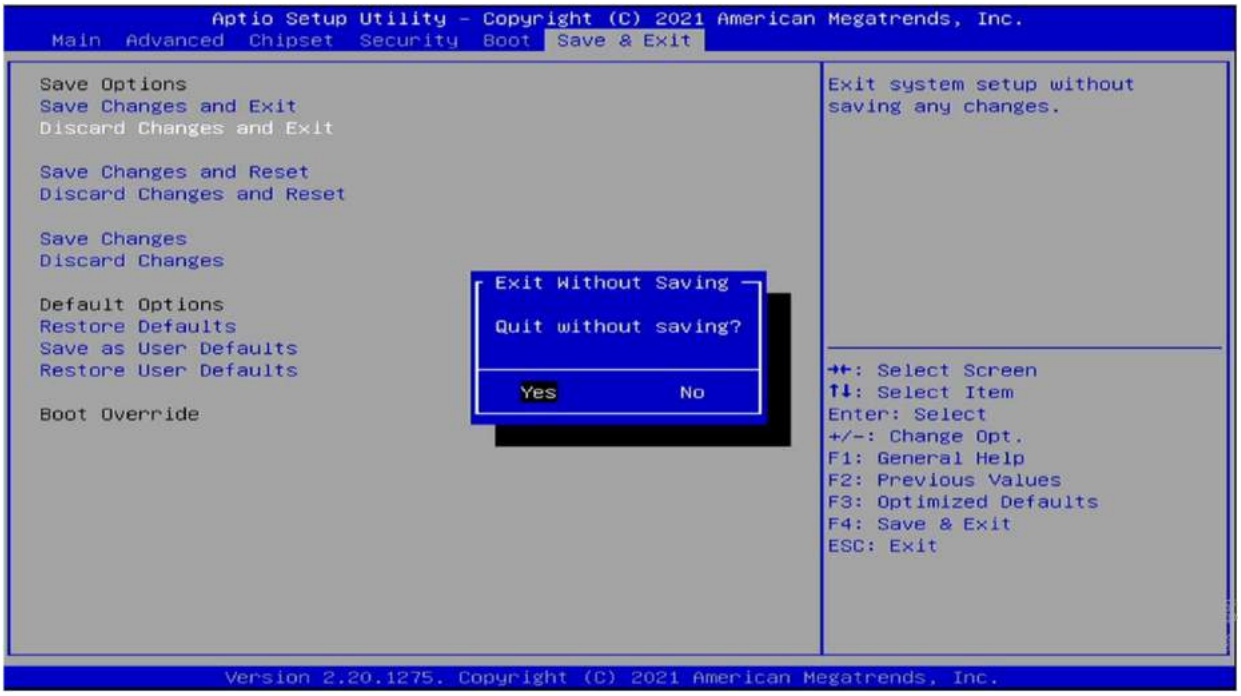
3.8.1 Save Changes and Exit



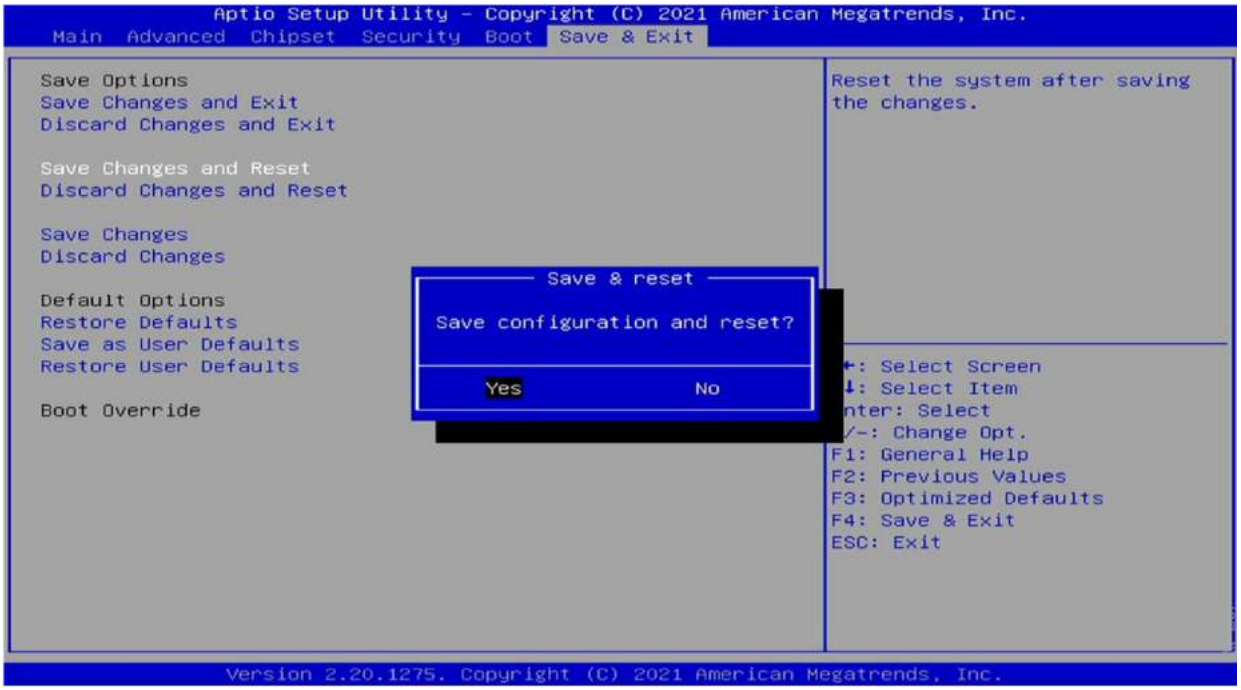
