Lanner

Network Computing

Hardware Platforms for Network Computing

NCA-1020 User Manual

Version: 1.7

Date of Release: 2019-11-20

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

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

Online Resources

The listed websites are links to the online product information and technical support.

Resources	URL
Lanner	http://www.lannerinc.com
Product Resource	http://www.lannerinc.com/download-center
RMA	http://eRMA.lannerinc.com

Copyright and Trademarks

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 B

This equipment has been tested and found to comply with the limits for a Class B 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 residential environment.This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a commercial 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 B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. 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. However, there is no guarantee that interference will not occur in a particular installation. However, if this equipment does cause interference to radio or television equipment reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/television technician for help.
- Use a shielded and properly grounded I/O cable and power cable to ensure compliance of this unit to the specified limits of the rules.

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:
(1) this device may not cause harmful interference and
(2) this device must accept any interference received, including interference that may cause undesired operation.

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.

Lithium Battery Caution:

- Risk of Explosion if Battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.
- Installation only by a trained electrician or only by an electrically trained person who knows all English Installation and Device Specifications which are to be applied.
- Do not carry the handle of power supplies when moving to another place.
- The machine can only be used in a fixed location such as labs or computer facilities.

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).

Mounting Installation Precaution

Environment:

- Do not install and/or operate this unit in any place that flammable objects are stored or used in.
- 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 over-current protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- Reliable Earthing - Reliable earthing 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).
- Lanner Electronics Inc. shall not be held liable for any losses resulting from insufficient strength for supporting the unit or use of inappropriate installation components.

Installation & Operation:

- The installation of this product must be performed by trained specialists; otherwise, a non-specialist might create the risk of the unit'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 unit or use of inappropriate installation components.

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.

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.
- La machine ne peut être utilisée qu'à un lieu fixe comme en laboratoire, salle d'ordinateurs ou salle de classe.

Sécurité de fonctionnement

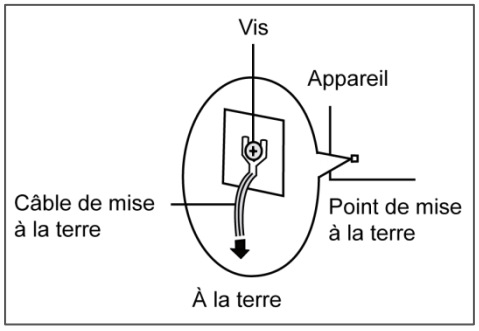
- L'équipement électrique génère de la chaleur. La température ambiante peut ne pas être adéquate pour refroidir l'équipement à une température de fonctionnement acceptable sans circulation adaptée. Vérifiez que votre site propose une circulation d'air adéquate.
- Vérifiez que le couvercle du châssis 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).

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.

Procédure de mise à la terre pour source d'alimentation CC Procédure de mise à la terre pour source d'alimentation CC

- 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 CC doit fournir 30 A de courant.
- Cet appareil de protection doit être branché à la source d'alimentation avant l'alimentation CC.



Revision History

Version	Date	Descriptions
1.0	2017/07/18	1st Draft
1.1	2017/09/29	Modified ToC
1.2	2017/11/30	Modified Front Panel and Connector Pin Assignments
1.3	2018/01/03	Modified Chapter 3: Board Layout
1.4	2018/07/09	Modified System Specifications
1.5	2019/02/13	Add Rack mount Kit
1.6	2019/09/06	Update Specifications and BIOS Setup
1.7	2019/11/20	Update HW Monitor section in BIOS Setup

Table of Contents

CHAPTER 1: PRODUCT OVERVIEW

Thank you for choosing NCA-1020. Lanner's NCA-1020 is a compact desktop appliance empowered by Intel® Celeron® Processor N3010 (code-named Braswell) for deployment at edge environment, branch offices, and retail surroundings. Besides the low power consumption and decent processing capability, NCA-1020 also provides necessary I/O functionality for edge computing, multi-service gateways, VPN routers and CPE applications.

Here is the summary of the key features:

- Intel® Celeron® N3010 CPU
- 1x 204-pin DIMM DDR3L 1600 MHz non-ECC up to 8GB
- Ultra-compact design for edge computing, multi-service gateways, SME VPN routers and CPE applications
- 3x RJ45 GbE LAN ports
- 1x pair of LAN Bypass
- Built-in with AES-NI crypto-security
- Fanless design
- 2x SMA antenna holes
- 1x SATA 2.5" SSD tray (By SKU)
- 1x HDMI port
- 1x RJ-45 console port

Package Content

Your package contains the following items:

- 1x NCA-1020 Network Appliance
- 1x 36W Power adaptor
- 1x U.S standard Power cord

Note: If any component should be missing or damaged, please contact your dealer immediately for assistance.

