Lanner

Vehicle Computing

Rugged Platforms for Vehicles Computing Applications

V3S
User Manual

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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.

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In addition to contacting your distributor or sales representative, you could visit our Lanner Technical Support, to fill in a support ticket to our technical support department.

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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. To protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend using 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, according 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 following 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.

EMC Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, according 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 following 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 a 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 the safe disposal of lithium batteries.
- Removal of a battery into fire or a hot oven, or mechanically crushing or cutting a battery can result in an explosion.
- Leaving a battery in a too high temperature surrounding environment can result in an explosion or the leakage of flammable liquid or gas.
- A battery subjected to extremely low air pressure may result in an explosion or the leakage of flammable liquid or gas.

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

Environment:

► Do not install and/or operate this unit in any place that flammable objects are stored or used in.
► 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.
► Installation of the equipment (especially in a rack) should consider the ventilation of the system's intake (for taking chilled air) and exhaust (for emitting hot air) openings so that the amount of airflow required for the safe operation of the equipment is not compromised.
► To avoid a hazardous load condition, be sure the mechanical loading is even when mounting.
► 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 over-current protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
► Reliable earthing should be maintained. Particular attention should be given to provide connections other than direct connections to the branch circuit (e.g., use of power strips).
► This equipment is for INDOOR USE ONLY.

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.
► 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

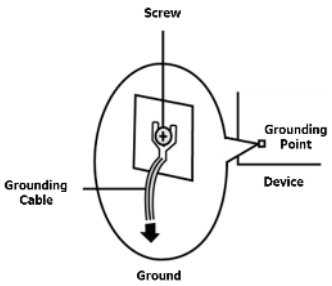
Before turning on the device, ground the grounding cable of the equipment. Proper grounding (grounding) is essential to protect the equipment against the harmful effects of external noise and to reduce the risk of electrocution in the event of a lightning strike. To uninstall the equipment, disconnect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

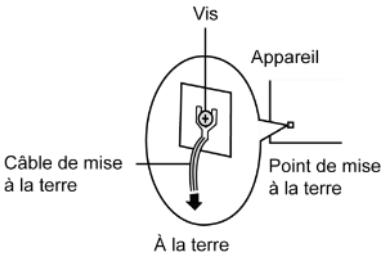
Grounding Procedure for Power Source

- 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 should 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



Important

This product is intended to be supplied by a Listed Power Adapter or DC power source, rated 9-36Vdc, 14-4A minimum, Tma = 70 degrees C, and the altitude of operation = 5000m.

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CHAPTER 1: PRODUCT OVERVIEW

The V3S is targeted for video surveillance, recording, and analytics. As a fanless NVR system, V3S features next-generation Intel® x86 SoC, rich I/O functionality, and environmental endurance, making it highly applicable in smart bus surveillance. V3S features the new generation 14 nm Intel® Atom™ x7-E3950 SoC (formerly Apollo Lake). This processor consumes a low volume of power and offers a performance upgrade for advanced computing needs from the previous generation of Atom™ processors.

V3S boasts an abundance of I/O peripheral connectivity, including 2 x serial COM ports, 2x video output by DVI-D, USB and Digital I/O ports, 6x RJ-45 ports (4 with PoE), and removable SATA storage bay. To enable wireless network connectivity, V3S offers two mini-PCIe sockets with a swappable dual SIM slot supporting 3G/4G/LTE cellular communications and optional removable PGN Caddy with dual SIM card readers. Also, the compact system comes with CAN bus for video analysis.

Features

- Intel® Atom™ x7-E3950 Processor (Codenamed Apollo Lake)
- Video Surveillance NVR with 6x RJ-45 ports (4 with PoE/2 with PoE+), DIO, CAN bus port, Dual COM and DVI-D ports
- 1x removable PGN Caddy with dual SIM card readers for 4G LTE module
- Wide range operating temperature from -40 to 70°C
- Removable 2.5" Drive Bay for HDD/SSD
- 1x Full-Size Mini-PCIe with dual SIM card reader, 1x Half Size Mini- PCIe
- Compliant with E13 standard

Package Content

Your package contains the following items:

- 1x V3S System
- 1x Pack of Screws



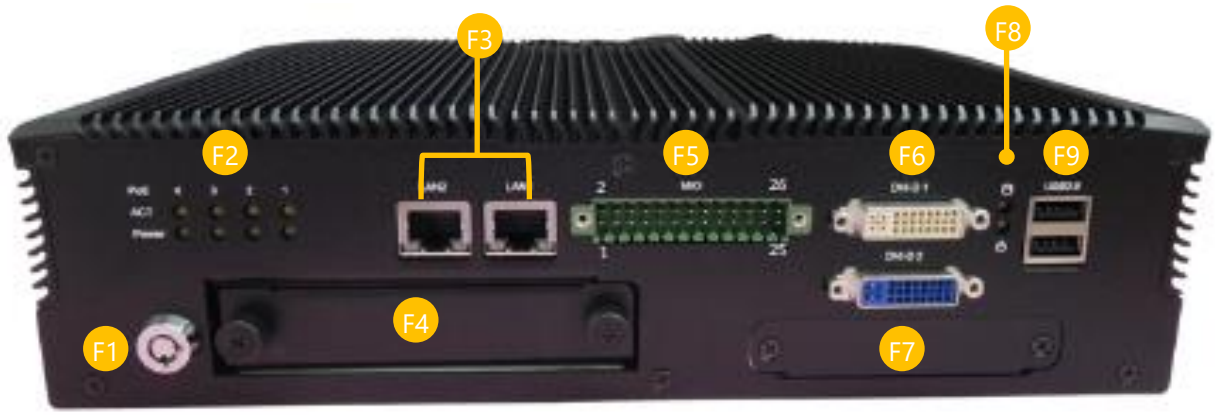
Ordering Information

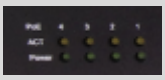
SKU No.	Description
V3SA	Fan-less In-vehicle Surveillance Computer with Intel® Atom™ x7-E3950 Processor, IEEE 802.3af PoE ports RJ45 x4
V3SB	Fan-less In-vehicle Surveillance Computer with Intel® Atom™ x7-E3950 Processor, IEEE802.3af PoE ports RJ45 x4, or IEEE 802.3at PoE+ ports RJ45 x2 (ttl max. 60W)
PGN-300	4G LTE Radio Modem with LTE Cat-6 embedded module
PGN-600	4G LTE-Advanced Pro Radio Modem with LTE Cat-12 embedded module, certified with PTCRB, AT&T

System Specifications

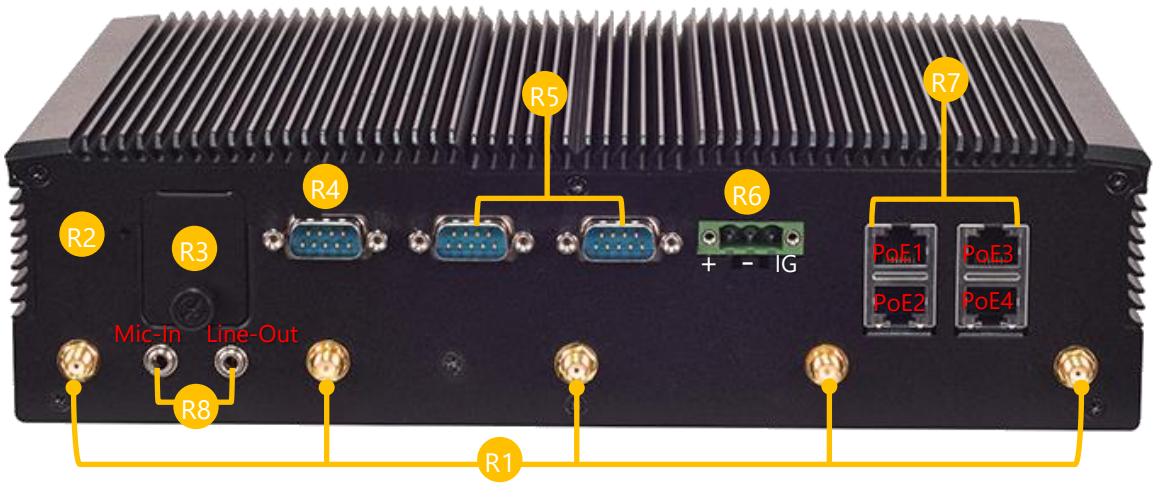
Processor System	CPU	Intel® Atom™ x7-E3950
	Frequency	1.60 GHz
	Core Number	4 Cores
	Chipset	N/A
Fanless		Yes
Memory	Technology	1x DDR3L 1866 SO-DIMM Socket
	Max. Capacity	Up to 8GB
	Socket	1x 204-pin SODIMM
Graphic	Graphic Processor	Intel® Integrated HD Graphics 505
Audio	Codec	Realtek ALC886 HD codec
	Interface	Mic-in and Line-out
Ethernet	Controller	2x Intel® i210IT, 1x Intel® i210IS (PoE)
	PoE	4x IEEE802.3af PoE (SKU A), or 2x IEEE802.3at PoE+ (SKU B); TTL Max Power: 60W
	Interface	RJ45
Storage	Type	SATA
	Installation	1x Removable 2.5" drive bay1 (HDD/SSD not included)
	Type	mSATA
	Installation	1x mSATA socket
I/O	Display Port	2x DVI-D, resolution up to 1920x1200
	LAN Port	6x RJ-45 ports (4 with PoE)
	CAN Port	CAN Bus J1939/ J1708
	COM Port	2x RS-232/422/485
	USB Port	2x USB 2.0 Type A
	GPS/G-sensor	u-blox NEO-M8N/ADXL 345
	Digital I/O Port	8x DI 5V TTL and 8x DO 12V TTL 2x DI (from MCU) 3.3V TTL 1x 12V with 1A dry relay
	Antenna	7x SMA antenna hole (with 1x GPS+GLONASS)
Expansion Interface	Mini-PCIe	1x Full-Size Mini-PCIe with dual SIM card reader 1x Half-Size Mini-PCIe 1x Optional removable PGN Caddy with dual SIM card readers
Cooling	Processor	Passive CPU heatsink
	System	Fanless design with corrugated aluminum
Power	Connector	3-pin terminal block (+,-,ignition)
	Input	Supports DC 9~36V level
Environment	Operating Temperature	-40~70°C / -40~158°F
	Storage Temperature	-40~85°C / -40~185°F
	Relative Humidity	5%~95% @ 40°C / 104°F (Storage Level)
Mechanical	Dimension (W x H x D)	273.8 x 73 x 185 mm (10.78" x 2.87" x 7.28")
	Weight	4 kg
	Mounting	Wallmount
Driver Support	Microsoft Windows	Windows 10
	Linux	Linux: Redhat Enterprise 5, Fedora 14. Linux Kernel 2.6.18 or later
Certification	EMC	CE Class A, FCC Class A, RoHS
	Safety	E13 include ISO 7637-2
Compliance	Vibration	MIL-STD-810G, Method 514.6
	Shock	MIL-STD-810G, Method 516.6

Front Panel



No.	Description	
F1	Key Lock	For extra protection of the data on the hard disk
F2	LED Indicators (PoE Ports)	Indicating the status of 4x PoE port  (Please refer to Appendix A: LED Indicator Explanations)
F3	GbE Ports	2x RJ45 port with LED indicators
F4	Storage Bay	1x removable 2.5" HDD/ SSD bay
F5	MIO Port	8x DI@5V; 8x DO @12V; 2x DI from MCU @ 3.3V
F6	DVI-D Port	2x DVI-D Port
F7	Module Slot (Antenna Port)	Removable PGN Module Slot supporting Dual SIM and 2x Antenna Hole with dust cover
F8	System Status LED Indicator	1 for System Power, 1 for HDD Status
F9	USB Port	2x USB2.0 Type A

Rear Panel



No.	Description	
R1	Antenna Port	5x Antenna Port, From left to right: Wi-Fi →Wi-Fi→ GPS → Wi-Fi → Wi-Fi
R2	Reset Button	Press to reset the system
R3	Dual SIM Socket	For 2x SIM cards
R4	CAN Bus Port	1x DB9 Male connector for CAN Bus
R5	COM Port	2x DB9 Male Connector for RS232/422/485
R6	DC Input	For the external power source, +9V~36VDC, three-pin terminal block
R7	PoE Port	4x PoE (SKU A), or 2x PoE+ (SKU B)
R8	Audio	1x Mic-in & 1x Line-out

Note: The external antenna (along with a female SMA connector an inner cable) is optional.

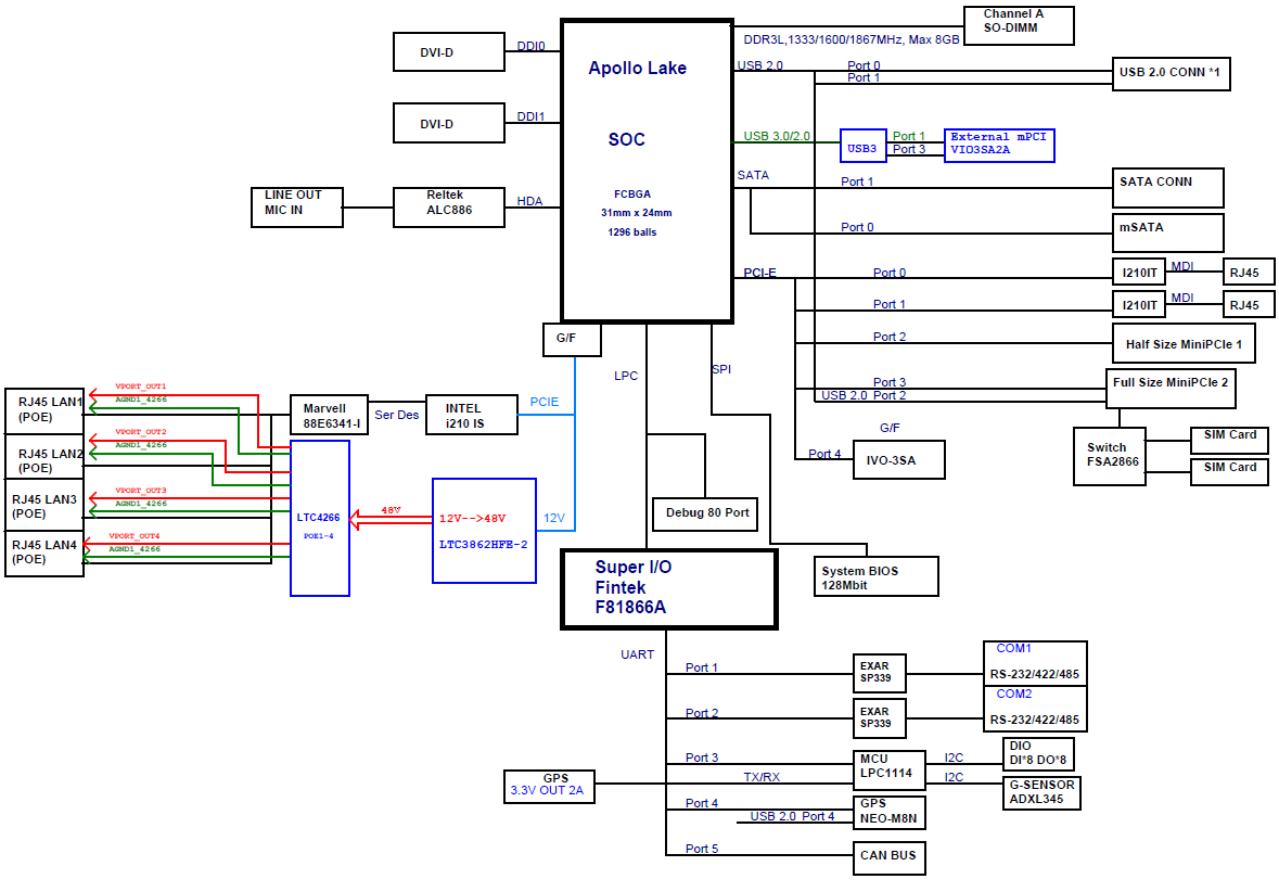


(with antennas installed)

CHAPTER 2: MOTHERBOARD INFORMATION

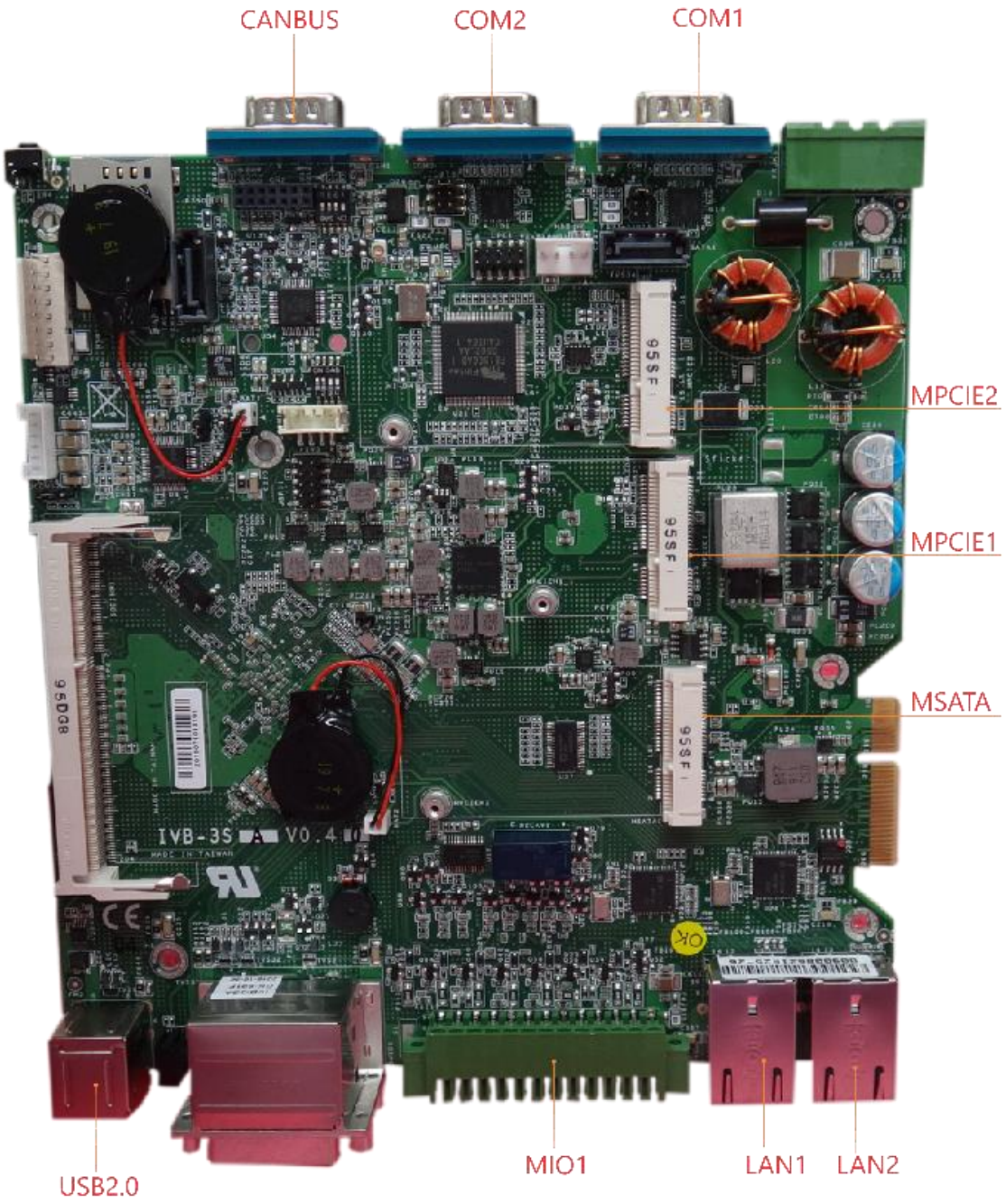
Block Diagram

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



Motherboard Layout

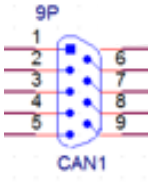
This layout shows the connectors and jumpers on the board regarding the pin assignments and the internal connectors.



