Lanner

Embedded Computing Platform

Hardware Platforms for Intelligent Edge Computing

LEC-2290B
User Manual

Version: 1.9

Date of Release: 2024-06-18

About this Document

This manual describes the overview of the various functionalities of this product, and the information you need to get it ready for operation. It is intended for those who are:

- responsible for installing, administering and troubleshooting this system or Information Technology professionals.
- assumed to be qualified in the servicing of computer equipment, such as professional system integrators, or service personnel and technicians.

Icon Descriptions

The icons are used in the manual to serve as an indication of interest topics or important messages. Below is a description of these icons:

Note or Information: This mark indicates that there is a note of interest and is something that you should pay special attention to while using the product.

Warning or Important: This mark indicates that there is a caution or warning and it is something that could damage your property or product.

Online Resources

To obtain additional documentation resources and software updates for your system, please visit the Lanner Download Center. As certain categories of documents are only available to users who are logged in, please be registered for a Lanner Account at http://www.lannerinc.com/ to access published documents and downloadable resources.

Technical Support

In addition to contacting your distributor or sales representative, if there are any technical queries, you could submit a support ticket to our **Lanner Technical Support** department.

Documentation Feedback

Your feedback is valuable to us, as it will help us continue to provide you with more accurate and relevant documentation. To provide any feedback, comments or to report an error, please email to contact@lannerinc.com. Thank you for your time.

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Acknowledgment

Compliances and Certification

CE

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

FCC Class A

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. The 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 his own expense.

Note

1. An unshielded-type power cord is required to meet FCC emission limits and to prevent interference to the nearby radio and television reception. It is essential that only the supplied power cord be used.
2. Use only shielded cables to connect I/O devices to this equipment.
3. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Important

1. Operations in the 5.15-5.25GHz band are restricted to indoor usage only.
2. This device meets all the other requirements specified in Part 15E, Section 15.407 of the FCC Rules.

EMC Notice

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. The operation of this equipment in a residential area is likely to cause harmful interference in which case users will be required to correct the interference at their own expense.

Safety Guidelines

Follow these guidelines to ensure general safety:

- Keep the chassis area clear and dust-free during and after installation.
- Do not wear loose clothing or jewelry that could get caught in the chassis. Fasten your tie or scarf and roll up your sleeves.
- Wear safety glasses if you are working under any conditions that might be hazardous to your eyes.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.
- Disconnect all power by turning off the power and unplugging the power cord before installing or removing a chassis or working near power supplies
- Do not work alone if potentially hazardous conditions exist.
- Never assume that power is disconnected from a circuit; always check the circuit.

Consignes de sécurité

Suivez ces consignes pour assurer la sécurité générale :

- Laissez la zone du châssis propre et sans poussière pendant et après l'installation.
- Ne portez pas de vêtements amples ou de bijoux qui pourraient être pris dans le châssis. Attachez votre cravate ou écharpe et remontez vos manches.
- Portez des lunettes de sécurité pour protéger vos yeux.
- N'effectuez aucune action qui pourrait créer un danger pour d'autres ou rendre l'équipement dangereux.
- Coupez complètement l'alimentation en éteignant l'alimentation et en débranchant le cordon d'alimentation avant d'installer ou de retirer un châssis ou de travailler à proximité de sources d'alimentation.
- Ne travaillez pas seul si des conditions dangereuses sont présentes.
- Ne considérez jamais que l'alimentation est coupée d'un circuit, vérifiez toujours le circuit. Cet appareil génère, utilise et émet une énergie radiofréquence et, s'il n'est pas installé et utilisé conformément aux instructions des fournisseurs de composants sans fil, il risque de provoquer des interférences dans les communications radio.

Lithium Battery Caution

- There is risk of Explosion if Battery is replaced by an incorrect type.
- Dispose of used batteries according to the instructions.
- Installation only by a skilled person who knows all Installation and Device Specifications which are to be applied.
- Do not carry the handle of power supplies when moving to another place.
- Please conform to your local laws and regulations regarding safe disposal of lithium BATTERY.
- Disposal of a battery into fire or a hot oven, or mechanically crushing or cutting of a battery can result in an explosion.
- Exposing a battery to high temperatures may cause it to explode or leak flammable substances.
- A battery exposed to extremely low air pressure may explode or leak flammable liquids or gases.

Avertissement concernant la pile au lithium

- Risque d'explosion si la pile est remplacée par une autre d'un mauvais type.
- Jetez les piles usagées conformément aux instructions.
- L'installation doit être effectuée par un électricien formé ou une personne formée à l'électricité connaissant toutes les spécifications d'installation et d'appareil du produit.
- Ne transportez pas l'unité en la tenant par le câble d'alimentation lorsque vous déplacez l'appareil.

Operating Safety

- Electrical equipment generates heat. Ambient air temperature may not be adequate to cool equipment to acceptable operating temperatures without adequate circulation. Be sure that the room in which you choose to operate your system has adequate air circulation.
- Ensure that the chassis cover is secure. The chassis design allows cooling air to circulate effectively. An open chassis permits air leaks, which may interrupt and redirect the flow of cooling air from internal components.
- Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. ESD damage occurs when electronic components are improperly handled and can result in complete or intermittent failures. Be sure to follow ESD-prevention procedures when removing and replacing components to avoid these problems.
- Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. If no wrist strap is available, ground yourself by touching the metal part of the chassis.
- Periodically check the resistance value of the antistatic strap, which should be between 1 and 10 megohms (Mohms).

Sécurité de fonctionnement

- L'équipement électrique génère de la chaleur. La température ambiante peut ne pas être adéquate pour refroidir l'équipement à une température de fonctionnement acceptable sans circulation adaptée. Vérifiez que votre site propose une circulation d'air adéquate.
- Vérifiez que le couvercle du châssis est bien fixé. La conception du châssis permet à l'air de refroidissement de bien circuler. Un châssis ouvert laisse l'air s'échapper, ce qui peut interrompre et rediriger le flux d'air frais destiné aux composants internes.
- Les décharges électrostatiques (ESD) peuvent endommager l'équipement et gêner les circuits électriques. Des dégâts d'ESD surviennent lorsque des composants électroniques sont mal manipulés et peuvent causer des pannes totales ou intermittentes. Suivez les procédures de prévention d'ESD lors du retrait et du remplacement de composants.
- Portez un bracelet anti-ESD et veillez à ce qu'il soit bien au contact de la peau. Si aucun bracelet n'est disponible, reliez votre corps à la terre en touchant la partie métallique du châssis.
- Vérifiez régulièrement la valeur de résistance du bracelet antistatique, qui doit être comprise entre 1 et 10 mégohms (Mohms).

Mounting Installation Precaution

The following should be put into consideration for rackmount or similar mounting installations:

- Do not install and/or operate this unit in any place that flammable objects are stored or used in.
- The installation of this product must be performed by trained specialists; otherwise, a non-specialist might create the risk of the system's falling to the ground or other damages.
- Lanner Electronics Inc. shall not be held liable for any losses resulting from insufficient strength for supporting the system or use of inappropriate installation components.
- Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.
- Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of airflow required for safe operation of the equipment is not compromised.
- Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- Reliable Grounding - Reliable grounding of rack mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

Installation & Operation:

- This equipment must be grounded. The power cord for product should be connected to a socket-outlet with earthing connection.
  Cet équipement doit être mis à la terre. La fiche d'alimentation doit être connectée à une prise de terre correctement câblée
- Suitable for installation in Information Technology Rooms in accordance with Article 645 of the National Electrical Code and NFPA 75.
  Peut être installé dans des salles de matériel de traitement de l'information conformément à l'article 645 du National Electrical Code et à la NFPA 75.
- The machine can only be used in a restricted access location and must be installed by a skilled person.
  Les matériels sont destinés à être installés dans des EMPLACEMENTS À ACCÈS RESTREINT.
- This product is intended to be supplied by a Listed Power Adapter or DC power source, rated 12-24Vdc, 17.5-8A minimum, Tma = 70°C, and the altitude of operation = 5000m.
- Lanner Electronics Inc. shall not be held liable for any losses resulting from insufficient strength for supporting the system or use of inappropriate installation components.

Electrical Safety Instructions

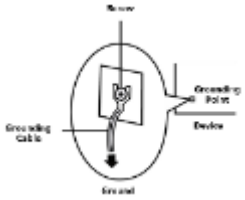
Before turning on the device, ground the grounding cable of the equipment. Proper grounding (grounding) is very important to protect the equipment against the harmful effects of external noise and to reduce the risk of electrocution in the event of a lightning strike. To uninstall the equipment, disconnect the ground wire after turning off the power. A ground wire is required and the part connecting the conductor must be greater than 4 mm2 or 10 AWG.

Consignes de sécurité électrique

- Avant d'allumer l'appareil, reliez le câble de mise à la terre de l'équipement à la terre.
- Une bonne mise à la terre (connexion à la terre) est très importante pour protéger l'équipement contre les effets néfastes du bruit externe et réduire les risques d'électrocution en cas de foudre.
- Pour désinstaller l'équipement, débranchez le câble de mise à la terre après avoir éteint l'appareil.
- Un câble de mise à la terre est requis et la zone reliant les sections du conducteur doit faire plus de 4 mm2 ou 10 AWG.

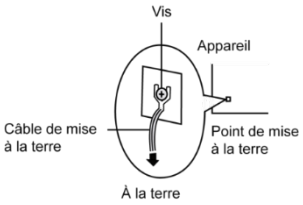
Grounding Procedure for Power Source

- Loosen the screw of the earthing point.
- Connect the grounding cable to the ground.
- The protection device for the power source must provide 30 A current.
- This protection device must be connected to the power source before power.
- The cable hould 16 AWG



Procédure de mise à la terre pour source d'alimentation

- Desserrez la vis du terminal de mise à la terre.
- Branchez le câble de mise à la terre à la terre.
- L'appareil de protection pour la source d'alimentation doit fournir 30 A de courant.
- Cet appareil de protection doit être branché à la source d'alimentation avant l'alimentation.
- Le câble doit 16 AWG



This equipment is for INDOOR USE ONLY

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CHAPTER 1: PRODUCT OVERVIEW

The LEC-2290B, a GPU intelligent edge computing appliance, is a robust box PC powered by the Intel® Core™ i7- 9700TE (Codenamed Coffee Lake S) processor.

Product Features

- Intel® Core™ i7-9700TE
- 2x DDR4 2133/2400 SO-DIMM, Max. 64GB
- 2x RJ45 GbE LAN, 4x PoE, 4x USB3.0, 6x COM Ports, 8x DI & 8x DO
- 2x Removable HDD/SSD External Slot w/ RAID, 1x mSATA
- Built-in TPM 2.0 & IPMI Support

Package Content

Your package contains the following items:

- 1x Edge AI Appliance
- 4x Rubber Foot
- 2x 4-pin Terminal Block, 1x 2-pin Terminal Block, 1x 20-pin Terminal Block

Note: If you should find any components missing or damaged, please contact your dealer immediately for assistance.

Ordering Information

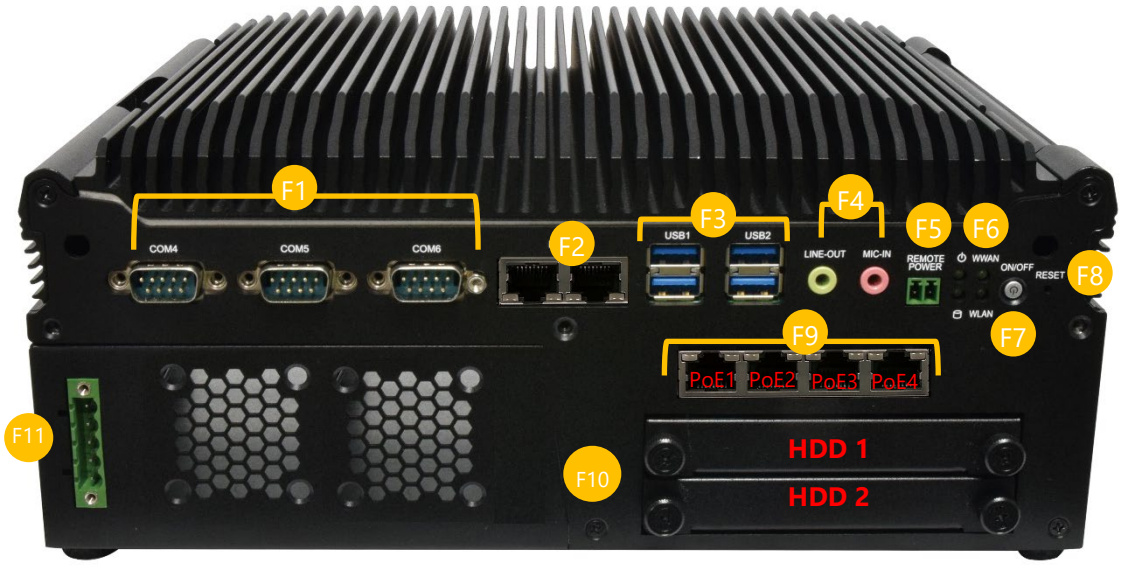
SKU No.	Description
LEC-2290B	Intel® Core™ i7-9700TE, 16GB System Memory, 128GB mSATA and 2.5" 256GB SATA Storage, 1x PCIe*16 expansion slot (Intel® AI Software Suite Preinstalled), +9~30VDC Input with 270W AC/DC Adapter.

System Specifications

Processor System	CPU	Support Intel® Core™ i7-8700/ i7-9700TE (Coffee Lake S)
	Frequency	Up to 3.2 GHz/1.8GHz
	Core Number	6 Cores/ 8 Cores
	Chipset	C246
Fanless		No
Memory	Technology	DDR4 2133/2400 SO-DIMM
	Max. Capacity	Up to 64 GB
	Socket	2x 260-pin SO-DIMM
Graphic	Graphic Processor	Intel® UHD Graphics 630
Audio	Codec	TSI 92HD73C HD code
	Interface	1x for MIC-in and 1x for Line-out
Ethernet	Controller	Intel i210iT Ethernet controller
	Speed	10/100/1000 Mbps
	Interface	2x GbE RJ45 Ports; 4x PoE RJ45 Ports, IEEE 802.3af / IEEE 802.3at (Total PoE Budget of 60W)
Storage	HDD/SSD	2x Removable HDD/SSD external slot with RAID
	mSATA	1x mSATA
I/O	COM Port	6x D-Sub Ports, support RS232/422/485
	Ethernet Ports	6x RJ45 GbE Ethernet Ports (4x PoE)
	PoE	4x PoE supporting IEEE802.3af (15.5W), 1x Single port supporting IEEE802.3at (25.5W), Max power output of 4x port PoE: 60W
	USB Port	4x USB 3.0 Type A Ports
	Audio	1x Mic-in, 1xLine-out
	Power Switch	1x 2pin Remote Power Switch
	LED Indicator	Power/Storage/LTE/Wi-Fi LED Indicator
	Reset/Power Button	1x Reset Button, 1x Power-on button (Red-stand by, Green-Operating)
	Display	1x DP max. 4096x2304@60Hz; 2x HDMI max. 4096x2304@24Hz
	Digital I/O	1x terminal block Isolation: 8x DI (12V), and 8x DO (Sink mode, 12V@100mA)
	Power input	1x 4-Pin Terminal block (Pin define: -/+/+/-) for 9~30V DC input (normal 12VDC & 24VDC)
	Antenna	4x SMA-type Antenna Hole
Expansion Interface	PCIe	1x PCIe *16 Slot, 1x PCIe *4 Slot, 1x mini-PCIe (PCIe + USB2.0) 1x M.2 B-key (PCIe + USB3.0) with Nano-SIM
Cooling	Processor	Passive CPU heatsink
	System	2x Smart Fans (Optional)
Power	Connector	1x 4pin terminal block
	Power Supply Voltage	9~30 VDC (-/+/+/-)
	Power Consumption (Idle)	29.5W@ +12VDC-IN
	Power Consumption (Full Load)	121.6W@ +12VDC-IN

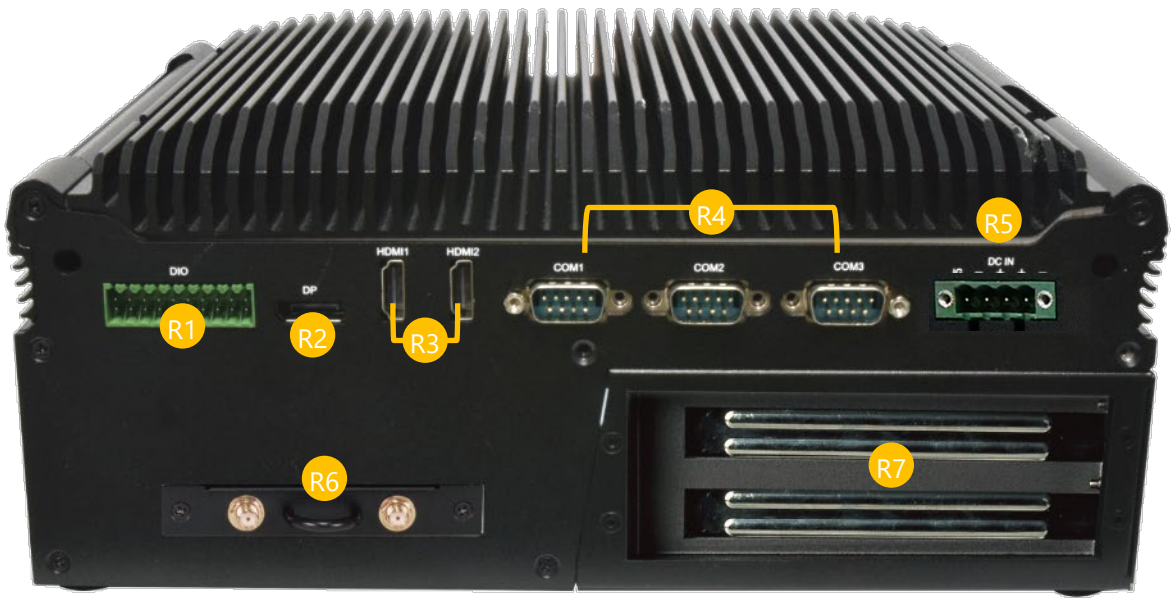
Environment	Operating Temperature	● -20°C~45°C for Intel® Core™ i7-8700(3.2GHz) @TDP 65W Intel® Core™ i5-8500(3.3GHz) @TDP 62W Intel® Core™ i3-8300(3.7GHz) @TDP 62W ● -20°C~55°C for Intel® Core™ i7-8700T(2.4GHz) @TDP 35W Intel® Core™ i5-8500(2.7GHz) @TDP 35W Intel® Core™ i3-8100(3.1GHz) @TDP 35W
	Storage Temperature	-40°C to +70°C
	Relative Humidity	10%~90% (Non-condensing)
Mechanical	Dimension (W x H x D)	275 x 225 x 115mm (without mounting)
	Weight	6.4 kg
	Mounting	Wallmount kit
OS Support	Microsoft Windows	Windows 10 IoT 64-bit series
	Linux	Ubuntu 18.10 64bit and above / Cent OS 7 and above / Fedora 30 64bit and above / Kernel 3.12
Certification	EMC	FCC/CE Class A
	Safety	N/A

Front Panel



No.	Description	
F1	COM Port	3x DB9 Male Connector for RS232/422/485
F2	LAN Port	2x GbE RJ45 port with LED indicators
F3	USB 3.0 Port	4x USB 3.0 Type A
F4	Audio Jack	3.5mm Line-out and Mic-in Jack
F5	Remote Switch	1x 2-pin Remote Power Switch
F6	System Status LED Indicator	
F7	Power Button	1x Power On/Off button with LED Indicator
F8	Reset Button	1x Reset Button (Default SW Reset)
F9	PoE Port	4x PoE Port with LED indicators. Any single port supports IEEE 802.3at 25.4W under total PoE power budget at 60W.
F10	Storage Bay	2x HDD/SSD Disk Bays (9.5mm height each max.)
F11	DC Input	1x 4 pin terminal block (pin define: -/+/+/-) for 12V DC input (max. 200W)

Rear Panel

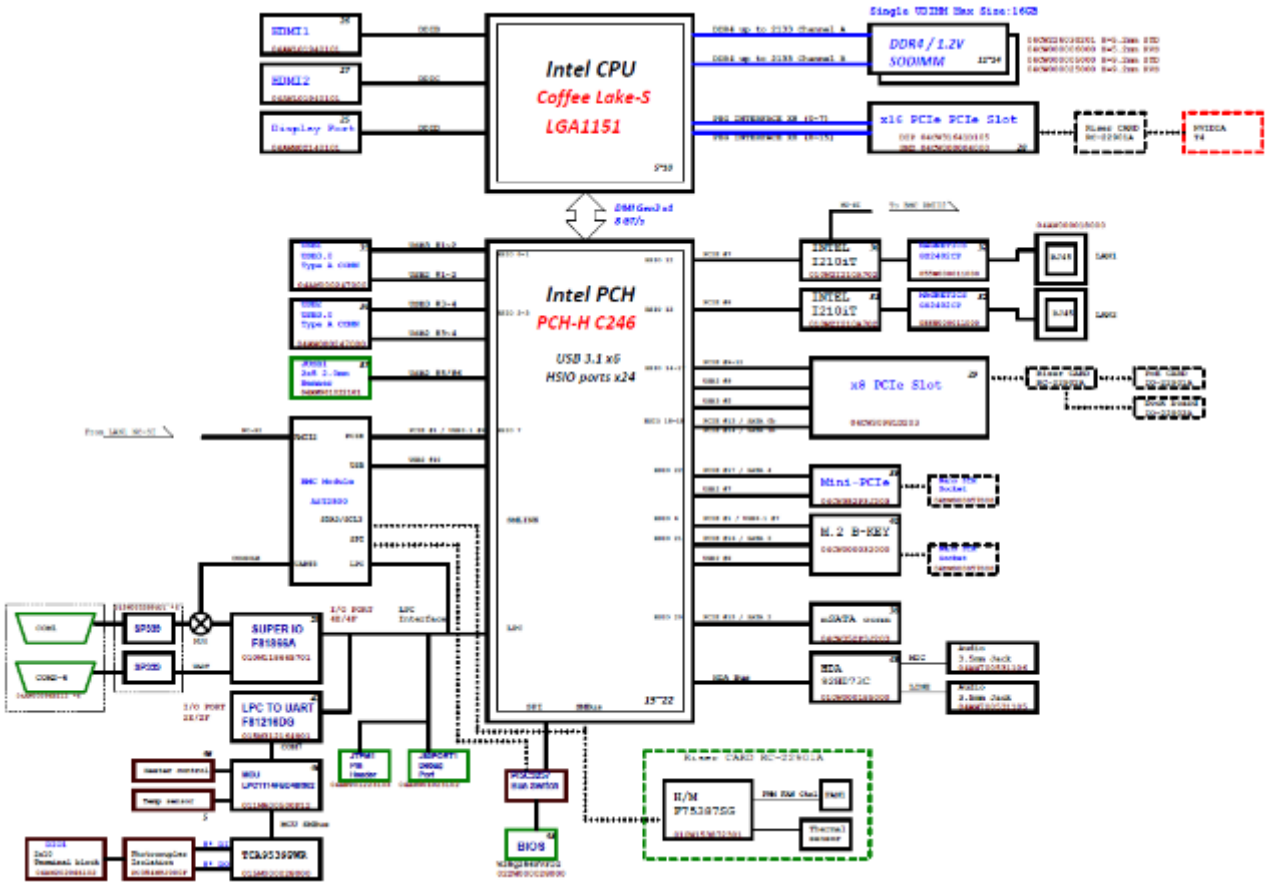


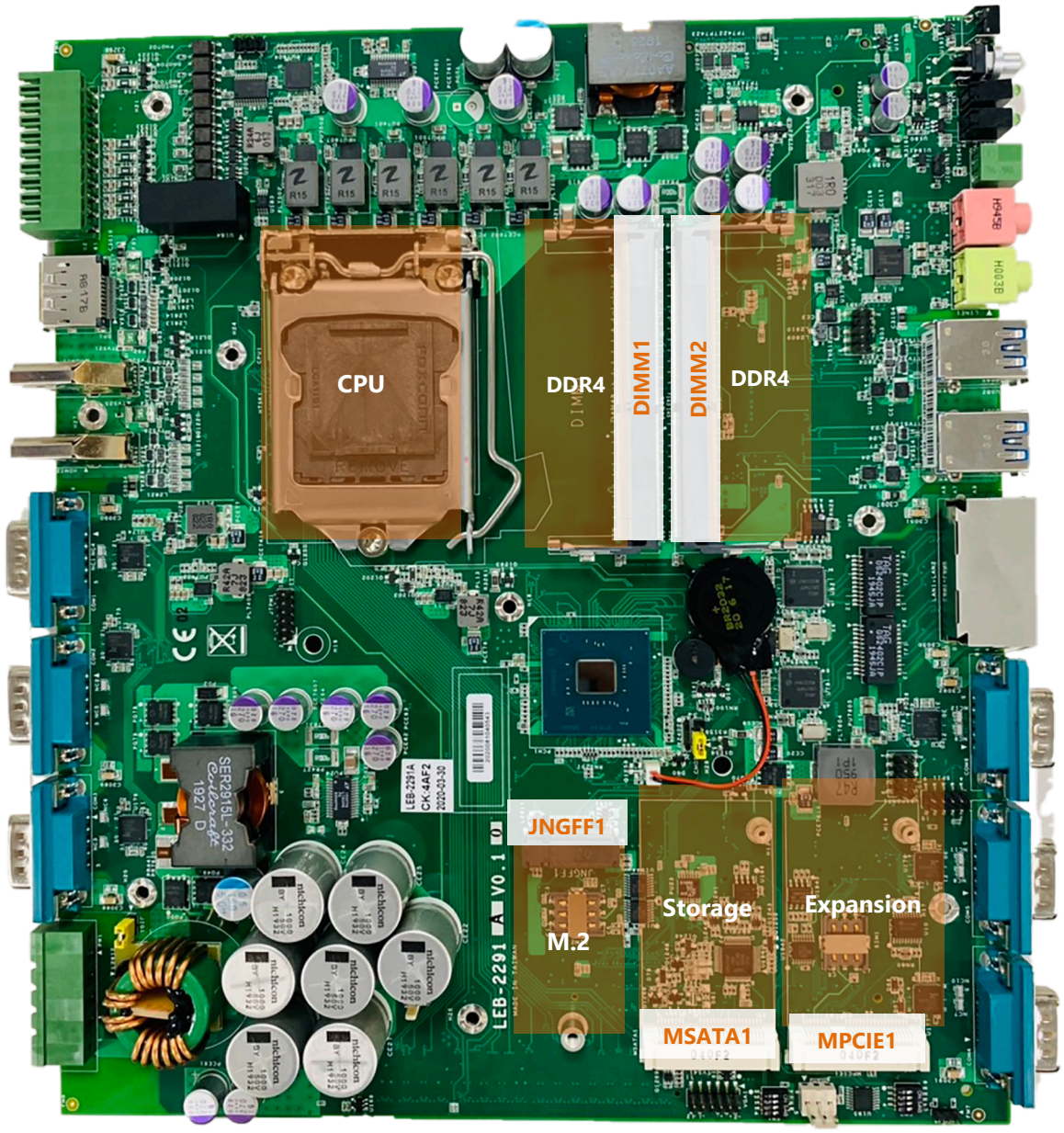
No.	Description	
R1	DIO	1x 20 pin terminal block 8 DI (12V) & 8 DO (12V,100mA) Isolation
R2	Display Port	1x Display Port
R3	HDMI Port	2x HDMI Port
R4	COM Port	3x DB9 Male Connector for RS232/422/485
R5	DC Input	1x 4-pin terminal block for DC 9~36V system power source
R6	Module Slot (Antenna Port)	Removable PGN Module Slot supporting Dual SIM and 2x Antenna Hole with dust cover
R7	PCIE Slot	1x PCIe*16 Slot

CHAPTER 2: MOTHERBOARD INFORMATION

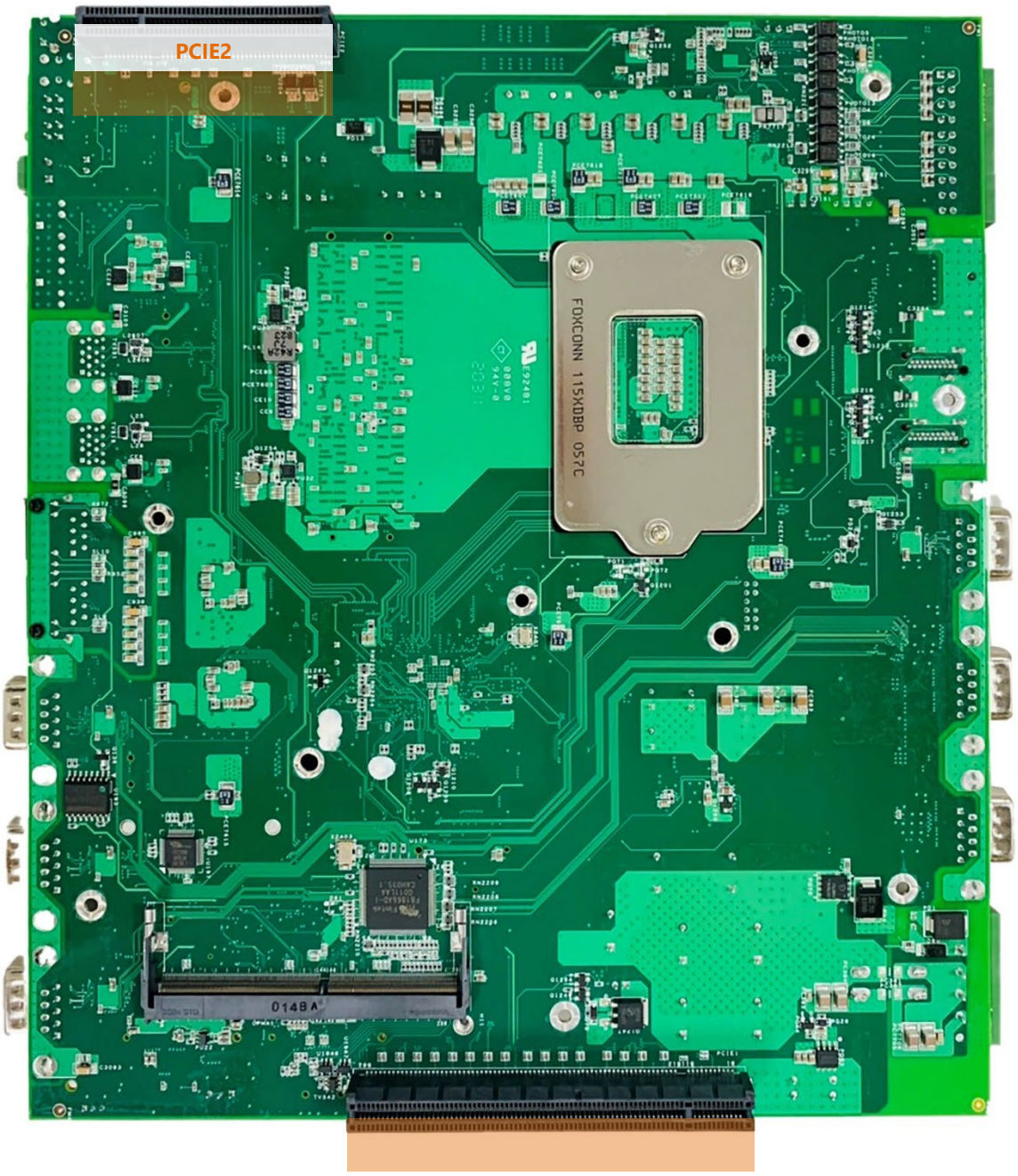
Block Diagram

The block diagram indicates how data flows among components on the motherboard. Please refer to the following figure for your motherboard's layout design.