3.8.1.1 Save & Exit Setup



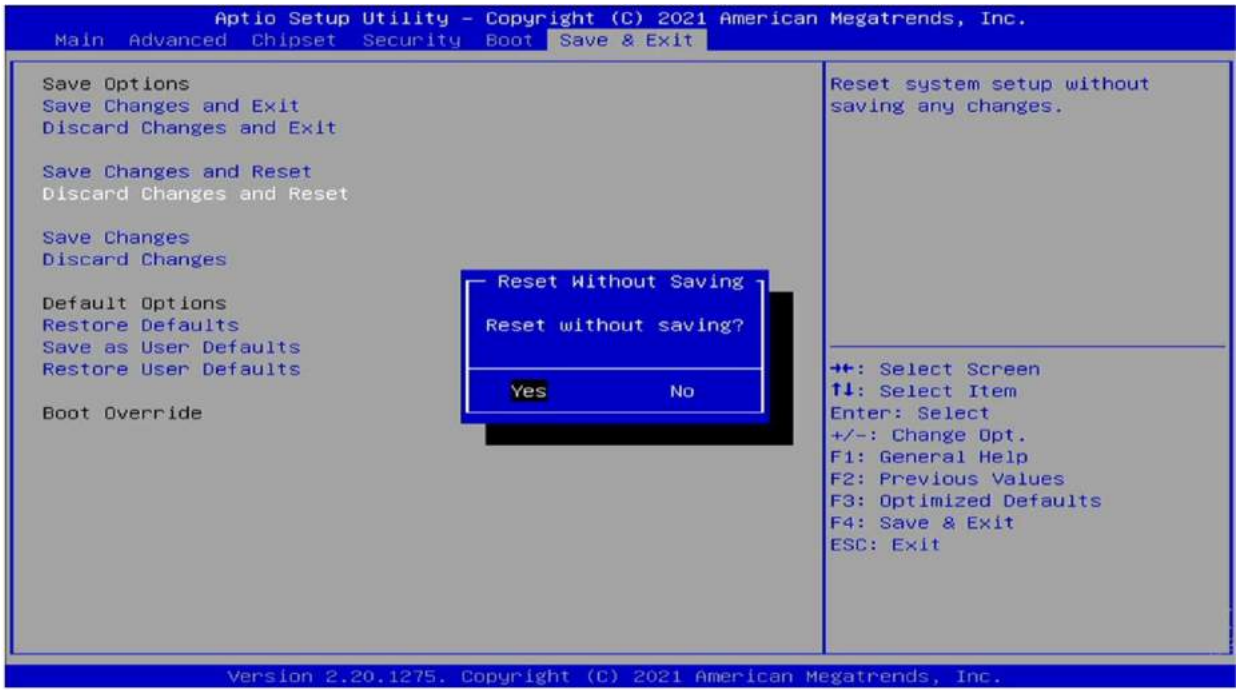
3.8.2 Exit without Saving



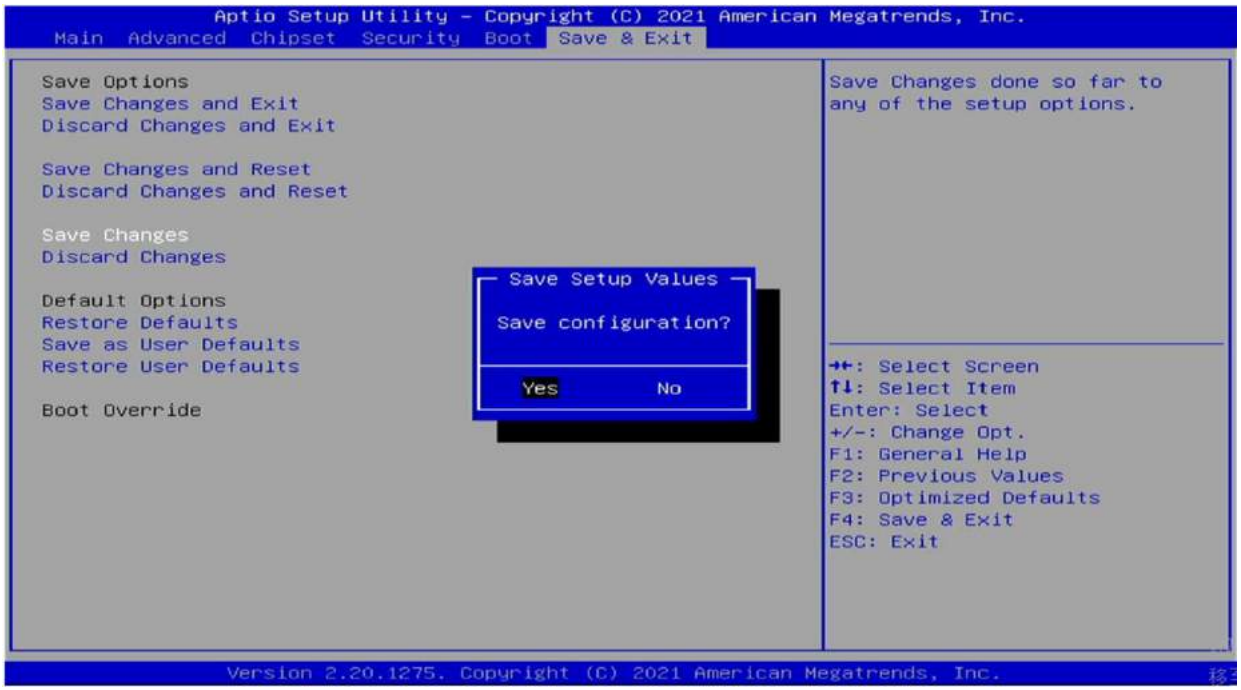