Internal Jumpers & Connectors

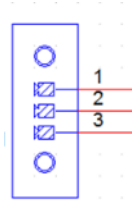
▲CAN1

Pin	Signal
1	J1850-/J1708-
2	GND_COM
3	CAN_H/J1939+
4	K_LINE
5	CAN_L/J1939-
6	J1850-/J1708-
7	J1850+/J1708+
8	J1850+/J1708+
9	BAT_12V_24V



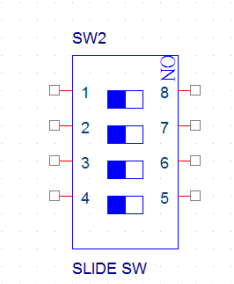
▲ PRJK1: (+9V~36V)

Pin	Signal
1	IGNITION
2	GND_IGNI
3	DC_VIN



▲ SW2

Pin	Signal	Function
1	ON (Default)	For detection of power status
2	OFF	Enabling low power detection
3	OFF	Enabling Watchdog
4	OFF	For MCU programming



▲ SW3: Connect to COM3 internally (Default for operating)

Pin	Signal
1 ON (Default)	SOUT3
2 ON (Default)	SIN3
3 OFF	NXP_RXD
4 OFF	NXP_TXD

▲ SW3: Connect to MIO externally (For manual FW update)

Pin	Signal
1 OFF	SOUT3
2 OFF	SIN3
3 ON	NXP_RXD
3 ON	NXP_TXD



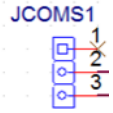
▲ JCOM1

Pin	Signal
1	IGN3V3_SB
2	NXP_RXD
3	GND
4	NXP_TXD



▲ JCOMS1

Pin	Signal
1	NC
2	VCCRTC_3P3
3	GND



▲ JCOMS2

Pin	Signal
1	NC
2	RTEST_N
3	GND



▲ JRI1 1-2 (Default) COM1

Pin	Signal
1	COM_RI1#_P
2	COM_RI1#_SEL
3	V5_S
4	COM_RI1#_SEL
5	V12_S
6	COM_RI1#_SEL



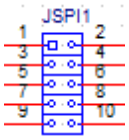
▲ JRI2 1-2 (Default) COM2

Pin	Signal
1	COM_RI2#_P
2	COM_RI2#_SEL
3	V5_S
4	COM_RI2#_SEL
5	V12_S
6	COM_RI2#_SEL



▲ JSPI1

Pin	Signal
1	SPI0_HOLD_N
2	N/A
3	SPI0_CS_N
4	V1P8_A_SPI
5	SPI0_MISO_R
6	N/A
7	N/A
8	SPI0_CLK
9	GND
10	SPI0_MOSI



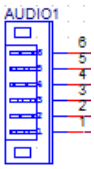
▲ LPC1

Pin	Signal
1	L_CLKOUT1
2	LPC_AD1
3	PLTRST_BUF2_N
4	LPC_AD0
5	LPC_FRAME#
6	V3P3_S
7	LPC_AD3
8	GND
9	LPC_AD2
10	GND



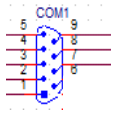
▲ AUDIO1

Pin	Signal
1	MIC_OUT_R
2	MIC_OUT_L
3	GND_AUD
4	GND_AUD
5	AMPOUT_R
6	AMPOUT_L



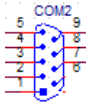
▲ COM1

Pin	Signal
1	COM_DCD1#_P
2	COM_RXD1_P
3	COM_TXD1_P
4	COM_DTR1#_P
5	GND
6	COM_DSR1#_P
7	COM_RTS1#_P
8	COM_CTS1#_P
9	COM_RI1#_SEL



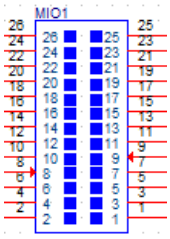
▲ COM2

Pin	Signal
1	COM_DCD2#_P
2	COM_RXD2_P
3	COM_TXD2_P
4	COM_DTR2#_P
5	GND
6	COM_DSR2#_P
7	COM_RTS2#_P
8	COM_CTS2#_P
9	COM_RI2#_SEL



▲ MIO1

Pin	Signal	Pin	Signal
1	GND	2	V12_S
3	IGN_DI0	4	IGN_DI1
5	NXP_TXD	6	NXP_RXD
7	DI_0	8	DO_0
9	DI_1	10	DO_1
11	DI_2	12	DO_2
13	DI_3	14	DO_3
15	RELAY1_NOPEN	16	RELAY1_COMM
17	GND	18	N/A
19	DI_4	20	DO_4
21	DI_5	22	DO_5
23	DI_6	24	DO_6
25	DI_7	26	DO_7



▲ mSATA1

Pin	Signal	Pin	Signal
1	X	2	P3V3
3	X	4	GND
5	X	6	P1V5_MPCIE
7	X	8	X
9	GND	10	X
11	X	12	X
13	X	14	X
15	GND	16	X
17	X	18	GND
19	X	20	X
21	GND	22	X
23	ATA_HRX_C_DTXP2	24	P3V3
25	ATA_HRX_C_DTXN2	26	GND
27	GND	28	P1V5_MPCIE
29	GND	30	SMB_S0_CLK
31	SATA_HTX_C_DTXN2	32	SMB_S0_DAT
33	SATA_HTX_C_DTXP2	34	GND
35	GND	36	X
37	GND	38	X
39	P3V3	40	GND
41	P3V3	42	X
43	X	44	X
45	X	46	X
47	X	48	X
49	X	50	GND
51	X	52	P3V3
53	GND	54	GND

▲ USB2.0

Pin	Signal
1	VCCUSB2
2	USB20_N7_L
3	USB20_P7_L
4	GND

▲ MPCIE1 & MPCIE2

Pin	Signal	Pin	Signal
1	E_WAKE1-	2	P3V3_WLAN1
3	X	4	GND
5	X	6	P1V5_MPCIE1
7	UIM1_RST2	8	UIM1_PWR
9	GND	10	UIM1_RST1
11	CLK_PCIE_N_MPCIE1_SW	12	UIM1_CLK1
13	CLK_PCIE_P_MPCIE1_SW	14	UIM1_DAT1
15	GND	16	UIM1_VPP1
17	UIM1_CLK2	18	GND
19	UIM1_DAT2	20	X
21	GND	22	X
23	PCIE_HRX_R_DTX_P5	24	P3V3_WLAN1
25	PCIE_HRX_R_DTX_N5	26	GND
27	GND	28	P1V5_MPCIE1
29	GND	30	E_SCLK
31	PCIE_HTX_R_DRX_N5	32	E_SDTA
33	PCIE_HTX_R_DRX_P5	34	GND
35	GND	36	USB20_P5_R
37	GND	38	USB20_N5_R
39	P3V3_WLAN1	40	GND
41	P3V3_WLAN1	42	LED_WWAN1-
43	GND	44	LED_WLAN1-
45	X	46	X
47	X	48	P1V5_MPCIE1
49	X	50	GND
51	X	52	P3V3_WLAN1
53	GND	54	GND

▲ M2_1: (For PGN)

Pin	Signal	Pin	Signal
1	NC	2	P3V3_AUX
3	GND	4	P3V3_AUX
5	GND	6	P1V8_A
7	USB20_P0	8	NC
9	USB20_N0	10	NC
11	GND	12	NC
13	NC	14	NC
15	NC	16	NC
17	NC	18	NC
19	NC	20	NC
21	NC	22	NC
23	NC	24	NC
25	NC	26	NC
27	GND	28	NC
29	USB3_HRX_L_DTX_N16	30	UIM1_VPP
31	USB3_HRX_L_DTX_P16	32	UIM1_RST
33	GND	34	UIM1_CLK
35	USB3_HTX_L_DRX_N16	36	UIM1_DAT
37	USB3_HTX_L_DRX_P16	38	UIM1_PWR
39	GND	40	NC
41	SATA_HRX_C_DTX_P9	42	NC
43	SATA_HRX_C_DTX_N9	44	NC
45	GND	46	NC
47	SATA_HTX_C_DRX_N9	48	NC
49	SATA_HTX_C_DRX_P9	50	NGFF_PCI_RST#
51	GND	52	NC
53	NC	54	NC
55	NC	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	NC
67	NC	68	SUSCLK_R
69	NC	70	P3V3_AUX
71	GND	72	P3V3_AUX
73	GND	74	P3V3_AUX
75	NC		

▲ MPCIE1: (For PGN)

Pin	Signal	Pin	Signal
1	NC	2	P3V3_AUX
3	NC	4	GND
5	NC	6	P1V5_A
7	NC	8	UIM2_PWR
9	GND	10	UIM2_DAT1
11	CLK100_PCIE_SLOT2_N4	12	UIM2_CLK1
13	CLK100_PCIE_SLOT2_P4	14	UIM2_RST1
15	GND	16	UIM2_VPP1
17	NC	18	GND
19	NC	20	W_DISABLE_B_N
21	GND	22	MINI_PCI_RST#
23	PCIE_HRX_WLAN2TX_N12	24	P3V3_AUX
25	PCIE_HRX_WLAN2TX_P12	26	GND
27	GND	28	P1V5_A
29	GND	30	SMB_MPCIE2_CLK
31	PCIE_HTX_C_WLAN2RX_N12	32	SMB_MPCIE2_DATA
33	PCIE_HTX_C_WLAN2RX_P12	34	GND
35	GND	36	USB20_N2
37	GND	38	USB20_P2
39	P3V3_AUX	40	GND
41	P3V3_AUX	42	NC
43	GND	44	NC
45	NC	46	NC
47	NC	48	P1V5_A
49	NC	50	GND
51	NC	52	P3V3_AUX
53	NC	54	GND
55	NC	56	NC
57	NC	58	NC

CHAPTER 3: BIOS SETUP

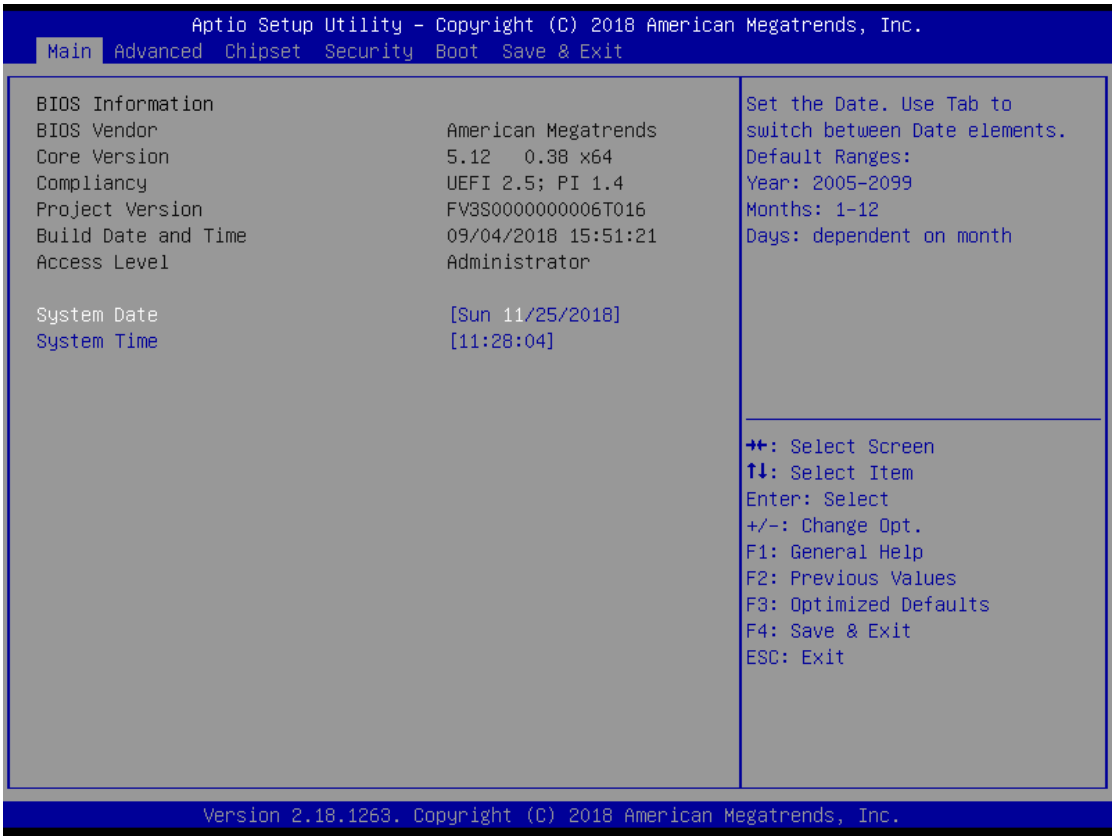
Enter BIOS Setup

To enter the BIOS setup utility, simply follow the steps below:

1. Boot up the system.
2. Pressing the **<Tab>** or **<Del>** key allows you to enter the Setup utility, then you will enter the BIOS main screen.
3. Instructions of BIOS navigations:

Control Keys	Description
→←	select a setup screen, for instance, [Main], [IntelRCSetup], [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 the 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>	exit the current screen

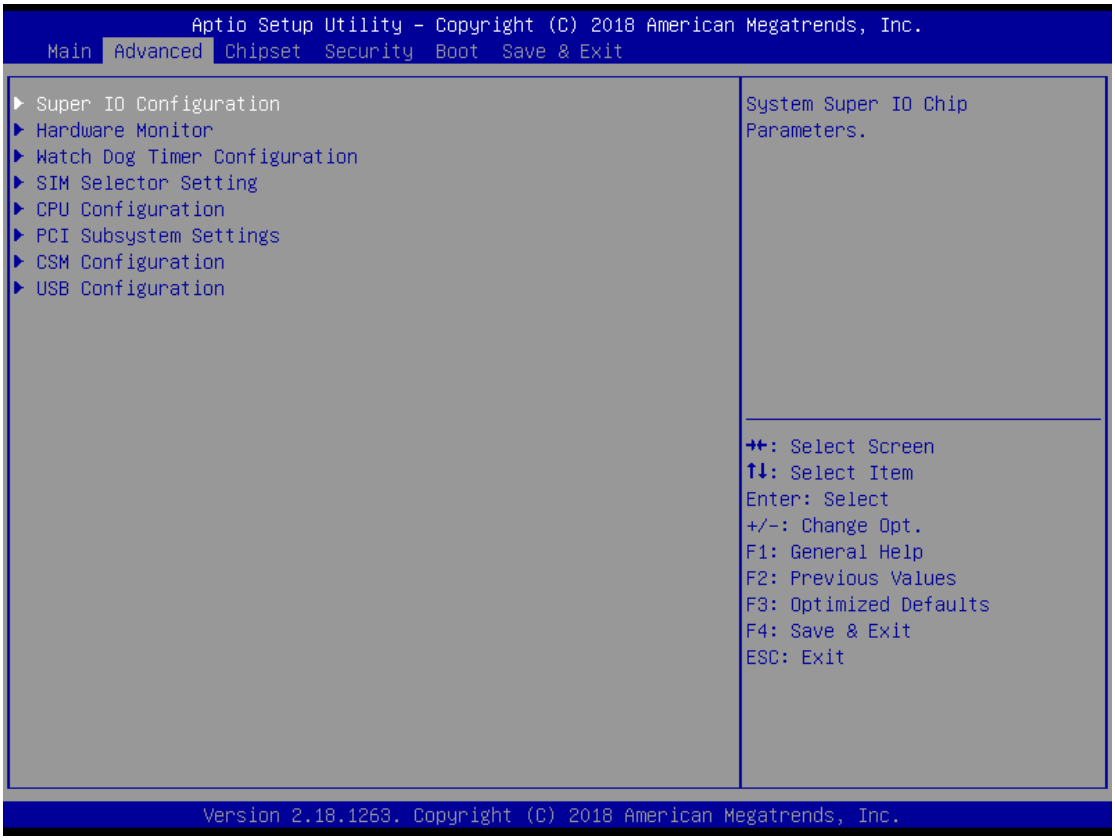
Setup main page contains BIOS information and project version information.