CPU
DDR4
DIMM1
DIMM2
DDR4
JNGFF1
M.2
Storage
Expansion
MSATA1
MPCIE1

Rear View

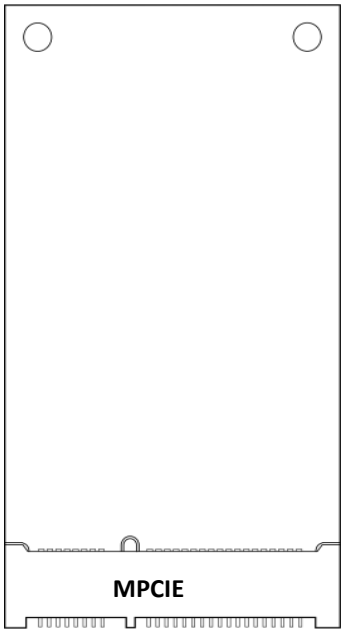


Internal Jumpers and Connectors

Expansion

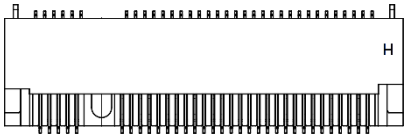
MPCIE1: MCCIE Mini Card Slot

PIN	DESCRIPTION	PIN	DESCRIPTION
1	WAKE#	2	+3.3V
3	RSVD	4	GND
5	RSVD	6	+1.5V
7	CLKREQ#	8	UIM_PWR
9	GND	10	UIM_DATA
11	REFCLK-	12	UIM_CLK
13	REFCLK+	14	UIM_RESET
15	GND	16	UIM_VPP
KEY			
17	RSVD	18	GND
19	RSVD	20	W_DISABLE#
21	GND	22	PERST#
23	PERn0	24	+3.3V
25	PERp0	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PETn0	32	SMB_DATA
33	PETp0	34	GND
35	GND	36	USB_D+
37	GND	38	USB_D-
39	+3.3V	40	GND
41	+3.3V	42	LED_WWAN#
43	GND	44	LED_WLAN#
45	RSVD	46	LED_WPAN#
47	RSVD	48	+1.5V
49	RSVD	50	GND
51	RSVD	52	+3.3V



JNGFF1: M.2 Slot (B-KEY)

PIN	DESCRIPTION	PIN	DESCRIPTION
1	CONFIG3	2	3V3_AUX
3	GND	4	3V3_AUX
5	GND	6	CARD PWROFF
7	USB D+	8	W_DIS
9	USB D-	10	DAS/DSS#
11	GND		
KEY B			
21	CONFIG0	20	AUDIO_0
23	NC	22	AUDIO_1
25	NC	24	AUDIO_2
27	GND	26	AUDIO_3
29	PERn1/USB3RX-	28	UIM_RFU
31	PERp1/USB3RX+	30	UIM_RESET



33	GND	32	UIM_CLK
35	PETn1/USB3TX-	24	UIM_DATA
37	PETp1/USB3TX+	36	UIM_PWR
39	GND	38	DEVSLP
41	PETn0/SATA_B+	40	GNSS0
43	PETp0/SATA_B-	42	GNSS1
45	GND	44	GNSS2
47	PERn0/SATA_A-	46	GNSS3
49	PERp0/SATA_A+	48	GNSS4
51	GND	50	PRESET#
53	REFCLK-	52	CLKREQ#
55	REFCLK+	54	WALE#
57	GND	56	NC
59	ANTCTL0	58	NC
61	ANTCTL1	60	COEX3
63	ANTCTL2	62	COEX2
65	ANTCTL3	64	COEX1
67	PEDET	66	SIM_DET
69	PEDET/CONFIG1	68	SUSCLK
71	GND	70	3V3_AUX
73	GND	72	3V3_AUX
75	CONFIG2	74	3V3_AUX

PCIE1: x16 PCIE Slot

Pin No	DESCRIPTION	Pin No	DESCRIPTION
B1	12V	A1	PRSNT1#
B2	12V	A2	12V
B3	12V	A3	12V
B4	GND	A4	GND
B5	SMCLK	A5	JTAG2
B6	SMDAT	A6	JTAG3
B7	GND	A7	JTAG4
B8	3.3V	A8	JTAG5
B9	JTAG1	A9	3.3V
B10	3.3VAUX	A10	3.3V
B11	WAKE#	A11	PERST#
KEY B			
B12	RSVD	A12	GND
B13	GND	A13	REFCLKA+
B14	HSOP0	A14	REFCLKA-
B15	HSON0	A15	GND
B16	GND	A16	HSIP0

B17	PRSNT2#	A17	HSIN0
B18	GND	A18	GND
B19	HSOP1	A19	RSVD
B20	HSON1	A20	GND
B21	GND	A21	HSIP1
B22	GND	A22	HSIN1
B23	HSOP2	A23	GND
B24	HSON2	A24	GND
B25	GND	A25	HSIP2
B26	GND	A26	HSIN2
B27	HSOP3	A27	GND
B28	HSON3	A28	GND
B29	GND	A29	HSIP3
B30	RSVD	A30	HSIN3
B31	PRSNT2#	A31	GND
B32	GND	A32	RSVD(REFCLKB+)
B33	HSOP4	A33	RSVD(REFCLKB-)
B34	HSON4	A34	GND
B35	GND	A35	HSIP4
B36	GND	A36	HSIN4
B37	HSOP5	A37	GND
B38	HSON5	A38	GND
B39	GND	A39	HSIP5
B40	GND	A40	HSIN5
B41	HSOP6	A41	GND
B42	HSON6	A42	GND
B43	GND	A43	HSIP6
B44	GND	A44	HSIN6
B45	HSOP7	A45	GND
B46	HSON7	A46	GND
B47	GND	A47	HSIP7
B48	PRSNT2#	A48	HSIN7
B49	GND	A49	GND
B50	HSOP8	A50	RSVD
B51	HSON8	A51	GND
B52	GND	A52	HSIP8
B53	GND	A53	HSIN8

B54	HSOP9	A54	GND
B55	HSON9	A55	GND
B56	GND	A56	HSIP9
B57	GND	A57	HSIN9
B58	HSOP10	A58	GND
B59	HSON10	A59	GND
B60	GND	A60	HSIP10
B61	GND	A61	HSIN10
B62	HSOP11	A62	GND
B63	HSON11	A63	GND
B64	GND	A64	HSIP11
B65	GND	A65	HSIN11
B66	HSOP12	A66	GND
B67	HSON12	A67	GND
B68	GND	A68	HSIP12
B69	GND	A69	HSIN12
B70	HSOP13	A70	GND
B71	HSON13	A71	GND
B72	GND	A72	HSIP13
B73	GND	A73	HSIN13
B74	HSOP14	A74	GND
B75	HSON14	A75	GND
B76	GND	A76	HSIP14
B77	GND	A77	HSIN14
B78	HSOP15	A78	GND
B79	HSON15	A79	GND
B80	GND	A80	HSIP15
B81	PRSNT2#	A81	HSIN15
B82	RSVD(CARD_DET#)	A82	GND

PCIE2 x8PCIE Slot (none-standard x8 PCIE SLOT)

Pin No	DESCRIPTION	Pin No	DESCRIPTION
B1	12V	A1	PRSNT1#
B2	12V	A2	12V
B3	12V	A3	12V

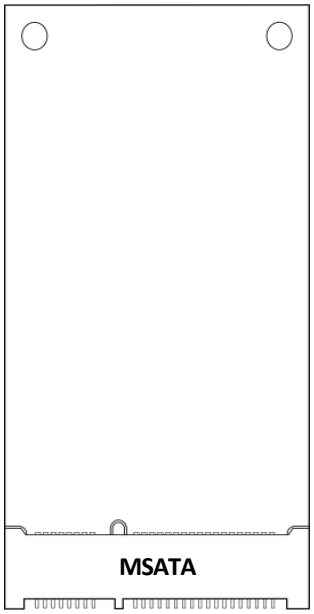
B4	GND	A4	GND
B5	SMCLK	A5	JTAG2
B6	SMDAT	A6	JTAG3
B7	GND	A7	JTAG4
B8	3.3V	A8	JTAG5
B9	JTAG1	A9	3.3V
B10	3.3VAUX	A10	3.3V
B11	WAKE#	A11	PERST#
KEY B			
B12	RSVD	A12	GND
B13	GND	A13	REFCLK+
B14	HSOP0	A14	REFCLK-
B15	HSON0	A15	GND
B16	GND	A16	HSIP0
B17	PRSNT2#	A17	HSIN0
B18	GND	A18	GND
B19	HSOP1	A19	PoE_INT
B20	HSON1	A20	GND
B21	GND	A21	HSIP1
B22	GND	A22	HSIN1
B23	HSOP2	A23	GND
B24	HSON2	A24	GND
B25	GND	A25	HSIP2
B26	GND	A26	HSIN2
B27	HSOP3	A27	GND
B28	HSON3	A28	GND
B29	GND	A29	HSIP3
B30	RSVD	A30	HSIN3
B31	PRSNT2#	A31	GND
B32	GND	A32	12V
B33	USB2_P9	A33	12V
B34	USB2_N9	A34	GND
B35	GND	A35	12V
B36	GND	A36	12V
B37	USB3_TX5+	A37	GND
B38	USB3_TX5-	A38	GND
B39	GND	A39	USB3_RX5+

B40	GND	A40	USB3_RX5-
B41	SATA_TX1+	A41	GND
B42	SATA_TX1-	A42	GND
B43	GND	A43	SATA_RX1+
B44	GND	A44	SATA_RX1-
B45	SATA_TX2+	A45	GND
B46	SATA_TX2-	A46	GND
B47	GND	A47	SATA_RX2+
B48	4G_PERST#	A48	SATA_RX2-
B49	VSIM_SW	A49	GND

Storage

MSATA1: MSATA Slot (Full Size)

PIN	DESCRIPTION	PIN	DESCRIPTION
1	N.C	2	+3.3V
3	N.C	4	GND
5	N.C	6	N.C
7	N.C	8	N.C
9	GND	10	N.C
11	N.C	12	N.C
13	N.C	14	N.C
15	GND	16	N.C
KEY			
17	N.C	18	GND
19	N.C	20	N.C
21	GND	22	N.C
23	SATA_RXp	24	+3.3V
25	SATA_RXn	26	GND
27	GND	28	N.C
29	GND	30	N.C
31	SATA_TXn	32	N.C
33	SATA_TXp	34	GND
35	GND	36	N.C
37	GND	38	N.C
39	+3.3V	40	GND
41	+3.3V	42	N.C
43	GND	44	N.C
45	N.C	46	N.C
47	N.C	48	N.C
49	N.C	50	GND
51	N.C	52	+3.3V



Power

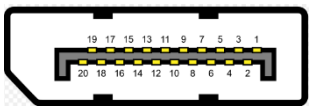
PW1: DC IN Connector (1x4 Pin 5.0mm Terminal block)

PIN NO.	DESCRIPTION
1	DC_IN (-)
2	DC_IN (+)
3	DC_IN (+)
4	DC_IN (-)

Display

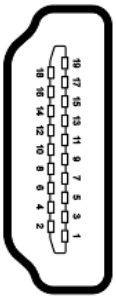
DP1: Display Port Interface

Pin No.	Description	Pin No.	Description
1	LANE0+	2	GND
3	LANE0-	4	LANE1+
5	GND	6	LANE1-
7	LANE2+	8	GND
9	LANE2-	10	LANE3+
11	GND	12	LANE3-
13	GND	14	GND
15	AUX CH+	16	GND
17	AUX CH-	18	HOT PLUG
19	RETURN	20	DP PWR



HDMI1/HDMI2: High-Definition Multimedia Interface

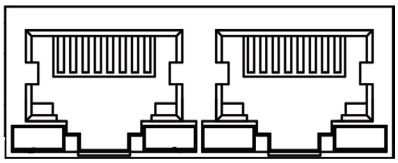
Pin No.	Description	Pin No.	Description
1	DATA2+	2	GND
3	DATA2-	4	DATA1+
5	GND	6	DATA1-
7	DATA0+	8	GND
9	DATA0-	10	CLK+
11	GND	12	CLK-
13	N.C	14	N.C
15	DDC CLK	16	DDC DAT
17	GND	18	HDMI_VCC
19	HPD		



Ethernet

Ethernet LAN1/LAN2: Dual RJ-45 with LED

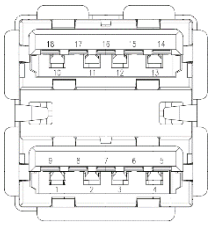
Pin No.	Description	
	Fast E-Net	Giga Net
1	TX+	MD0+
2	TX-	MD0-
3	RX+	MD1+
4	T45	MD2+
5	T45	MD2-
6	RX-	MD1-
7	T78	MD3+
8	T78	MD3-
9	10-/100-/1000+	
10	10+/100+/1000-	
11	Link+/ACT-	
12	Link-/ACT+	



USB

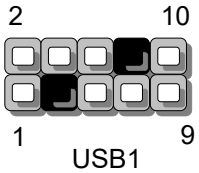
USB1/USB2: USB 3.0 Double Stack Type A

PIN NO	9	8	7	6	5
Description	USB1_TX+	USB1_TX-	GND	USB1_RX+	USB1_RX-
PIN NO	1	2	3	4	
Description	USB_VCC1	USB1_D-	USB1_D+	GND	
PIN NO	9	8	7	6	5
Description	USB1_TX+	USB1_TX-	GND	USB1_RX+	USB1_RX-
PIN NO	1	2	3	4	
Description	USB_VCC1	USB1_D-	USB1_D+	GND	



JUSB1: Internal USB Connector

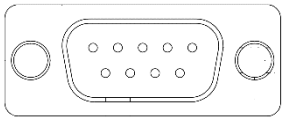
PIN NO.	DESCRIPTION	PIN NO	DESCRIPTION
1	USB_VCC	2	GND
3	KEY	4	+USB
5	-USB	6	-USB
7	+USB	8	KEY
9	GND	10	USB_VCC



I/O Function

COM1~6: Serial Port 1~6 (RS232/422/485)

Pin No.	Description	Description	Description
1	DCD#	Tx-	RxTx-
2	RX	Tx+	RxTx+
3	TX	Rx+	
4	DTR#	Rx-	
5	GND	GND	GND
6	DSR		
7	RTS#		
8	CTS#		
9	RI#		



DIO1: Isolation Digital Input / Output

PIN NO.	DESCRIPTION	PIN NO	DESCRIPTION
1	DO_0	2	DI_0
3	DO_1	4	DI_1
5	DO_2	6	DI_2
7	DO_3	8	DI_3
9	DO_4	10	DI_4
11	DO_5	12	DI_5
13	DO_6	14	DI_6
15	DO_7	16	DI_7
17	DO_COM	18	I_COM
19	DO_COM	20	12V_OUT(400mA)

Audio

LINE1: 3.5mm Headphone Jack (Green)

PIN	DESCRIPTION
1	GND
2	LINE_OUT_L
3	GND
4	GND
5	LINE_OUT_R

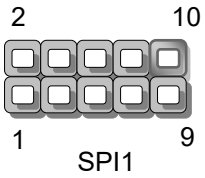
MIC1: 3.5mm Headphone Jack (Pink)

PIN	DESCRIPTION
1	GND
2	MIC_L
3	GND
4	GND
`5	MIC_R

Other Connectors

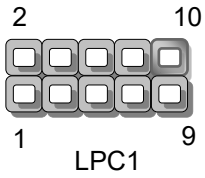
SP1: SPI Interface (Debug Only)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	SPI_HOLD	2	N.C
3	SPI_CS#	4	SPI_VCC
5	SPI_MO	6	N.C
7	N.C	8	SPI_CLK
9	GND	10	SPI_MI



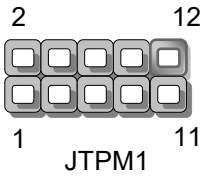
J80PORT1: LPC Debug 80Port (Debug Only)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	SPI_HOLD	2	N.C
3	SPI_CS#	4	SPI_VCC
5	SPI_MO	6	N.C
7	N.C	8	SPI_CLK
9	GND	10	SPI_MI



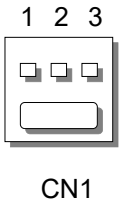
JTPM1: TPM Module Connector

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	SERIRQ#	2	+3.3V
3	LAD0	4	+3.3V
5	LAD1	6	GND
7	LFRAME#	8	key
9	LPC_CLK	10	PLTRST#
11	LAD2	12	LAD3



CN1: MCU Debug Connector (Debug Only)

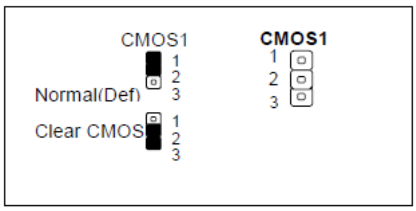
PIN NO.	DESCRIPTION
1	EXT_TX
2	GND
3	EXT_RX



Jumper Settings & Switch Settings

CMOS1: Clear CMOS

Description	CMOS1
Normal (Default)	1-2
Clear CMOS	2-3

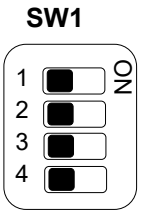


PSBTN2: External Power Button (1x2 Pin 3.81mm Terminal Block)

PIN NO.	DESCRIPTION
1	PS_IN
2	GND

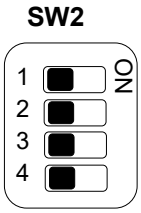
SW1: Ignition Function Setting

SW NO.	DESCRIPTION	Off	On
S1	DETECT POWER GOOD	Disable	Enable
S2	LOW POWER DETECT	Disable	Enable
S3	MCU WATCH DOG	Disable	Enable
S4	PROGRAM MODE	Disable	Enable



SW2: MCU Communication Port Select

Description	SW2
Connect internal RS232(COM7)	S1/S2 on S3/S4 off
Connect external RS232 from CN1. (Debug & Update FW)	/S2 off S3/S4 on



JIG1: Disable Ignition Function

Description.	DESCRIPTION
Normal	1-2 Short
IG mode	1-2 Open

JIGBTN1: Disable Ignition Function

Feature	DESCRIPTION
Power button from MCU	1-2 Short
Power button from PSBTN1	1-2 Open

DIO Specifications

Digital Input (DI)

Channel	8
Type	Sink / Source Type
Voltage (max)	30V
Input Impedance	8.2K ohm
Response Time	<2ms
Isolation Voltage (RMS)	3750VDC

Digital Output (DO)

Channel	8
DO Type	Sink Type
DO Mode	Level
Work Voltage	5~24V
Driver Current (max)	200mA
Resp	<2ms
Isolation Voltage (RMS)	3750VDC

Power Output

Voltage	12V@400mA (25°C)
Isolation Voltage (RMS)	1500 VDC (60s)
	1800 VDC (1s)

CHAPTER 3: COMMAND LINE

You can configure the value of voltage, power on delay, DI/DO and others on LEC-2290 via the MCU command line.

Below are the requirements to enable the command line

1. Host communication interface: COM#7 (RS-232)
2. Support baud rate: 57600/ 8N1
3. Communication protocol: ANSI terminal.

Use below formula to set/get your command line:

GET VariableName

SET VariableName value

MCU Command	Write/Read (SET/GET)	VariableName	Value	
Startup Voltage(mV)	SET	STARTUP_VOLTAGE	0(default)	0mV
	GET	STARTUP_VOLTAGE		
Shutdowm Voltage (mV)	SET	INPUT_VOLTAGE_MIN	8500(default)	8500mV
	GET	INPUT_VOLTAGE_MIN		
PowerOn Delay (Sec)	SET	POWERON_DELAY	4(default)	4S
	GET	POWERON_DELAY		
PowerOff Delay (Sec)	SET	SHUTDOWN_DELAY	4(default)	4S
	GET	SHUTDOWN_DELAY		
Input Voltage	GET	INPUT_VOLTAGE		
Device ID	GET	DEVICE_ID	LEC-2290_N	
Firmware Version	GET	VERSION	0.07B	
Ignition	GET	IGNITION		
Digital POE	SET	DIGITAL_POE	15(default)	0~15
	GET	DIGITAL_POE		
Digital DO	SET	DIGITAL_DO	0(default)	0~255
Digital DI	GET	DIGITAL_DI		
Save flash	SAVE			

Example

1. The minimum voltage for startup **Setting: 6V(6000mV)**

SET STARTUP_VOLTAGE 6000	command
OK	response massage
GET STARTUP_VOLTAGE	command
STARTUP_VOLTAGE= 6000	response massage

2. The delay time for POWERON_DELAY state **Setting: 4 S**

SET POWERON_DELAY 4	command
OK	response massage
GET POWERON_DELAY	command
POWERON_DEALY= 4	response massage

3. Device ID

GET DEVICE_ID	command
DEVICE_ID= LEC-2290_N	response massage

4. Firmware Version

GET VERSION	command
VERSION= 0.07B	response massage

5. Ignition state (Read only)

GET IGNITION	command
IGNITION= 0	response massage (0: Ignition off / 1: ignition on)

6. Control the ON/OFF of each POE port

SET DIGITAL_POE 1	command
OK	response massage
GET DIGITAL_POE	command
DIGITAL_POE= 1	response massage

POE1/bit0	=	1
POE2/bit1	=	2
POE3/bit2	=	4
POE4/bit3	=	8

To achieve POE1~4 enable, please entry value setting at 15.

7. Write/Read Digital DO state Setting: DO1/DO2/DO3/DO4/DO5/DO6/DO7/DO8

SET DIGITAL_DO 3	command
OK	response massage
GET DIGITAL_DO	command
DIGITAL_DO= 3	response massage

DO1/bit0	=	1
DO2/bit1	=	2
DO3/bit2	=	4
DO4/bit3	=	8
DO5/bit4	=	16
DO6/bit5	=	32
DO7/bit6	=	64
DO8/bit7	=	128

To achieve DO1~8 enable, please entry value setting at 255.

8. Save setting

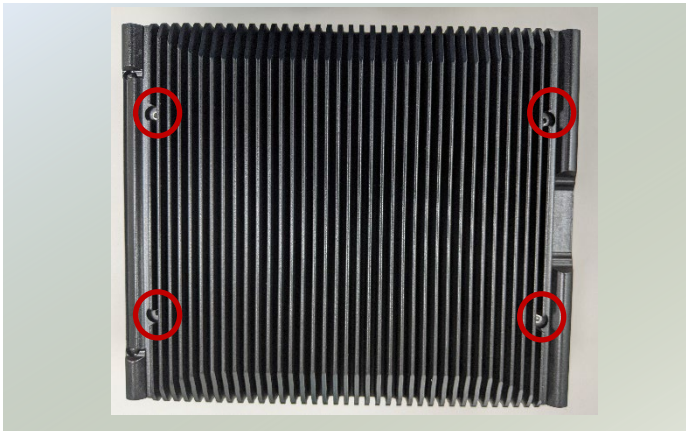
SAVE	command
OK Flash Updated.	response massage

CHAPTER 4: HARDWARE SETUP

To reduce the risk of personal injury, electric shock, or damage to the unit, please remove all power connections to completely shut down the device, and wear ESD protection gloves when conducting the steps in this chapter.

Open the Chassis

1. Power off the system and disconnect the power cord. Unscrew the four (4) screws securing the cover.



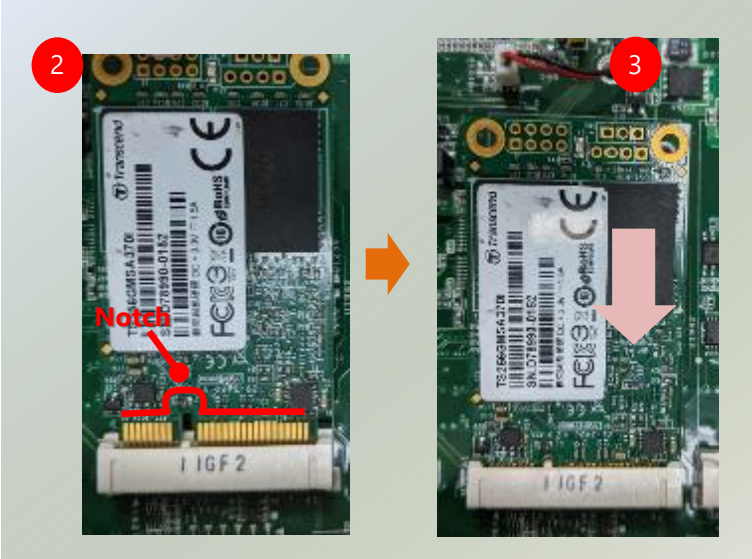
2. Loosen all the screws and lift the cover chassis up.

Installing Memory Card

The system supports one (1) slot for mSATA memory card. Please follow the steps for installation.

1. Power off the system and open the system chassis cover. Locate the mSATA memory slot on the motherboard.

2. Align the notch of the memory card with the socket key in the pin slot.
3. Insert the memory card pins at 30 degrees into the socket until it is fully seated.

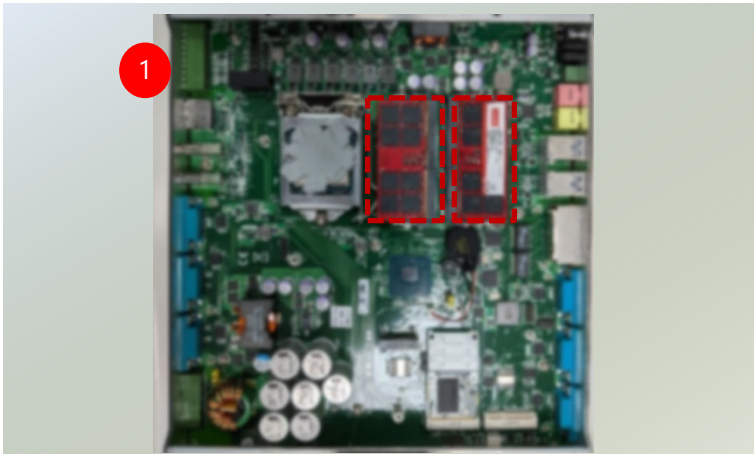


4. Push down on the memory card and secure it with two screws.

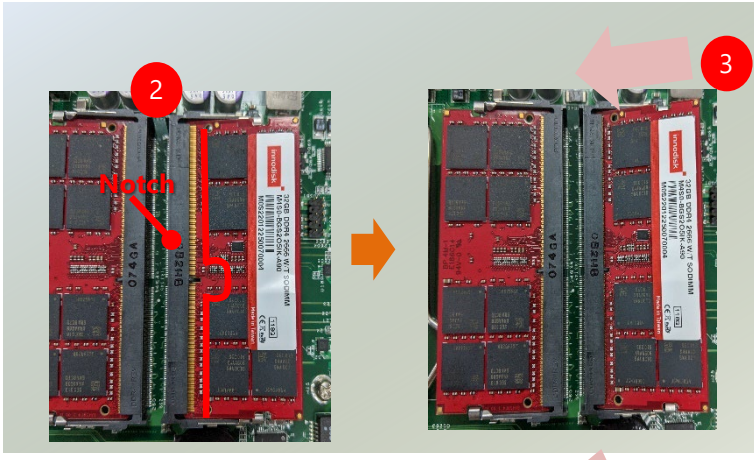
Installing System Memory

The motherboard supports two (2) memory slots for DDR4 registered DIMM. Please follow the steps for installation.

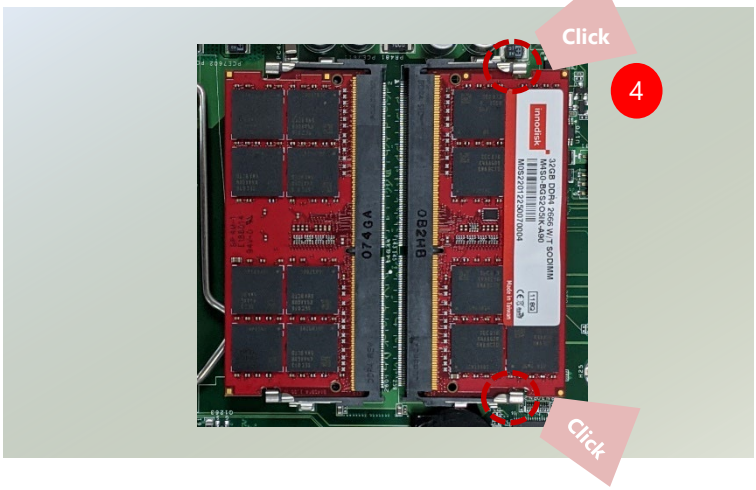
1. Power off the system and open the system chassis cover. Locate the memory slots on the motherboard.



2. Align the notch of the module with the socket key in the pin slot.
3. Insert the memory card pins at 30 degrees into the socket until it is fully seated.



4. Push down on the module until the slot latches catches and clicks into place.



Installing 4G Module (Optional)

This system comes with an external M.2 slot, supporting dual SIM design. The following will discuss the installation of 4G module and SIM cards.

To Install the 4G Module:

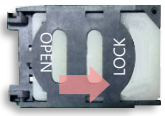
1. Locate the M.2 slot on the motherboard. Align the notch of the module card with the socket key in the slot, and insert it at 30 degrees into the socket until it is fully seated.
2. Push down on the module and secure it with one (1) screw.

To Install the SIM Cards:

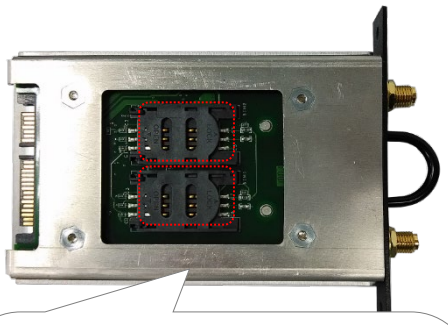
1. Loosen the two (2) screws that secure the tray and draw out the tray by its grip.

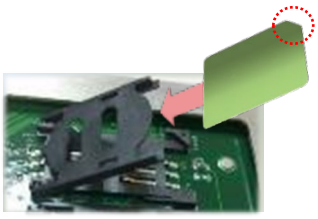
2. Slide open the socket cover and lift the cover on its hinges.

3. Insert the SIM card into the slot in the cover with the gold contacts facing down.



4. Push down the cover to close, and the SIM card will come in contact with the metal contacts in the socket. Finally, Slide the socket cover to the Lock position.



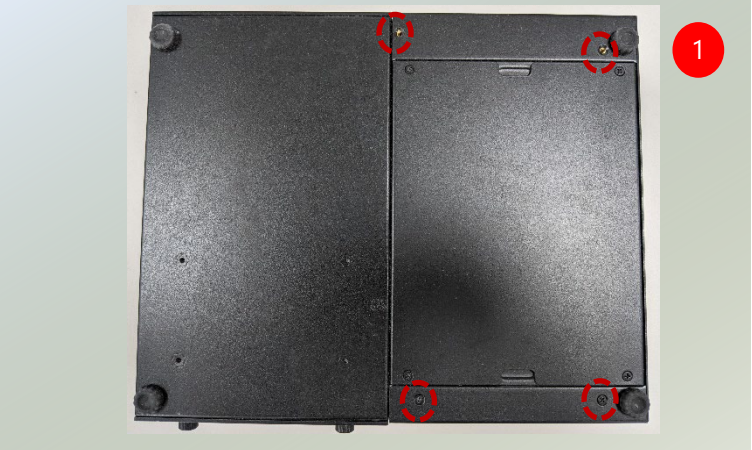


The angled corner of the card is positioned as shown in this picture.

Installing IPMI BMC Card (Optional)

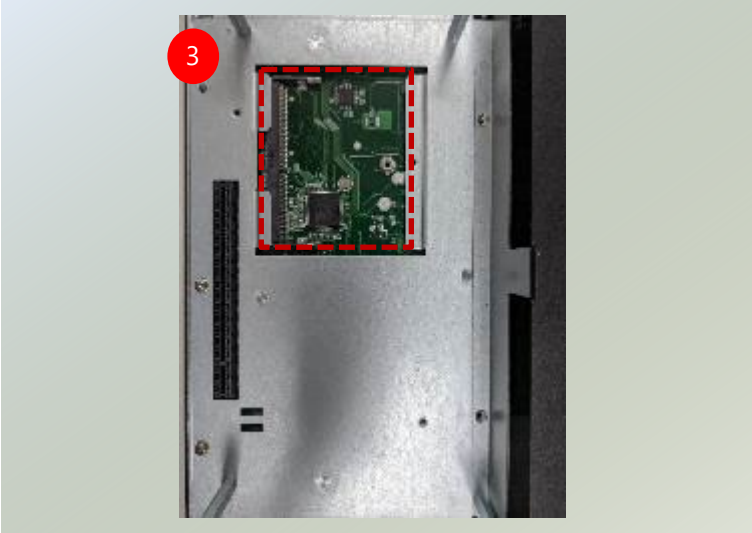
IPMI provides better server management, server monitoring, and remote access. IPMI is independent of the system's CPU operating system via hardware applied directly into the motherboard. Please follow the steps for installation.

1. Power off the system and turn the system upside down. Locate the four (4) screws on the bottom panel.

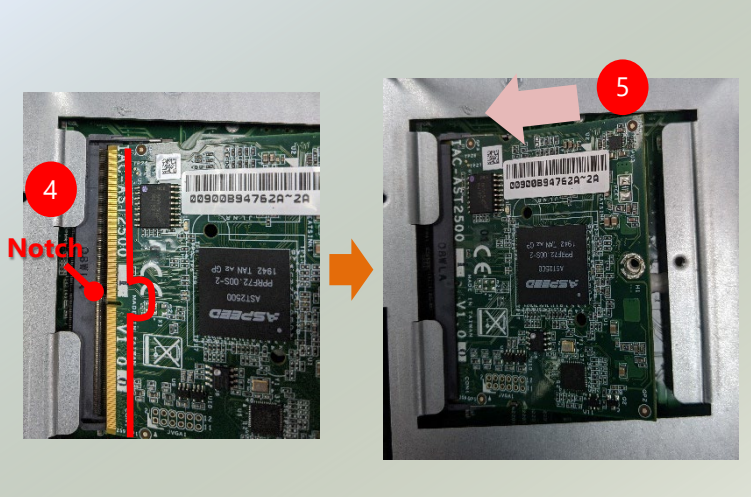


2. Loosen the screws and lift up to remove, and place it aside. Watch out for the metal pillars on each corner and PCIe pins.