3.8.3 Save & reset



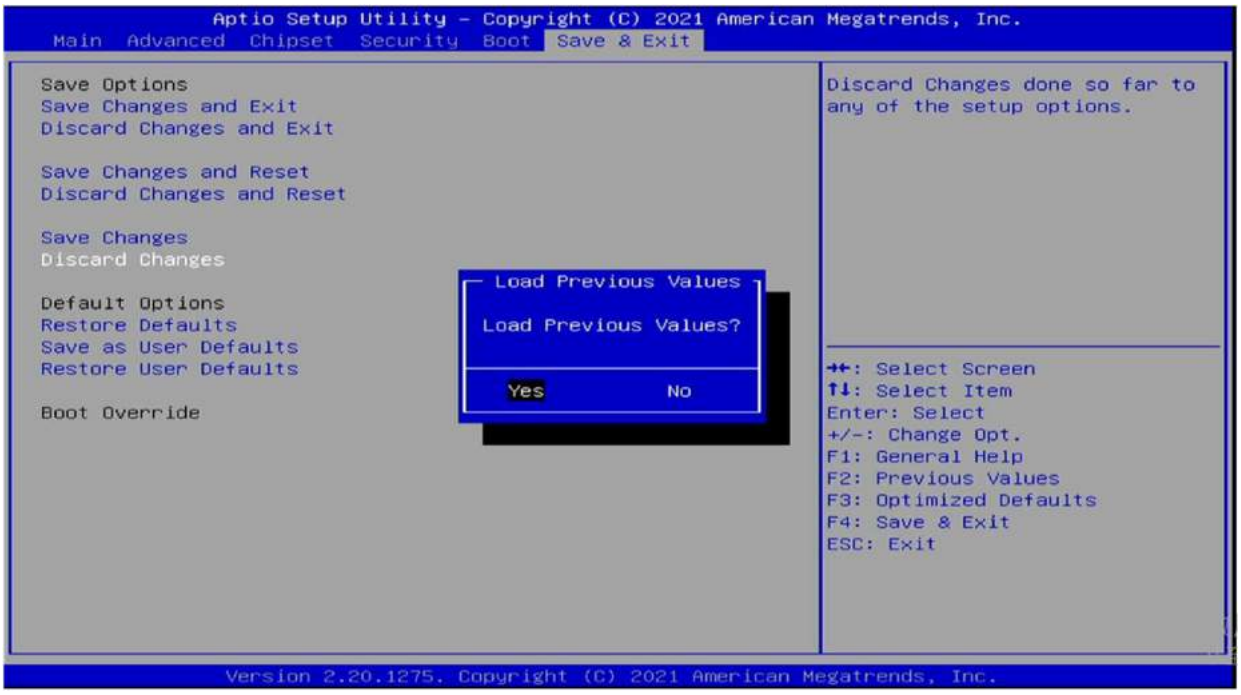
3.8.4 Reset Without Saving



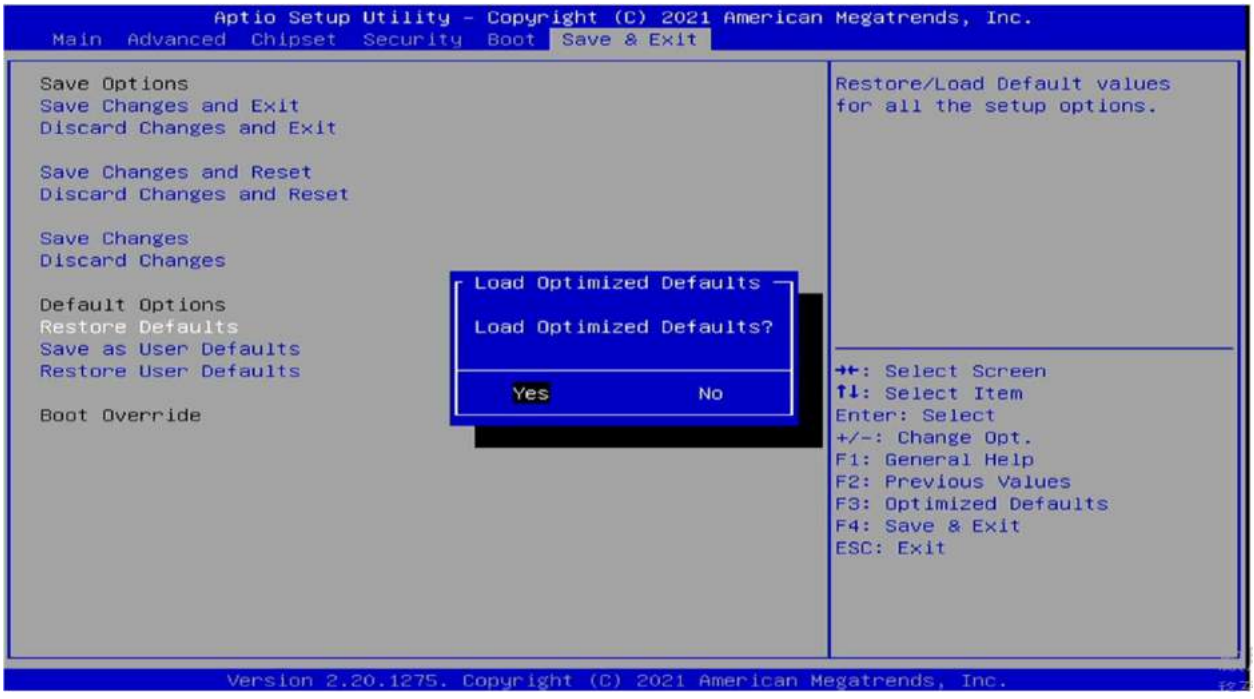