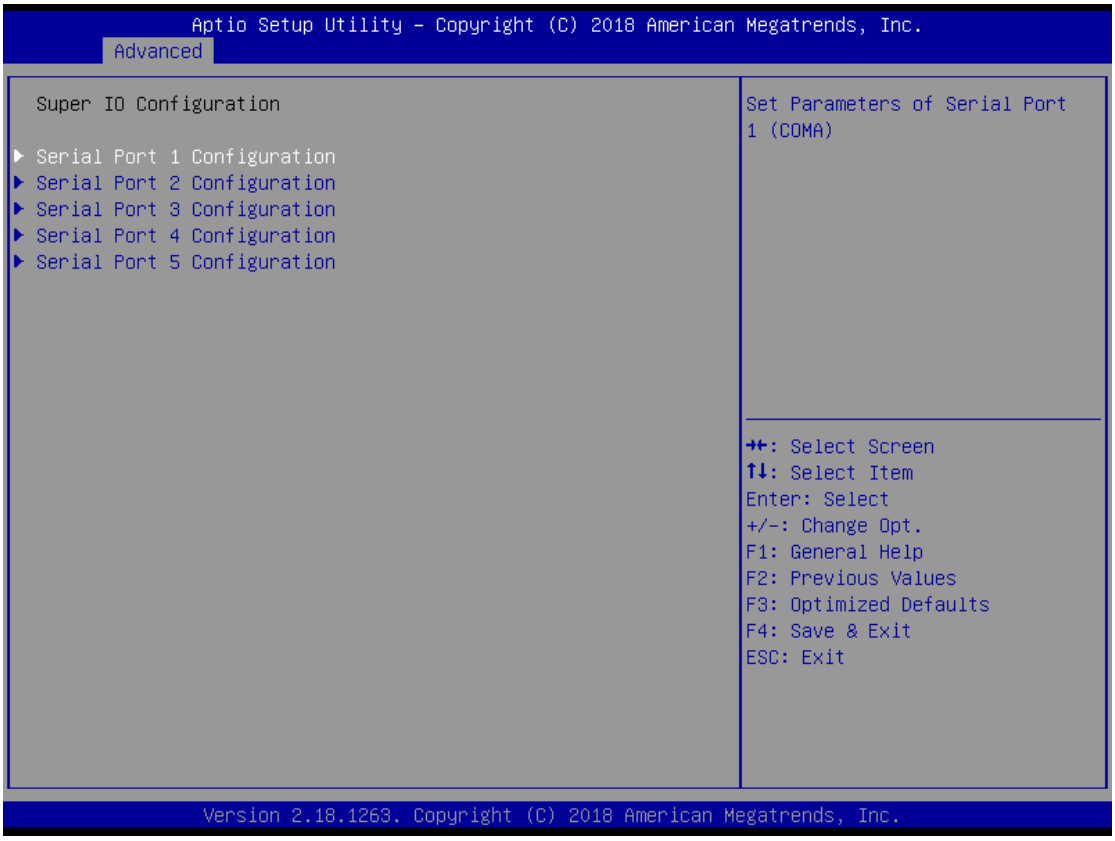
Feature	Description
BIOS Information	BIOS Vendor: American Megatrends Core Version: AMI Kernel version, CRB code base, X64 Compliancy: UEFI version, PI version Project Version: BIOS release version Build Date and Time: MM/DD/YYYY Access Level: Administrator / User
System Date	To set the Date, use **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

Advanced

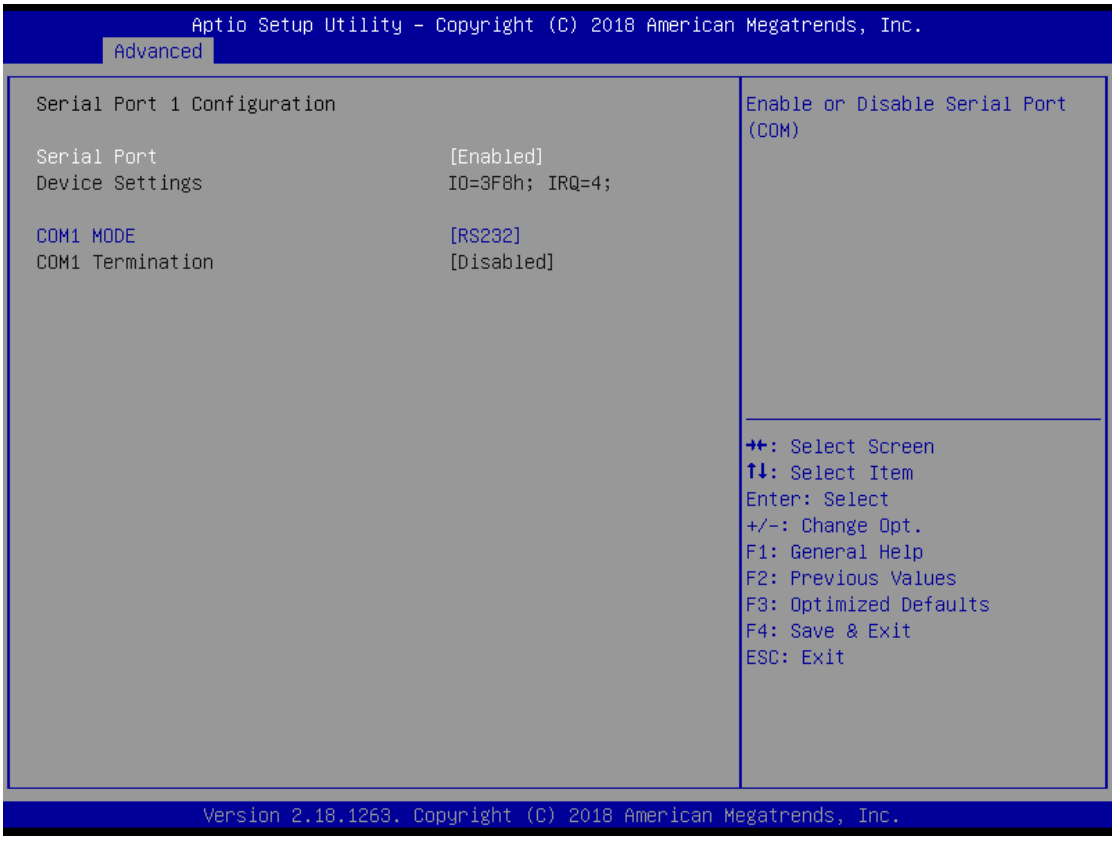
Select the **Advanced** menu item from the BIOS setup screen to enter the "Advanced" setup screen. Users can select any of the items in the left frame of the screen.



Super IO Configuration

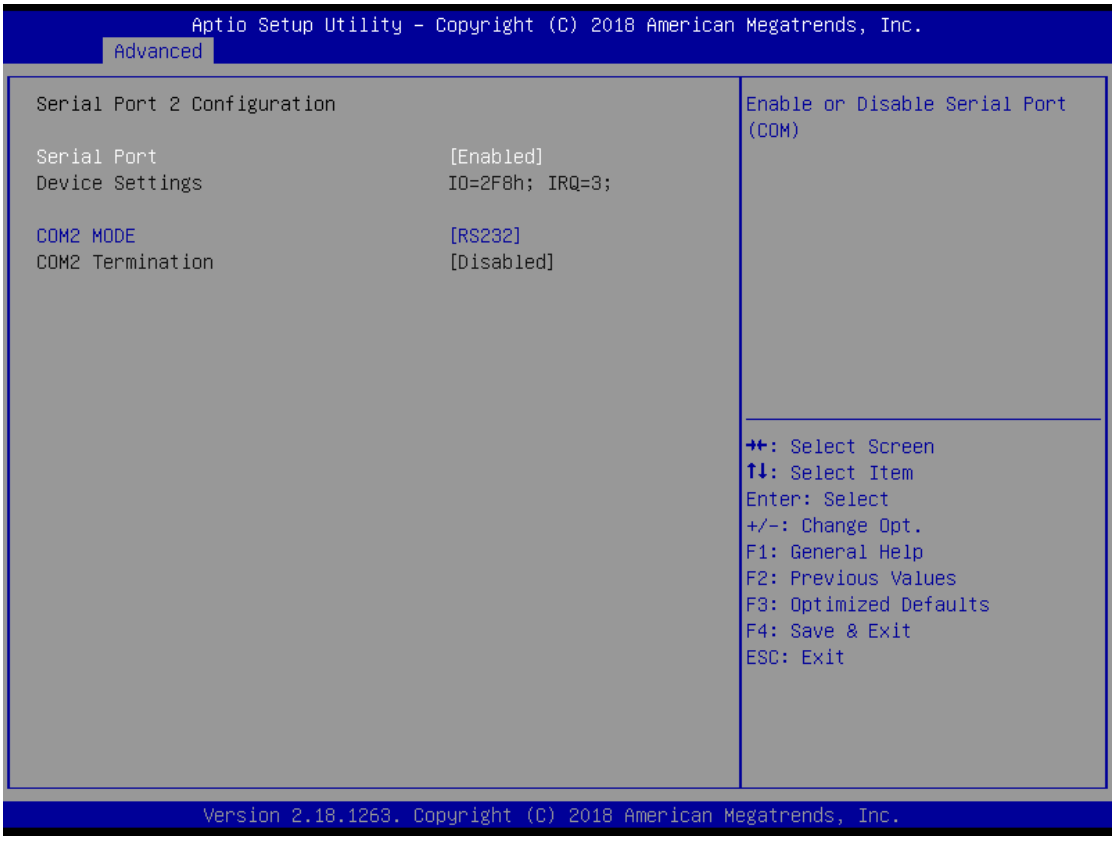


Serial Port 1 Configuration



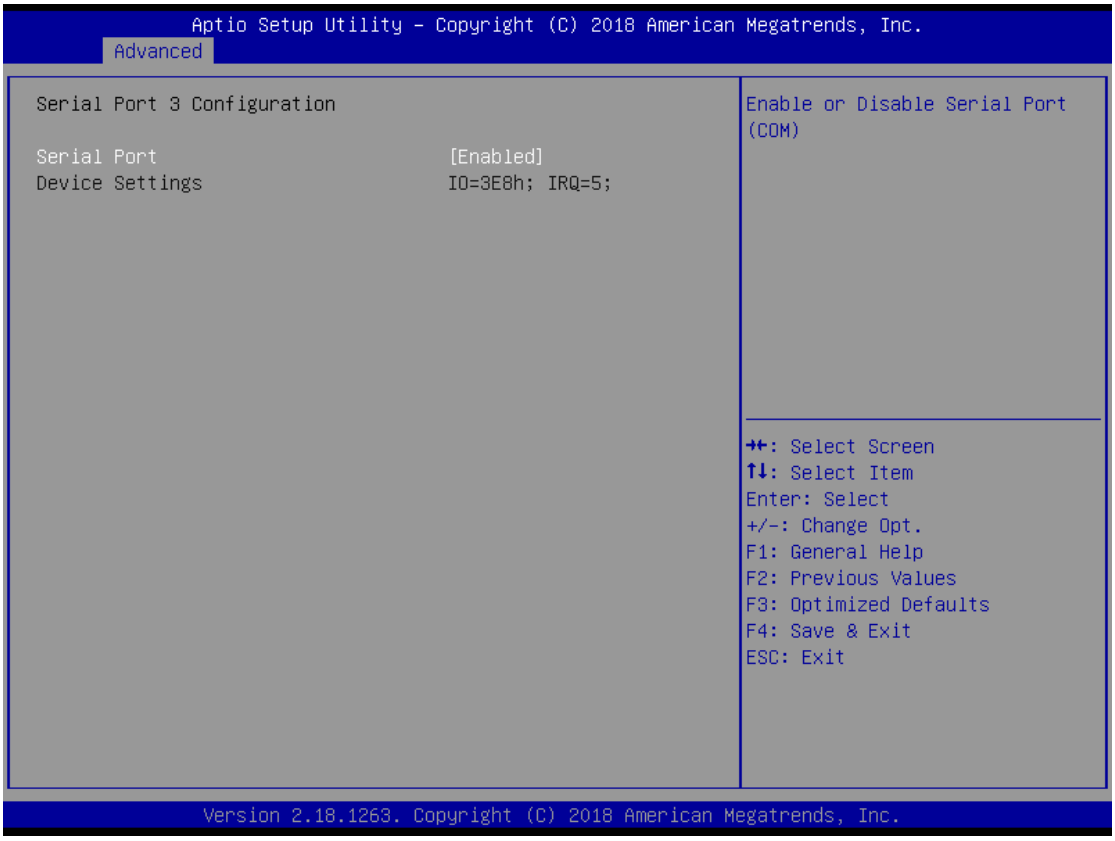
Feature	Options	Description
Serial Port	Enabled Disabled	Enables or disables Serial Port 1.
Device Settings	NA	IO=3F8h; IRQ = 4
COM1 MODE	RS232 RS485 RS422	Select Com Mode as RS232/RS485/RS422
COM1 Termination	Disabled Enable	COM RS-422/485 Receiver Termination

Serial Port 2 Configuration



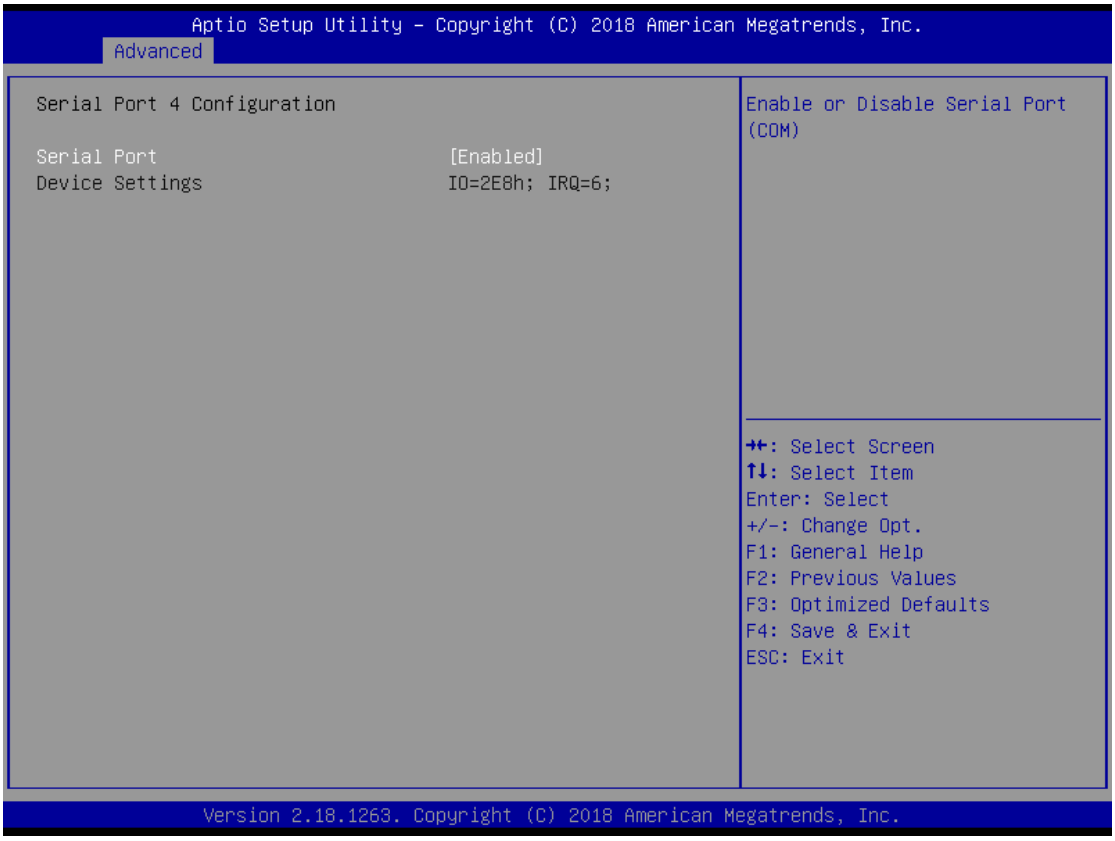
Feature	Options	Description
Serial Port	Enabled Disabled	Enables or disables Serial Port 2.
Device Settings	NA	IO=2F8h; IRQ = 3
COM2 MODE	RS232 RS485 RS422	Select Com Mode as RS232/RS485/RS422
COM2 Termination	Disabled Enable	COM RS-422/485 Receiver Termination

Serial Port 3 Configuration



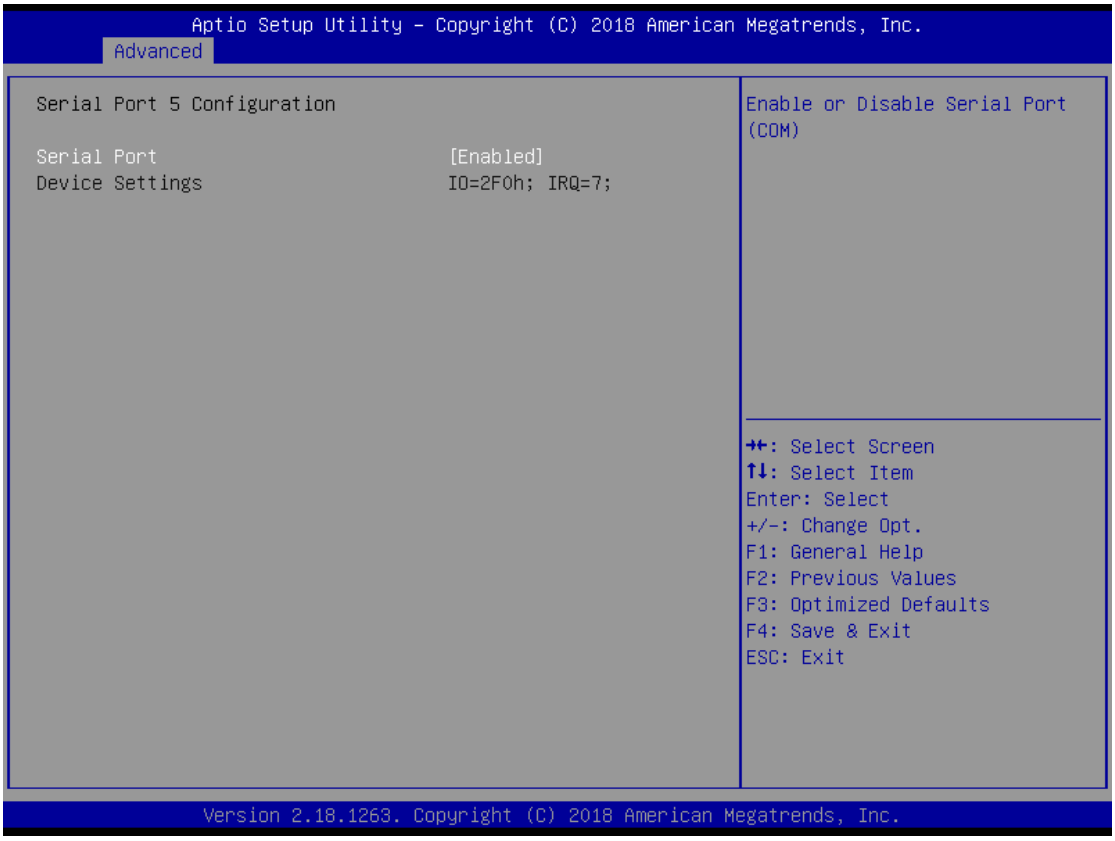
Feature	Options	Description
Serial Port	Enabled Disabled	Enables or disables Serial Port 3.
Device Settings	NA	IO=3E8h; IRQ = 5