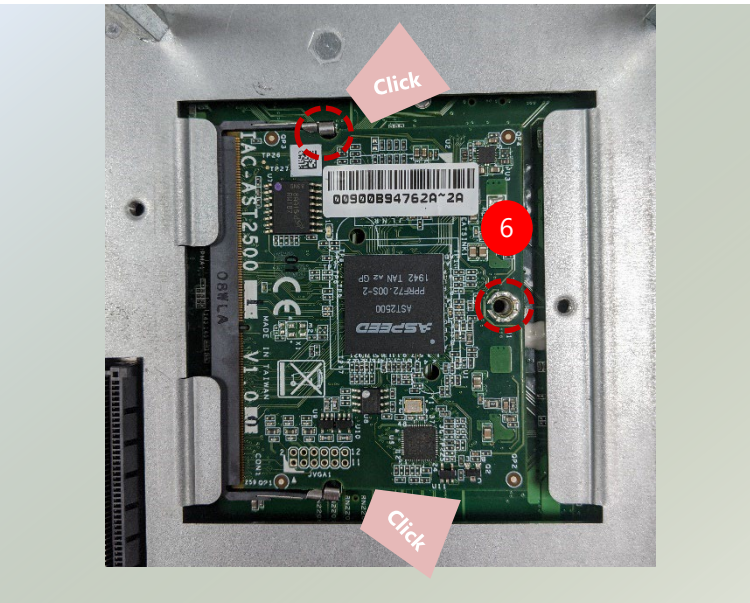
3. Locate the BMC module slot on the motherboard.



4. Align the notch of the module with the socket key in the pin slot.
5. Insert the BMC card pins at 30 degrees into the socket until it is fully seated.



6. Push down on the module until the slot latches catches and clicks into place. Then, secure into place with one (1) screw.



Installing the Disk Drive(s) (Optional)

The system supports two 2.5" HDD/SSD drive bays, with one 2.5" SSD drive included. The following will discuss disk drive installation procedures.

1. Power off the system and unplug the power cord. Unscrew the two thumbscrews that fix the tray on the system. Pull the drive tray out.

2. Install the disk onto the tray and secure with four (4) screws, two on each side. Make sure the SATA connector faces outwards as shown in the image.

3. Insert the tray into the bay and fasten the two thumbscrews that fix the tray on the system.

Wall-Mounting the System (Optional)

The system can be mounted on a flat surfaced wall. Please take the following into considerations when mounting the system onto the wall.

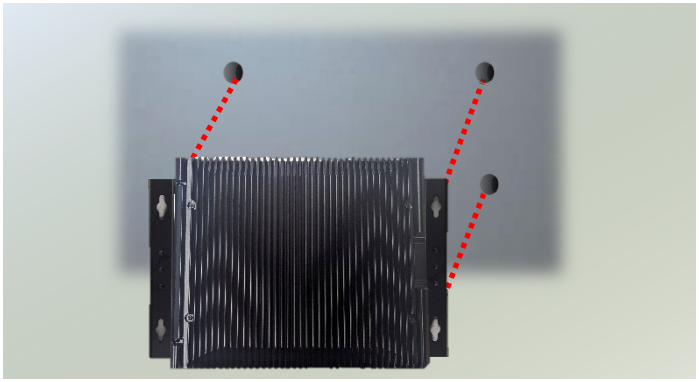
The wallmount kit contains the following items:

- 1x pair of Wall Brackets
- 6x Screws (for the wall brackets)

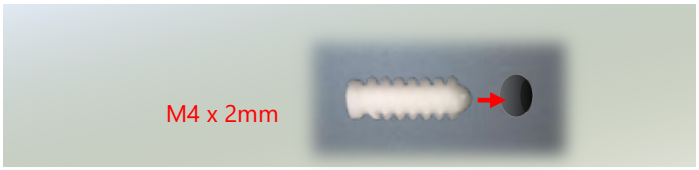
1. Invert the system to expose the bottom side. Secure the two wall brackets to the system base using four (4) screws, two (2) per bracket.

2. On the wall, measure the exact place where you want to hang the system and drill four holes.

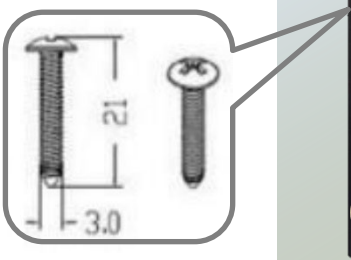
NOTE: *The demonstrated screw type can fit in general drywall or shelves. Please identify the wall type and select the suitable fixing approach to secure this system to the wall, and consult a qualified trained person if you are unsure.*

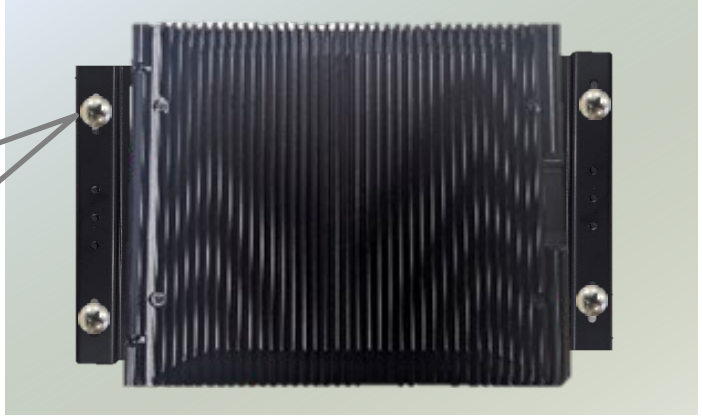


3. Insert the expansion anchor bolts into the holes



4. Drive four (4) long screws into the anchoring bolts to secure the system.



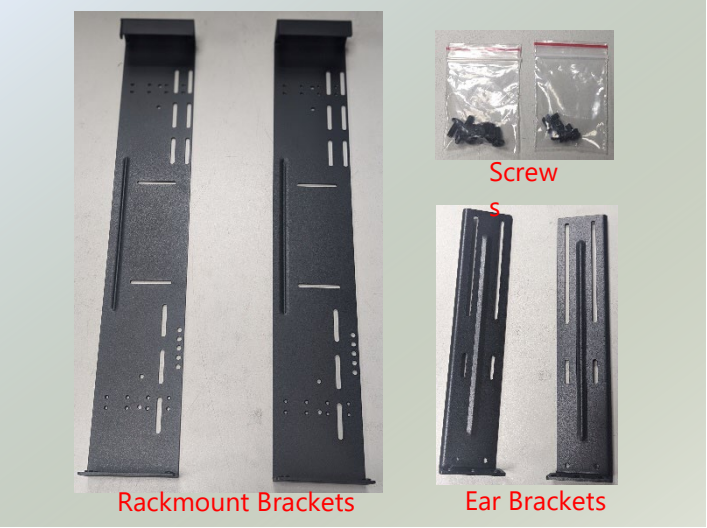


Rackmount the System (Optional)

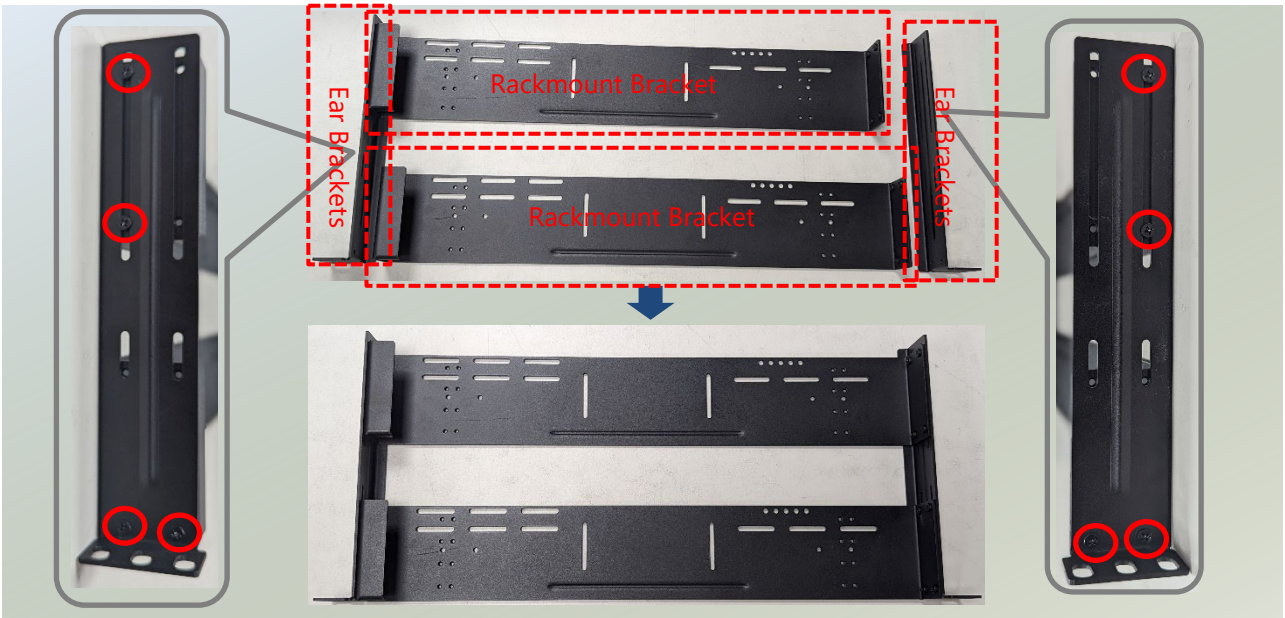
With a rackmount kit, LEC-2290 can be installed into a rack. Please contact Lanner's sales representative for purchasing the rackmount kit.

The rackmount kit contains the following:

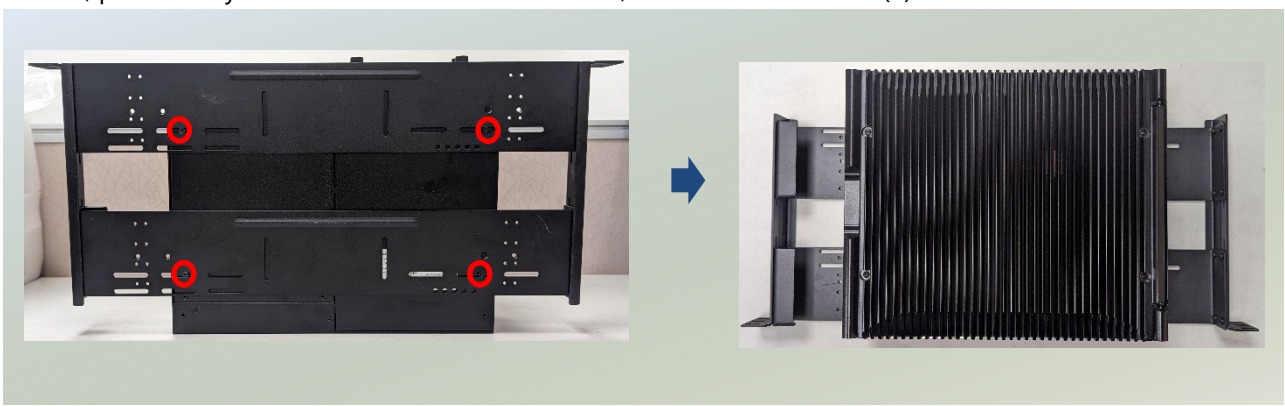
- 2x Rackmount Brackets
- 2x Ear Brackets
- 1x Screws Pack



1. Align the ear brackets to the rackmount brackets and secure using four (4) screws on each side.



2. Next, place the system in the center of the bracket, and secure with four (4) screws on the bottom side.



3. Position the system with its front facing you, gently lift it, and insert it into the rack. Attach the ear brackets to the rack rails using rack-mount screws (not provided).

CHAPTER 5: SOFTWARE SETUP

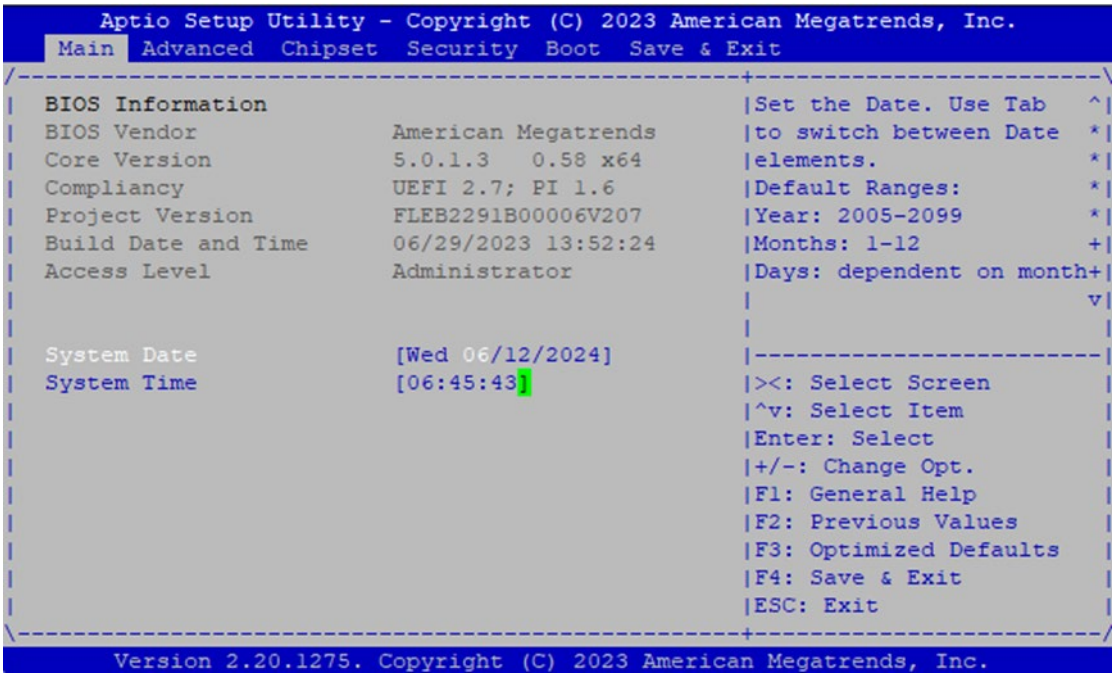
Entering BIOS

The system has AMI BIOS built-in, with a SETUP utility that allows users to configure required settings or to activate certain system features. Pressing the **<Tab>** or **<Del>** key immediately allows you to enter the Setup utility.

Control Keys	Description
→←	select a setup screen, for instance, [Main], [Advanced], [Chipset], [Security], [Boot], and [Save & Exit]
↑↓	select an item/option on a setup screen
<Enter>	select an item/option or enter a sub-menu
+/-	to adjust values for the selected setup item/option
F1	to display General Help screen
F2	to retrieve previous values, such as the parameters configured the last time you had entered BIOS.
F3	to load optimized default values
F4	to save configurations and exit BIOS
<Esc>	to exit the current screen

Main Page

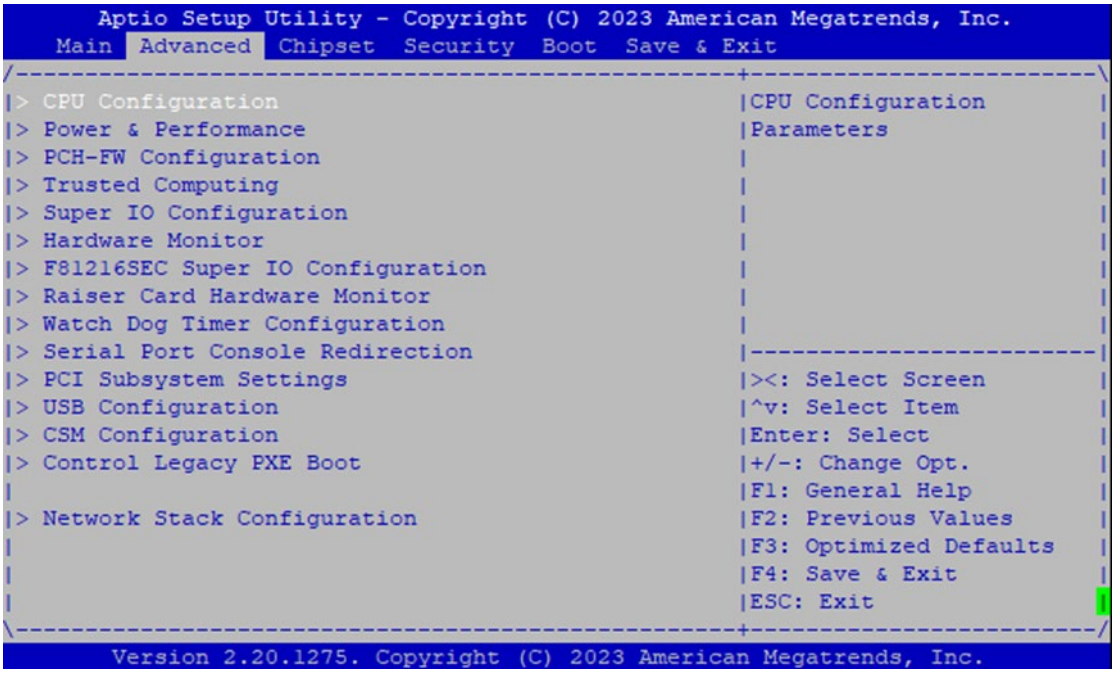
Setup main page contains BIOS information and project version information.



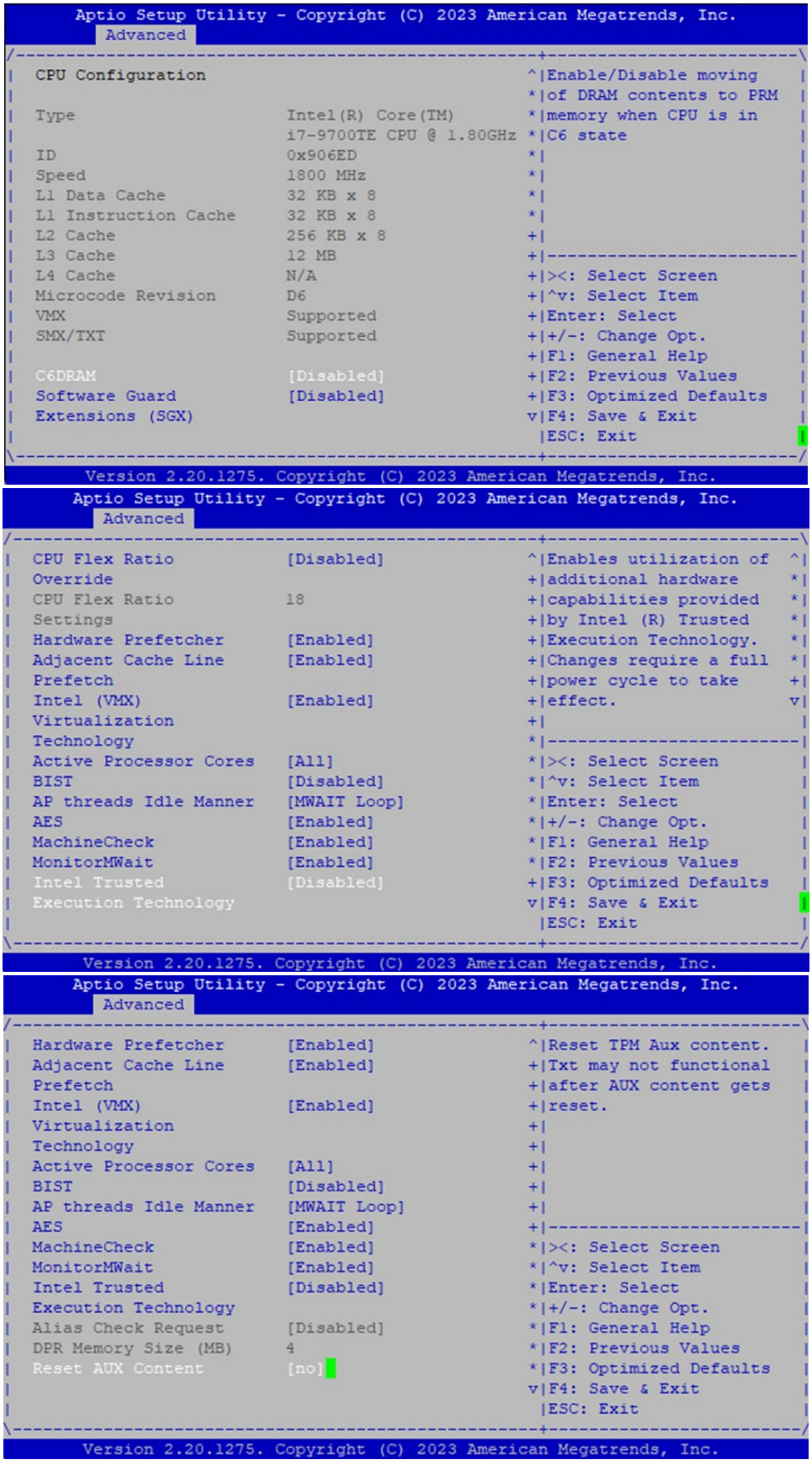
Feature	Description
BIOS Information	BIOS Vendor: American Megatrends Core Version: AMI Kernel version, CRB code base, X64 Compliancy: UEFI version, PI version Project Version: BIOS release version Build Date and Time: MM/DD/YYYY HH:MM:SS Access Level: Administrator / User
System Date	To set the Date, use **<Tab>** to switch between Date elements. Default Range of Year: 2005-2099 Default Range of Month: 1-12 Days: dependent on Month.
System Time	To set the Date, use **<Tab>** to switch between Date elements.

Advanced Page

Select the **Advanced** menu item from the BIOS setup screen to enter the "Advanced" setup screen. Users can select any of the items in the left frame of the screen.



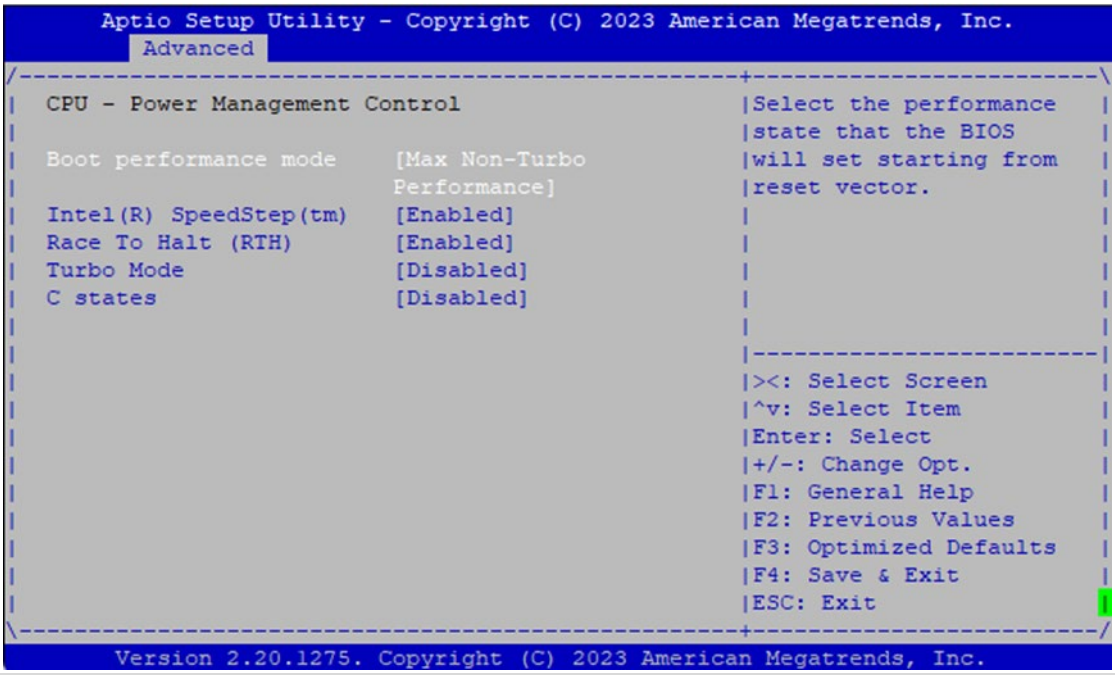
CPU Configuration



Feature	Options	Description
C6DRAM	Disabled Enabled	Enable/Disable moving of DRAM contents to PRM memory when CPU is in C6 state
Software Guard Extensions (SGX)	Disabled Enabled Software Controlled	Enable/Disable Software Guard Extensions (SGX)
CPU Flex Ratio Override	Disabled Enabled	Enable/Disable CPU Flex Ratio Programming
CPU Flex Ratio Settings	20	This value must be between Max Efficiency Ratio (LFM) and Maximum non-turbo ratio set by Hardware (HFM).
Hardware Prefetcher	Disabled Enabled	To turn on/off the MLC streamer prefetcher.
Adjacent Cache Line Prefetch	Disabled Enabled	To turn on/off prefetching of adjacent cache lines.
Intel (VMX) Virtualization Technology	Disabled Enabled	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Active Processor Cores	All 1 2 3 4 5 6 7	Number of cores to enable in each processor package.
BIST	Disabled Enabled	Enable/Disable BIST (Built-In Self-Test) on reset
AP threads Idle Manner	HALT Loop MWAIT Loop RUN Loop	AP threads Idle Manner for waiting signal to run
AES	Disabled Enabled	Enable/Disable AES (Advanced Encryption Standard)
MachineCheck	Disabled Enabled	Enable/Disable Machine Check
MonitorMWait	Disabled Enabled	Enable/Disable MonitorMWait

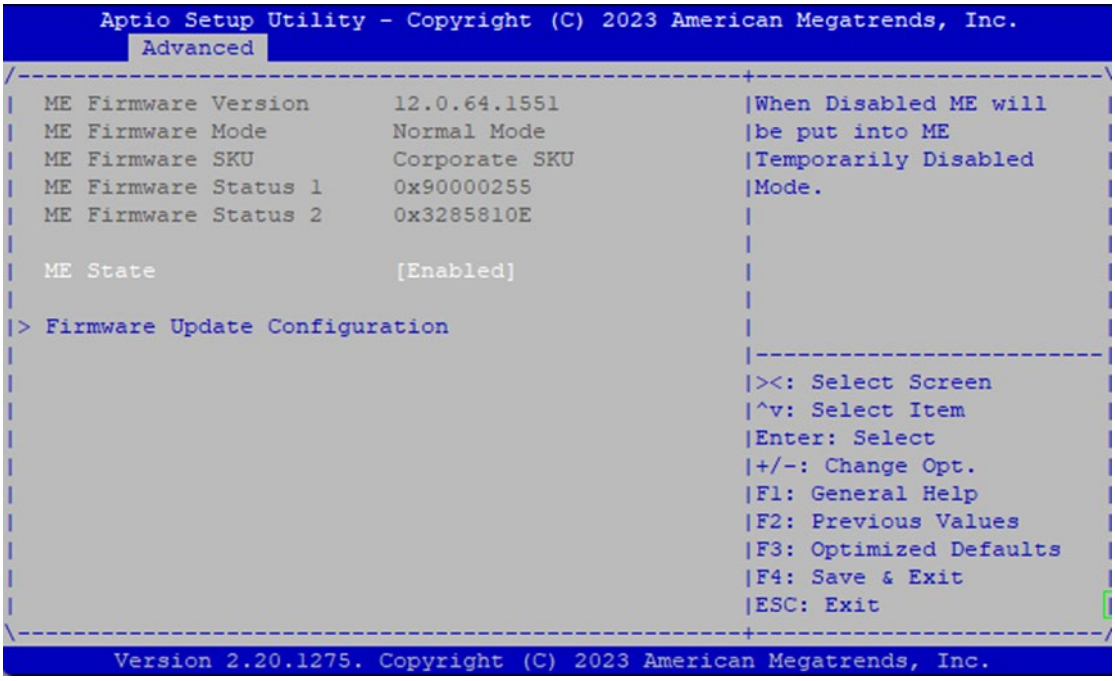
Intel Trusted Execution Technology	Disabled Enabled	Enables utilization of additional hardware capabilities provided by Intel (R) Trusted Execution Technology. Changes require a full power cycle to take effect.
Alias Check Request	Disabled Enabled	Enables Txt Alias Checking Capability Changes require full Txt capability before it will take effect. It is a one-time only change; next reboot will be reset.
DPR Memory Size (MB)	4	Reserve DPR memory size (0-255) MB
Reset AUX Content	yes no	Reset TPM Aux content. Txt may not functional after AUX content gets reset.

Power & Performance



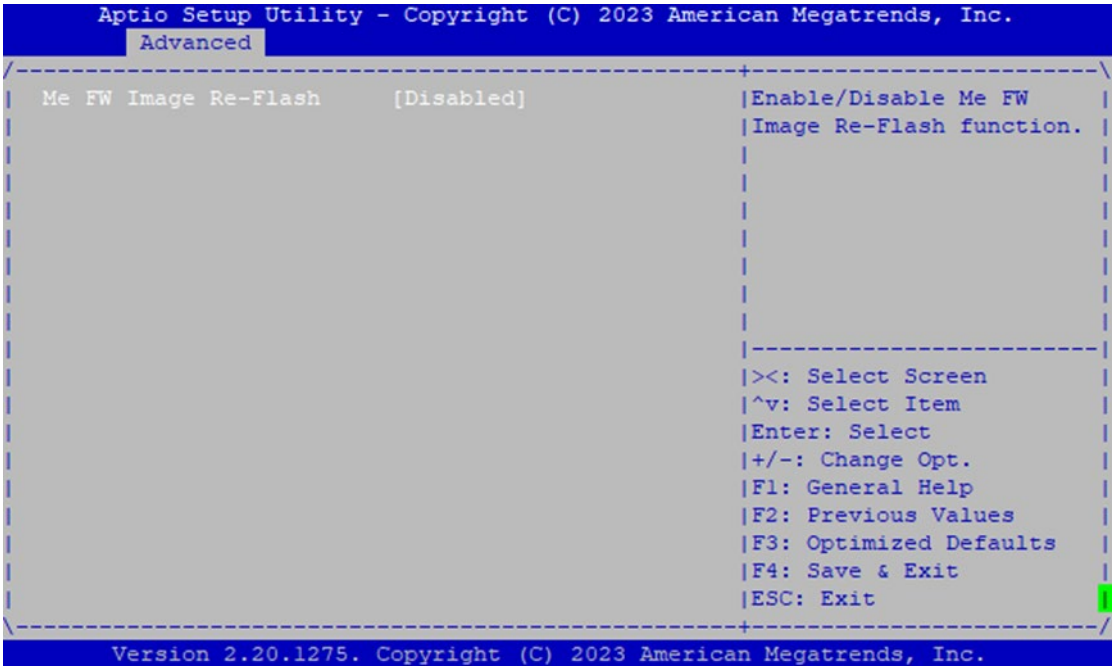
Feature	Options	Description
Boot performance mode	Max Battery Max Non-Turbo Performance Turbo Performance	Select the performance state that the BIOS will set starting from reset vector.
Intel(R) SpeedStep(tm)	Disabled Enabled	Allows more than two frequency ranges to be supported.
Race To Halt (RTH)	Disabled Enabled	Enable/Disable Race To Halt feature. RTH will dynamically increase CPU frequency in order to enter pkg C-State faster to reduce overall power. (RTH is controlled through MSR 1FC bit 20)
Turbo Mode	Disabled Enabled	Enable/Disable processor Turbo Mode (requires Intel Speed Step or Intel Speed Shift to be available and enabled).
C states	Disabled Enabled	Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.

PCH-FW Configuration



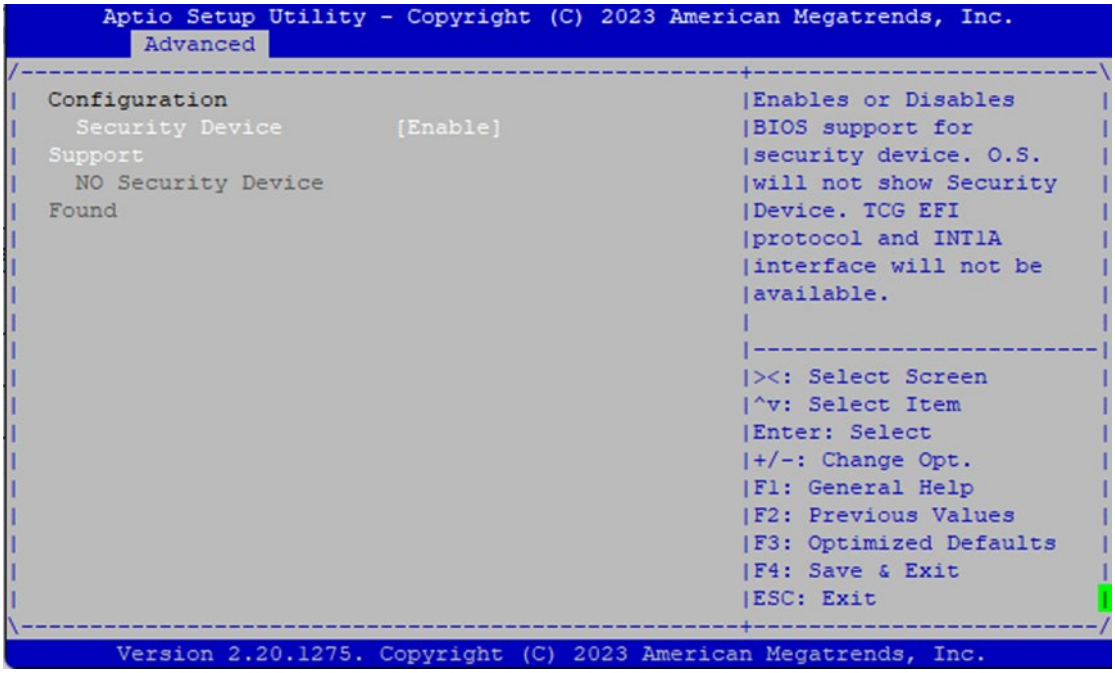
Feature	Options	Description
ME State	Disabled Enabled	When Disabled ME will be put into ME Temporarily Disabled Mode.