3.8.5 Save Setup Values



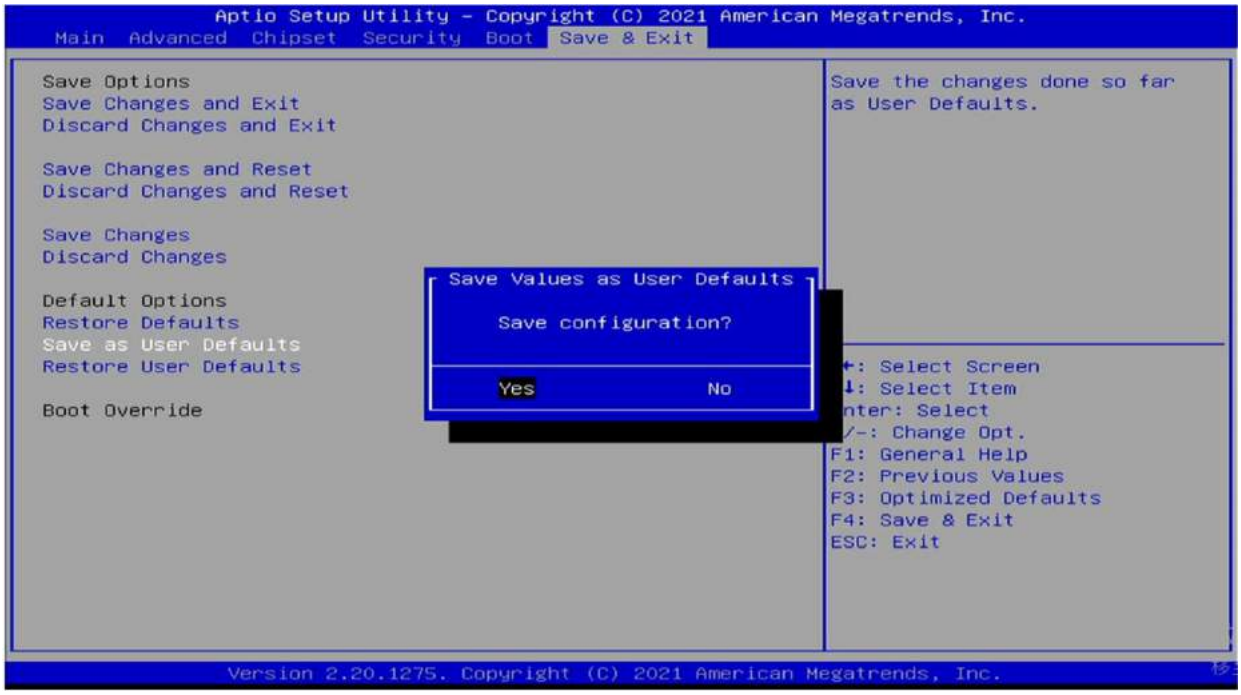
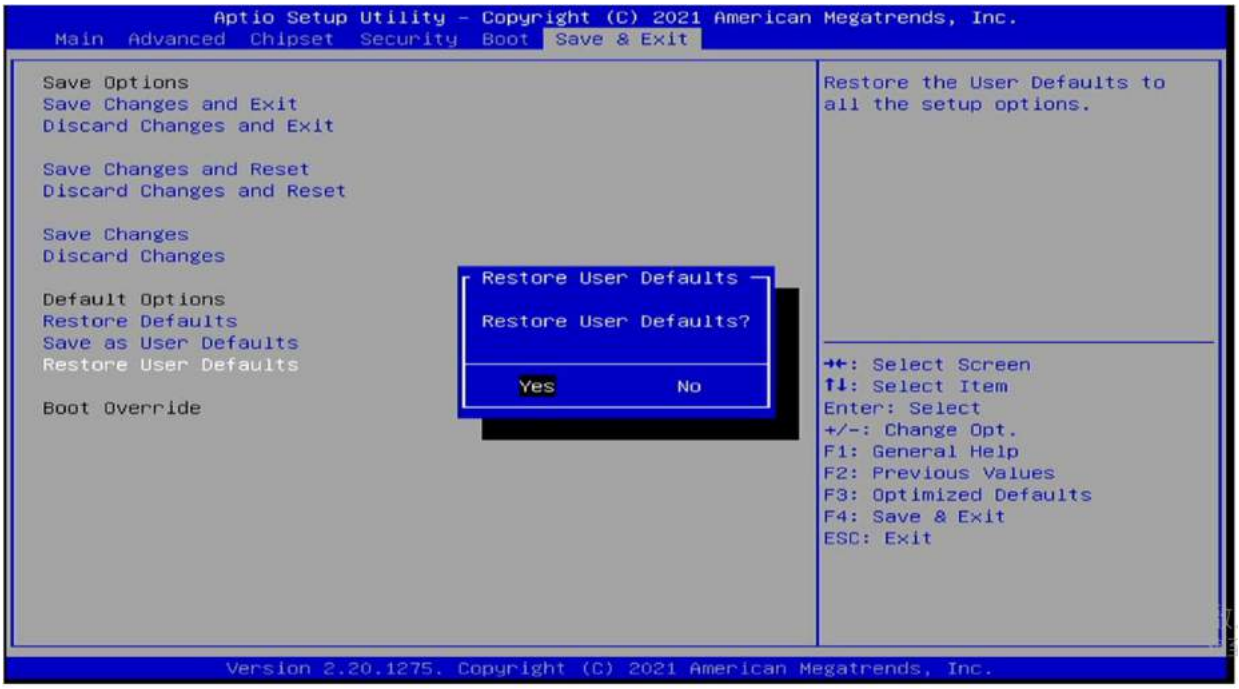
3.8.6 Load Previous Values



3.8.7 Load Optimized Defaults



3.8.8 Save Values as User Defaults



3.8.9 Restore User Defaults