Serial Port 4 Configuration



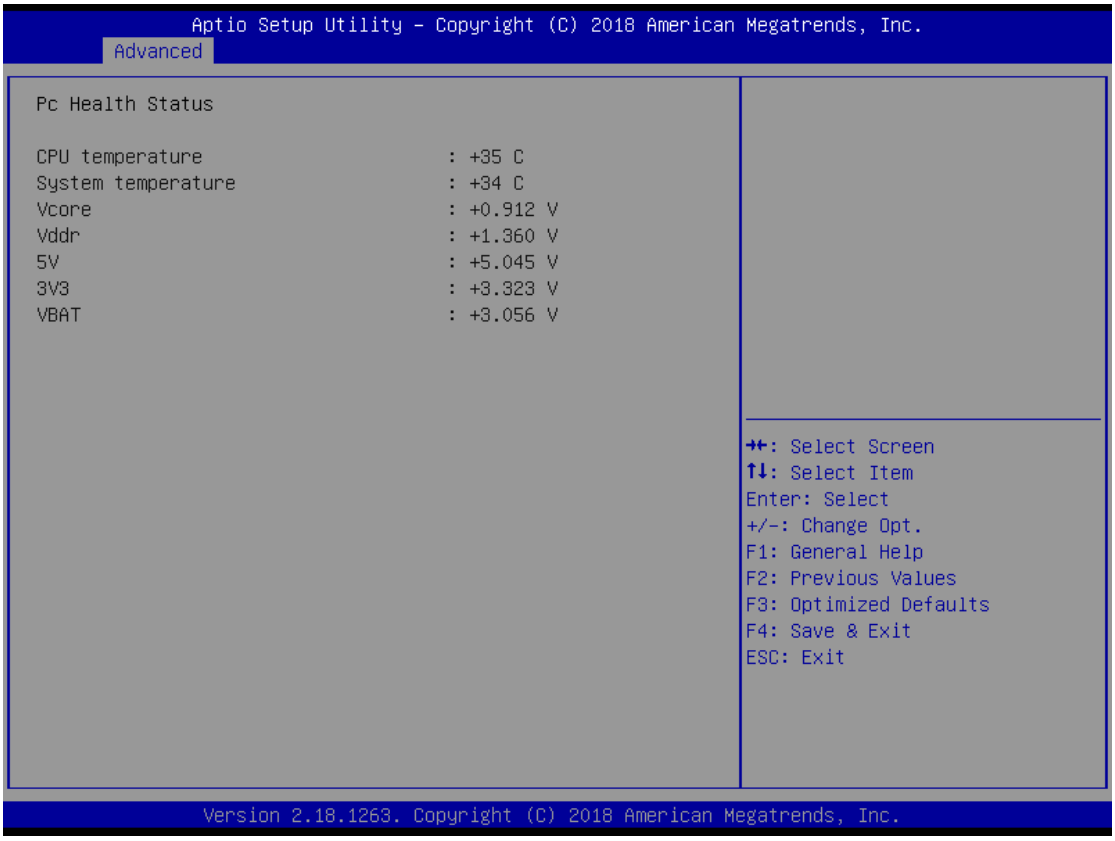
Feature	Options	Description
Serial Port	Enabled Disabled	Enables or disables Serial Port 4.
Device Settings	NA	IO=2E8h; IRQ = 6

Serial Port 5 Configuration



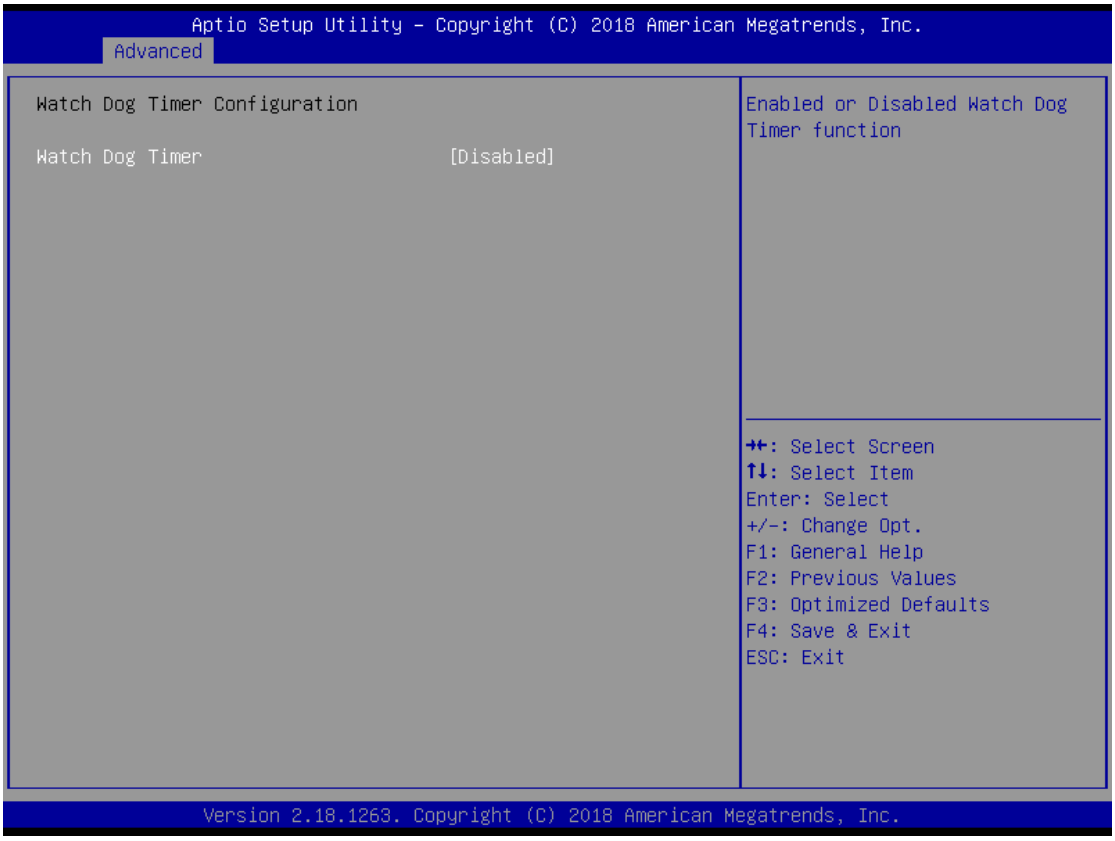
Feature	Options	Description
Serial Port	Enabled Disabled	Enables or disables Serial Port 5.
Device Settings	NA	IO=2F0h; IRQ = 7

Hardware Monitor



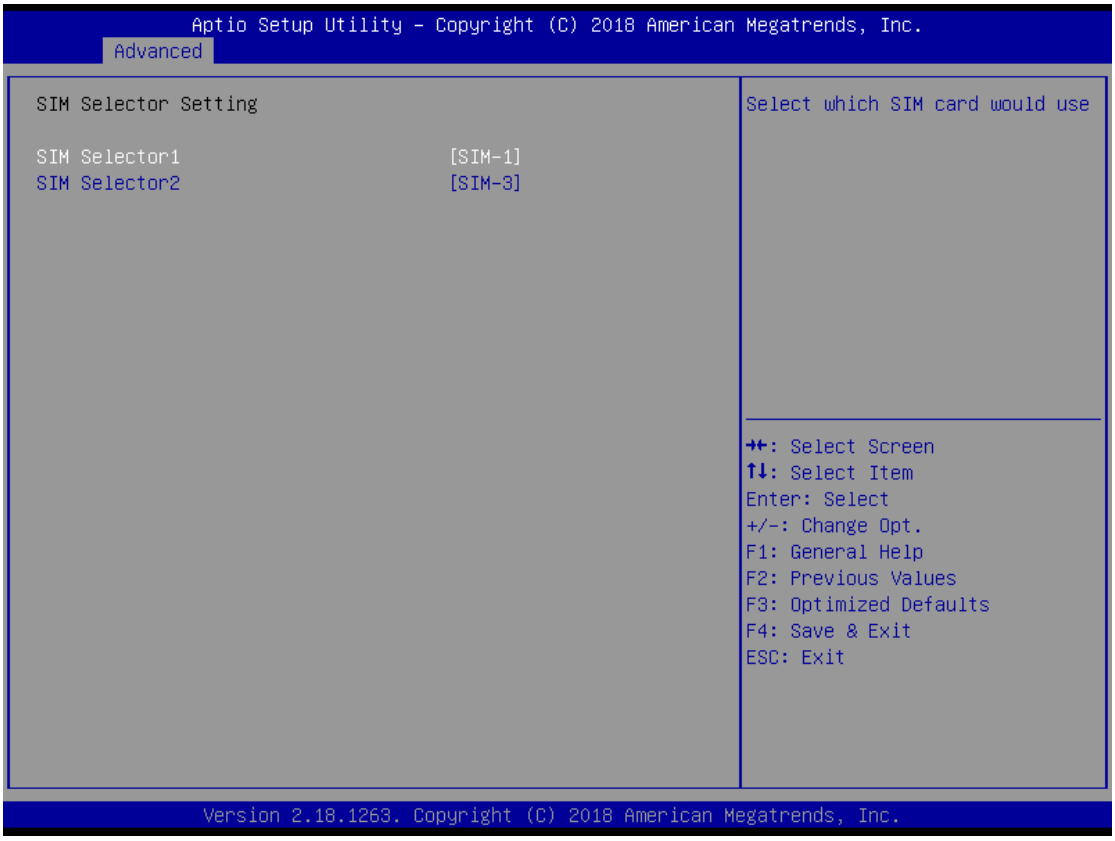
Feature	Description
CPU temperature	This value reports the CPU temperature.
SYS temperature	This value reports the System temperature.
Vcore	This value reports the CPU VCORE
Vddr	This value reports the RAM voltage.
5V	This value reports the 5V Input voltage.
3V3	This value reports the 3.3V Input voltage.
VBAT	This value reports the VBAT Input voltage.

Watch Dog Timer Configuration



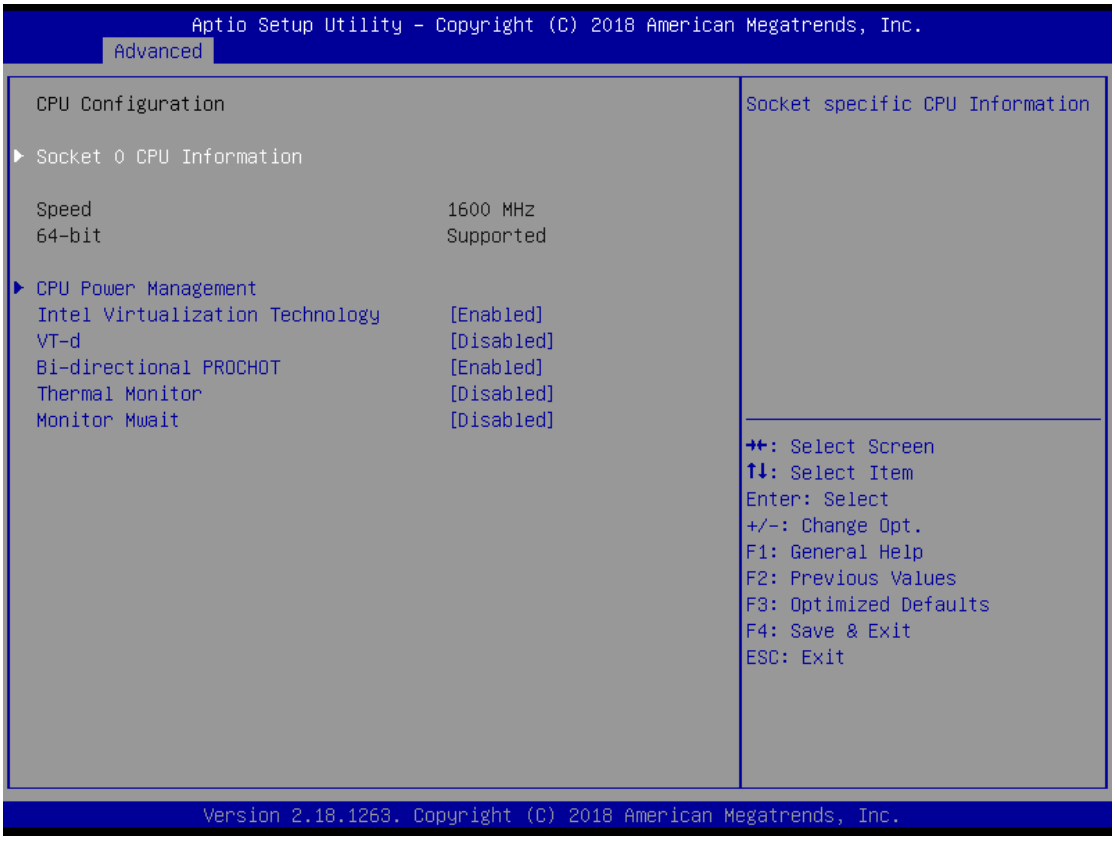
Feature	Options	Description
Watch Dog Timer	Enabled Disabled	Enable or Disable Watch Dog function
Timer Count Mode	Second Mode Minute Mode	Select Second Mode or Minute Mode
Timer out Value	60	Watch Dog Timer out Value 0-255

SIM selector Setting



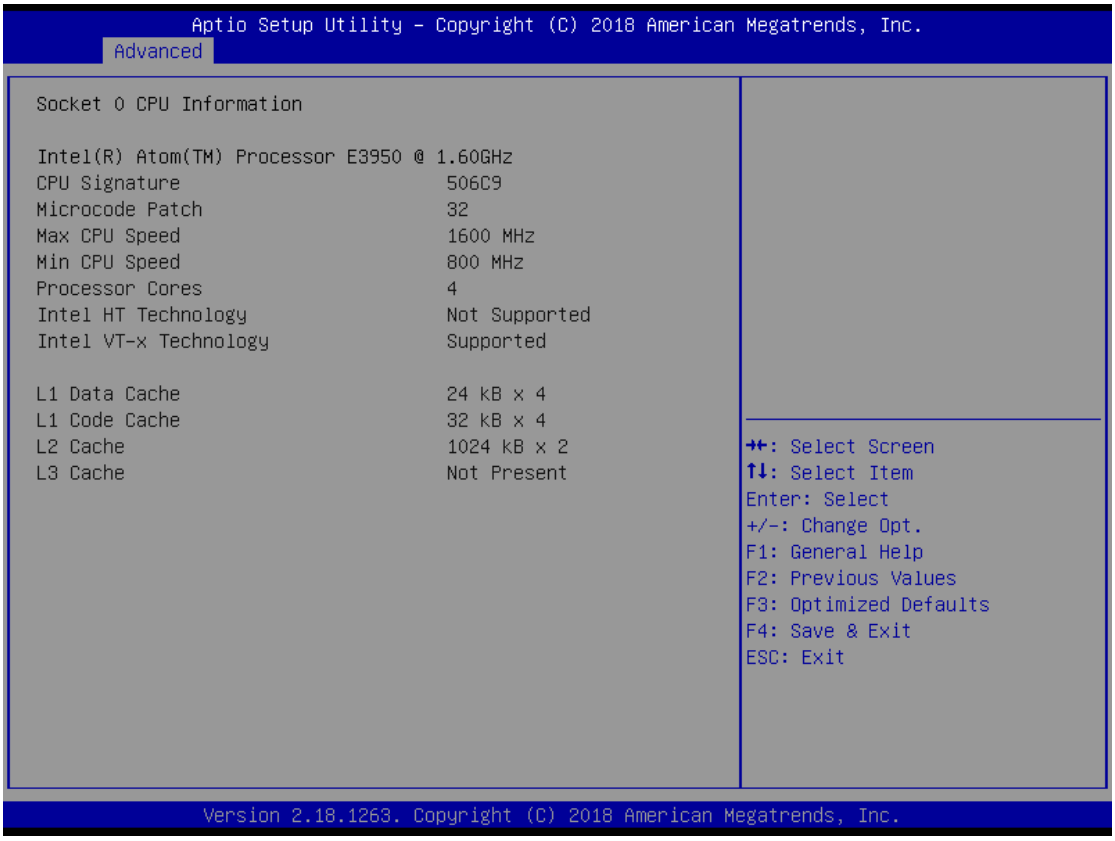
Feature	Options	Description
SIM Selector1	SIM-1 SIM-2	Select which SIM card would use
SIM Selector2	SIM-3 SIM-4	Select which SIM card would use

CPU Configuration

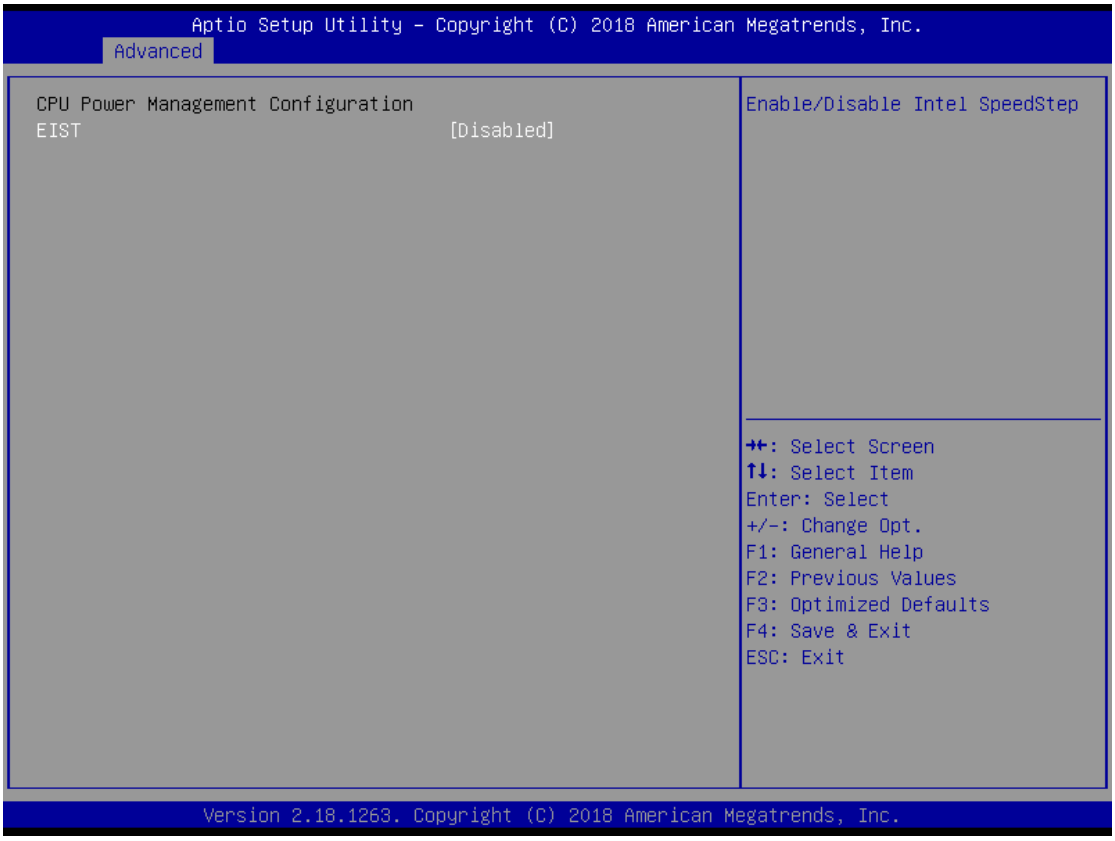


Feature	Options	Description
Intel Virtualization Technology	Disabled Enabled	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology
VT-d	Disabled Enabled	Enable/Disable CPU VT-d
Bi-directional PROCHOT	Disabled Enabled	When a processor thermal sensor trips (either core), the PROCHOT# will be driven. If bi-direction is enabled, externl agents can drive PROCHOT# to throttle.
Thermal Monitor	Disabled Enabled	Enable/Disable Thermal Monitor.
Thermal Mwait	Disabled Enabled	Enable/Disable Monitor Mwait.