PCH-FW Configuration



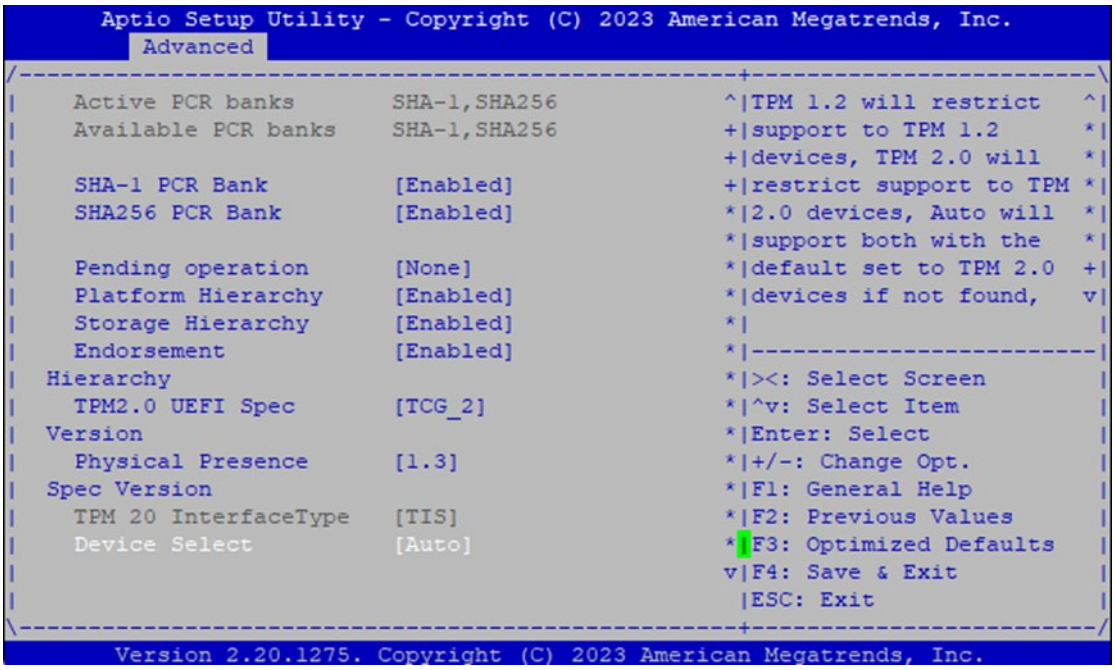
Feature	Options	Description
Me FW Image Re-Flash	Disabled Enabled	Enable/Disable Me FW Image Re-Flash function.

Trusted Computing



Feature	Options	Description
Security Device Support	Disabled Enabled	Enables or disables BIOS support for security device. By disabling this function, OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

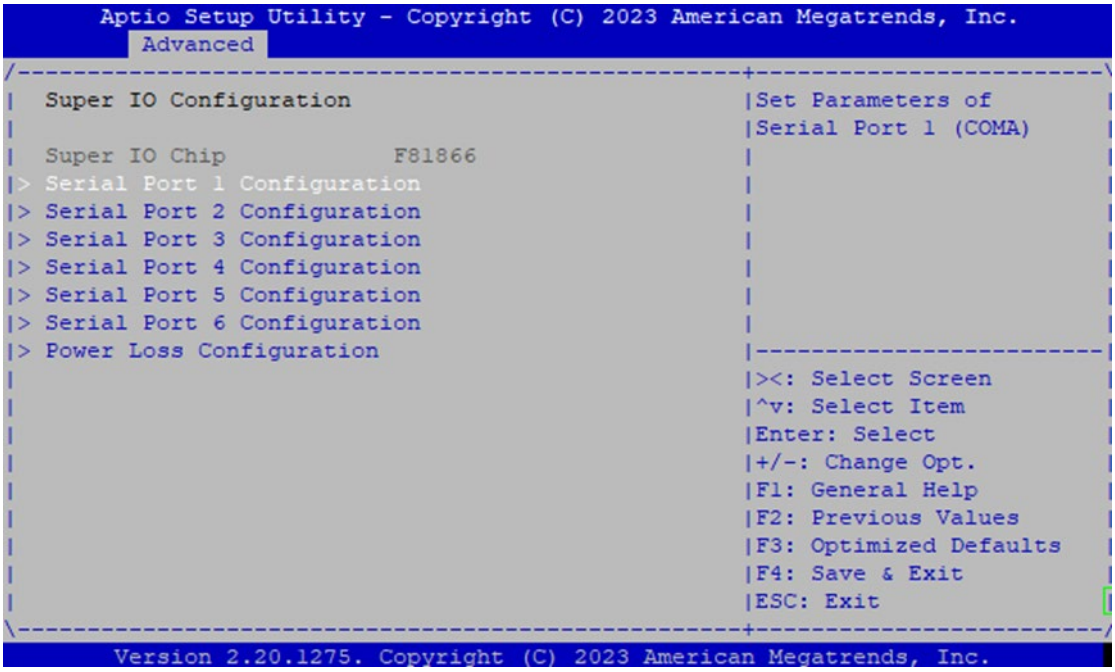
Trusted Computing (TPM2.0)



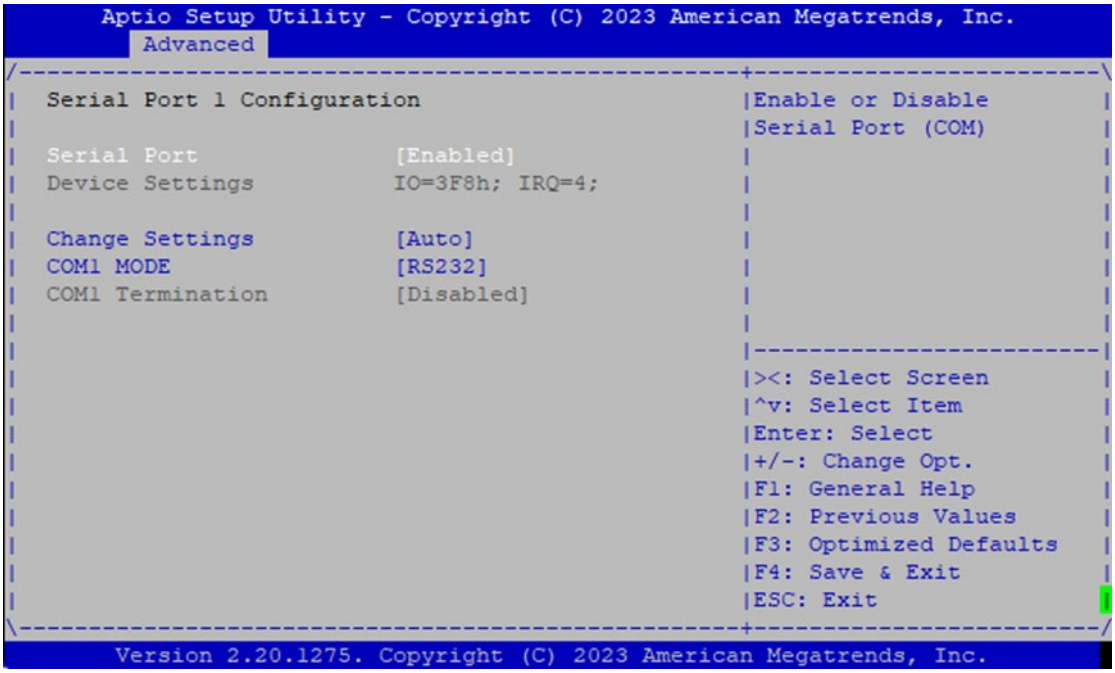
Feature	Options	Description
Security Device Support	Enabled Disabled	Enables or disables BIOS support for security device. By disabling this function, OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
SHA-1 PCR Bank	Enabled Disabled	Enables or disables SHA-1 PCR Bank.
SHA256 PCR Bank	Enabled Disabled	Enables or disables SHA256 PCR Bank.

Pending operation	None TPM Clear	Schedules an Operation for the Security Device. NOTE: Your computer will reboot during restart in order to change State of Security Device.
Platform Hierarchy	Enabled Disabled	Enables or disables Platform Hierarchy.
Storage Hierarchy	Enabled Disabled	Enables or disables Storage Hierarchy.
Endorsement Hierarchy	Enabled Disabled	Enables or disables Endorsement Hierarchy.
TPM2.0 UEFI Spec Version	TCG_1_2 TCG_2	Select the TCG2 Spec Version, **TCG_1_2**: Supports the Compatible mode for Win8/Win10 **TCG_2**: Supports new TCG2 protocol and event format for Win10 or later.
Physical Presence Spec Version	1.2 1.3	Select to tell OS to support PPI Spec Version 1.2 or 1.3. NOTE: Some HCK tests might not support 1.3.
TPM 20 InterfaceType	TIS	Select **TPM 20 Device** for the Communication Interface.
Device Select	TPM 1.2 TPM 2.0 Auto	**TPM 1.2** will restrict support to TPM 1.2 devices; while **TPM 2.0** will restrict support to TPM 2.0 devices; **Auto** will support both with the default set to TPM 2.0 devices. If not found, TPM 1.2 devices will be enumerated.

Super IO Configuration

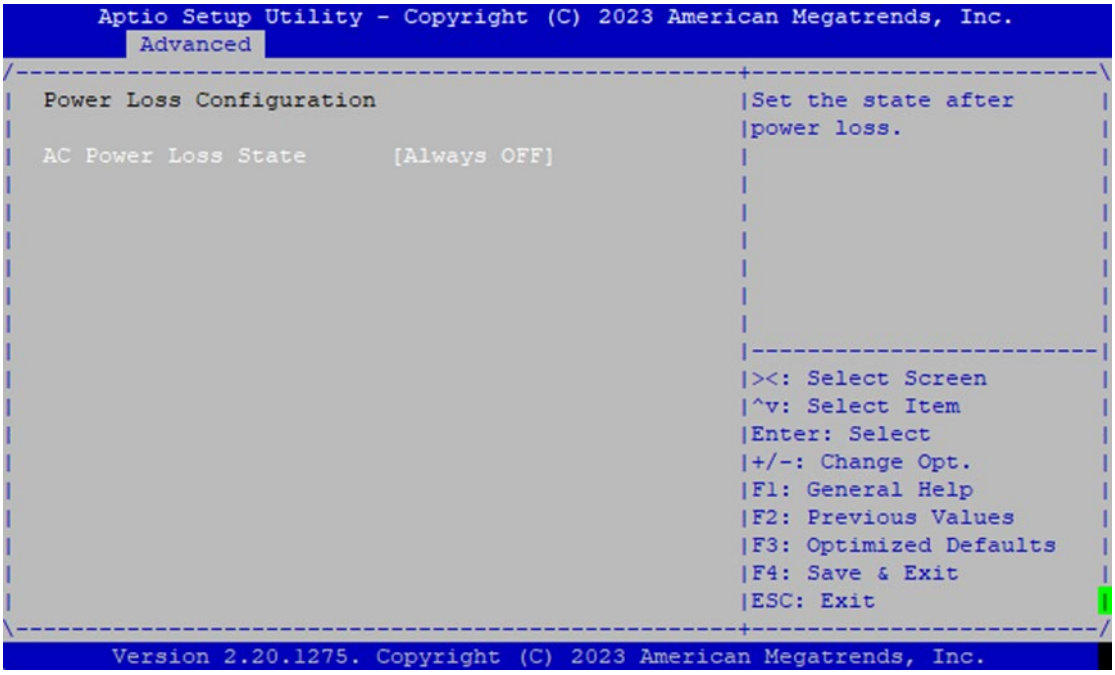


Serial Port 1-6 Configuration



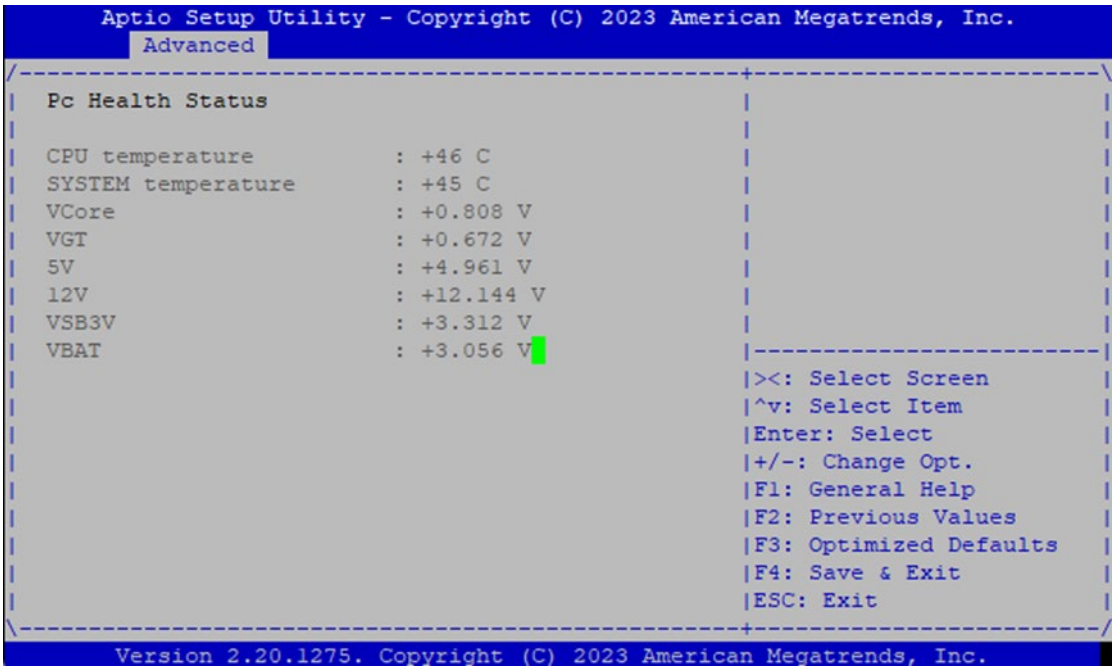
Feature	Options	Description
Serial Port	Disabled Enabled	Enables or disables Serial Port 1.
Device Settings	NA	IO=3F8h; IRQ = 4;
Change Settings	Auto IO=3F8h; IRQ=4; IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;	Select an optimal setting for Super IO device
COM# MODE	RS232 RS485 RS422	Select Com Mode as RS232/RS485/RS422
COM# Termination	Disabled Enabled	COM RS-422/485 Receiver Termination

Power Loss Configuration

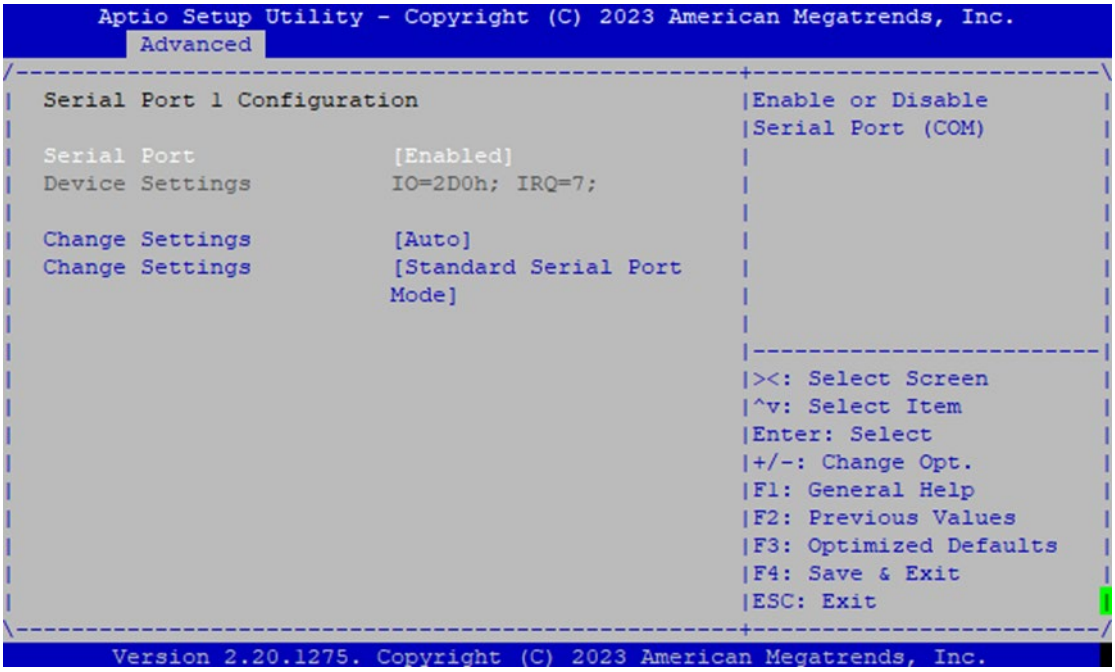


Feature	Options	Description
AC Power Loss State	Always OFF Always ON Last state	Set power state after power loss.

H/W Monitor

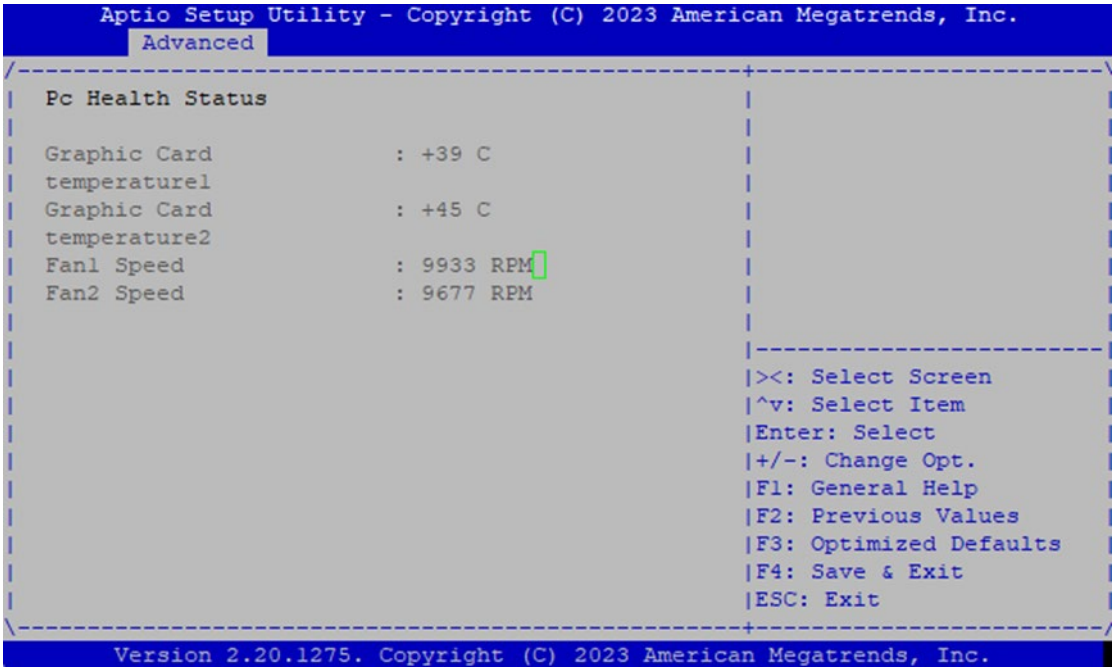

Aptio Setup Utility - Copyright (C) 2023 American Megatrends, Inc.
Advanced
Pc Health Status
CPU temperature : +46 C
SYSTEM temperature : +45 C
VCore : +0.808 V
VGT : +0.672 V
5V : +4.961 V
12V : +12.144 V
VSB3V : +3.312 V
VBAT : +3.056 V
><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.20.1275. Copyright (C) 2023 American Megatrends, Inc.

F81216SEC Super IO Configuration

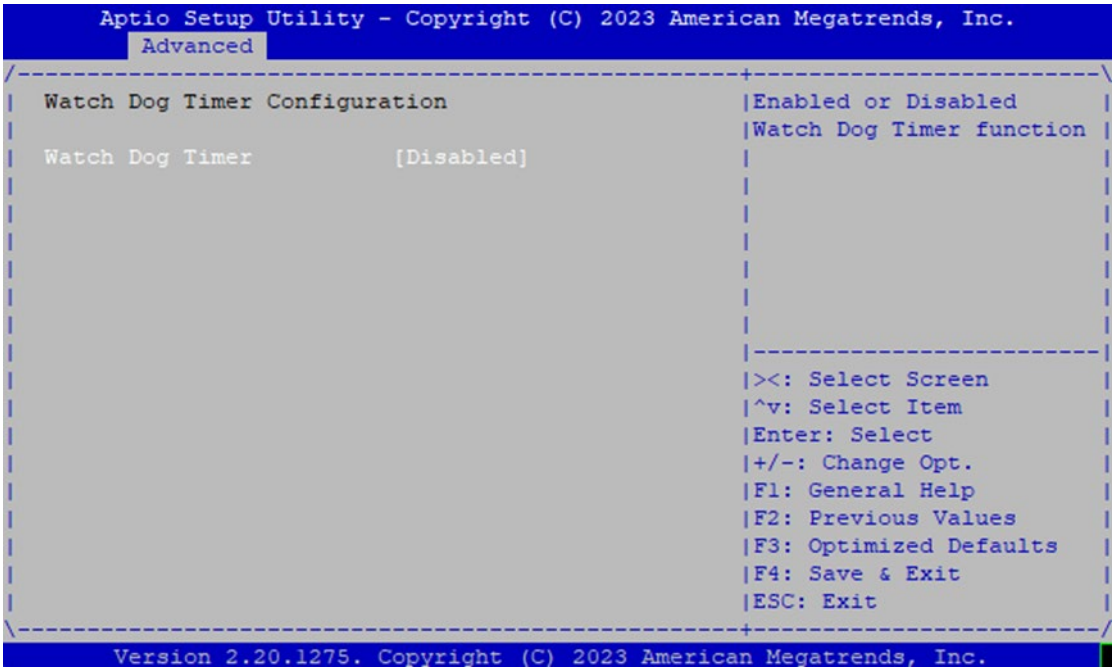


Feature	Options	Description
Serial Port	Disabled Enabled	Enable or Disable Serial Port (COM)
Device Settings	NA	IO=2D0h; IRQ=7;
Change Settings	Auto IO=240h; IRQ=7; IO=240h; IRQ=3,4,5,6,7,10,11,12; IO=248h; IRQ=3,4,5,6,7,10,11,12; IO=250h; IRQ=3,4,5,6,7,10,11,12; IO=258h; IRQ=3,4,5,6,7,10,11,12;	Select an optimal setting for Super IO Serial Port Device
Change Settings	Standard Serial Port Mode IrDA Active pulse 1.6 uS, Full Duplex IrDA Active pulse 1.6 uS, Half Duplex IrDA Active pulse 3/16 bit time, Full Duplex IrDA Active pulse 3/16 bit time, Half Duplex	Select an optimal setting for Super IO Serial Port Device

Raiser Card Hardware Monitor

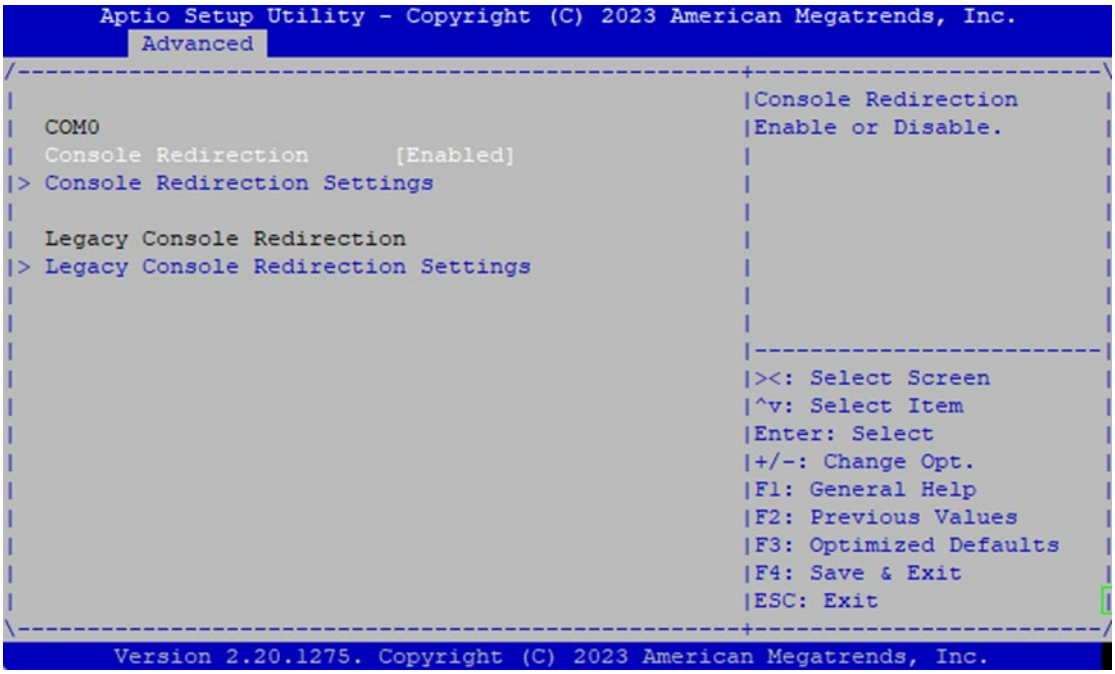


Watch Dog Timer Configuration



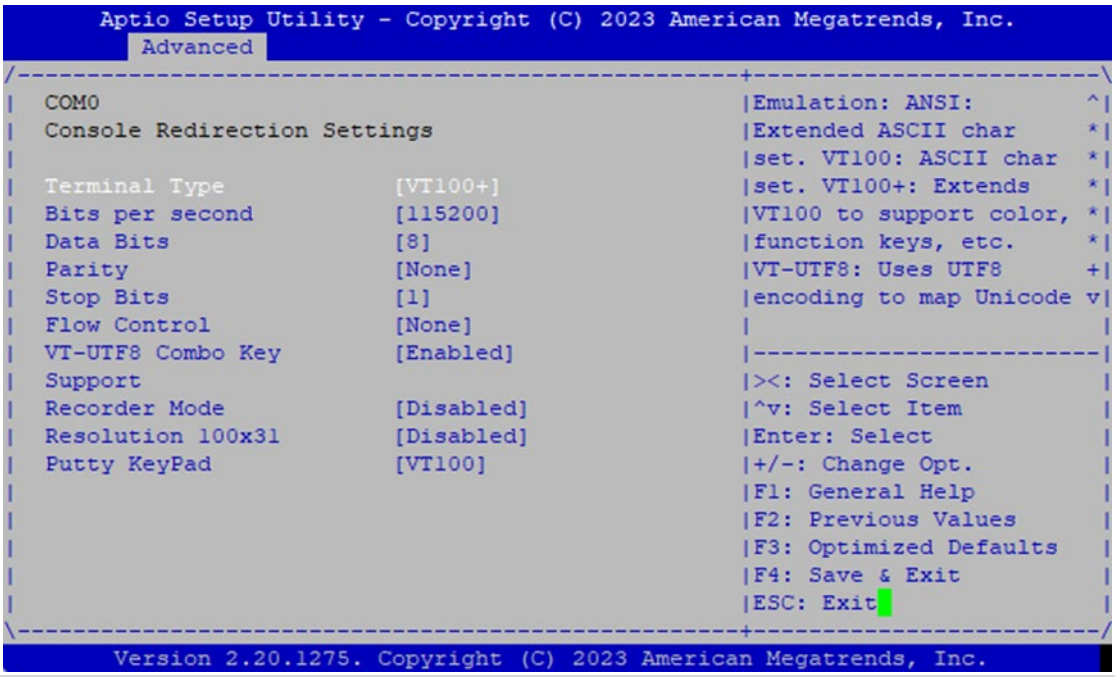
Feature	Options	Description
Watch Dog Timer	Enabled Disabled	Enables or disables Watch Dog Timer function

Serial Port Console Redirection



Feature	Options	Description
COM0 Console Redirection	Enabled Disabled	Enables or disables Console Redirection

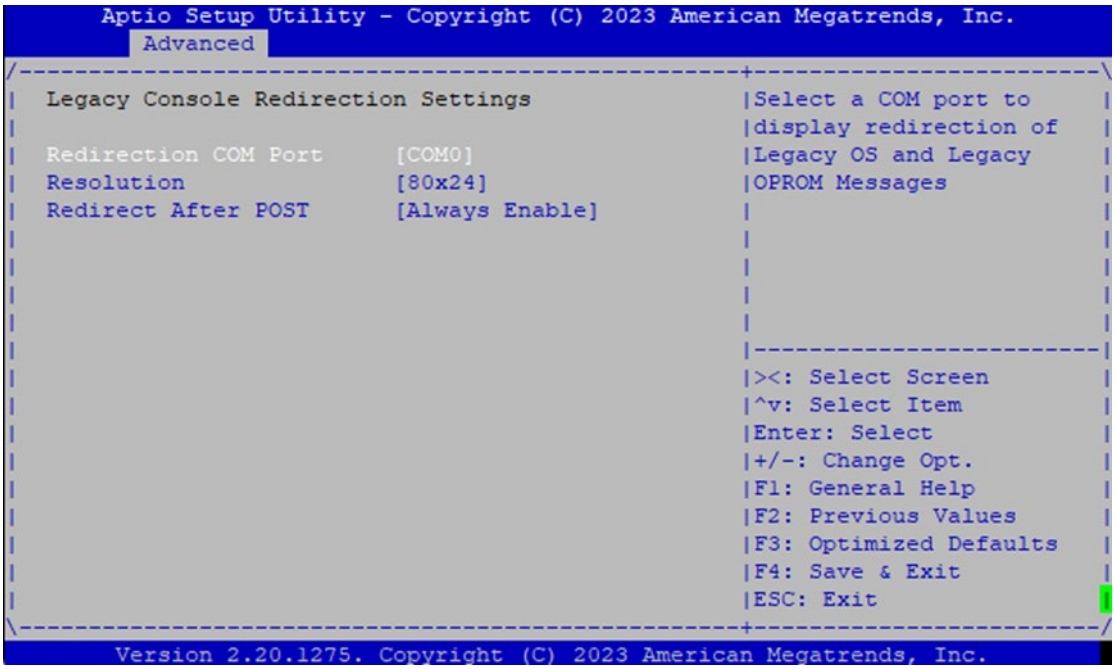
Console Redirection Settings



Feature	Options	Description
Terminal Type	VT100 VT100+ VT-UTF8 ANSI	Emulation: ANSI: Extended ASCII char set. VT100: ASCII char set. VT100+: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.
Bits per second	9600 19200 38400 57600 115200	Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
Data Bits	7 8	Data Bits
Parity	None Even Odd Mark Space	A parity bit can be sent with the data bits to detect some transmission errors. Even: parity bit is 0 if the num of 1's in the data bits is even. Odd: parity bit is 0 if num of 1's in the data bits is odd. Mark: parity bit is always 1. Space: Parity bit is always 0. Mark and Space Parity do not allow for error detection. They can be used as an additional data bit.
Stop Bits	1 2	Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.

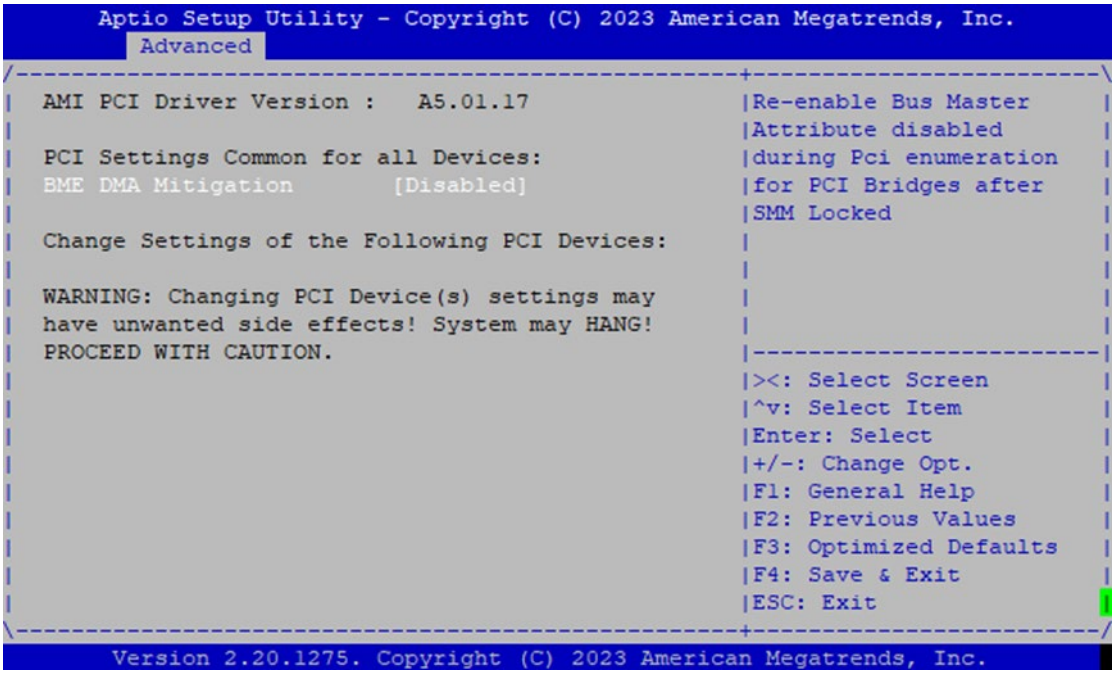
Flow Control	None Hardware RTS/CTS	Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.
VT-UTF8 Combo Key Support	Disabled Enabled	Enables VT-UTF8 Combination Key Support for ANSI/VT100 terminals
Recorder Mode	Disabled Enabled	With this mode enabled only text will be sent. This is to capture Terminal data.
Resolution 100x31	Disabled Enabled	Enables or disables extended terminal resolution
Putty KeyPad	VT100 LINUX XTERMR6 SCO ESCN VT400	Select FunctionKey and KeyPad on Putty.

Console Redirection Settings



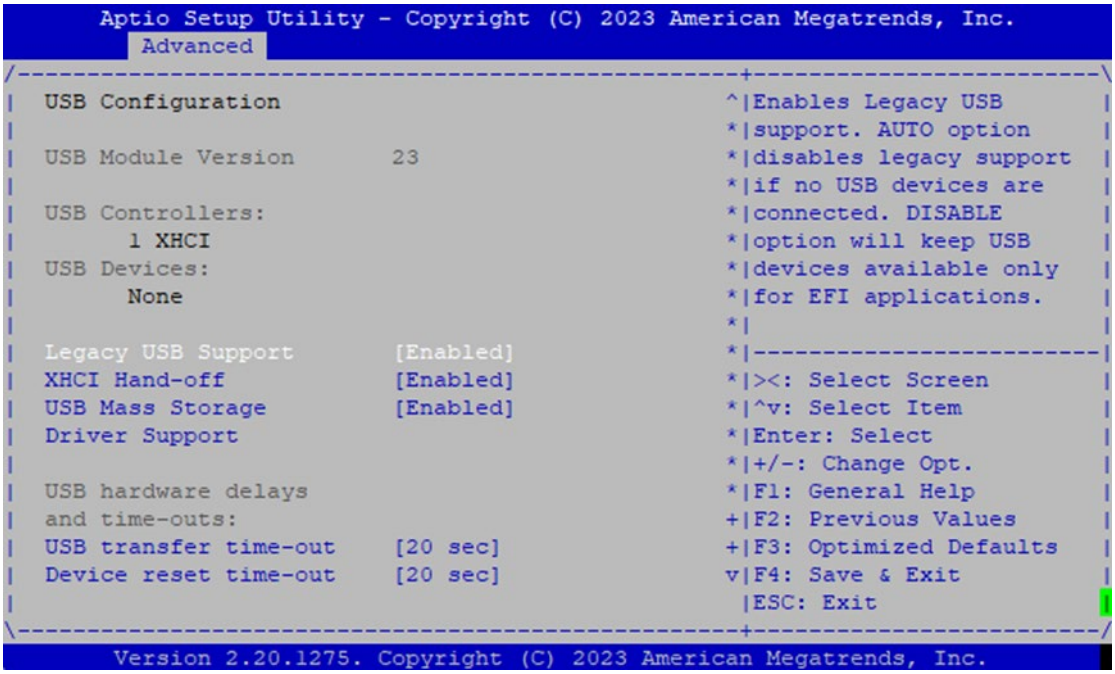
Feature	Options	Description
Redirection COM Port	COM0	Select a COM port to display redirection of Legacy OS and Legacy OPROM Messages.
Resolution	80x24 80x25	On Legacy OS, the Number of Rows and Columns supported redirection.
Redirection After BIOS POST	Always Enable BootLoader	When **Bootloader** is selected, Legacy Console Redirection is disabled before booting to legacy OS. When **Always Enable** is selected, then Legacy Console Redirection is enabled for legacy OS. Default setting for this option is set to **Always Enable**.

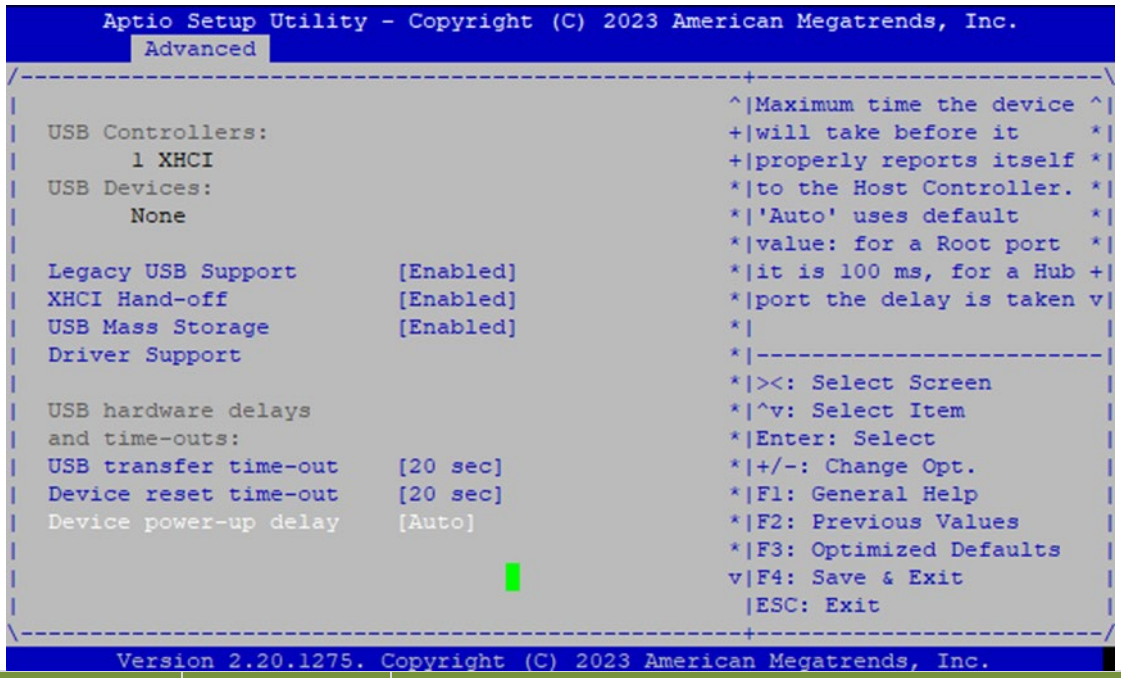
PCI Subsystem Settings



Feature	Options	Description
BME DMA Mitigation	Disabled Enabled	Re-enable Bus Master Attribute disabled during Pci enumeration for PCI Bridges after SMM Locked

USB Configuration

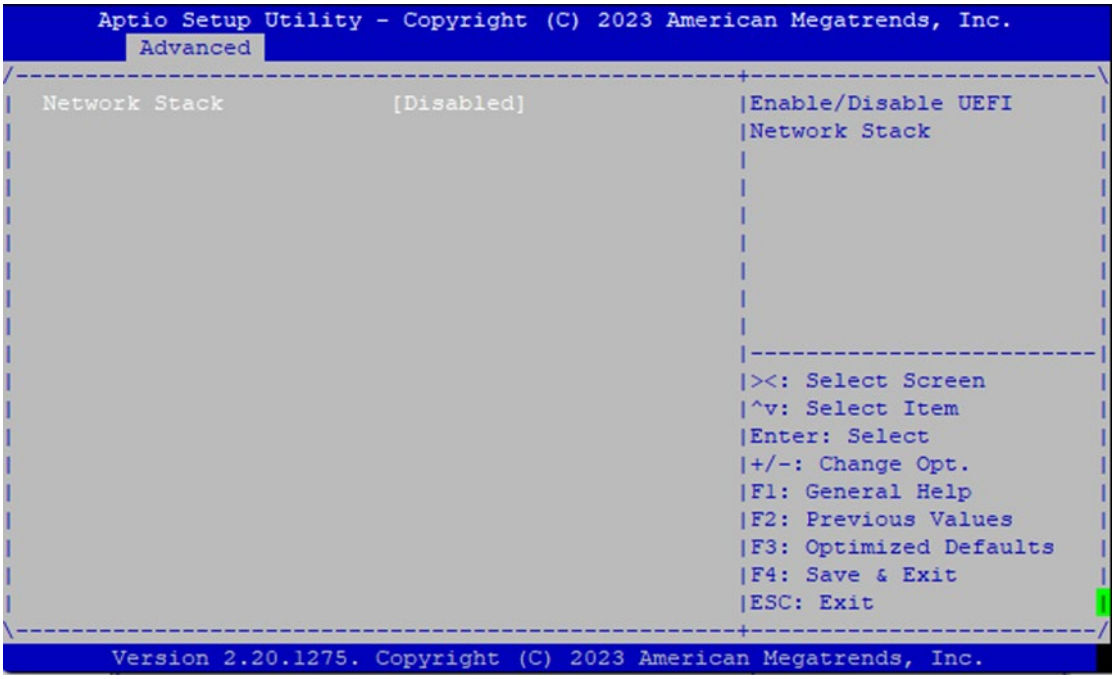




Feature	Options	Description
Legacy USB Support	Enabled Disabled Auto	Enables Legacy USB support. **Auto** option disables legacy support if no USB devices are connected; **Disabled** option will keep USB devices available only for EFI applications.
XHCI Hand-off	Enabled Disabled	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.

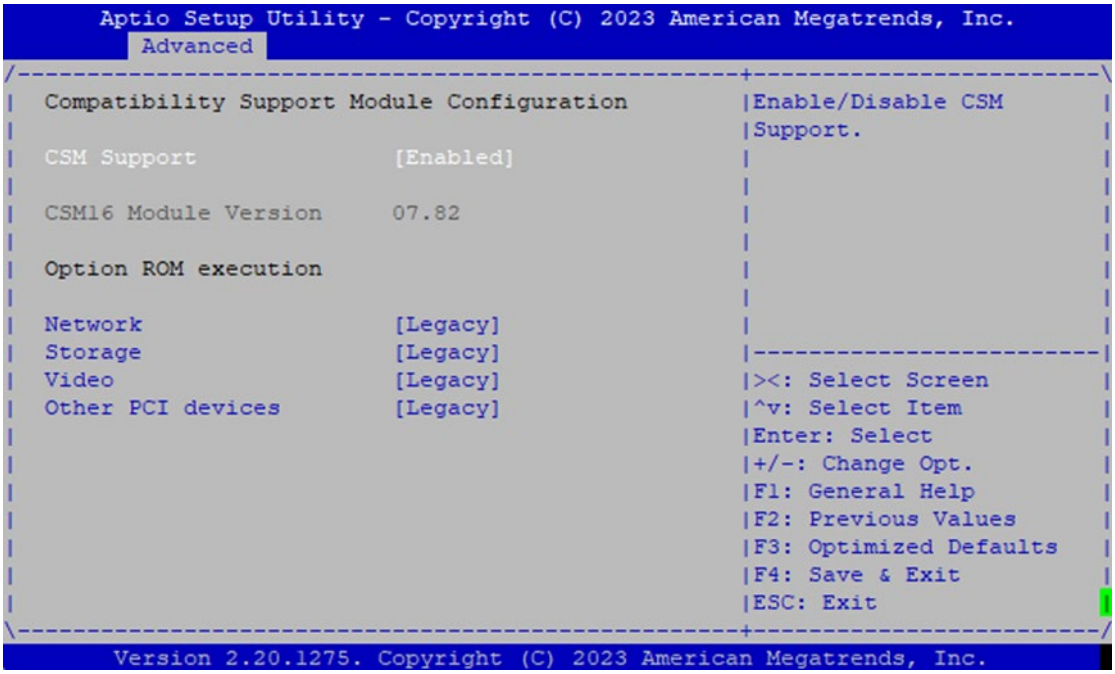
USB Mass Storage Driver Support	Disabled Enabled	Enables or disables USB Mass Storage Driver Support.
USB transfer time-out	1 sec 5 sec 10 sec 20 sec	The time-out value for Control, Bulk, and Interrupt transfers
Device reset time-out	10 sec 20 sec 30 sec 40 sec	USB mass storage device Start Unit command time-out
Device power-up delay	Auto Manual	Maximum time the device will take before it properly reports itself to the Host Controller. **Auto** uses default value: for a Root port, it is 100 ms, for a Hub port the delay is taken from Hub descriptor.

Network Stack Configuration



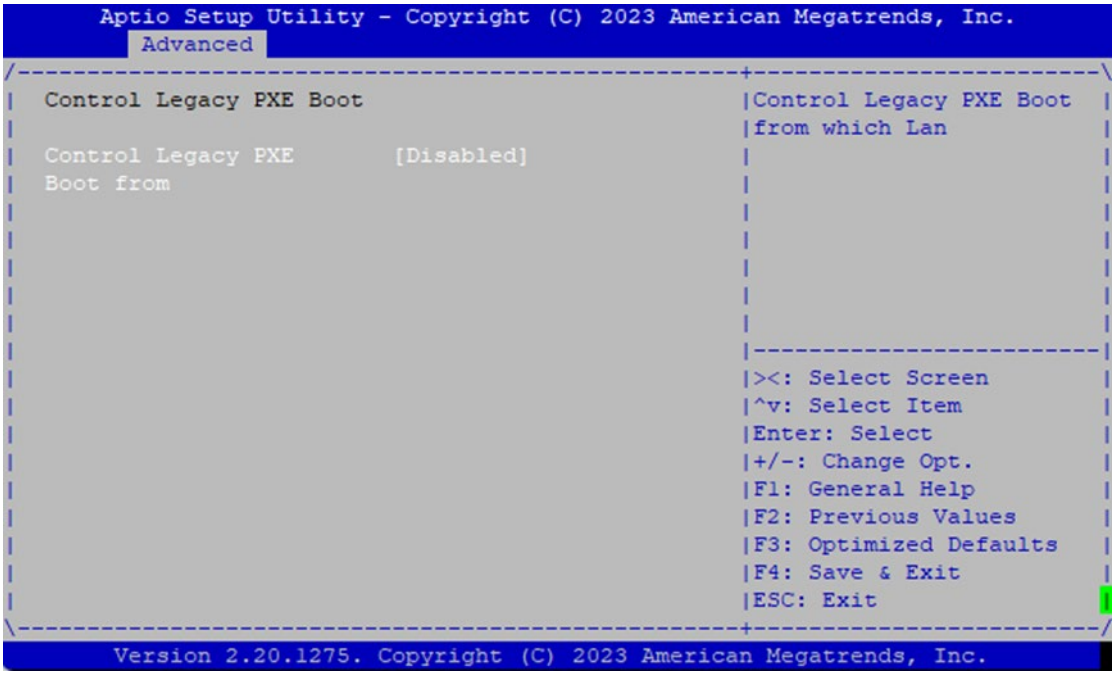
Feature	Options	Description
Network Stack	Disabled Enabled	Enables or disables UEFI Network Stack

CSM Configuration



Feature	Options	Description
CSM Support	Disabled Enabled	Enables or disables CSM Support
Network	Do Not Launch UEFI Legacy	Controls the execution of UEFI and Legacy PXE OpROM
Storage	Do Not Launch UEFI Legacy	Controls the execution of UEFI and Legacy Storage OpROM
Video	Do Not Launch UEFI Legacy	Controls the execution of UEFI and Legacy Video OpROM
Other PCI device	Do Not Launch UEFI Legacy	Determines OpROM execution policy for devices other than Network, Storage, or Video

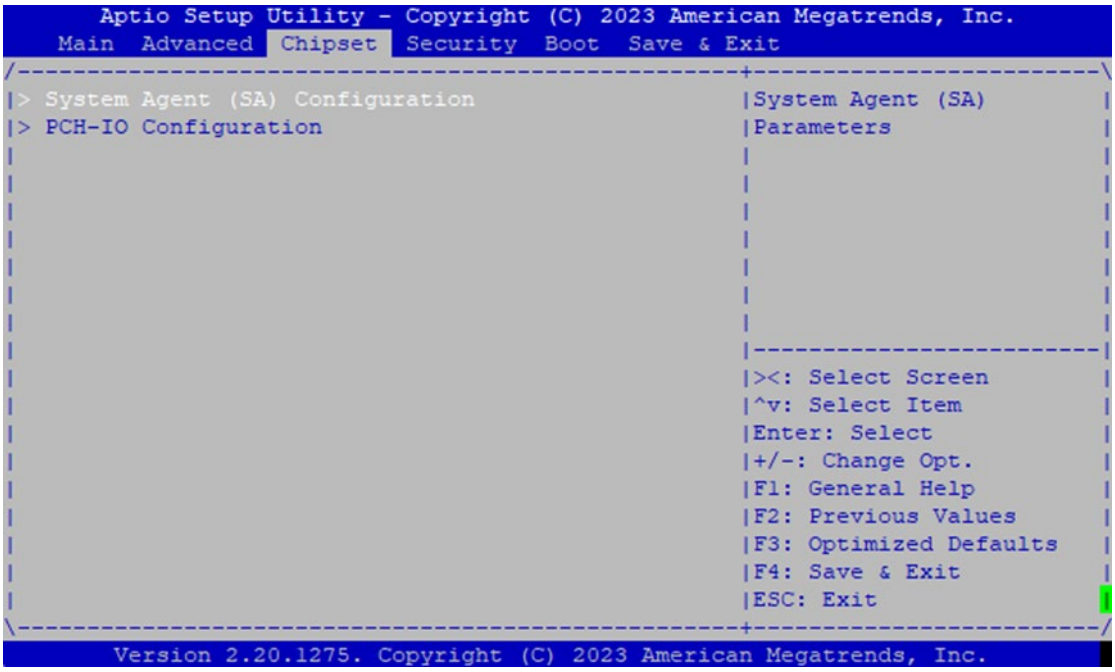
Control Legacy PXE Boot



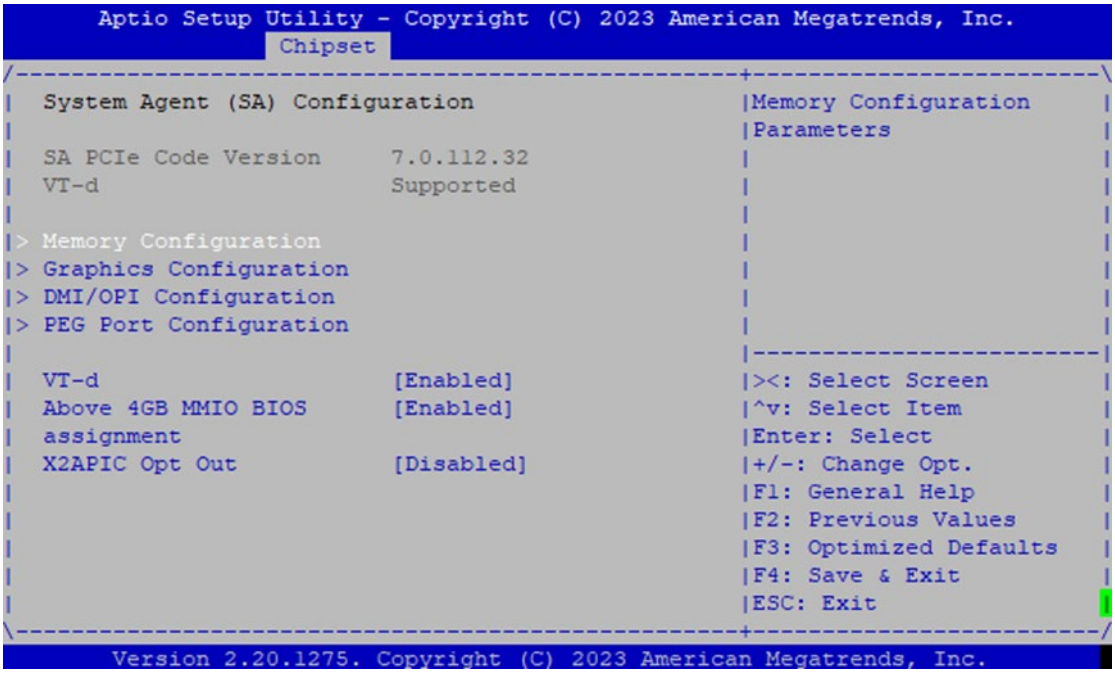
Feature	Options	Description
Control Legacy PXE Boot from	Disabled MGMT Lan1 MGMT Lan2	Control Legacy PXE Boot from which Lan

Chipset

Select the Chipset menu item from the BIOS setup screen to enter the Platform Setup screen. Users can select any of the items in the left frame of the screen.

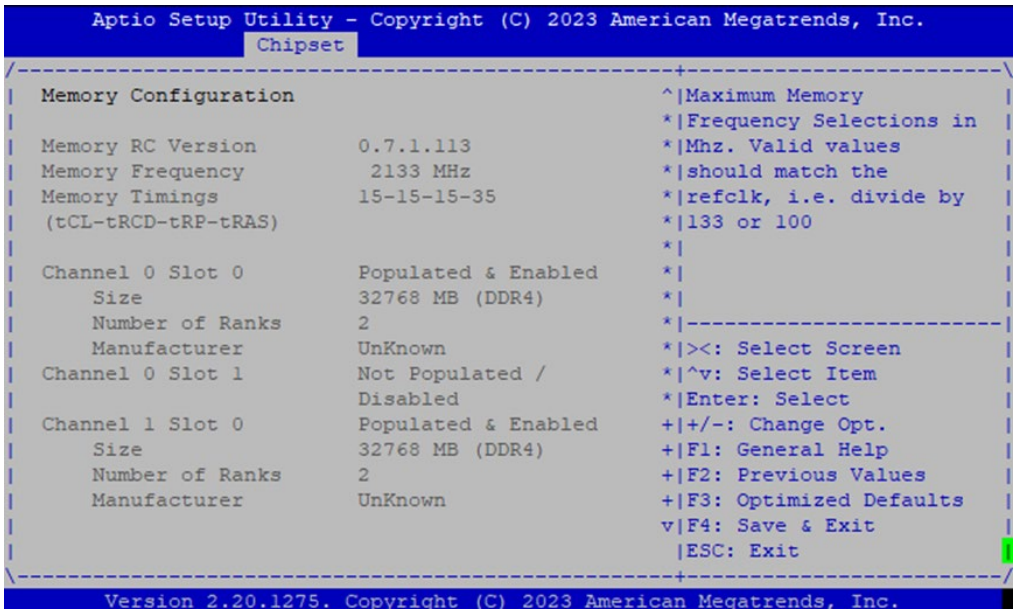


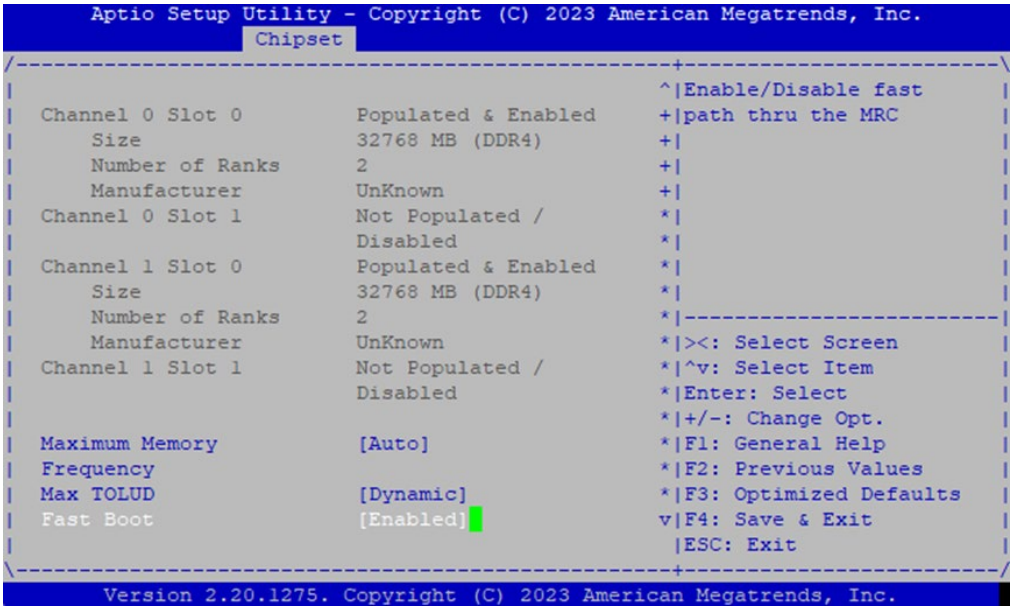
System Agent (SA) Configuration



Feature	Options	Description
VT-d	Disabled Enabled	VT-d capability
Above 4GB MMIO BIOS assignment	Enabled Disabled	Enable/Disable above 4GB MemoryMappedIO BIOS assignment This is enabled automatically when Aperture Size is set to 2048MB.
X2APIC Opt Out	Enabled Disabled	Enable/Disable X2APIC_OPT_OUT bit

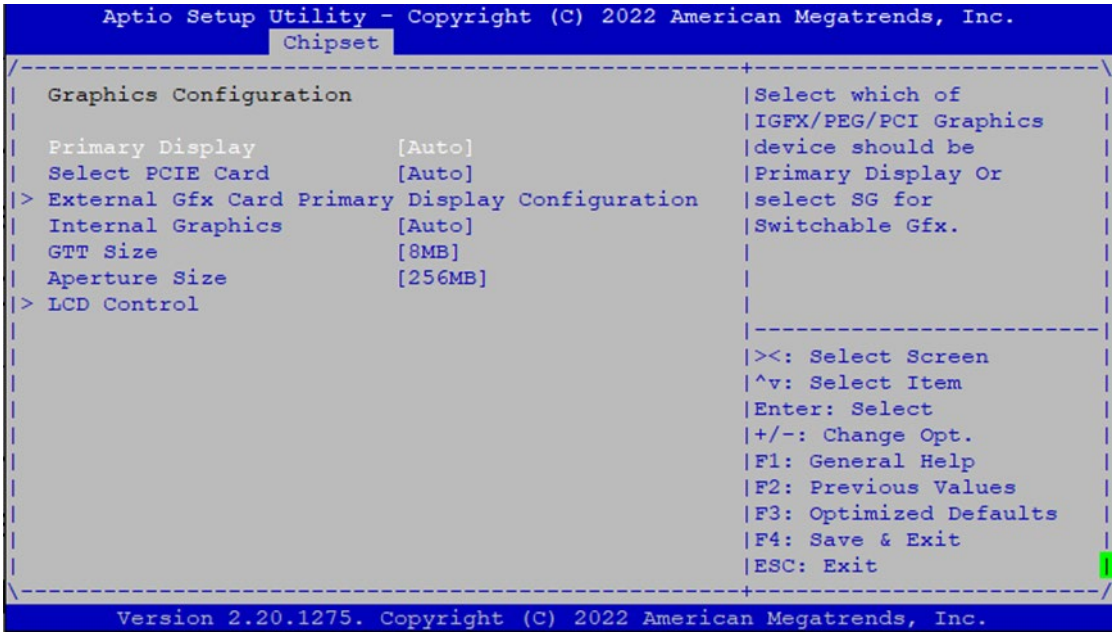
Memory Configuration



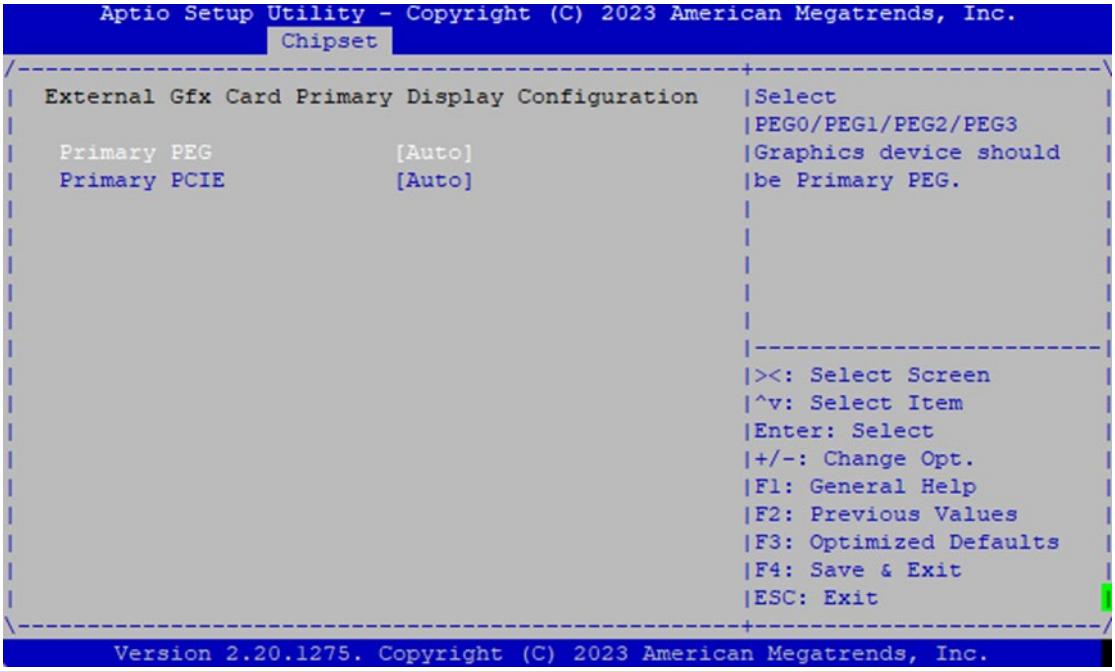


Feature	Options	Description
Maximum Memory Frequency	Auto 1067 ~ 6200	Maximum Memory Frequency Selections in Mhz. Valid values should match the refclk, i.e. divide by 133 or 100
Max TOLUD	Dynamic 1 GB ~ 3.5GB	Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller
Fast Boot	Disabled Enabled	Enable/Disable fast path thru the MRC

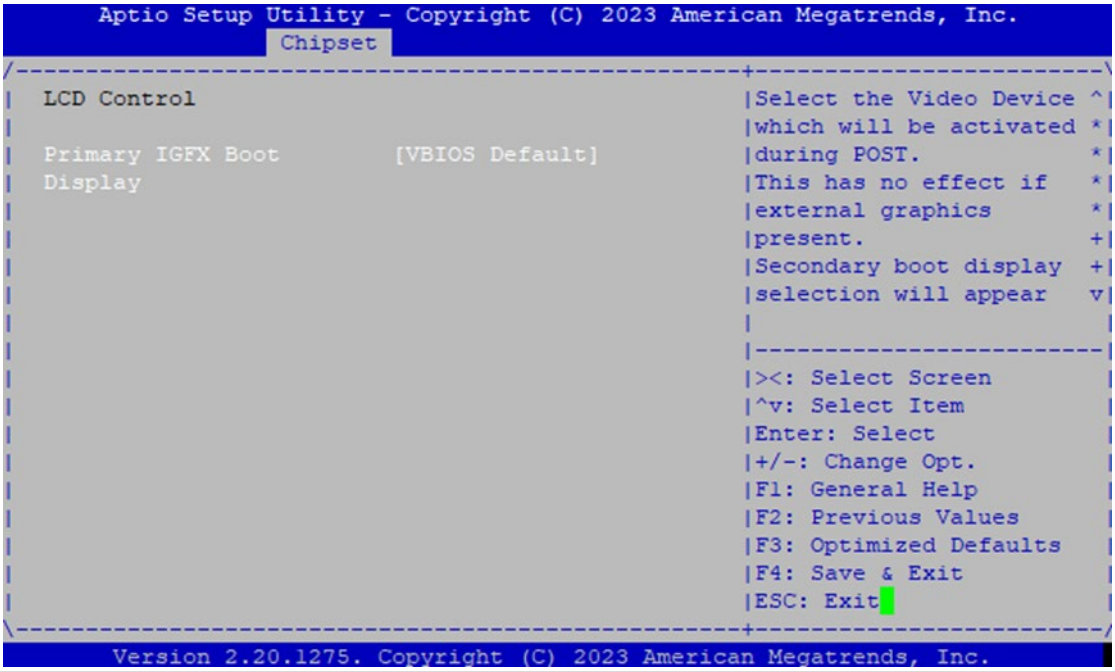
Graphics Configuration



Feature	Options	Description
Primary Display	Auto IGFX PEG PCI SG	Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select SG for Switchable Gfx.
Select PCIE Card	Auto Elk Creek 4 PEG Eval	Select the card used on the platform Auto: Skip GPIO based Power Enable to dGPU Elk Creek 4: DGPU Power Enable = ActiveLow PEG Eval: DGPU Power Enable = ActiveHigh
Internal Graphics	Auto Disabled Enabled	Keep IGFX enabled based on the setup options.
GTT Size	2M 4M 8M	Select the GTT Size
Aperture Size	128MB 256MB 512MB 1024MB 2048MB	Select the Aperture Size Note: Above 4GB MMIO BIOS assignment is automatically enabled when selecting 2048MB aperture. To use this feature, please disable CSM Support.