Socket 0 CPU Information

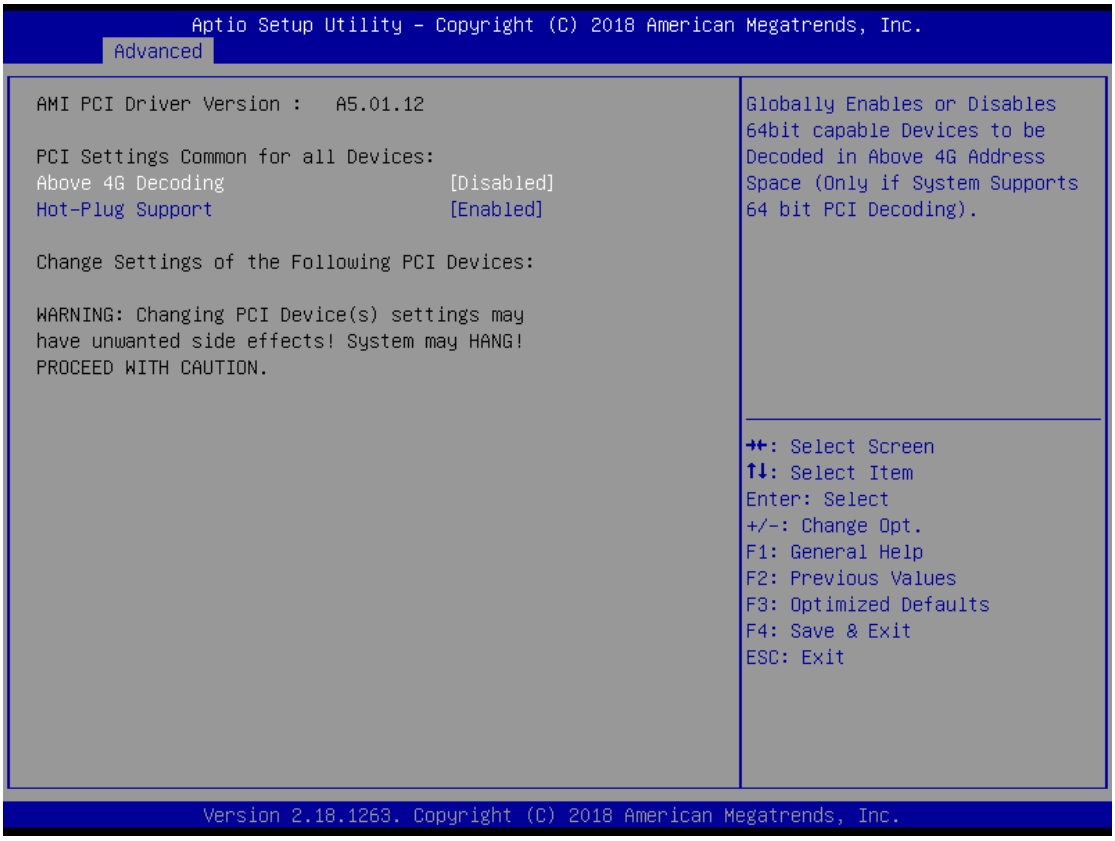


CPU Power Management



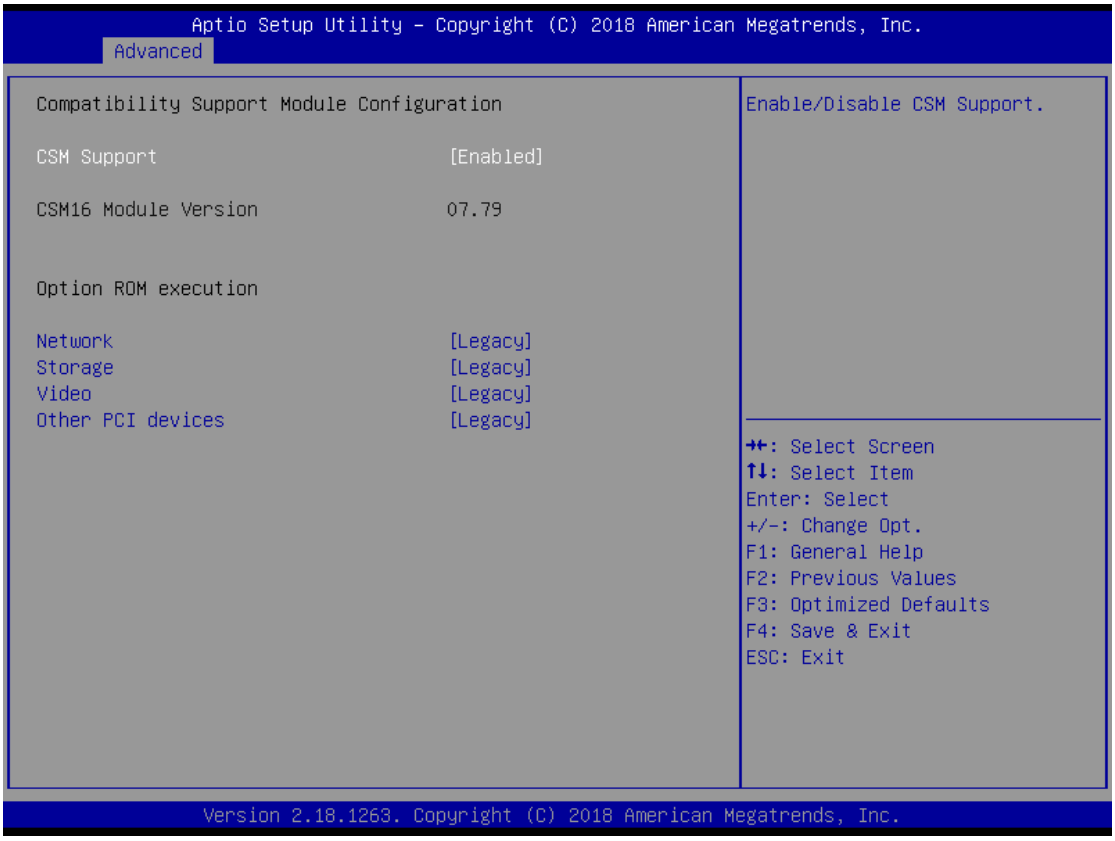
Feature	Options	Description
EIST	Disabled Enabled	Enable/Disable Intel SpeedStep

PCI Subsystem Setting



Feature	Options	Description
Above 4G Decoding	Disabled Enabled	Globally Enable or Disables 64bit capable Devices to be Decoded in Above 4G Address Space (Only if System Supports 64 bit PCI Decoding).
Hot-Plug Support	Disabled Enabled	Globally Enables or Disables Hot-Plug support for the entire System.

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

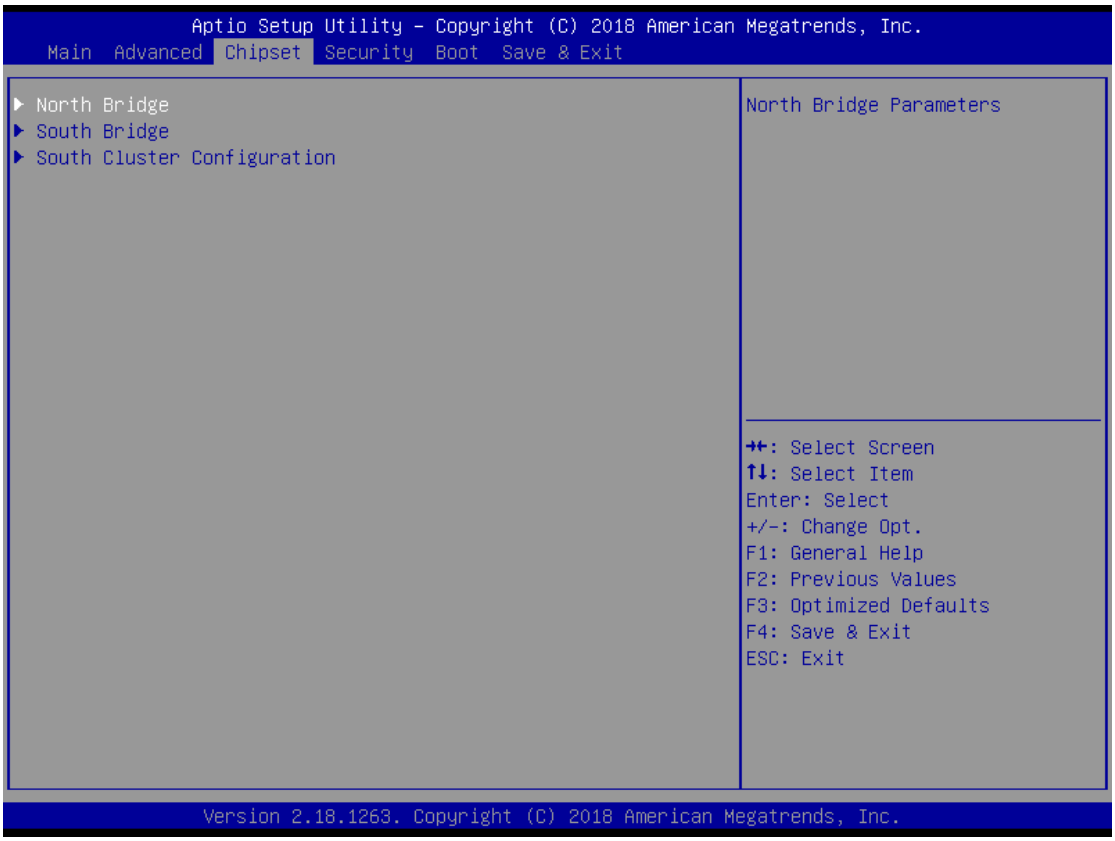
USB configuration



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	Enabled Disabled	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	1 sec 5 sec 10 sec 20 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.

Chipset

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

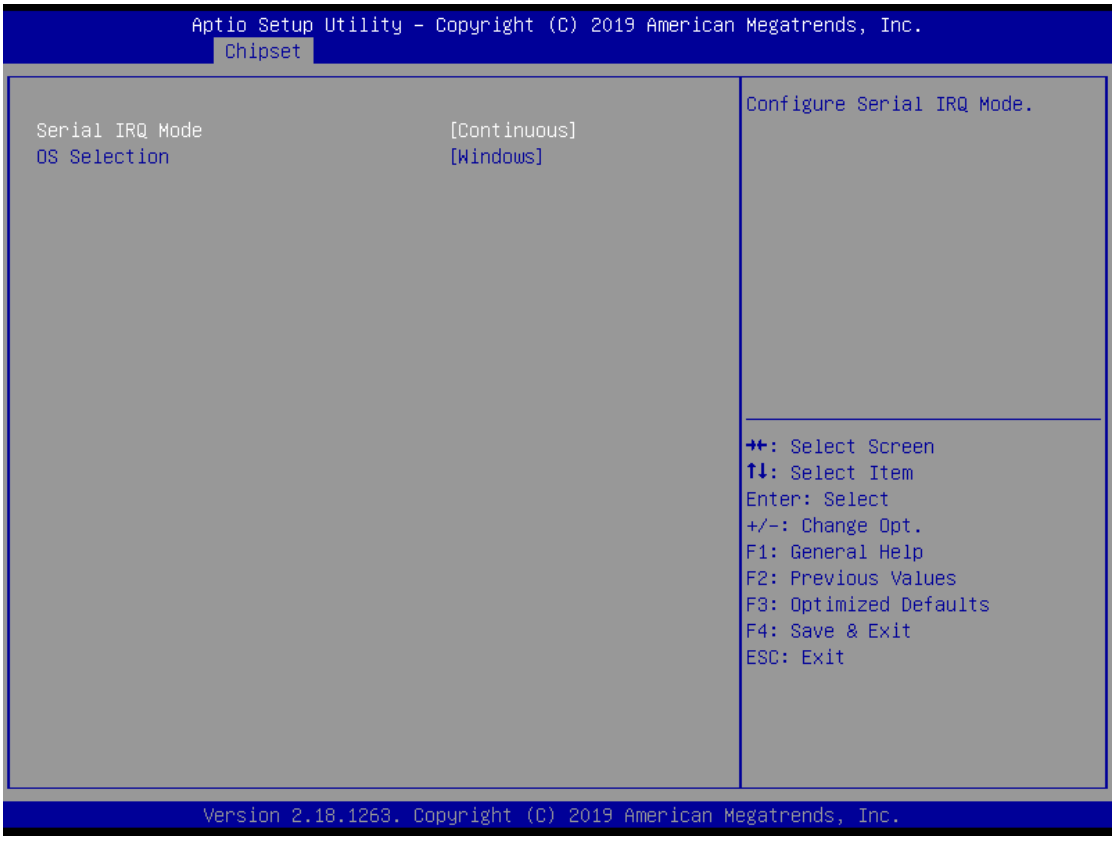


North Bridge



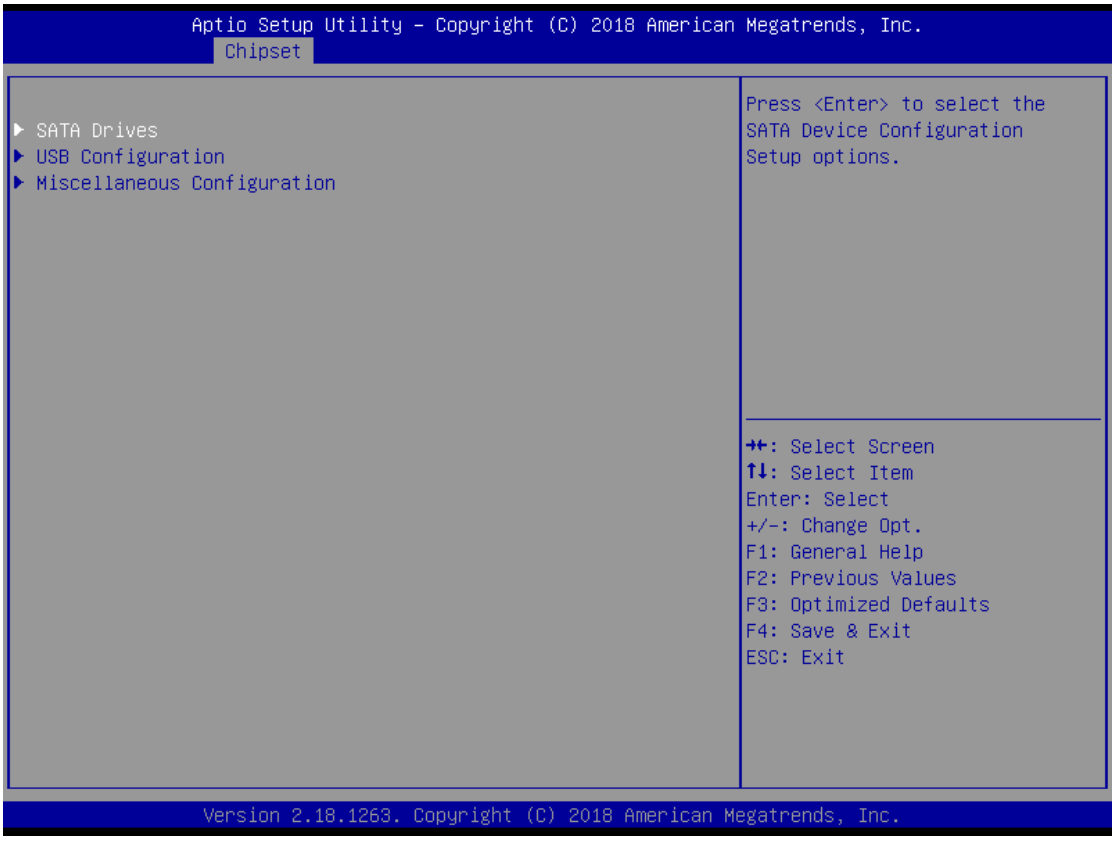
Feature	Options	Description
Max TOLUD	2 GB 2.25 GB 2.5 GB 2.75 GB 3 GB	Maximum Value of TOLUD.
Above 4GB MMIO BIOS assignment	Enabled Disabled	Enable/Disable above 4GB MemoryMappedIO BIOS assignment. This is disabled automatically when Aperture Size is set to 2048MB