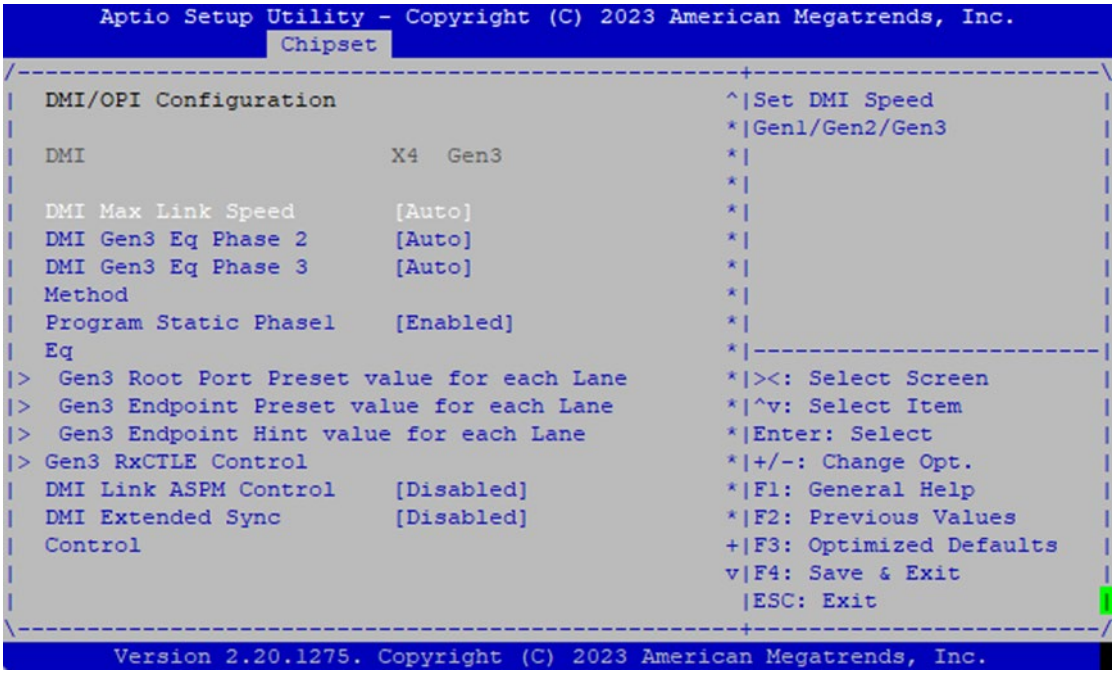


Feature	Options	Description
Primary PEG	Auto PEG11 PEG12	Select PEG0/PEG1/PEG2/PEG3 Graphics device should be Primary PEG.
Primary PCIE	Auto PCIE1 ~ PCIE19	Select Auto/PCIE1/PCIE2/PCIE3/PCIE4/PCIE5/PCIE6/PCIE7 of D28:F0/F1/F2/F3/F4/F5/F6/F7, PCIE8/PCIE9/PCIE10/PCIE11/PCIE12/PCIE13/PCIE14/PCIE15 of D29:F0/F1/F2/F3/F4/F5/F6/F7, PCIE16/PCIE17/PCIE18/PCIE19 of D27:F0/F1/F2/F3, Graphics device should be Primary PCIE.



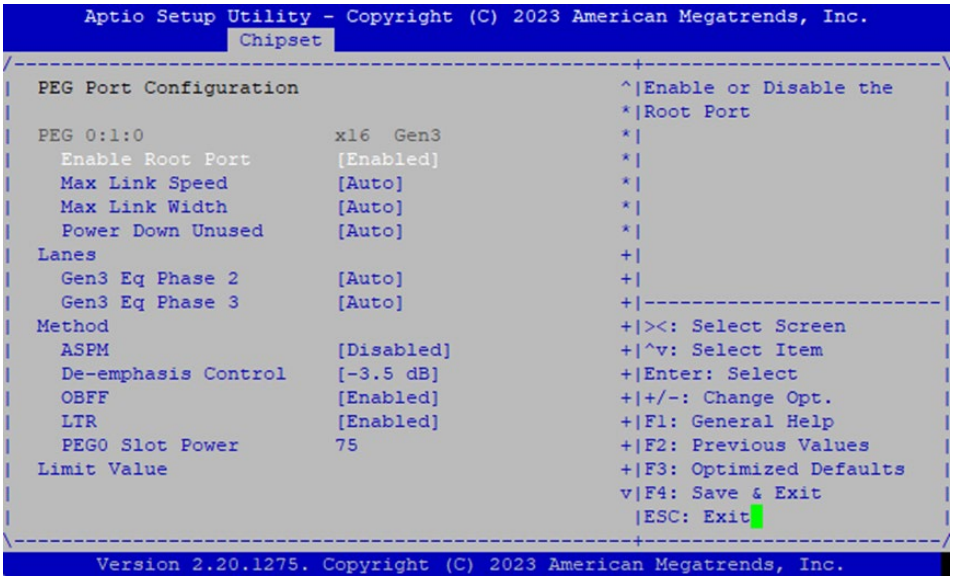
Feature	Options	Description
Primary IGFX Boot Display	VBIOS Default EFP LFP EFP3 EFP2 EFP4	Select the Video Device which will be activated during POST. This has no effect if external graphics present. Secondary boot display selection will appear based on your selection. VGA modes will be supported only on primary display

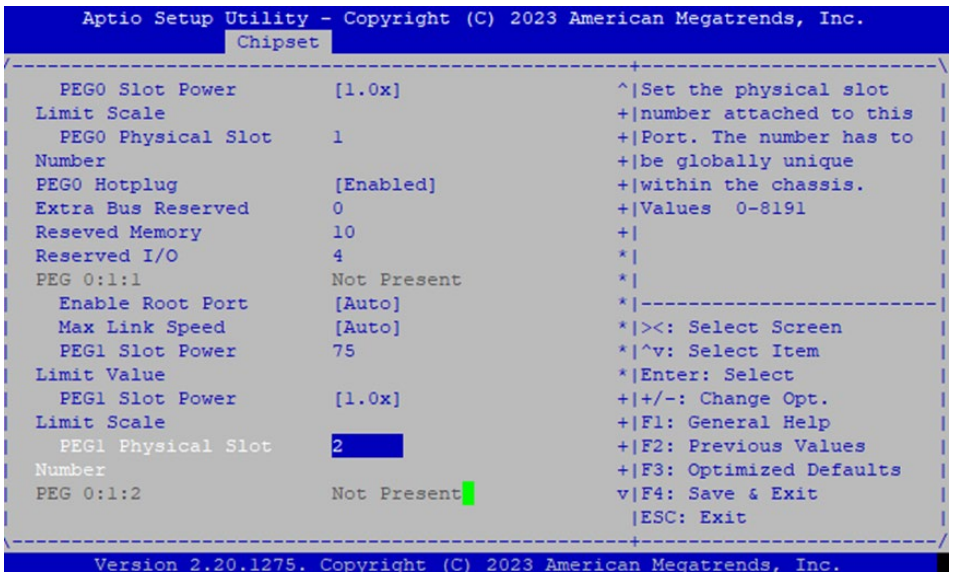
DMI/OPI Configuration

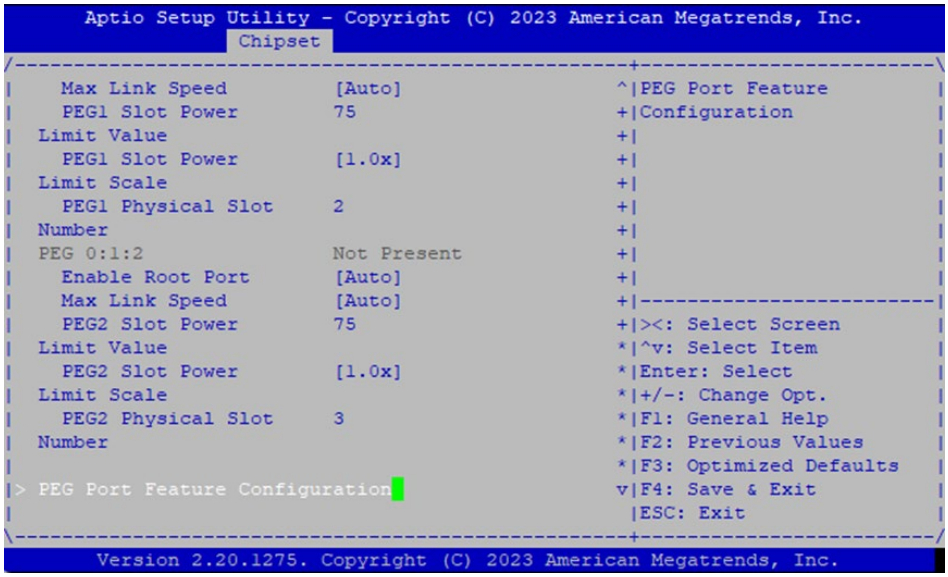


Control various DMI functions. Please keep at default setting.

PEG Port Configuration



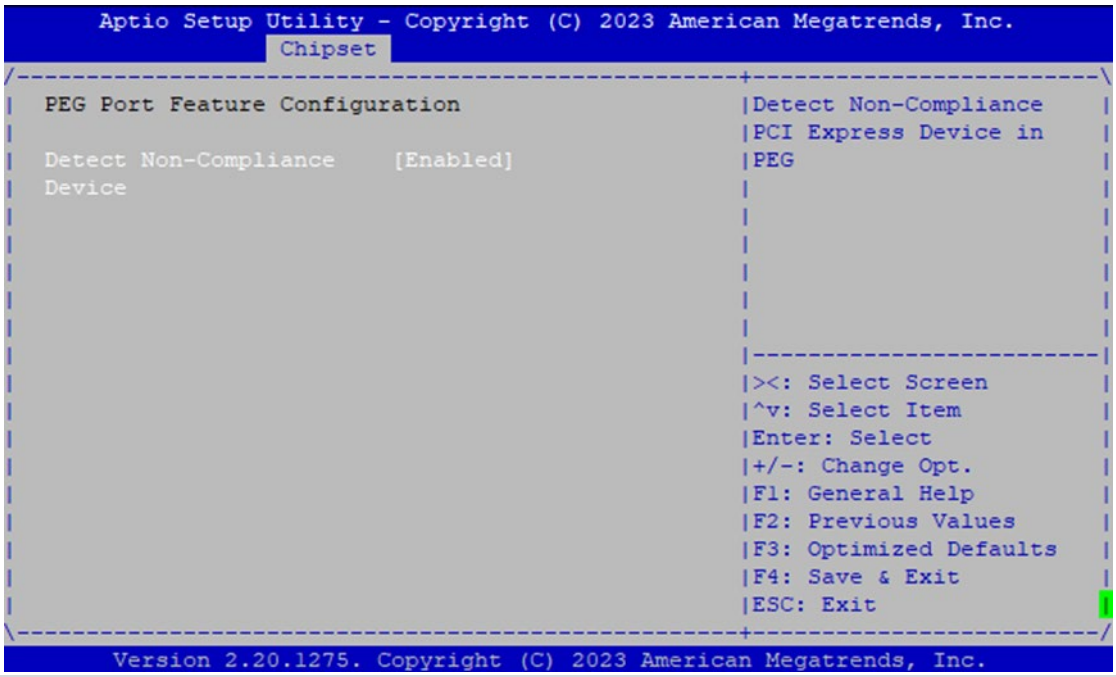




Feature	Options	Description
Enable Root Port	Disabled Enabled Auto	Enable or Disable the Root Port
Max Link Speed	Auto Gen1 Gen2 Gen3	Configure PEG 0:1:0 Max Speed
Max Link Width	Auto Force X1 Force X2 Force X4 Force X8	Force PEG link to retrain to X1/2/4/8
Power Down Unused Lanes	Disabled Auto	Power Down Unused Lanes. Disabled: No power saving Auto: Bios will power down unused lanes based on the max possible link width
Gen3 Eq Phase 2	Disabled Enabled Auto	Perform Gen3 Equalization Phase 2
Gen3 Eq Phase 3 Method	Auto Adaptive Hardware Equalization Adaptive Software Equalization Static Equalization Disabled	Select Method for Gen3 Equalization Phase 3
ASPM	Disabled Auto ASPM L0s ASPM L1 ASPM L0sL1	Control ASPM support for the PEG 0. This has no effect if PEG is not the currently active device.
De-emphasis Control	-6 dB -3.5 dB	PEG0: Configure the De-emphasis control on PEG
OBFF	Disabled Enabled	CPU PEG0 (0,1,0) OBFF Enable/Disable
LTR	Disabled Enabled	CPU PEG0 (0,1,0) Latency Reporting Enable/Disable

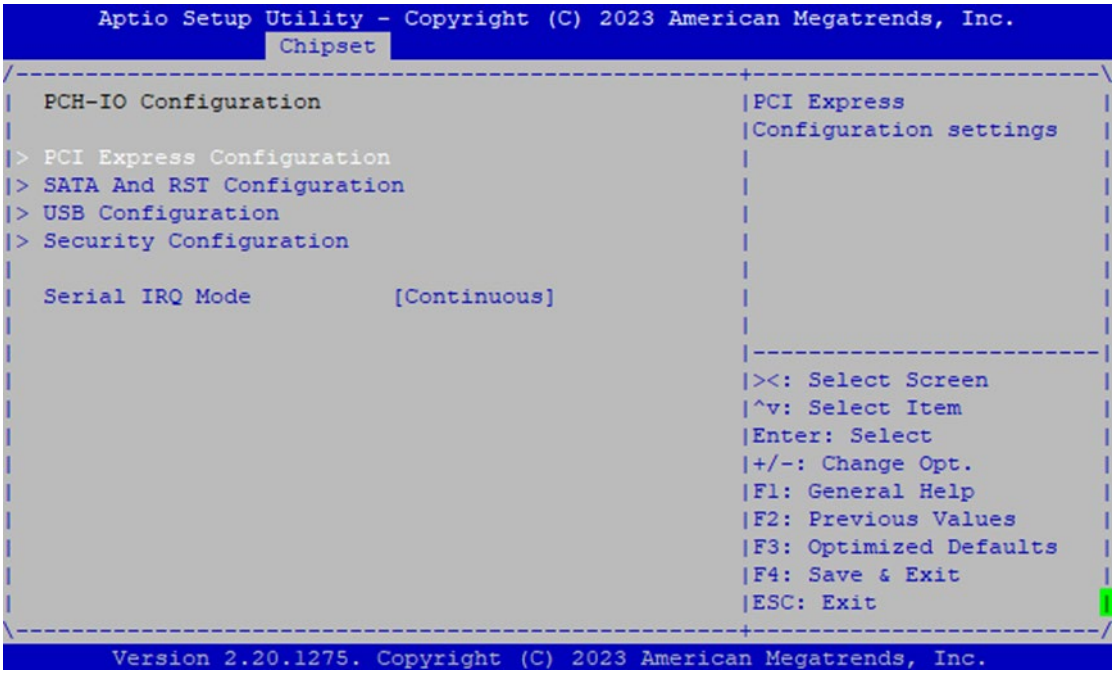
PEG# Slot Power Limit Value	75	Sets the upper limit on power supplied by slot. Power limit (in Watts) is calculated by multiplying this value by the Slot Power Limit Scale. Values 0-255
PEG# Slot Power Limit Scale	1.0x 0.1x 0.01x 0.001x	Select the scale used for the Slot Power Limit Value.
PEG# Physical Slot Number	1	Set the physical slot number attached to this Port. The number has to be globally unique within the chassis. Values 0-8191
PEG0 Hotplug	Disabled Enabled	PCI Express Hot Plug Enable/Disable
Extra Bus Reserved	0	Extra Bus Reserved (0-7) for bridges behind this Root Bridge.
Reseved Memory	10	Reserved Memory for this Root Bridge (1-4096) MB
Reserved I/O	4	Reserved I/O (4K/8K/12K/16K/20K) Range for this Root Bridge.

PEG Port Feature Configuration



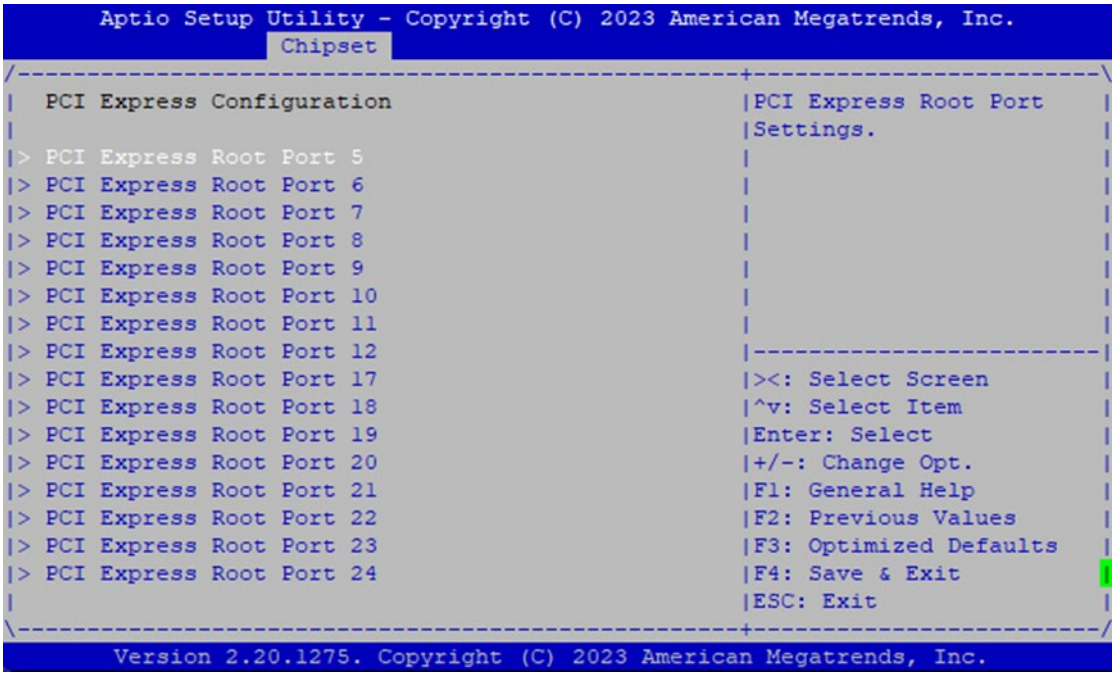
Feature	Options	Description
Detect Non-Compliance Device	Disabled Enabled	Detect Non-Compliance PCI Express Device in PEG

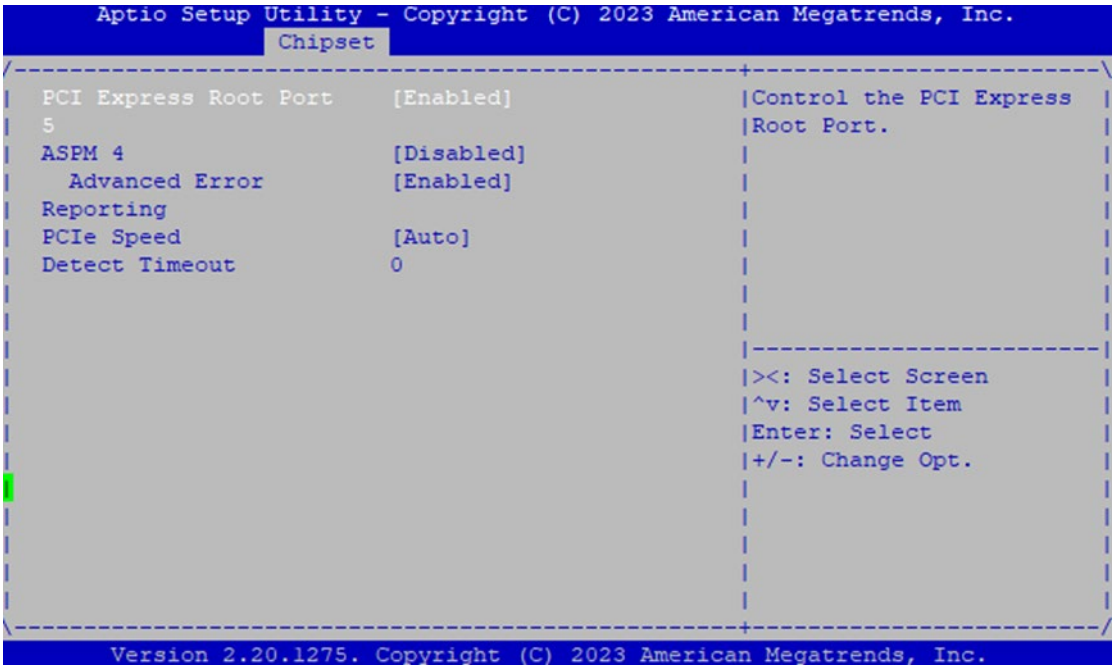
PCH-IO Configuration



Feature	Options	Description
Serial IRQ Mode	Quiet Continuous	Configure Serial IRQ Mode.

PCI Express Configuration

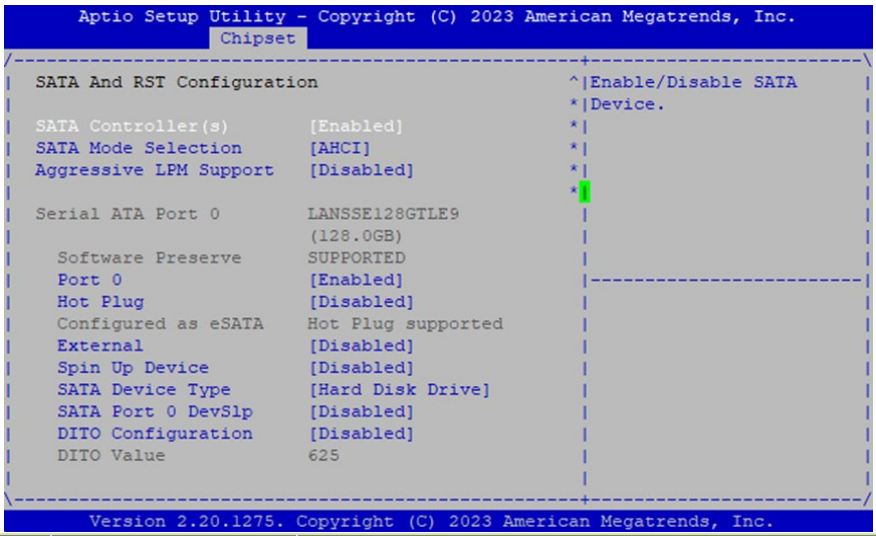




Feature	Options	Description
PCI Express Root Port #	Disabled Enabled	Control the PCI Express Root Port.
ASPM #-1	Disabled L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s - Force all links to L0s State AUTO - BIOS auto configure DISABLE - Disables ASPM

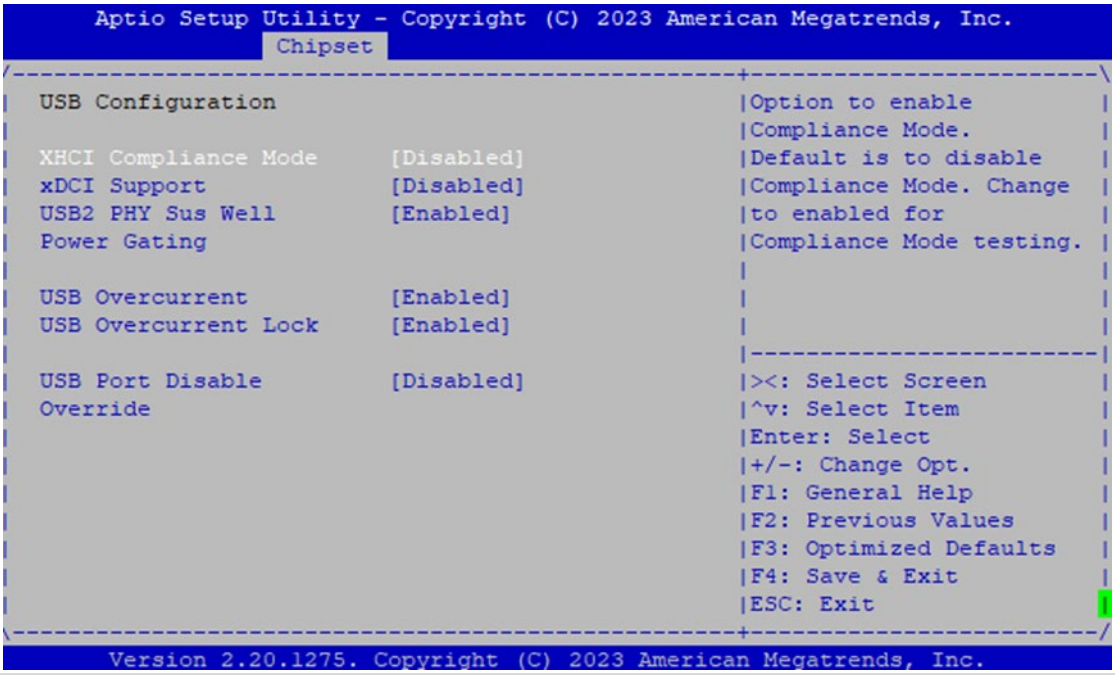
Advanced Error Reporting	Disabled Enabled	Advanced Error Reporting Enable/Disable.
PCIe Speed	Auto Gen1 Gen2 Gen3	Configure PCIe Speed
Detect Timeout	0	The number of milliseconds reference code will wait for link to exit Detect state for enabled ports before assuming there is no device and potentially disabling the port.

SATA And RST Configuration



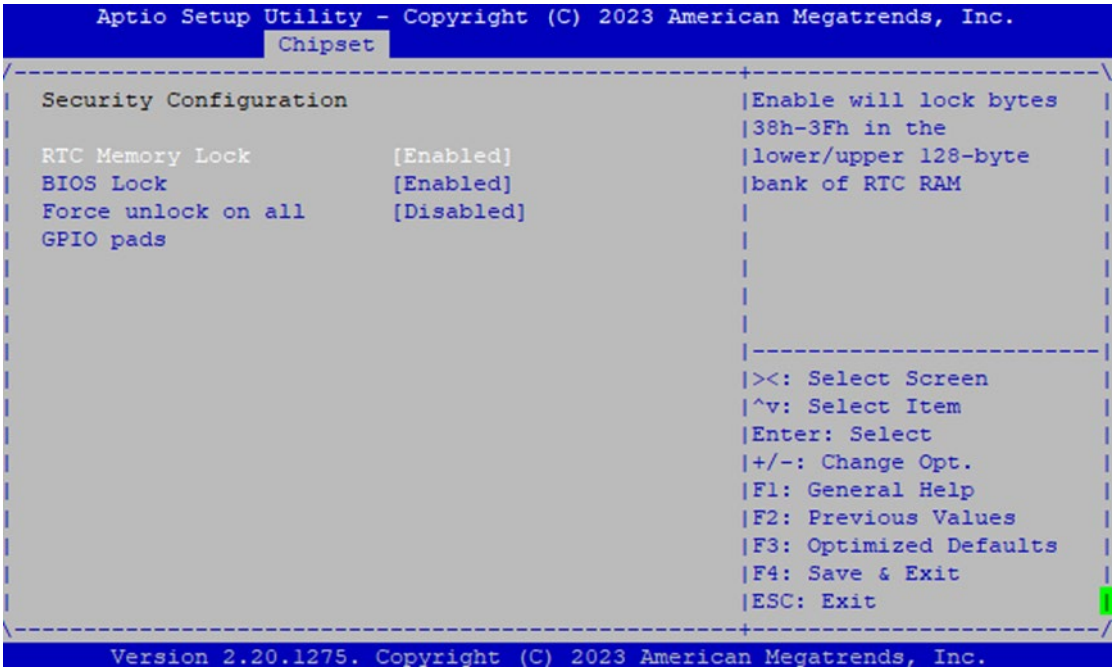
Feature	Options	Description
SATA Controller(s)	Enabled Disabled	Enable/Disable SATA Device.
SATA Mode Selection	AHCI Intel RST	Determines how SATA controller(s) operate.
Aggressive LPM Support	Enabled Disabled	Enable PCH to aggressively enter link power state.
Port #	Enabled Disabled	Enable or Disable SATA Port
Hot Plug	Enabled Disabled	Designates this port as Hot Pluggable.
External	Enabled Disabled	Marks this port as external.
Spin Up Device	Enabled Disabled	If enabled for any of ports Staggerred Spin Up will be performed and only the drives which have this option enabled will spin up at boot. Otherwise all drives spin up at boot.
SATA Device Type	Hard Disk Drive Solid State Drive	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive
SATA Device Type	Hard Disk Drive Solid State Drive	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive
SATA Port # DevSlp	Disabled Enabled	Enable/Disable SATA Port # DevSlp. For DevSlp to work, both hard drive and SATA port need to support DevSlp function, otherwise an unexpected behavior might happen.
DITO Configuration	Disabled Enabled	Enable/Disable DITO Configuration

USB Configuration



Feature	Options	Description
XHCI Compliance Mode	Disabled Enabled	Option to enable Compliance Mode. Default is to disable Compliance Mode. Change to enabled for Compliance Mode testing
xDCI Support	Disabled Enabled	Enable/Disable xDCI (USB OTG Device).
USB2 PHY Sus Well Power Gating	Disabled Enabled	Select 'Enabled' to enable SUS Well PG for USB2 PHY. This option has no effect on PCH-H
USB Overcurrent	Disabled Enabled	Select 'Disabled' for pin-based debug. If pin-based debug is enabled but USB overcurrent is not disabled, USB DbC does not work.
USB Overcurrent Lock	Disabled Enabled	Select 'Enabled' if Overcurrent functionality is used. Enabling this will make xHCI controller consume the Overcurrent mapping data
USB Port Disable Override	Disabled Select Per-Pin	Selectively Enable/Disable the corresponding USB port from reporting a Device Connection to the controller.

Security Configuration

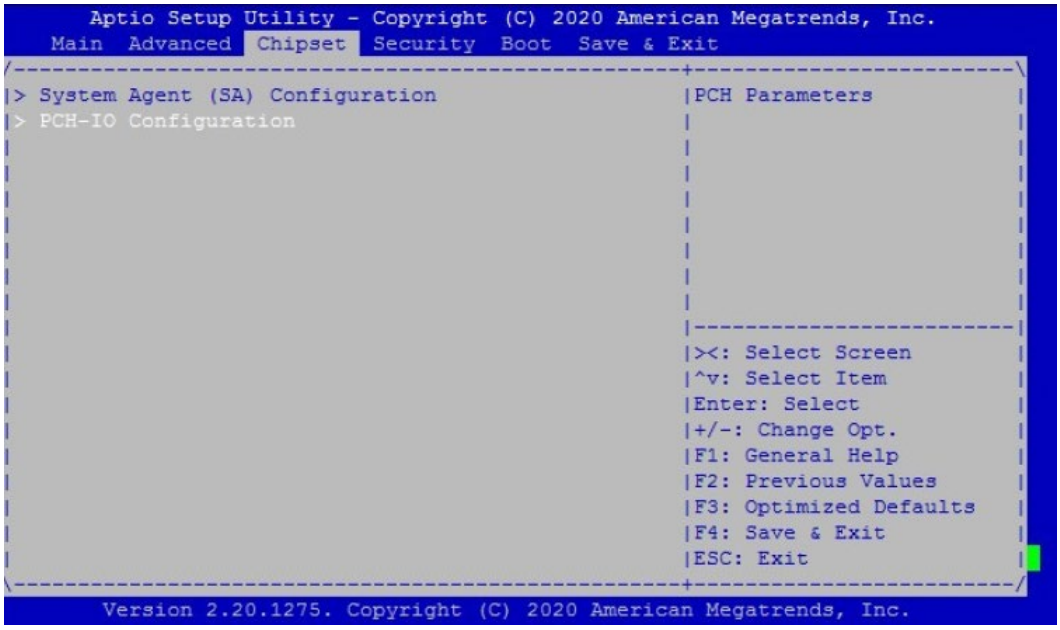


Feature	Options	Description
RTC Memory Lock	Disabled Enabled	Enable will lock bytes 38h-3Fh in the lower/upper 128-byte bank of RTC RAM
BIOS Lock	Disabled Enabled	Enable/Disable the PCH BIOS Lock Enable feature. Required to be enabled to ensure SMM protection of flash.
Force unlock on all GPIO pads	Disabled Enabled	If Enabled BIOS will force all GPIO pads to be in unlocked state

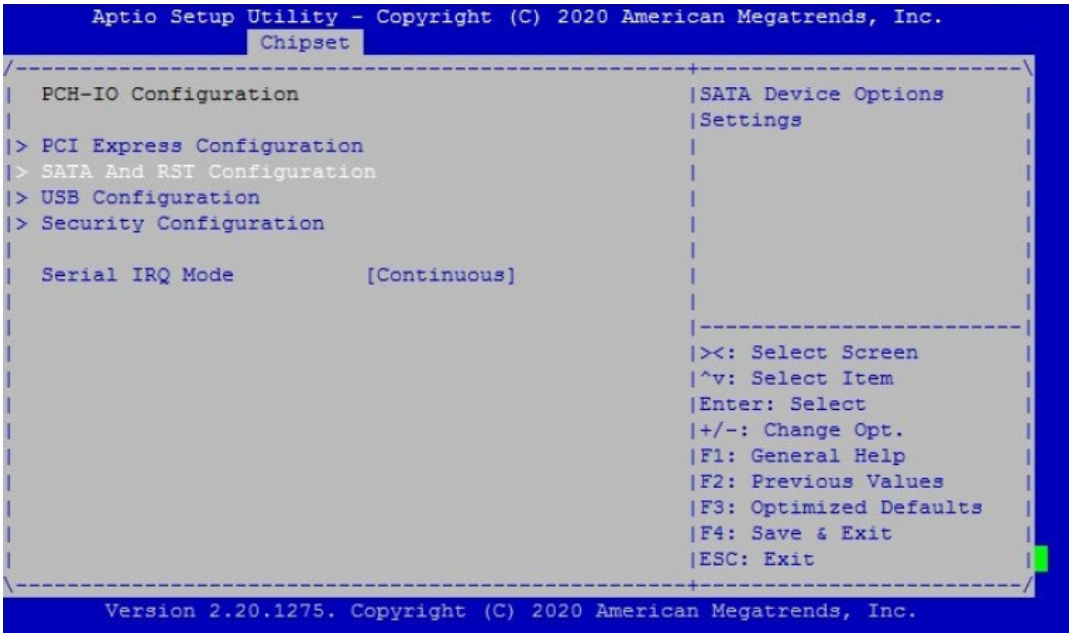
RAID 0/1 Setup

RAID, the abbreviation of Redundant Array of Independent Disks, is a technological combination of multiple physical disk drives to appear as one single logical storage unit on the operating system layer. RAID-0 requires at least two physical disk drives and the total capacity is the sum of all available storage devices. RAID-1 requires two or more physical disk drives to operate. Current BIOS default setting is to disable RAID FW function, please follow setup steps below to enable RAID 0 features.

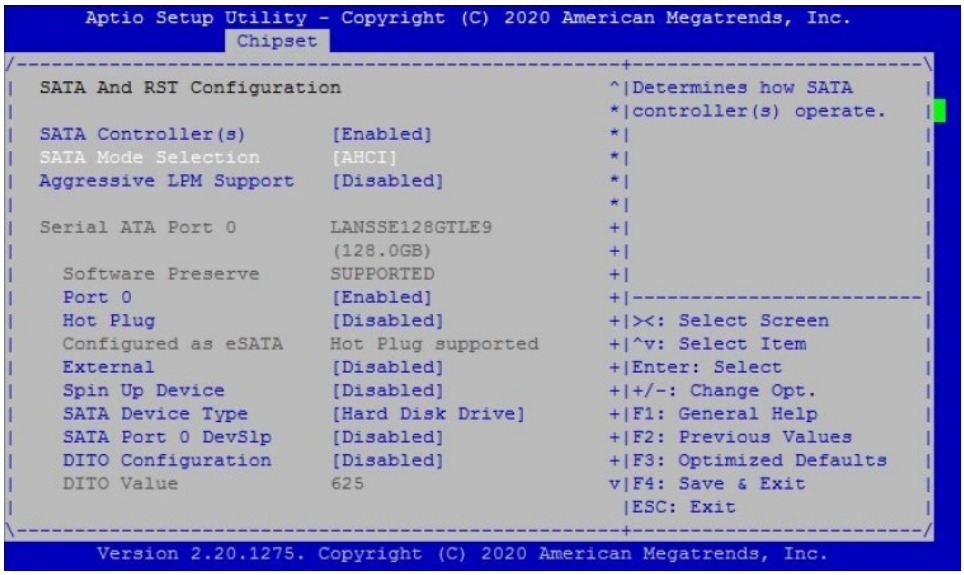
1. Select the **Chipset** menu item from the BIOS setup screen, and select **PCH-IO Configuration.**



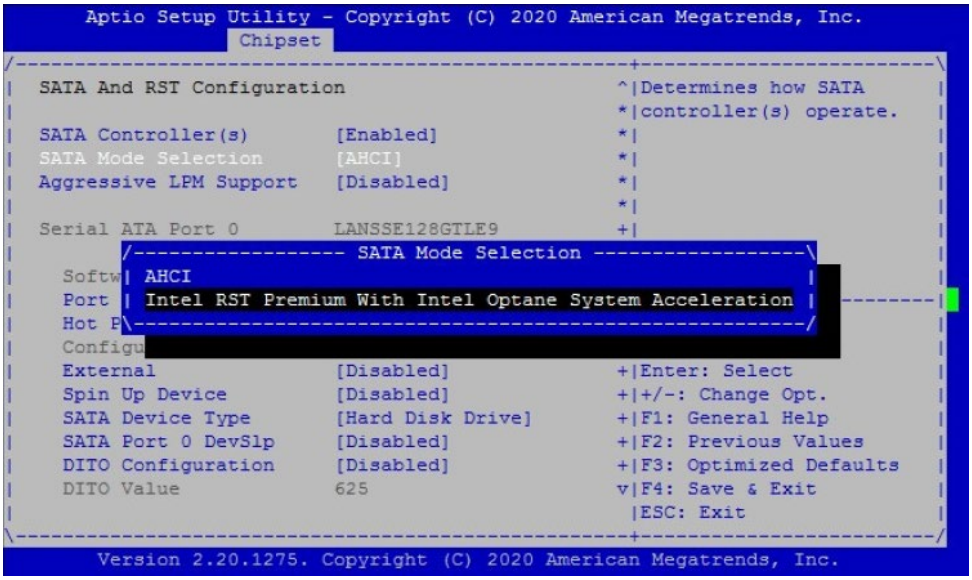
2. Select **SATA And RST Configuration.**

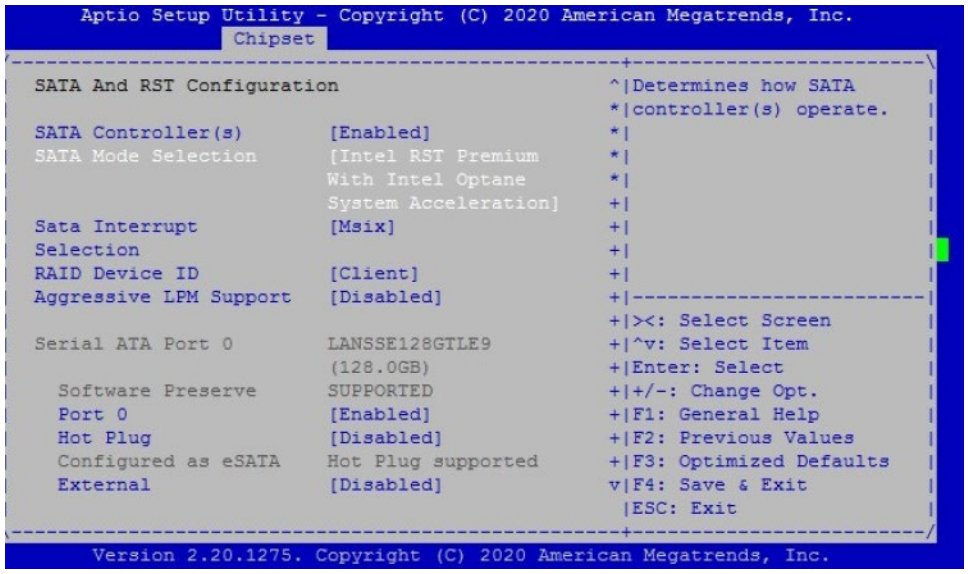


3. Select **SATA Mode Selection**.

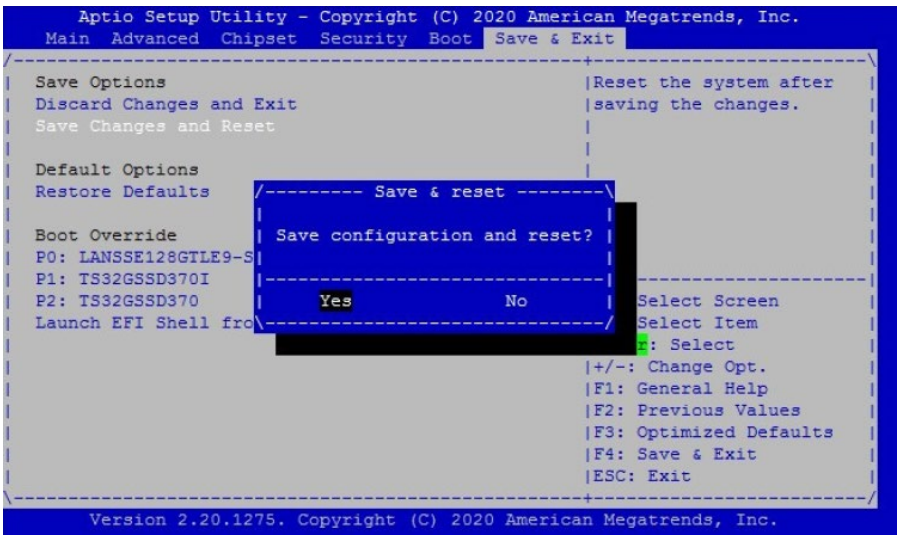


4. Select **Intel RST Premium With Intel Optane System Acceleration**.



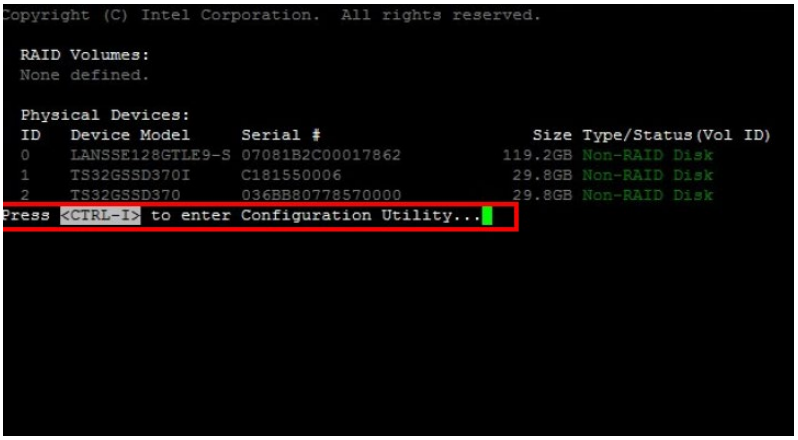


5. Then Select Save & Exit Menu item and select **Yes** to **Save configuration and reset**. RAID 0 function has been enabled.

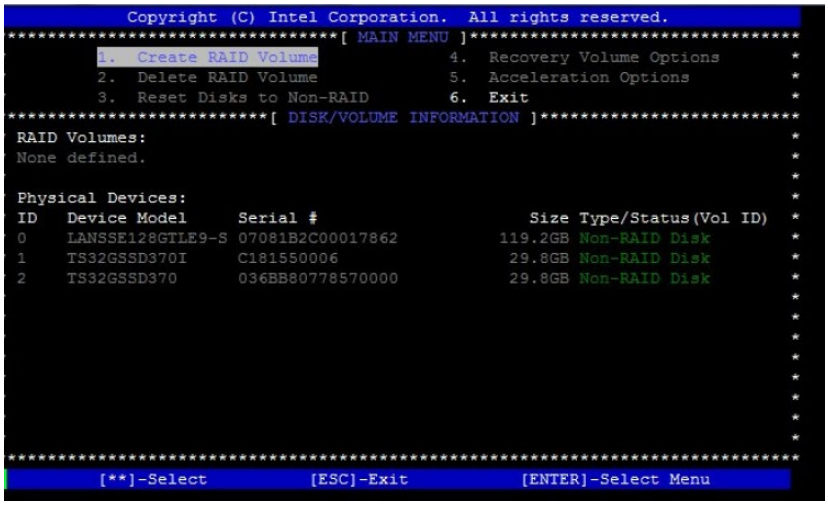


RAID-0 Setup

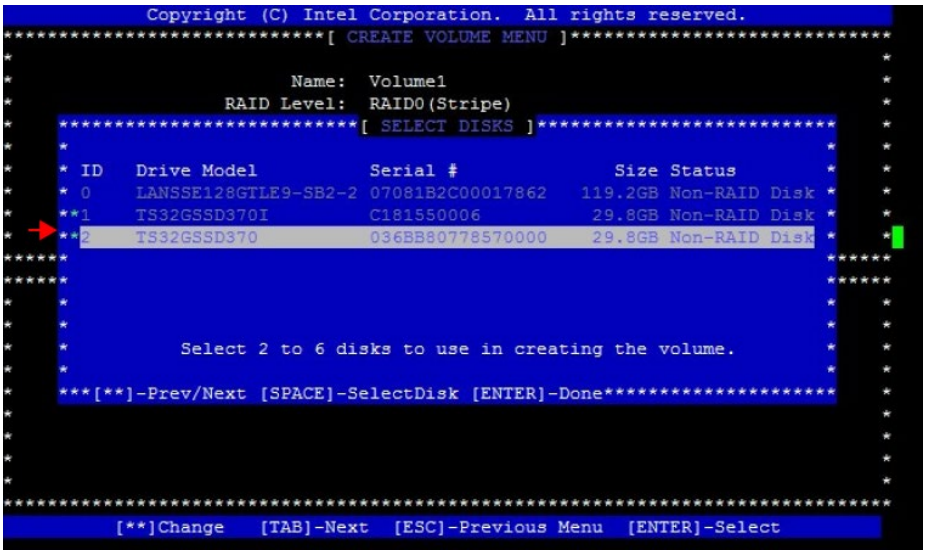
1. Select **<CTRL-I> to enter Configuration Utility...**



2. On the **MAIN MENU**, select **1. Create RAID Volume**.

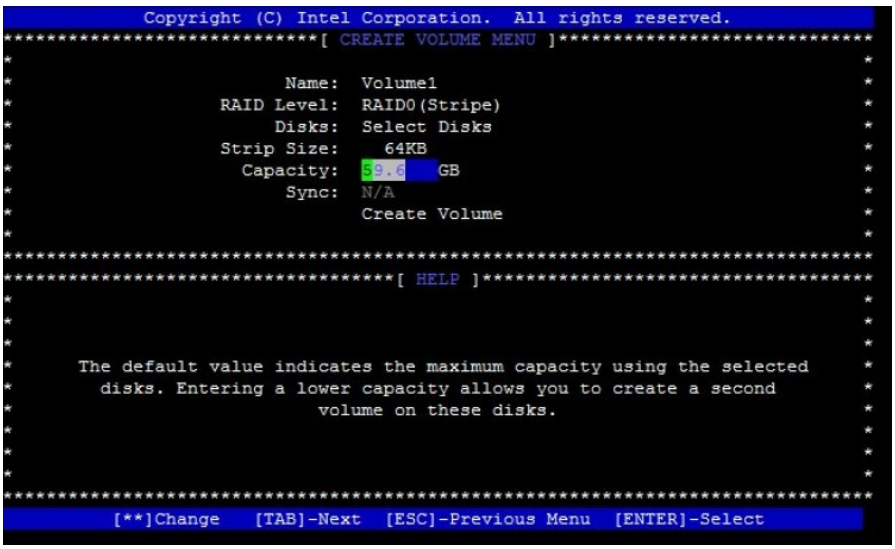


3. In the **CREATE VOLUME MENU**, select the disk to use in creating the volume.

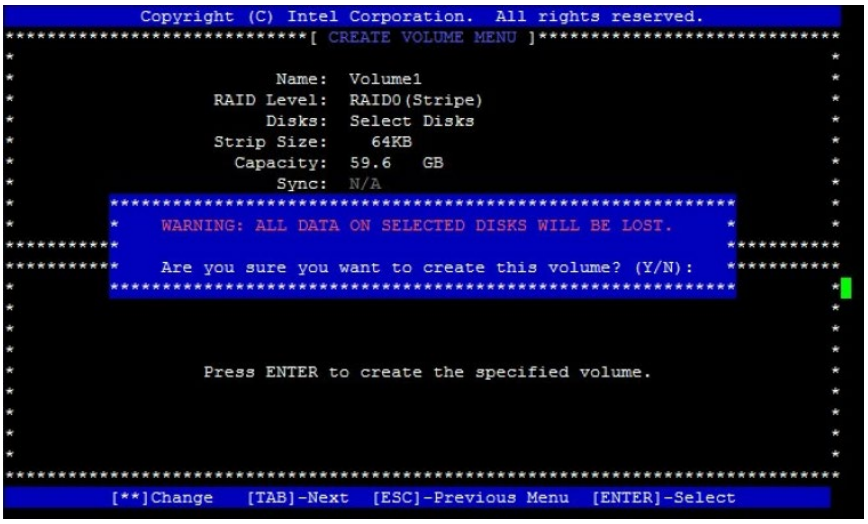


4. Insert **Strip Size** values.

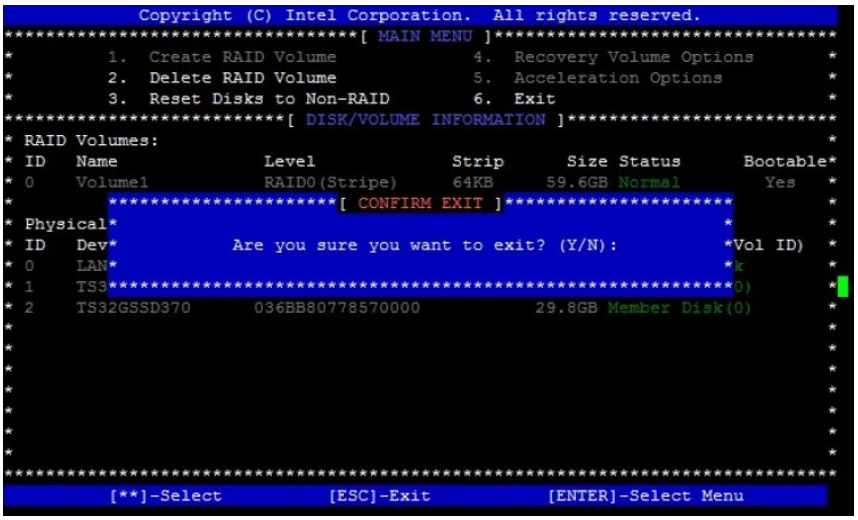
5. Insert **Capacity** values.



6. Select **Y** to create this volume.

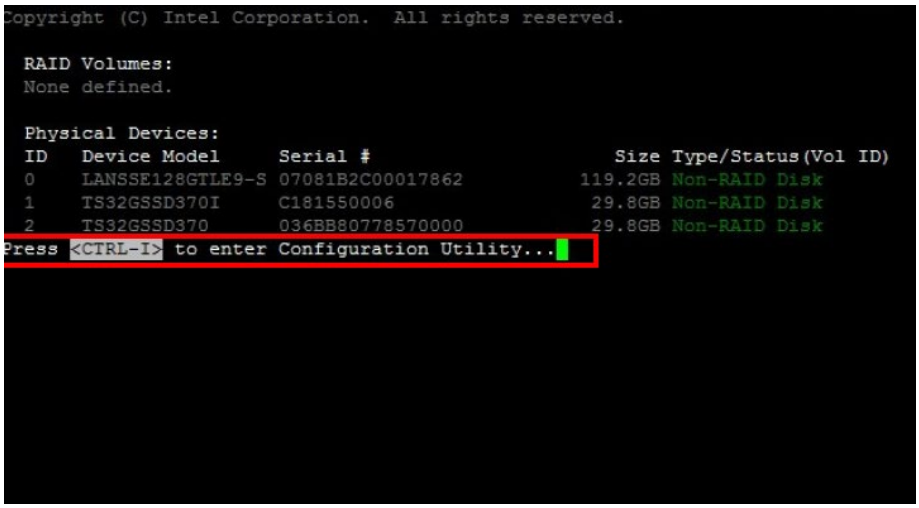


7. Select **Y** to exit.

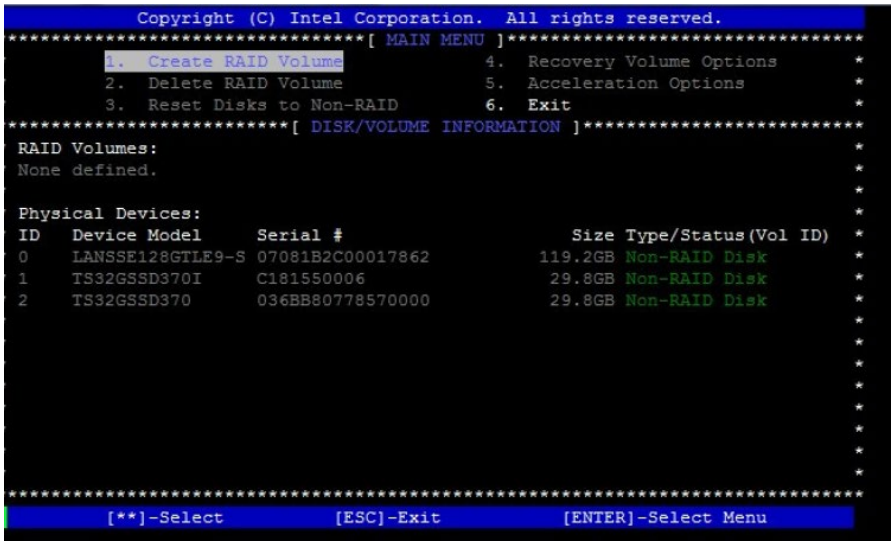


RAID-1 Setup

1. Select **<CTRL-I> to enter Configuration Utility...**



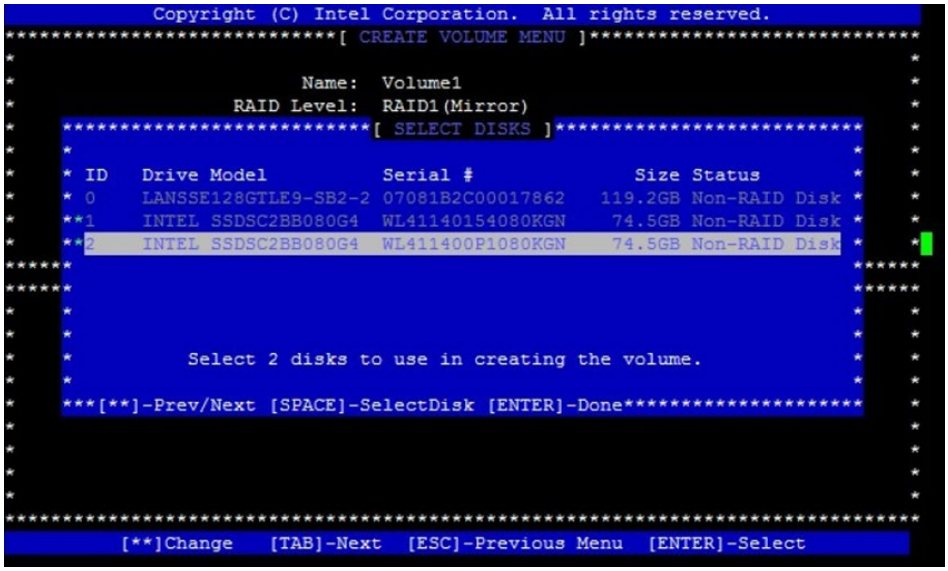
2. On the **MAIN MENU**, select **1. Create RAID Volume**.



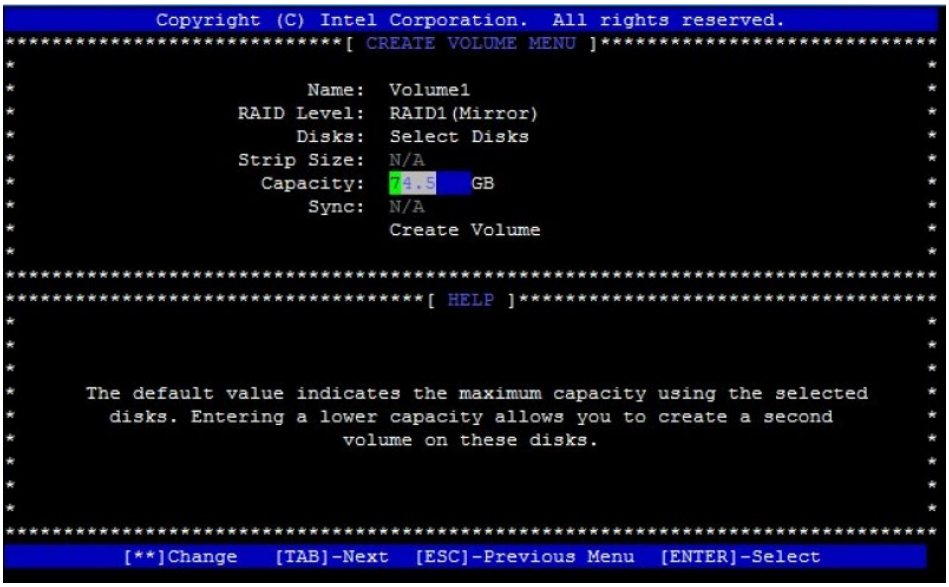
3. In the **CREATE VOLUME MENU**, Select **Name**.

4. Enter **RAID Level** value.

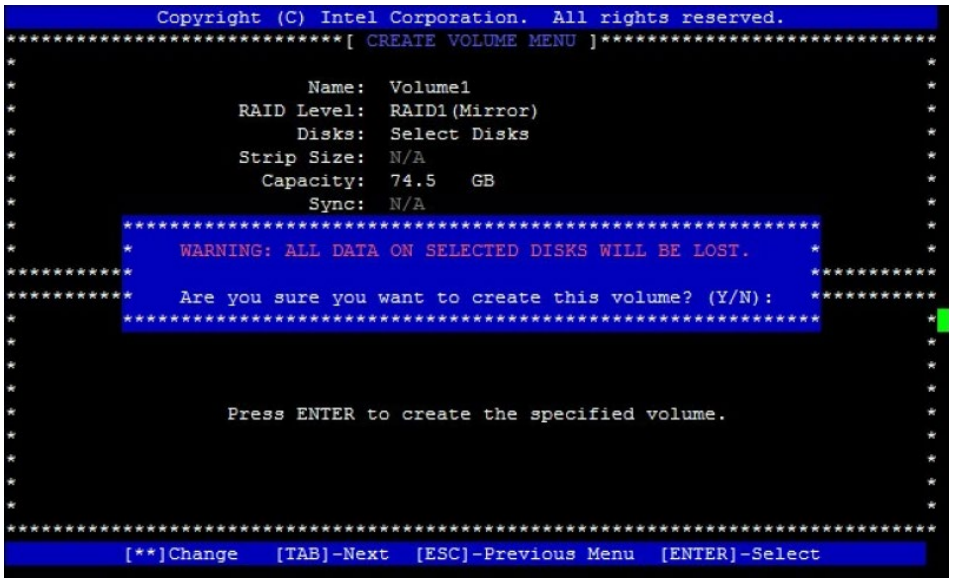
5. Select the Disks to use in creating the volume.



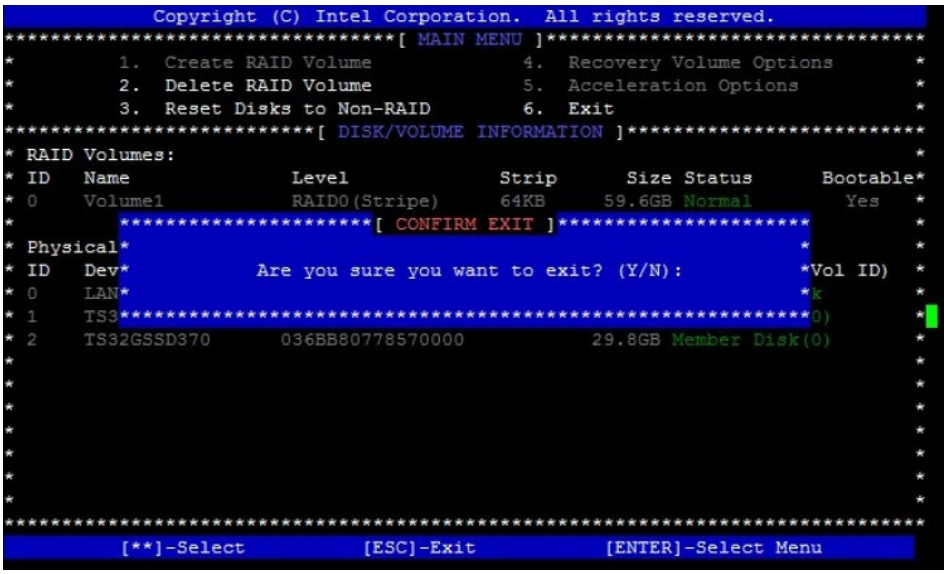
6. Enter Capacity value.