South Bridge

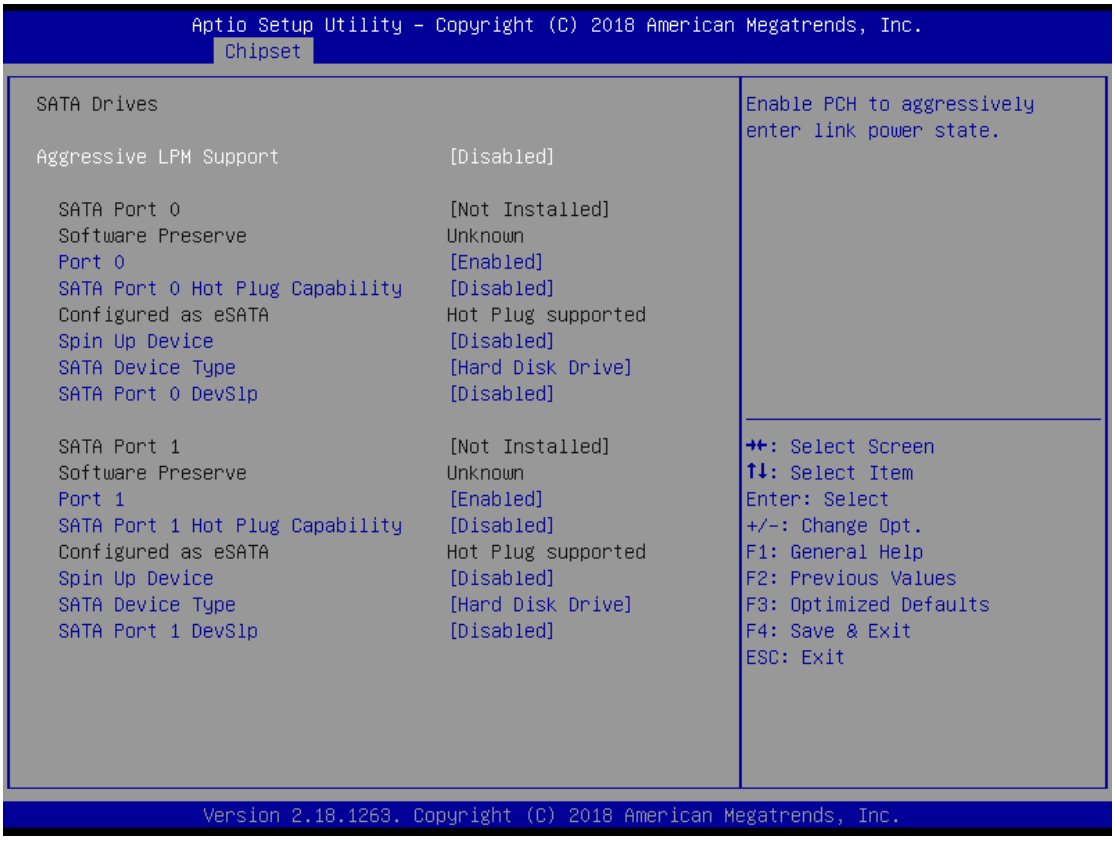


Feature	Options	Description
Serial IRQ Mode	Quiet Continuous	Configure Serial IRQ Mode.
OS Selection	Windows Android Win7 Intel Linux	Select the target OS

South Cluster Configuration



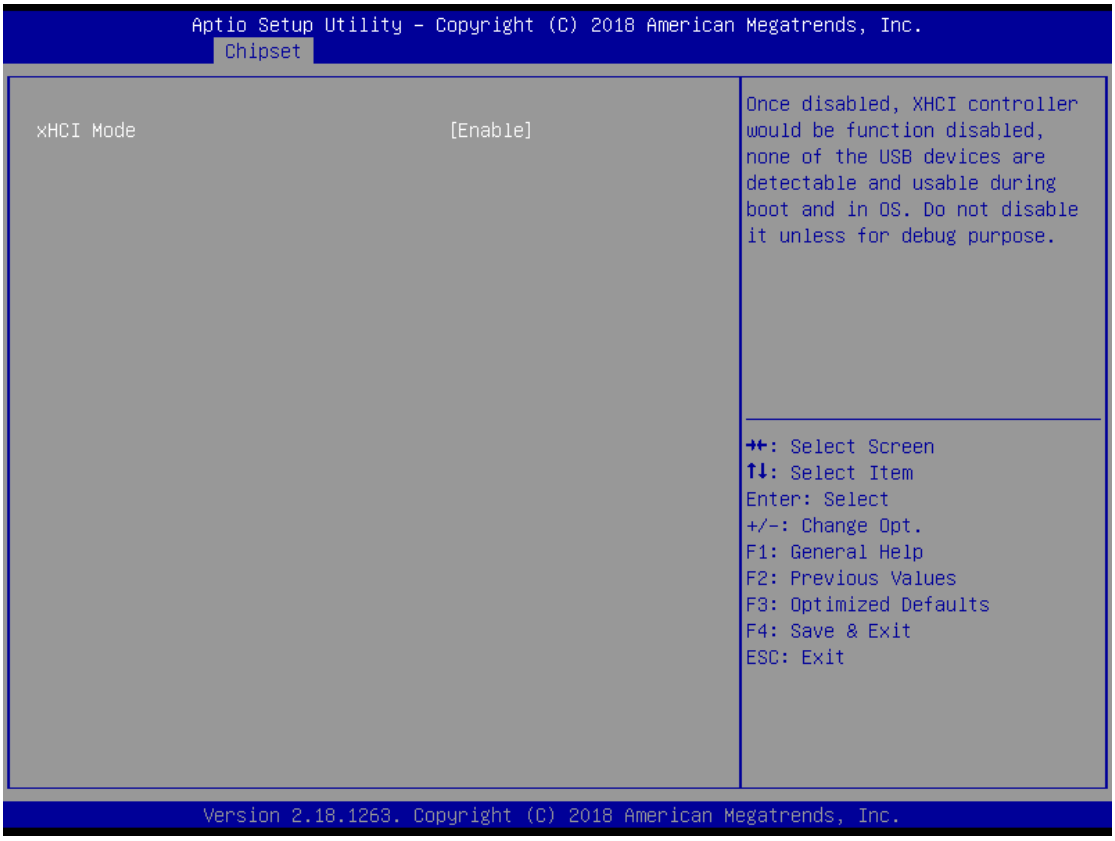
SATA Drivers



Feature	Options	Description
Aggressive LPM Support	Disabled Enabled	Enable PCH to aggressively entry link power state.
Port 0	Disabled Enabled	Enable or Disable SATA Port
SATA Port0 Hot Plug Capability	Disabled Enabled	If enabled, SATA port will be reported as Hot Plug capable.
Spin Up Device	Disabled Enabled	If enabled for any of ports, Staggered Spin Up will perform and only the drives which have this option enabled will spin up at boot. Otherwise, all drivers 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 Port 0 DevSlp	Disabled Enabled	Enable/Disable SATA Port 0 DevSlp. Board rework for LP is needed before this function is enabled.
Port 1	Disabled Enabled	Enable or Disable SATA Port
SATA Port1 Hot Plug Capability	Disabled Enabled	If enabled, SATA port will be reported as Hot Plug capable.

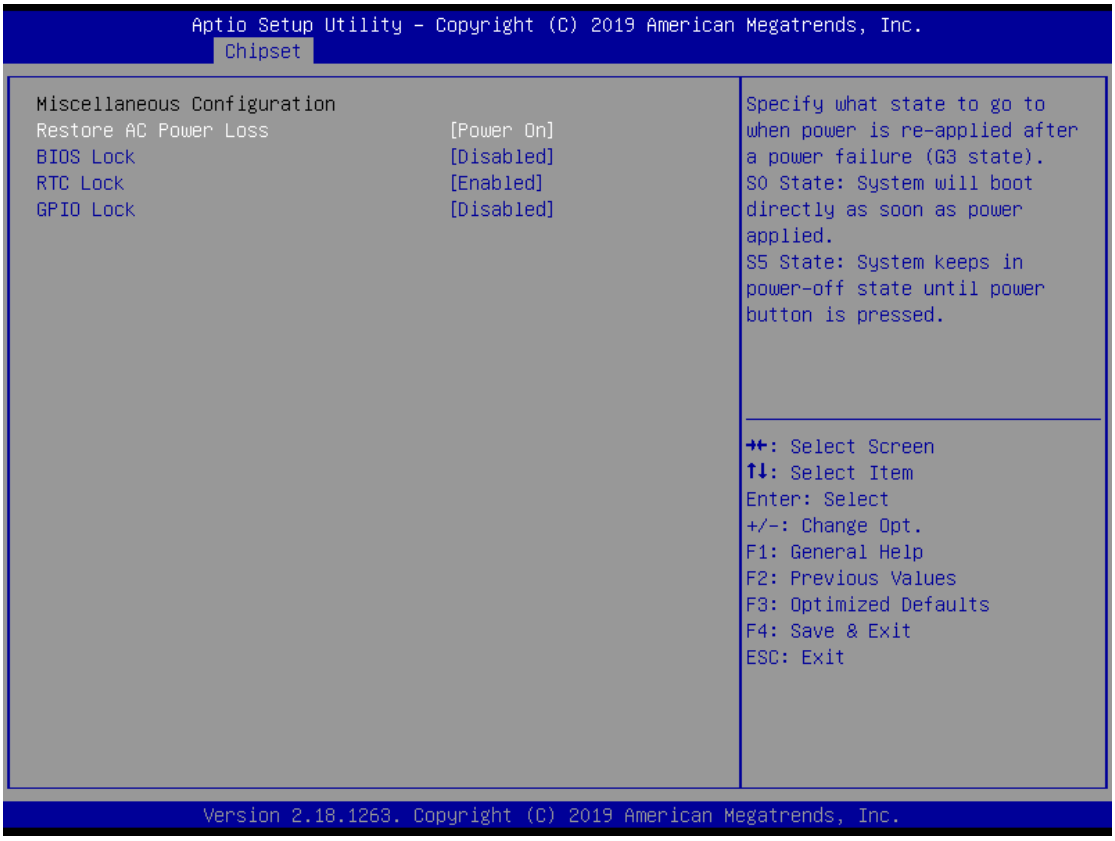
Spin Up Device	Disabled Enabled	If enabled for any of ports, Staggerred Spin Up will perform and only the drives which have this option enabled will spin up at boot. Otherwise, all drivers spin up at boot.
SATA Device Type	Hard Disk Drive Solid State Drive	Identify the SATA port is connected to Solid State drive or Hard Disk Drive.
SATA Port 1 DevSlp	Disabled Enabled	Enable/Disable SATA Port 1 DevSlp. Board rework for LP is needed before this function is enabled.

USB Configuration



Feature	Options	Description
xHCI Mode	Enable Disable	Once disabled. XHCI controller will be disabled; none of the USB devices is detected and usable during boot and in OS. Do not disable it unless for debug

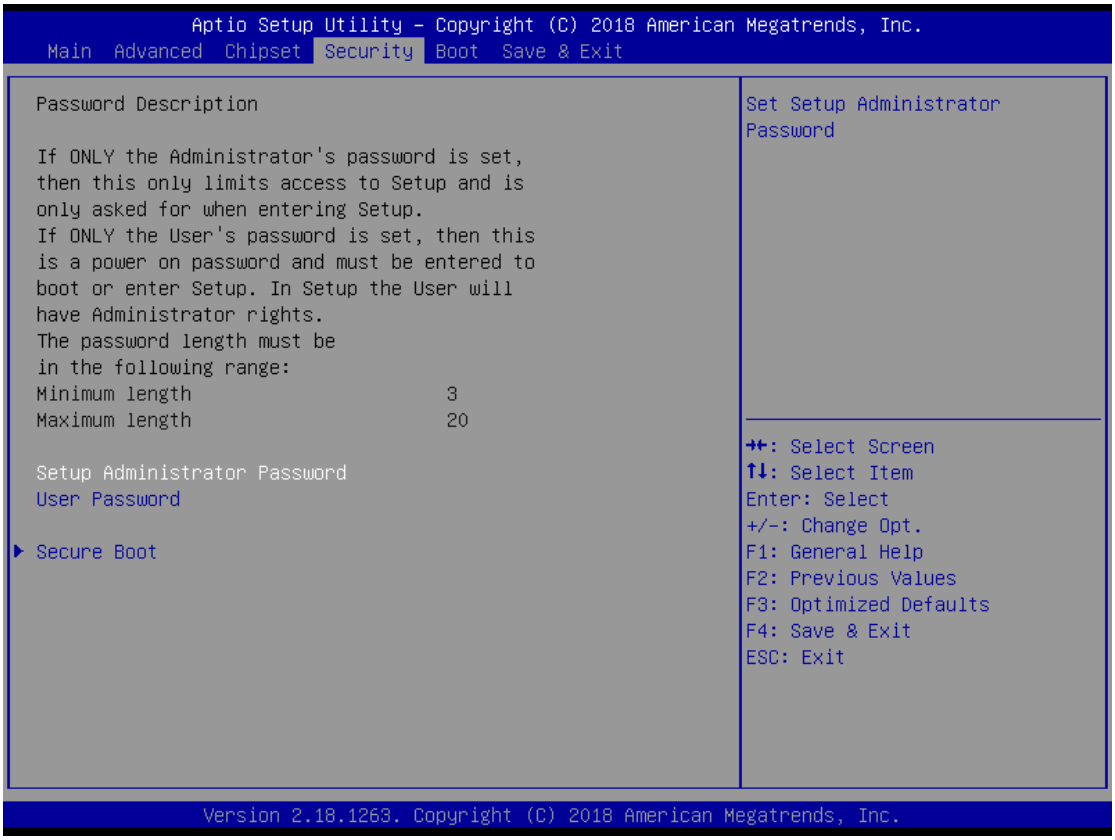
Miscellaneous Configuration



Feature	Options	Description
Restore AC Power Loss	Power On Power Off Last State	Specify what state to go to when power is re-applied after a power failure (G3 state). S0 State: System will boot directly as soon as power applied. S5 State: System keeps in power-off state until the power button is pressed.
BIOS Lock	Disabled Enabled	Enable / Disable the SC BIOS Lock Enabled feature. Required to be enabled to ensure SMM protection of flash.
RTC Lock	Disabled Enabled	Enable will lock bytes 38h-3Fh in the lower/upper 128-byte bank of RAM.
GPIO Lock	Disabled Enabled	Enable to set GPIO Pad Configuration lock for security.

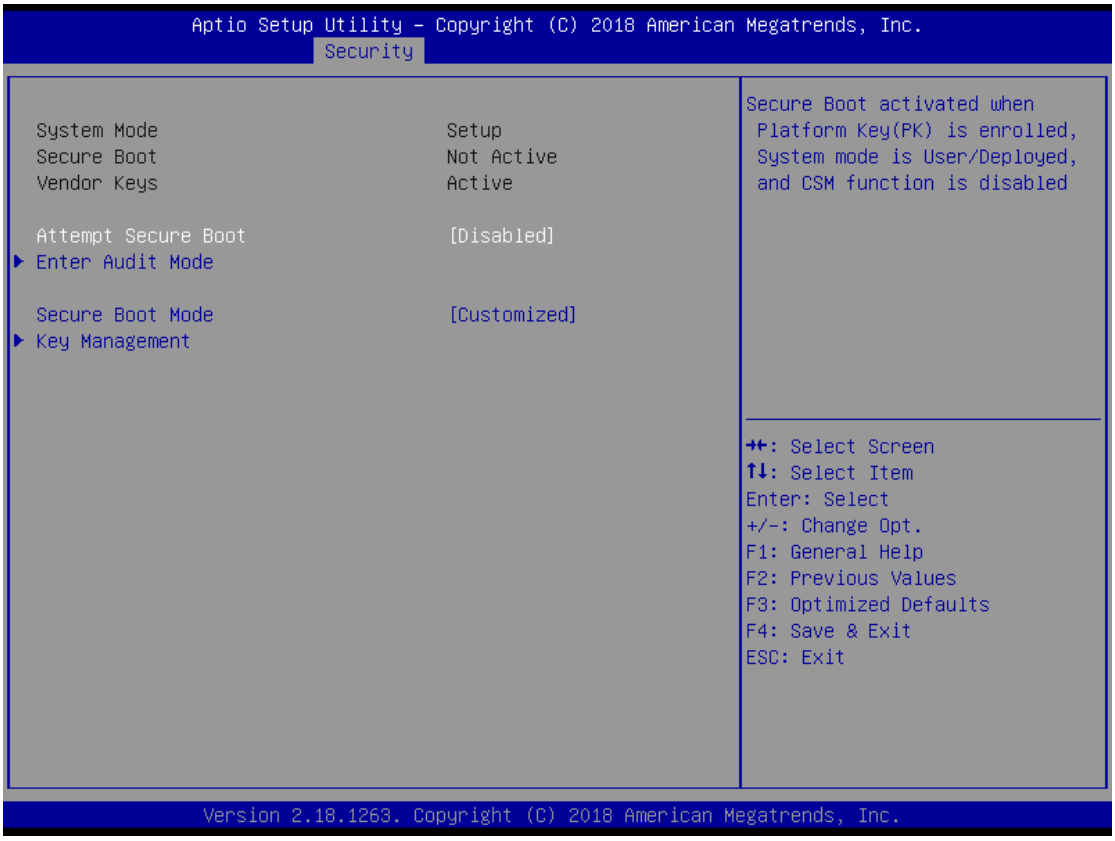
Security

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.

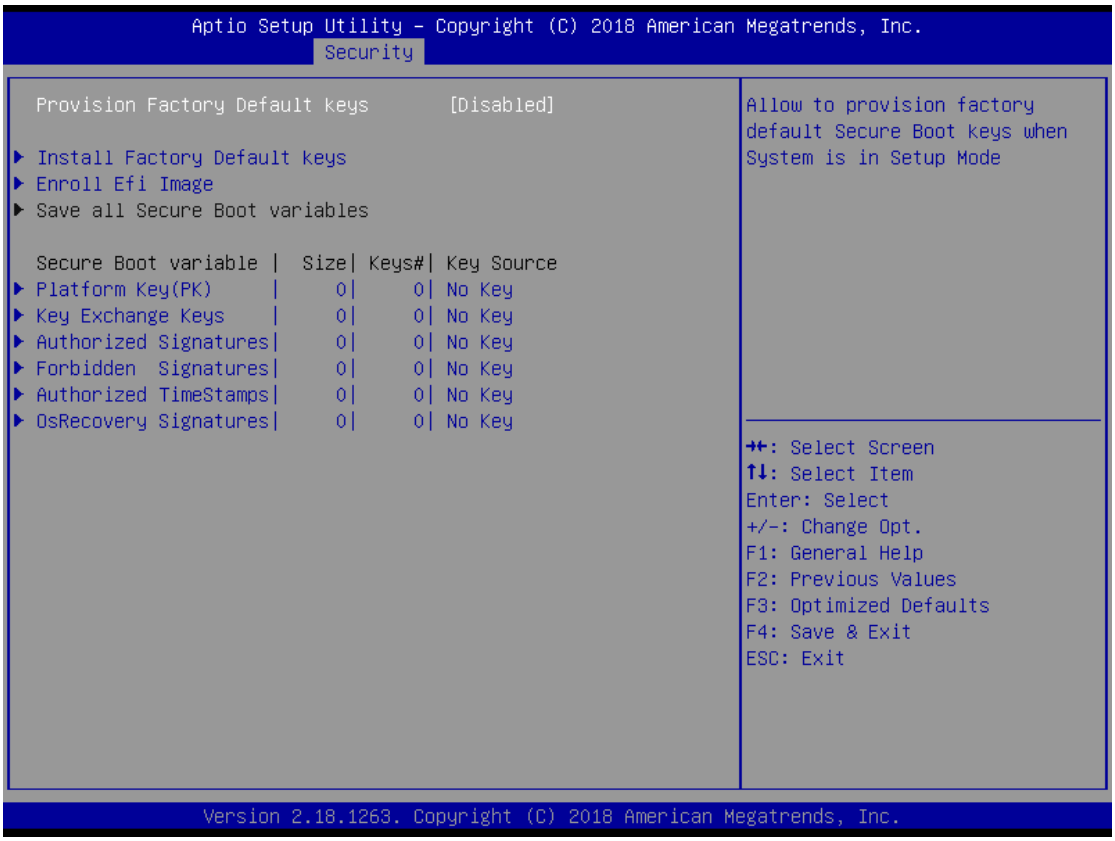


Feature	Description
Administrator Password	If ONLY the Administrator's password is set, it only limits access to Setup and is only asked for when entering Setup.
User Password	If ONLY the User's password is set, it serves as a power-on password and must be entered to boot or enter Setup. In Setup, the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

Secure Boot



Feature	Options	Description
Attempt Secure Boot	Disabled Enabled	Secure Boot is activated when Platform Key (PK) is enrolled, System mode is User/Deployed, and CSM function is disabled.
Secure Boot Mode	Standard Customized	Customizable Secure Boot mode: In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication.



Feature	Options	Description
Provision Factory Default keys	Disabled Enabled	Allow to provision factory default Secure Boot keys when System is in Setup Mode
Install Factory Default keys	None	Force System to User Mode - install all Factory Default keys
Enroll Efi Image	None	Allow the image to run in Secure Boot mode. Enroll SHA256 Hash Certificate of the Image into 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.

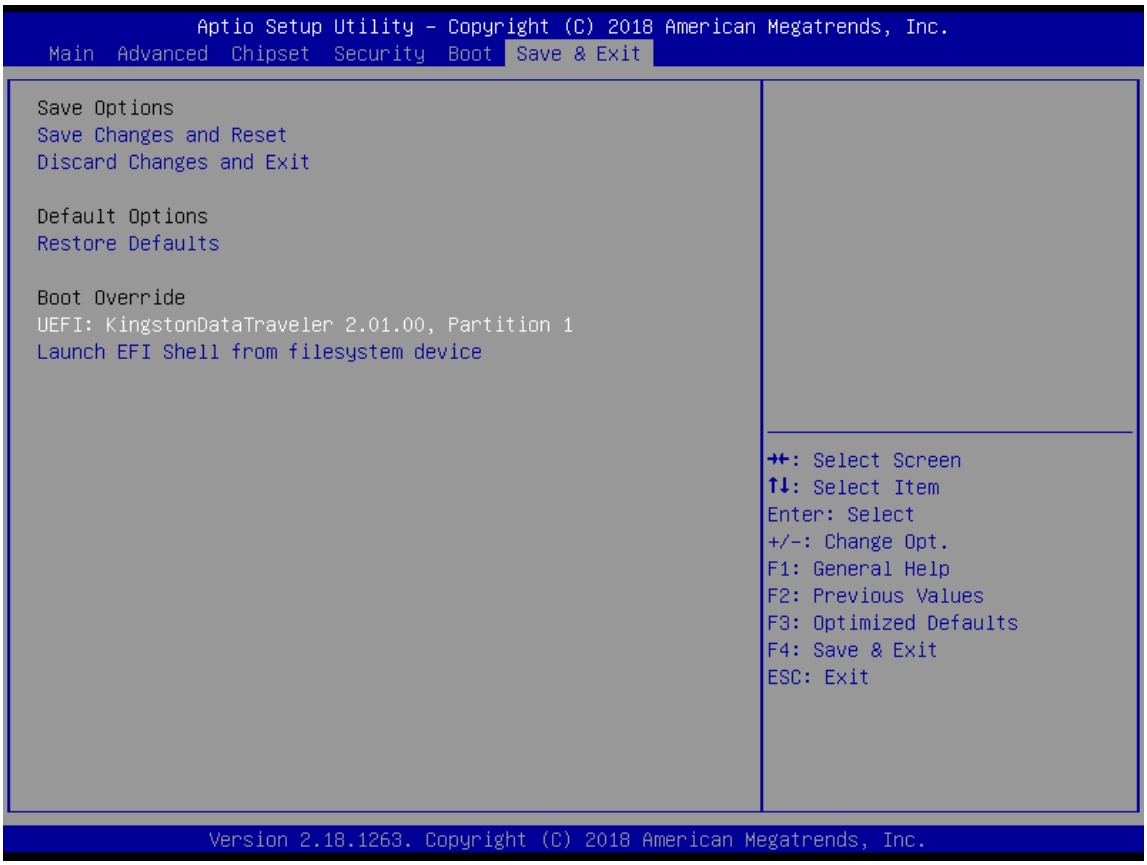


Feature	Options	Description
Setup Prompt Timeout	5	The number of seconds to wait for the setup activation key. 65535 means indefinite waiting.
Quiet Boot	Disabled Enabled	Enable or disables Quiet Boot option.
Boot mode select	LEGACY UEFI DUAL	Select boot mode for LEGACY or UEFI.

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

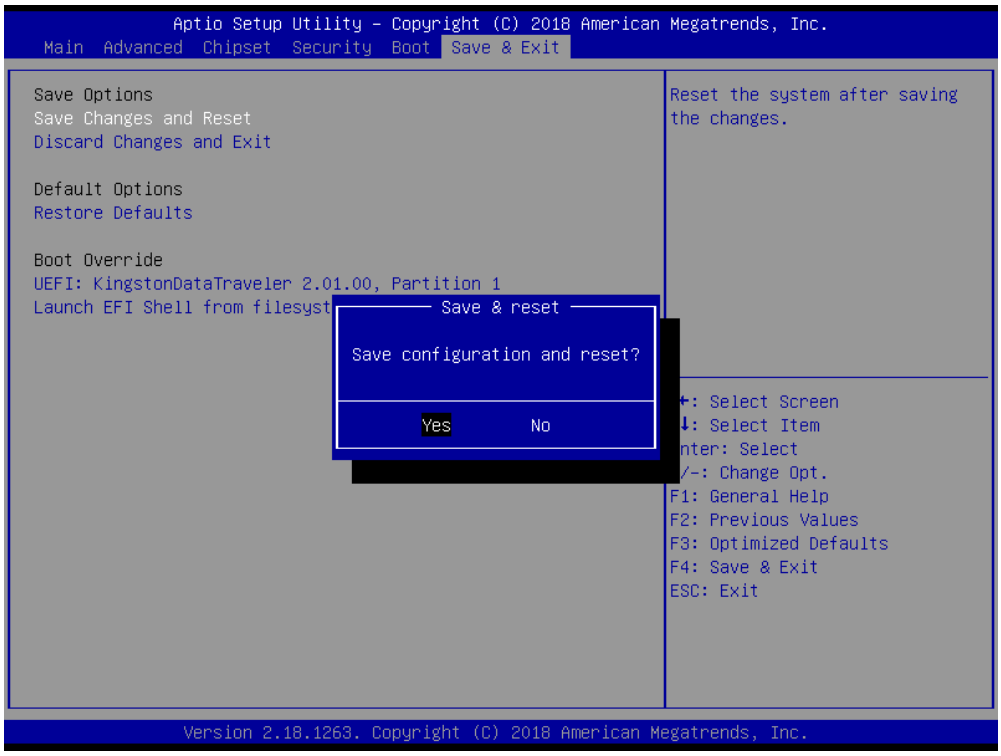
Save and Exit Menu

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.



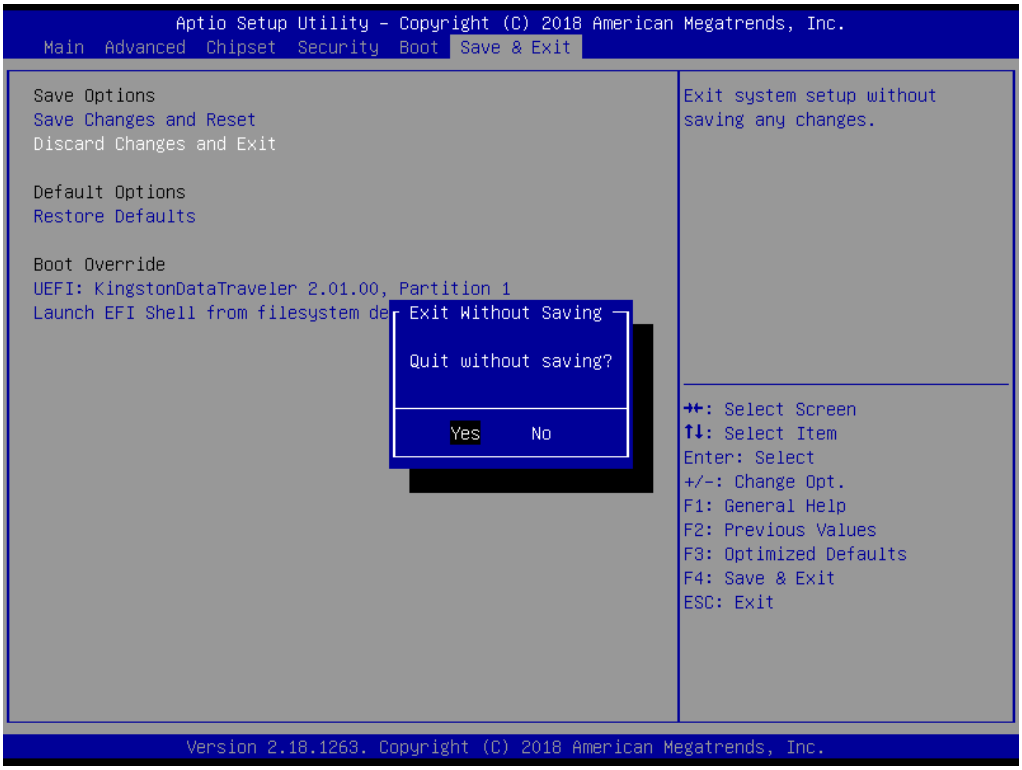
■ Save Changes and Reset

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.



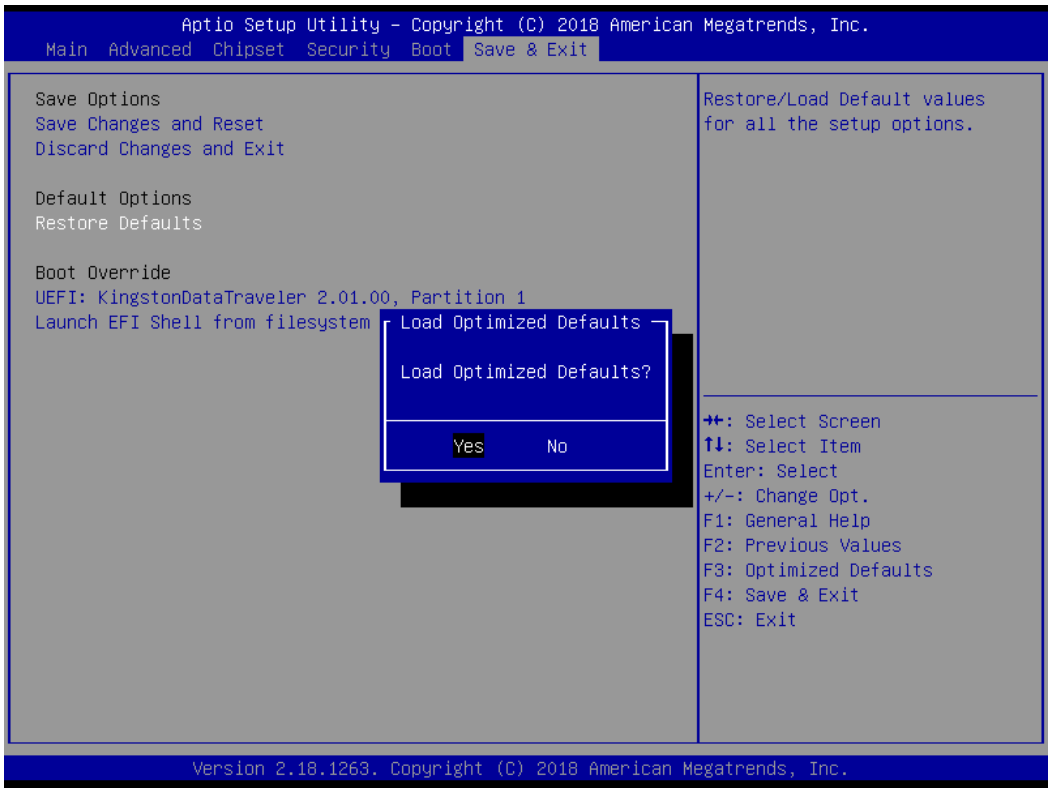
■ Discard Changes and Exit

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.



■ Restore Defaults

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



CHAPTER 4: HARDWARE SETUP

Wall Mounting

Wall-mount Kit

With the Wall-mount Kit, you can fix this system onto the wall surface.

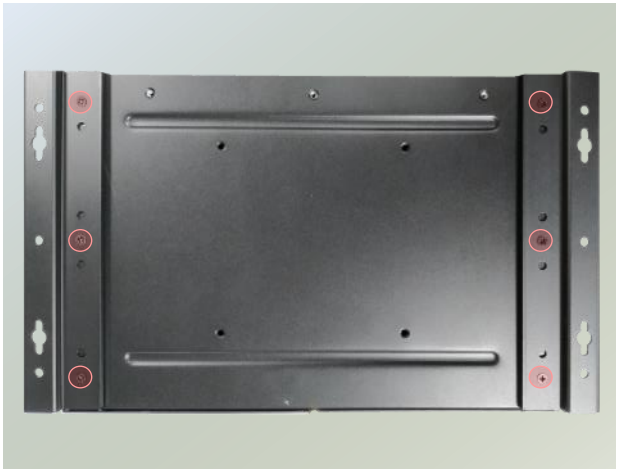
Wall Brackets



Check the kit contents for the following items:

- 1x pair of Wall Brackets
- 1x Screw Pack

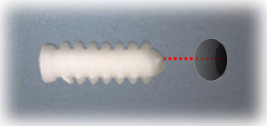
1. Flip over the system; fix both wall brackets onto the system bottom with **six** screws as shown in the picture.



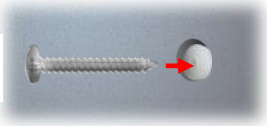
2. On the wall, measure the exact place where you want to hang the system and drill four holes.

3. Insert the expansion anchor bolts into the holes, and then insert the long screws into the wall screws.

M4 x 2mm

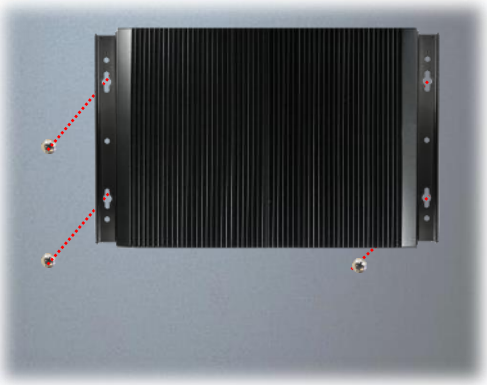


M3 x 19.5mm

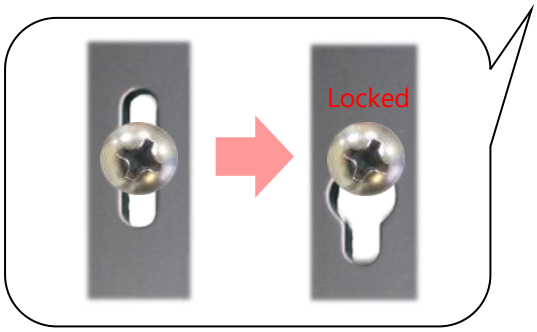


(The demonstrated screw type can fit in general drywall or shelves. Please identify the wall type and select the suitable fixing approach to secure this system to the wall, and consult a qualified trained person if you are unsure.)

4. Align the four screw holes on the system's wall brackets with the four long screws you just installed on the wall.



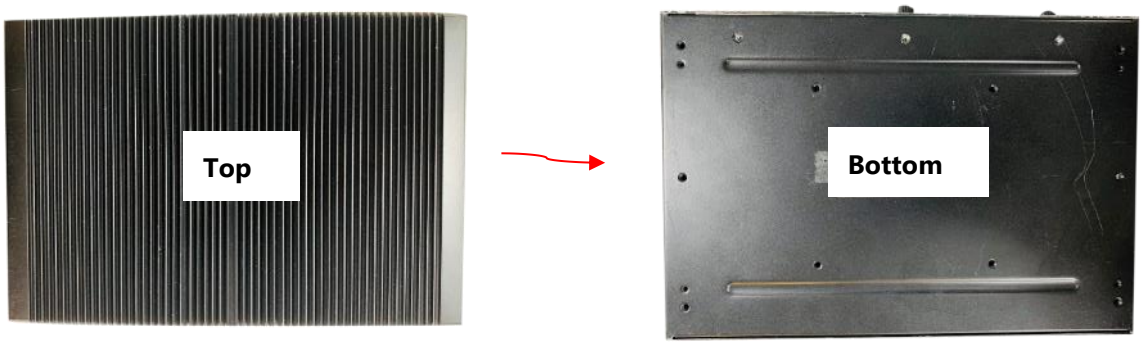
5. Engage the four screws in the bracket holes, and push the system downwards to lock the screws into position.