7. Select **Create Volume**. Select **Y** to create this volume.

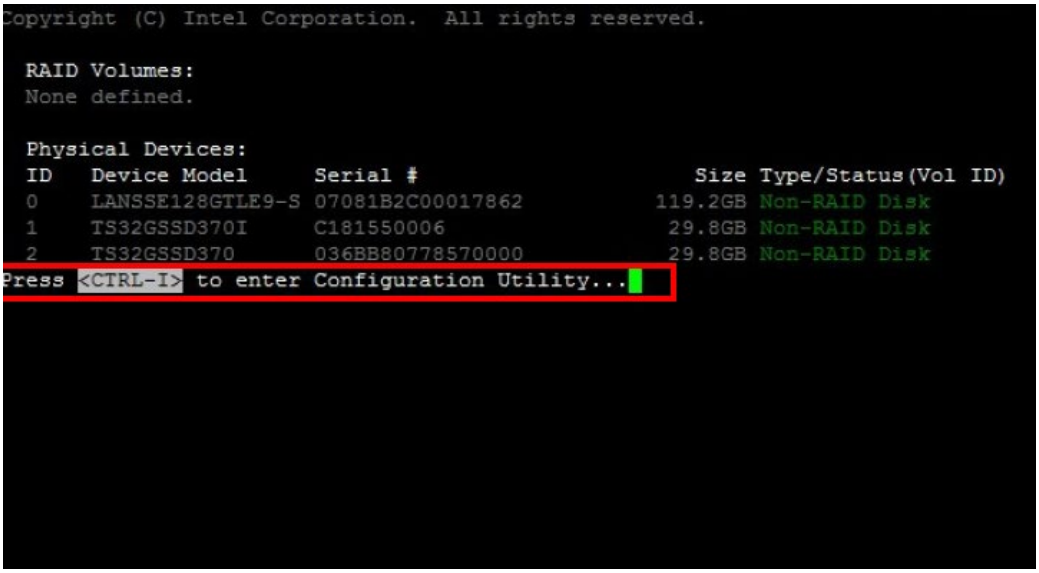


7. Back in the **MAIN MENU**, Select **6. Exit**. Select **Y** to exit.

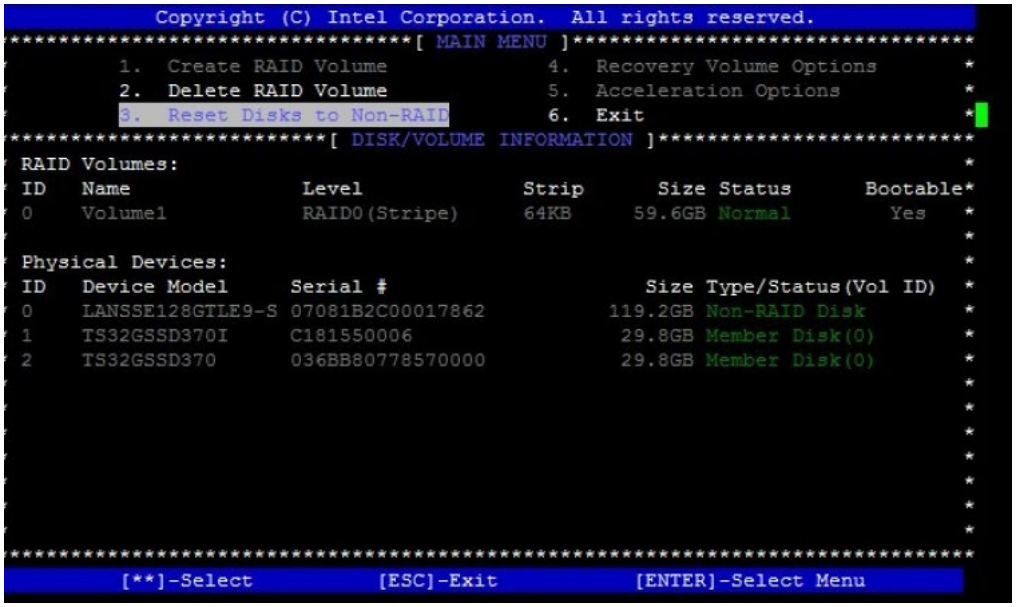


Reset RAID Disk

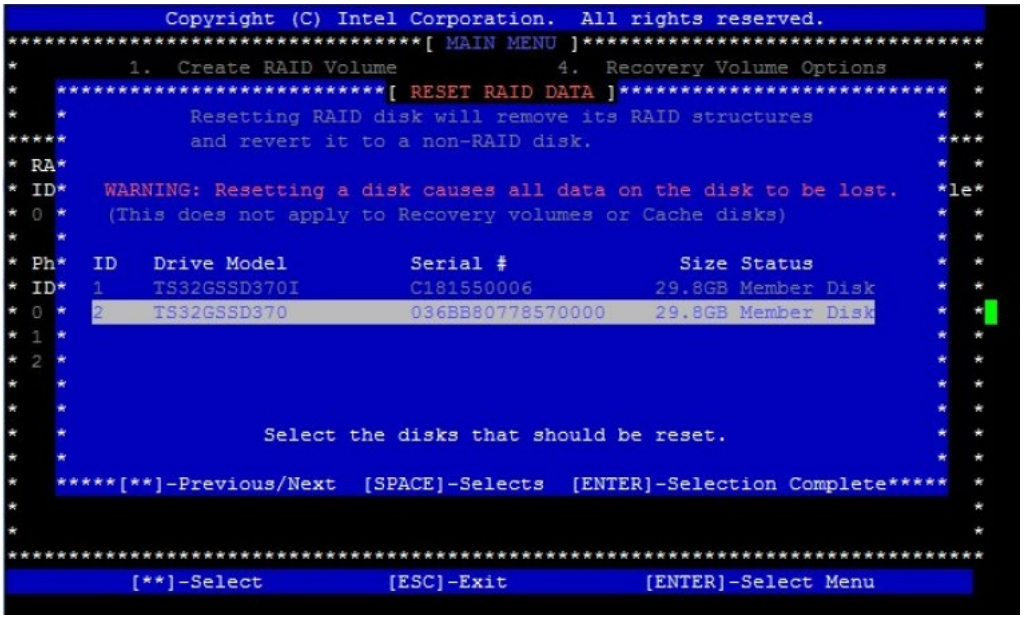
1. Select **<CTRL-I> to enter Configuration Utility...**

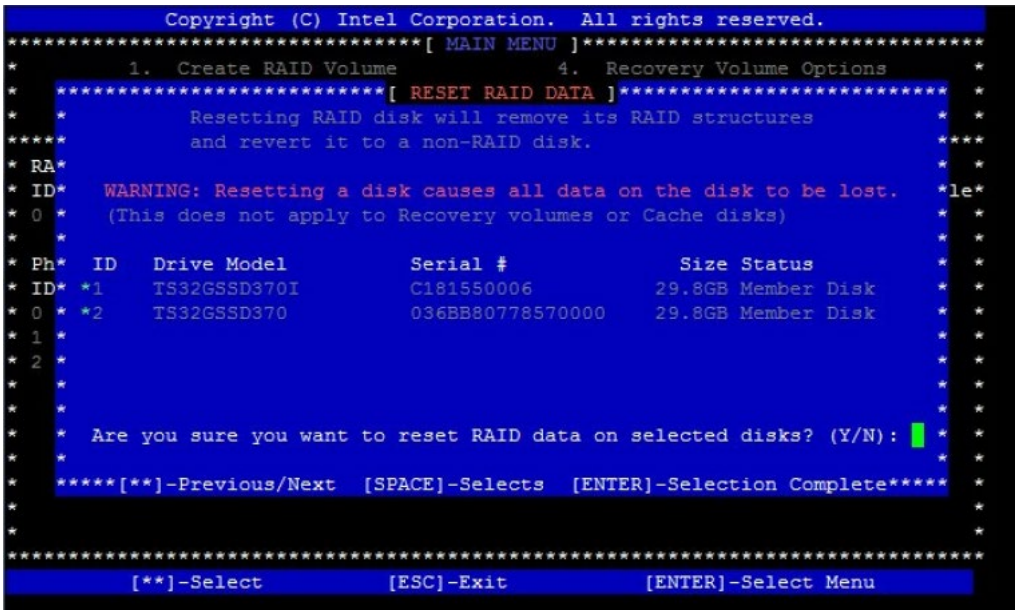


2. In the **MAIN MENU**, select **3. Reset Disks to Non-RAID.**



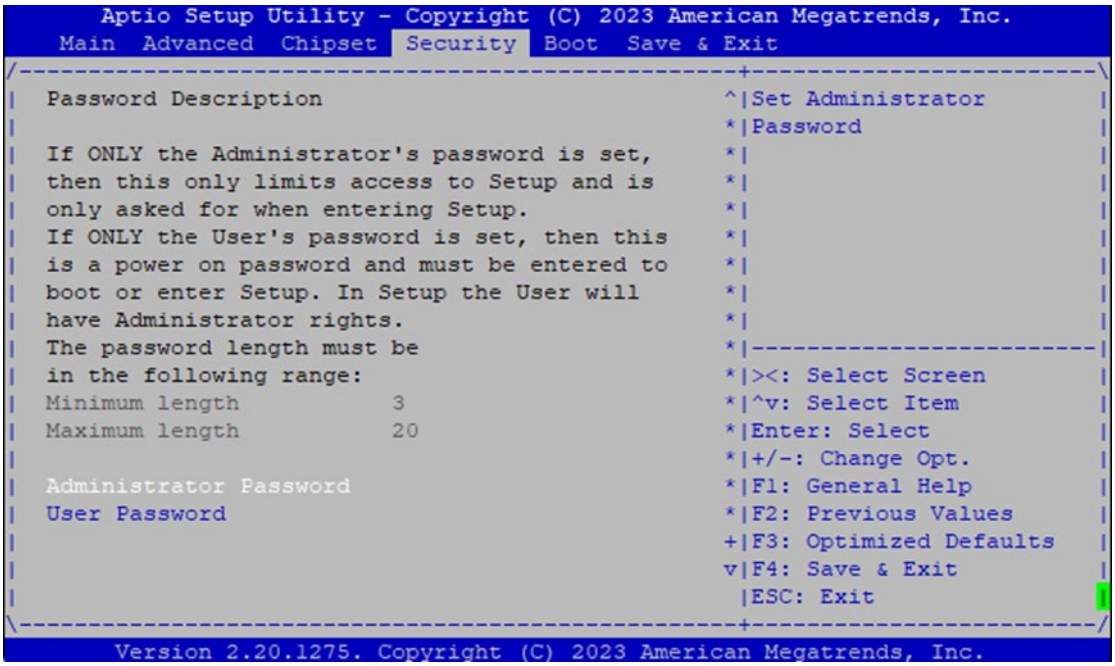
3. Select the disks that should be reset. Select **Y** to reset RAID data.





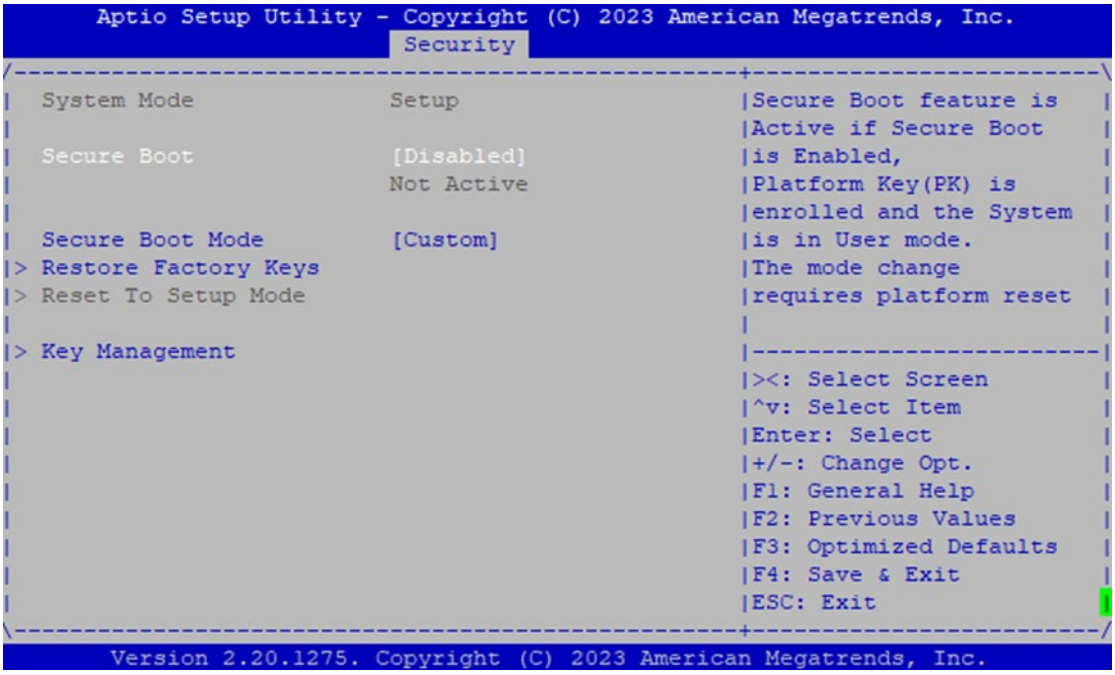
Security

Select the Security menu item from the BIOS setup screen to enter the Security Setup screen. Users can select any of the items in the left frame of the screen.



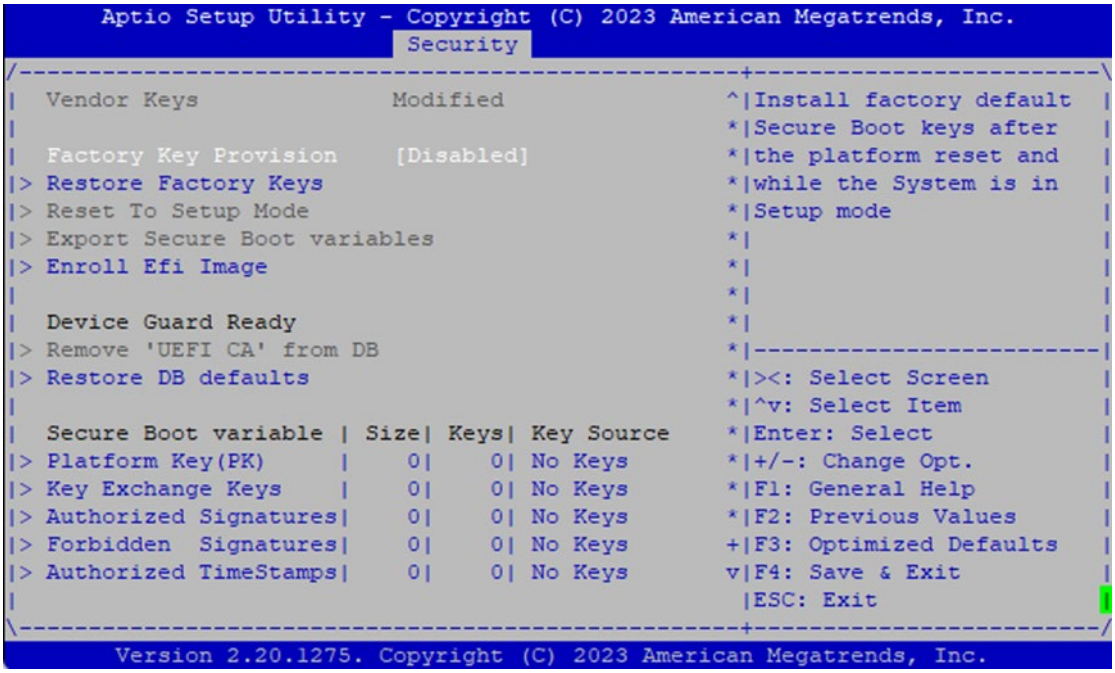
Feature	Description
Administrator Password	If ONLY the Administrator's password is set, it only limits access to Setup and is only asked for when entering Setup.
User Password	If ONLY the User's password is set, it serves as a power-on password and must be entered to boot or enter Setup. In Setup, the User will have Administrator rights.

Secure Boot



Feature	Options	Description
Secure Boot Enable	Disabled Enabled	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
Secure Boot Mode	Standard Custom	Customizable Secure Boot mode: In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication.
Restore Factory Keys	None	Force System to User Mode. Install factory default Secure Boot key databases
Reset To Setup Mode	None	Delete all Secure Boot key databases from NVRAM

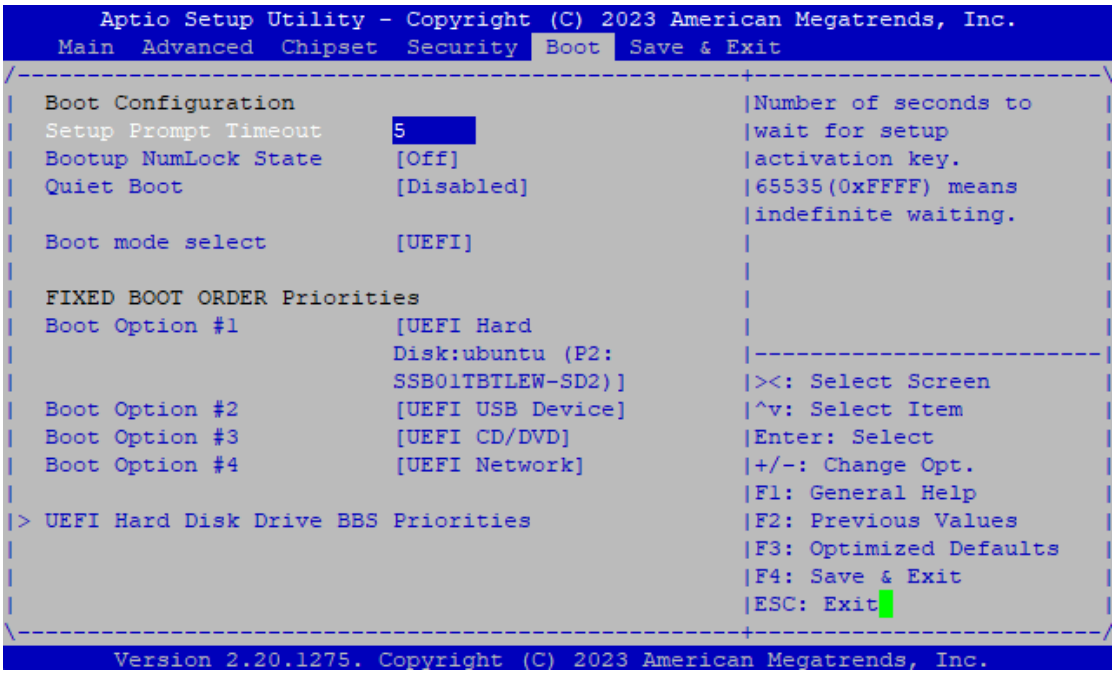
Key Management



Feature	Options	Description
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	None	Force System to User Mode. Install factory default Secure Boot key databases
Reset To Setup Mode	None	Delete all Secure Boot key databases from NVRAM
Export Secure Boot variables	None	Copy NVRAM content of Secure Boot variables to files in a root folder on a file system device
Enroll Efi Image	None	Allows the image to run in Secure Boot mode. Enroll SHA256 hash of the binary into Authorized Signature Database (db)
Remove 'UEFI CA' from DB	None	Device Guard ready system must not list 'Microsoft UEFI CA' Certificate in Authorized Signature database (db)

Boot Menu

Select the Boot menu item from the BIOS setup screen to enter the Boot Setup screen. Users can select any of the items in the left frame of the screen.

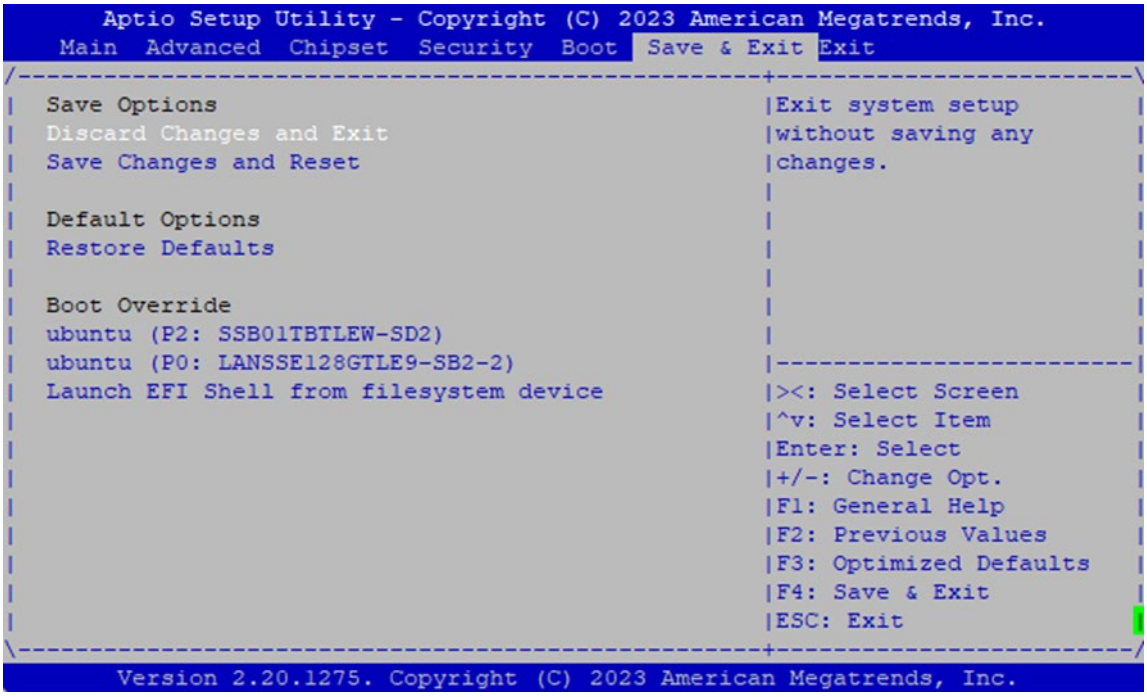


Feature	Options	Description
Setup Prompt Timeout	5	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
Bootup NumLock State	On Off	Select the keyboard NumLock state
Quiet Boot	Disabled Enabled	Enables or disables Quiet Boot option.
Boot mode select	LEGACY (*1) UEFI (*2) DUAL	Select boot mode for LEGACY or UEFI. (*1) LEB-2291C SKU default setting (*2) LEB-2291B SKU default setting

- Choose boot priority from boot option group.
- Choose specifies boot device priority sequence from available Group device.

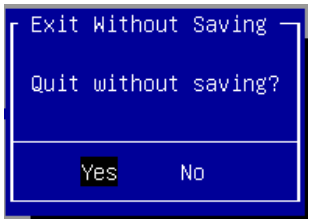
Save and Exit Menu

Select the Save and Exit menu item from the BIOS setup screen to enter the Save and Exit Setup screen. Users can select any of the items in the left frame of the screen.



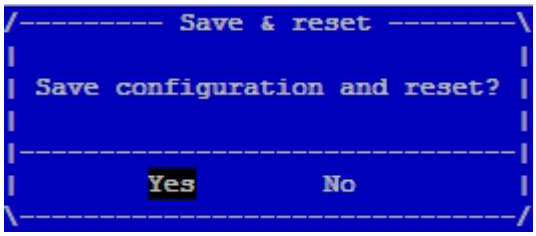
■ Discard Changes and Exit

Select this option to quit Setup without saving any modifications to the system configuration. The following window will appear after the "**Discard Changes and Exit**" option is selected. Select "**Yes"** to Discard changes and Exit Setup.



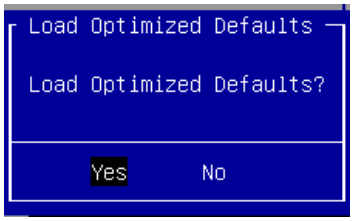
■ Save Changes and Reset

When Users have completed the system configuration changes, select this option to save the changes and reset from BIOS Setup in order for the new system configuration parameters to take effect. The following window will appear after selecting the "**Save Changes and Reset**" option is selected. Select "**Yes**" to Save Changes and reset.



■ **Restore Defaults**

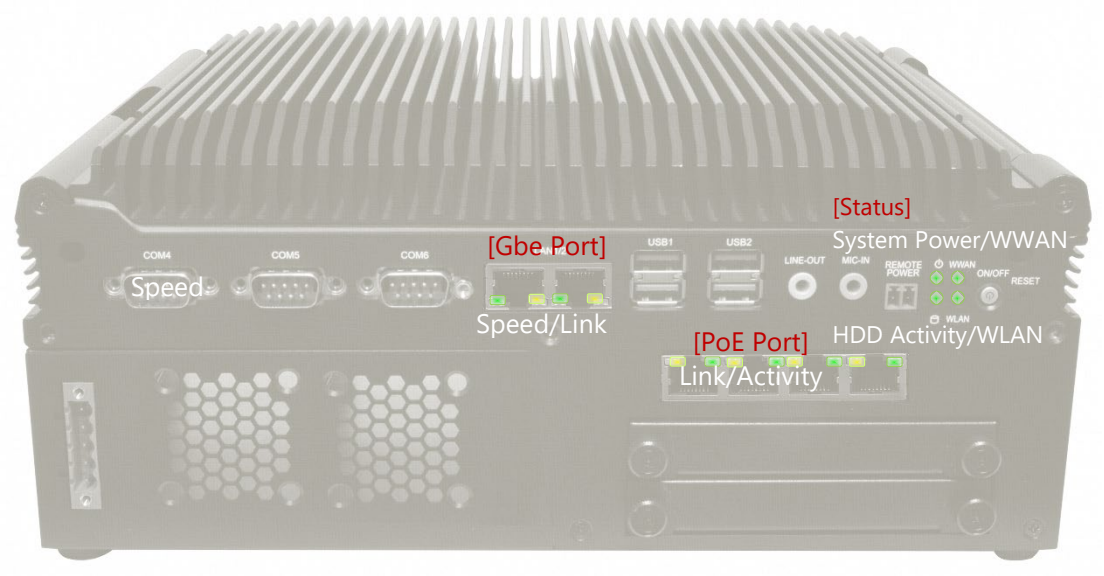
Restore default values for all setup options. Select "**Yes**" to load Optimized defaults.



PS: The items under Boot Override may not be the same as the image above as it should depend on the actual devices connected to the system.

APPENDIX A: LED INDICATOR EXPLANATIONS

The status explanations of LED indicators on the Front Panel are as follows:



Status LED

- **System Power**

Solid Green	*The system is powered on*
Off	*The system is powered off*

- **HDD Activity**

Blinking Green	*Data access activity*
Off	*No data access activity*

GbE Port LED

- **Link Activity**

Blinking Amber	*Link has been established and there is activity on this port*
Solid Amber	*Link has been established and there is no activity on this port*
Off	*No link is established*

- **Speed**

Solid Amber	*Operating as a Gigabit connection (1000 Mbps)*
Solid Green	*Operating as a 100-Mbps connection*
Off	*Operating as a 10-Mbps connection*

PoE Port LED

- **Link Activity**

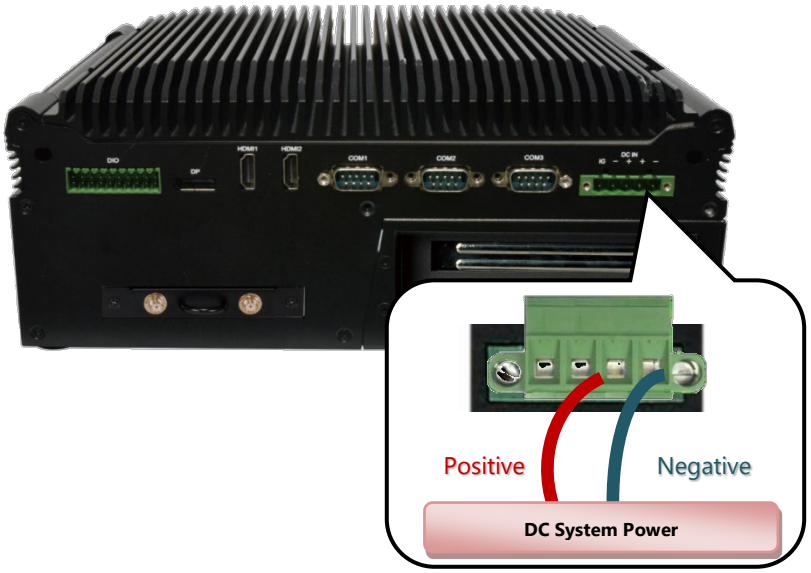
Blinking Amber	*Link has been established and there is activity on this port*
Solid Amber	*Link has been established and there is no activity on this port*
Off	*No link has been established*

- **Speed**

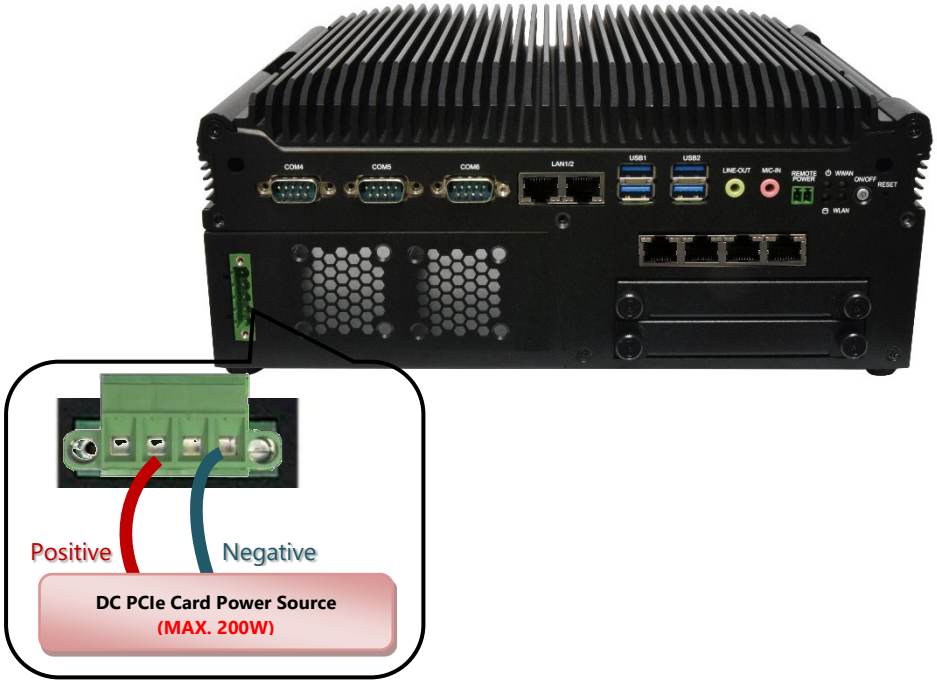
Off	*Operating as a 10-Mbps connection*
Solid Green	*Operating as a 100-Mbps connection*

APPENDIX B: CONNECT TO DC POWER

1. Make sure your system is turned off.
2. Follow the wiring definition and illustration below to connect the power source to the system through the 4-pin terminal block connector as DC Input. Connect the two Power Wires to the Terminal Block (supplied along with the system) by respectively inserting the red wire to the Positive contact, the other wire to the Negative contact, and then secure them onto the terminal block.



3. Follow the wiring definition and illustration below to connect the power source to the PCIe card through the 4-pin terminal block connector as DC Input. Connect the two Power Wires to the Terminal Block (supplied along with the system) by respectively inserting the red wire to the Positive contact, the other wire to the Negative contact, and then secure them onto the terminal block.



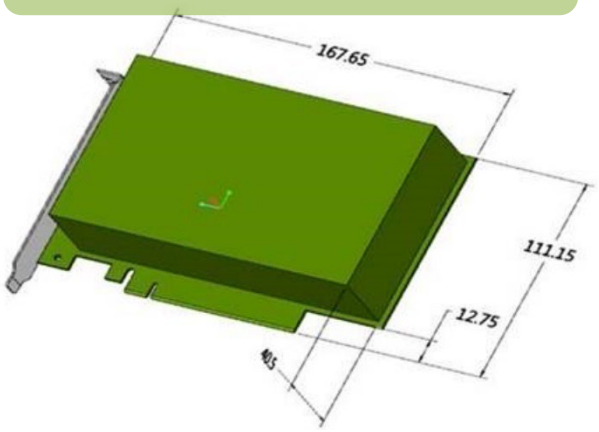
4. System with nVidia Graphic Card Burn-in Verification:

- LEC-2290 + graphic card N1050TI-L9FX (75W) with fan; operating temperature @ 0°C~55°C (35W CPU) / 0°C~45°C (65W CPU)
- LEC-2290 + graphic card N206S-V9FX (120W) with fan; operating temperature @ 0°C~50°C (35W CPU) / 0°C~40°C (65W CPU)
- LEC-2290 + graphic card N1660TI-Q9FX (175W) with fan; operating temperature @ 0°C~40°C (35W CPU) / 0°C~30°C (65W CPU)

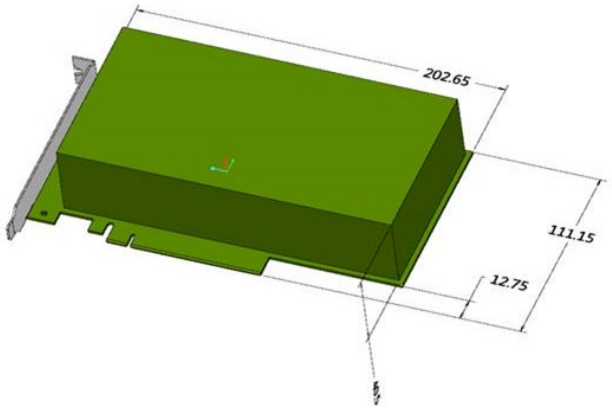
p.s. 0P0W000060000 240W 12V 20A C14 ATX 10P 9NA2700500 FSP 80CM 180

Space of PCIe Card:

The 168 x 111 x 42mm shall be the maximum with fan using graphic card



The 203 x 111 x 42mm shall be the maximum without fan using graphic card.



APPENDIX C: TERMS AND CONDITIONS

Warranty Policy

1. All products are under warranty against defects in materials and workmanship for a period of one year from the date of purchase.
2. The buyer will bear the return freight charges for goods returned for repair within the warranty period; whereas the manufacturer will bear the after-service freight charges for goods returned to the user.
3. The buyer will pay for the repair (for replaced components plus service time) and transportation charges (both ways) for items after the expiration of the warranty period.
4. If the RMA Service Request Form does not meet the stated requirement as listed on "RMA Service," RMA goods will be returned at customer's expense.
5. The following conditions are excluded from this warranty:
   - Improper or inadequate maintenance by the customer
   - Unauthorized modification, misuse, or reversed engineering of the product
   - Operation outside of the environmental specifications for the product.

RMA Service

Requesting an RMA#

1. To obtain an RMA number, simply fill out and fax the "RMA Request Form" to your supplier.
2. The customer is required to fill out the problem code as listed. If your problem is not among the codes listed, please write the symptom description in the remarks box.
3. Ship the defective unit(s) on freight prepaid terms. Use the original packing materials when possible.
4. Mark the RMA# clearly on the box.

Note: Customer is responsible for shipping damage(s) resulting from inadequate/loose packing of the defective unit(s). All RMA# are valid for 30 days only; RMA goods received after the effective RMA# period will be rejected.

RMA Service Request Form

When requesting RMA service, please fill out the following form. Without this form enclosed, your RMA cannot be processed.

RMA No:	Reasons to Return: ▫ Repair(Please include failure details) ▫ Testing Purpose
Company:	Contact Person:
Phone No.	Purchased Date:
Fax No.:	Applied Date:
Return Shipping Address: _____ Shipping by: ▫ Air Freight ▫ Sea ▫ Express_____ ▫ Others:_____	

Item	Model Name	Serial Number	Configuration

Item	Problem Code	Failure Status

*Problem Code:

01:D.O.A.	07: BIOS Problem	13: SCSI	19: DIO
02: Second Time R.M.A.	08: Keyboard Controller Fail	14: LPT Port	20: Buzzer
	09: Cache RMA Problem	15: PS2	21: Shut Down
03: CMOS Data Lost	10: Memory Socket Bad	16: LAN	22: Panel Fail
04: FDC Fail	11: Hang Up Software	17: COM Port	23: CRT Fail
05: HDC Fail	12: Out Look Damage	18: Watchdog Timer	24: Others (Pls specify)
06: Bad Slot			

Request Party

Authorized Signature / Date

Confirmed By Supplier

Authorized Signature / Date