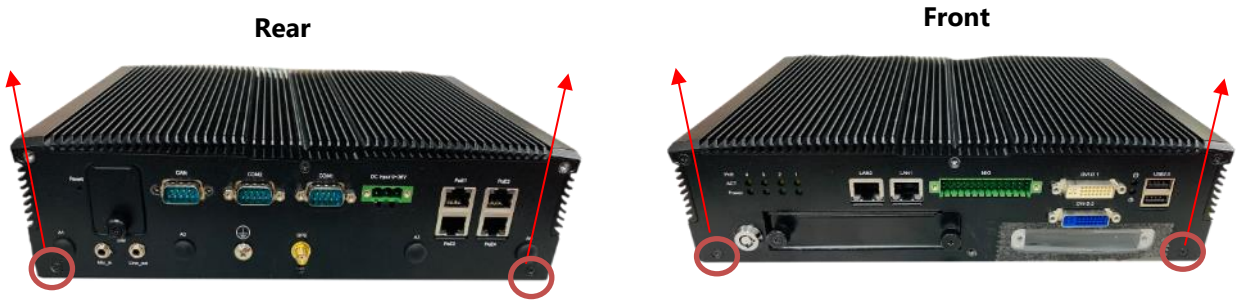


Open the Chassis

1. Turn the machine over so that the bottom is facing up.



2. Remove two screws from both the front and back panels.

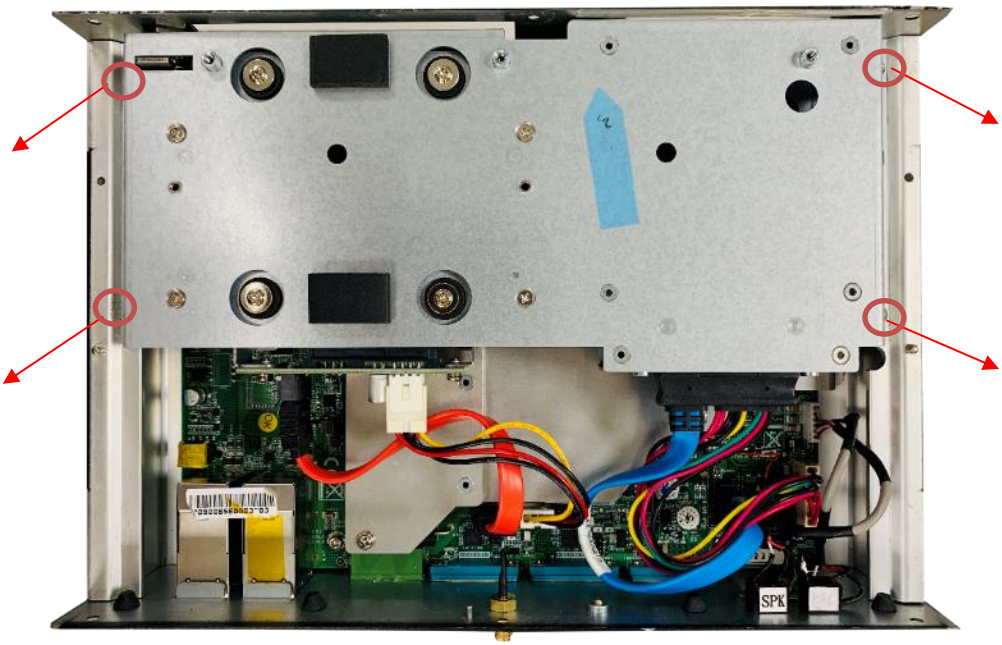


3. Remove the HDD Slide by loosening the screws on the front panel.

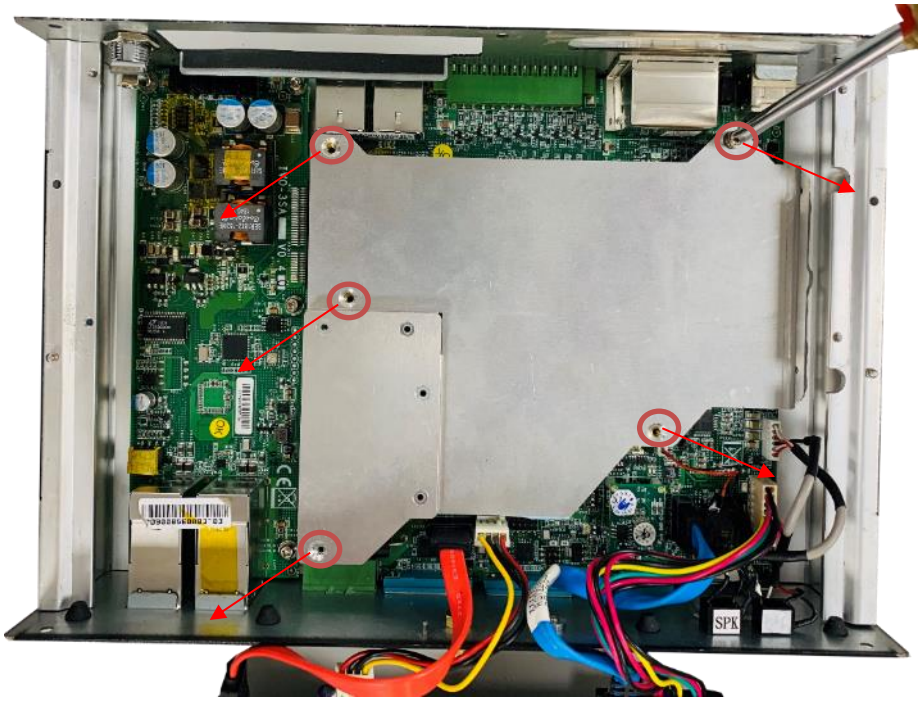


Remove Partition

1. Remove the tray after opening the chassis.



2. Then remove the partition board on top of the motherboard.

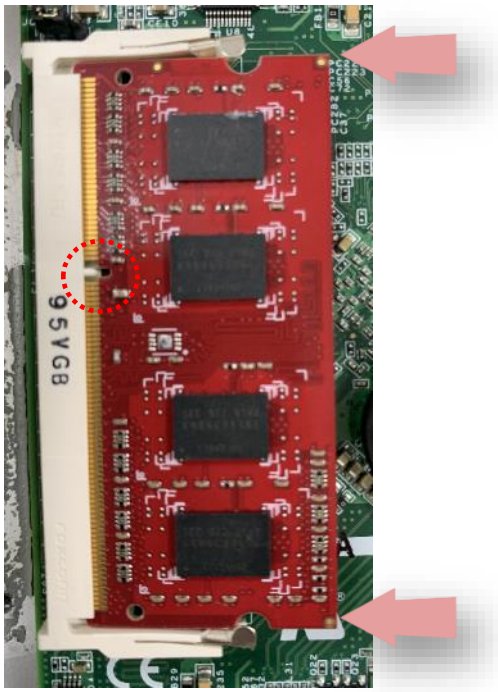


Install System Memory

1. Locate the memory slots on the motherboard



2. Align the notch of the module with the socket key in the slot. Tilt the end of the golden fingers down while carefully inserting the card into the slot.



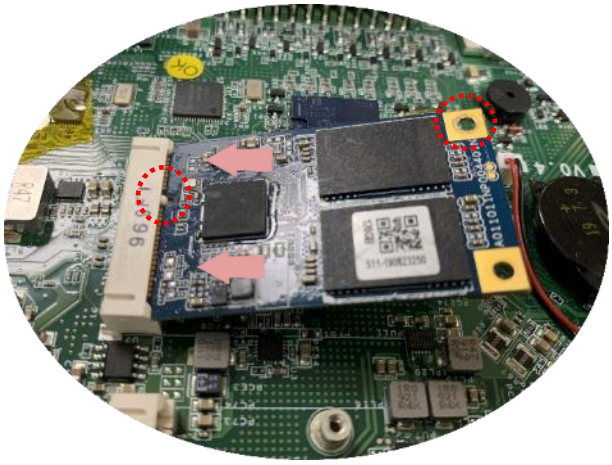
3. Press vertically on the other end of the card until it clicks into place.

Install Mini PCIE Module and MSATA

1. Locate the Mini PCI-E module and MSATA slot on the motherboard.



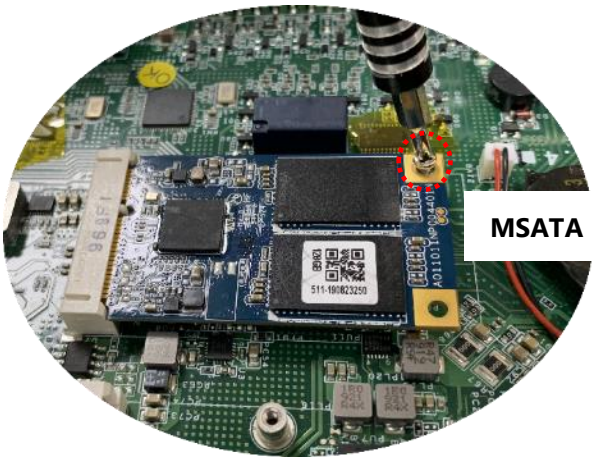
2. Align the notch of the module with the socket key in the slot. Tilt the end of the golden fingers down while carefully inserting the card into the slot.



3. Press vertically on the other end of the card until it clicks into place. Lock the module to the motherboard in the circle area

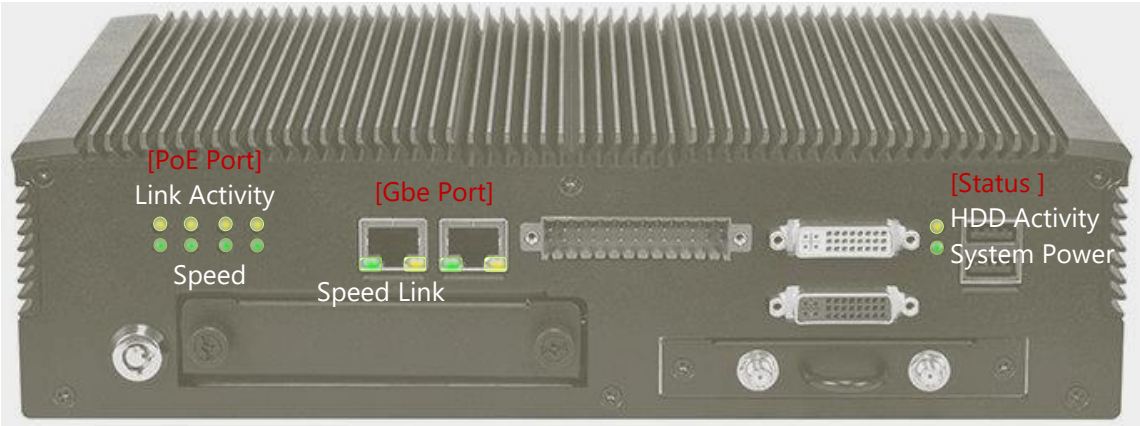






APPENDIX A: LED INDICATOR EXPLANATIONS

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 Amber	*Data access activity*
Off	*No data access activity*

GbE Port LED

- **Link Activity**

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

- **Speed**

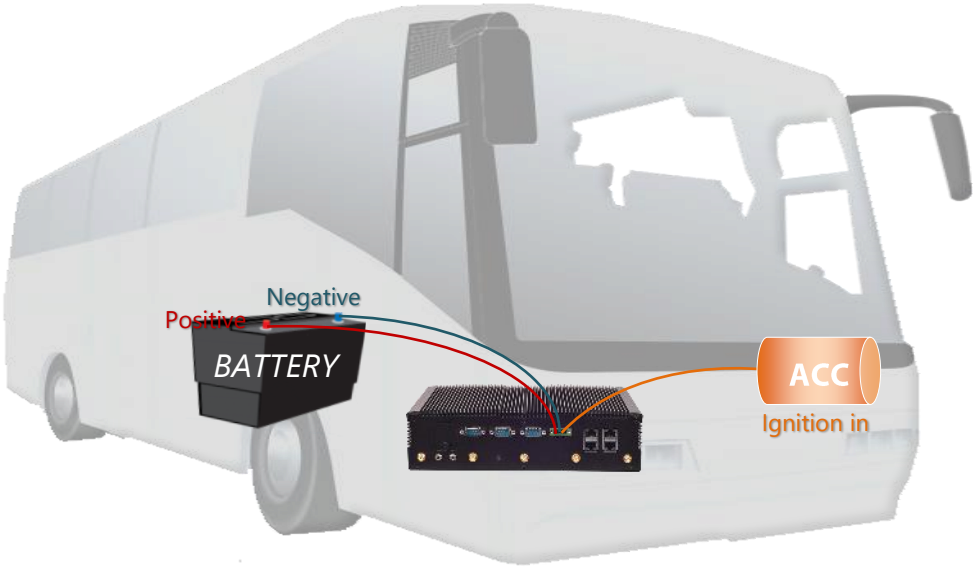
Off	*Operating as a 10-Mbps connection*
Solid Green	*Operating as a 100-Mbps connection*

APPENDIX B: IGNITION CONTROL SETUP

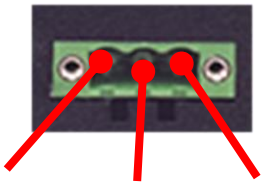
Connecting the Devices

The system comes with a controller to ensure that the device is well-shielded against premature failure at the boot or shutdown phase. When installing:

1. Make sure both your vehicle and the system are turned off.
2. Follow the wiring definition and illustration below to connect the vehicle battery and ignition (ACC) to the in-vehicle system through the 3-pin terminal block connector as **DC Input**.



DC Input



+	-	IG
Power	Ground	Ignition

Using the Ignition System Manager (ISM)

Command Format:

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

GET VariableName
SET VariableName value

MCU Command	Wirte/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		
Wakeup DI2/DI1	SET	WAKEUP_ENABLE	7(default)	1:DI1 2:Reserved 4: Reserved
Device ID	GET	DEVICE_ID	V3S_N	
Firmware Version	GET	VERSION	0.09B	
Digital Out (SIM selection)	SET	DIGITAL_OUT	0(default)	
Digial In	GET	DIGITAL_IN		
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		
Relay Switch	SET	RELAY_SWITCH	0(default)	0~1
	GET	RELAY_SWITCH		
Save flash	SAVE			

Example:

1. The minimun voltage for startup,
   Setting : 6V(6000mV)

Command	Response massage
SET STARTUP_VOLTAGE 6000	OK
GET STARTUP_VOLTAGE	STARTUP_VOLTAGE= 6000

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

Command	Response massage
SET POWERON_DELAY 4	OK
GET POWERON_DELAY	POWERON_DEALY= 4

3.Wakeup DI2/DI1 Enable,
Setting : DI2 & DI1 enable (011)

Command	Response massage
SET WAKEUP_ENABLE 3	OK
GET WAKEUP_ENABLE	WAKEUP_ENABLE= 3

4.Device ID

Command	Response massage
GET DEVICE_ID	DEVICE_ID= V3S_N

5.Firmware Version

Command	Response massage
GET VERSION	VERSION= 0.09B

6.Write/Read Digital_Out state,
Setting : SIM Card Control

Command	Response massage
SET DIGITAL_OUT 3	OK
GET DIGITAL_OUT	DIGITAL_OUT= 3

bit0 = LTE 1(M.2) - SIM Control(On board)
1: SIM #2
0: SIM #1

bit1 = LTE 2(MSATA) - SIM Control(On board)
1: SIM #1
0: SIM #2

bit2 = LTE 1(MPCIE) - Power Control(On board)
1: Power Off
0: Power On

bit3 = LTE 2(MSATA) - Power Control(On board)
1: Power Off
0: Power On

7.Read Digial_In state

Command	Response massage
GET DIGITAL_IN	DIGITAL_IN= 3

8.Ignition state (only read)

Command	Response massage
GET IGNITION	IGNITION= 0 (0: Ignition off / 1: ignition on)

9.Control the ON/OFF of each POE port

Command	Response massage
SET DIGITAL_POE 1	OK
GET DIGITAL_POE	DIGITAL_POE= 1

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

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

10.Write/Read Digital_DO state,
Setting : DO1、DO2、DO3、DO4、DO5、DO6、DO7、DO8

Command	Response massage
SET DIGITAL_DO 3	OK
GET DIGITAL_DO	DIGITAL_DO= 3

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.

11. Relay Control

Command	Response massage
SET RELAY_SWITCH 1	OK
GET RELAY_SWITCH	RELAY_SWITCH= 1

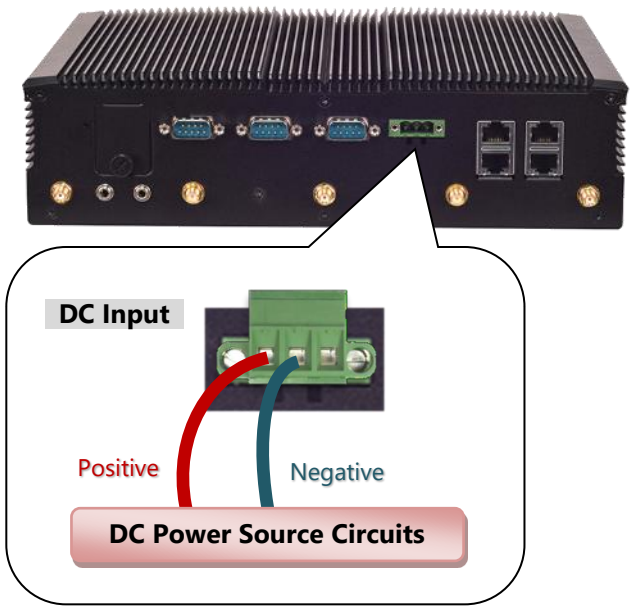
bit0 = Relay1 Control
1: Enable
0: Disable

12.Save setting

Command	Response massage
SAVE	OK Flash Updated

APPENDIX C: 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 3-pin terminal block connector as DC Input. Connect the two Power Wires to the Terminal Block (supplied along with the system) by inserting the red wire to the Positive contact, the other wire to the Negative contact, and then securing them onto the terminal block.



APPENDIX D: TERMS AND CONDITIONS

Warranty Policy

1. All products are under warranty against defects in materials and workmanship for 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. In contrast, the manufacturer will take 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 warranty period's expiration.
4. If the RMA Service Request Form does not meet the stated requirement as listed on "RMA Service," RMA goods will be returned at the customer's expense.
5. The following conditions are excluded from this warranty:
   - Improper or inadequate maintenance by the customer
   - Unauthorized modification, misuse, or reverse 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 described in the remarks box.
3. Ship the defective unit(s) on prepaid freight 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# is 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