Ordering Information

SKU No.	Main Features
NCA-1020A	Ultra Compact Fanless x86 Network Appliance with Intel Braswell N3010 2C 1.04GHz, 1x DDR3L SO-DIMM slot, 3x Gbe RJ45(3x Intel I211) with 1 pair bypass, USB, Console, HDMI, support 1x SSD
NCA-1020B	Ultra Compact Fanless x86 Network Appliance with Intel Braswell N3010 2C 1.04GHz, 1x DDR3L SO-DIMM slot, 3x Gbe RJ45(3x Intel I211), with 1 pair bypass, USB, Console, HDMI

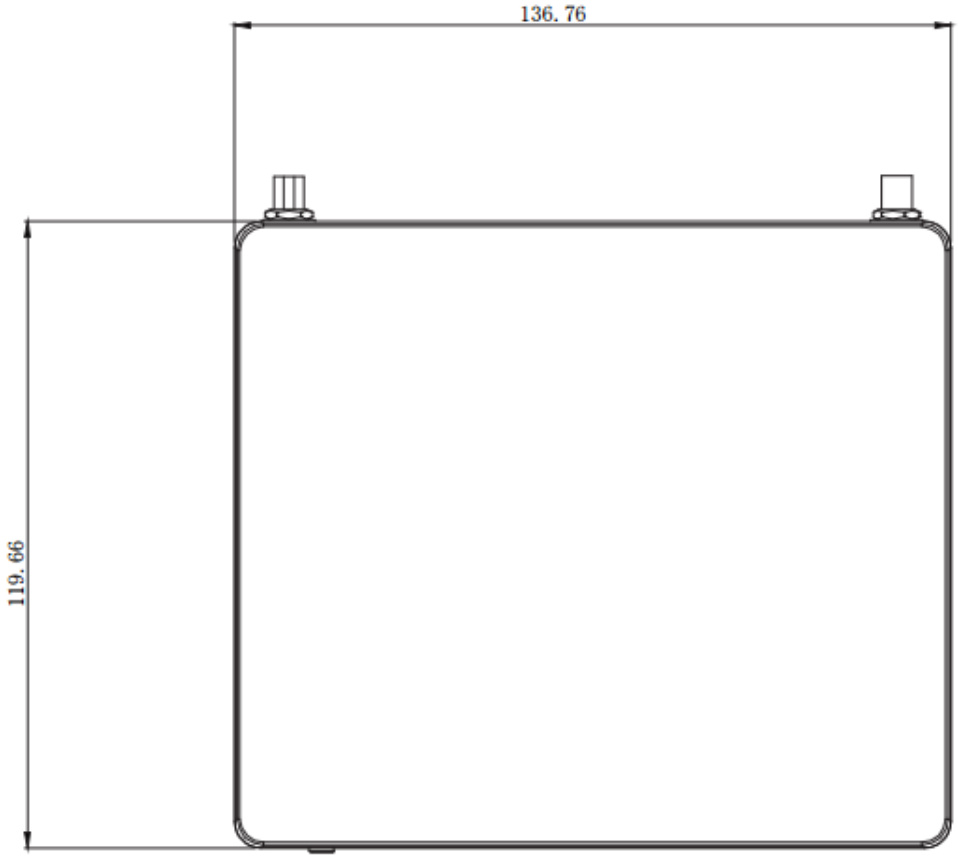
System Specifications

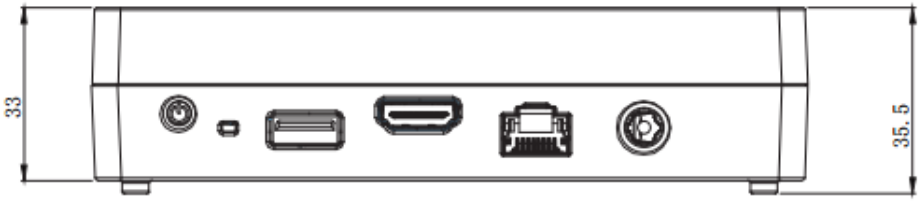
Form Factor		Fanless Desktop
Platform	Processor Options	Intel® Celeron® N3010 (Braswell)
	CPU Socket	Onboard
	Chipset	SoC
	Security Acceleration	N/A
BIOS		AMI SPI Flash BIOS
System Memory	Technology	DDR3L 1600MHz UDIMM
	Max. Capacity	8 GB
	Socket	1 x 204pin SODIMM
Networking	Ethernet Ports	3 x GbE RJ45 Intel® i211
	Bypass	1 pair Gen2
	NIC Module Slot	N/A
LOM	IO Interface	N/A
	OPMA slot	N/A
I/O Interface	Reset Button	1
	LED	Power LED on Power Button
	Power Button	1
	Console	1 x RJ45
	USB	1 x USB 2.0, 1 x USB 3.0
	LCD Module	N/A
	Display	1 x HDMI
	Power input	1 x DC Jack
Storage	HDD/SSD Support	1 x 2.5" Bay - SSD Only (By SKU)
	Onboard Slots	1 x mSATA mini
Expansion	PCIe	N/A
	mini-PCIe	1 x Mini-PCIe (PCIe/USB2.0)
Miscellaneous	Watchdog	YES
	Internal RTC with Li Battery	YES
	TPM	YES (Optional)
Cooling	Processor	Passive CPU Heatsink
	System	Fanless
Environmental Parameters	Temperature	0~40°C Operating -20~70°C Non-Operating
	Humidity (RH)	5~90% Operating 5~ 95% Non-Operating
System Dimensions	(WxDxH)	137 x 36 x 120 mm
	Weight	0.5 kg
Package Dimensions	(WxDxH)	426 x 252 x 282 mm
	Weight	8.5 kg (10 in 1)
Power	Type/Watts	12V 3A 36W Power Adapter
	Input	AC 100~240V @50~60 Hz
Approvals and Compliance		RoHS, CE, FCC Class B

CHAPTER 2: MOTHERBOARD INFORMATION

Mechanical Drawing

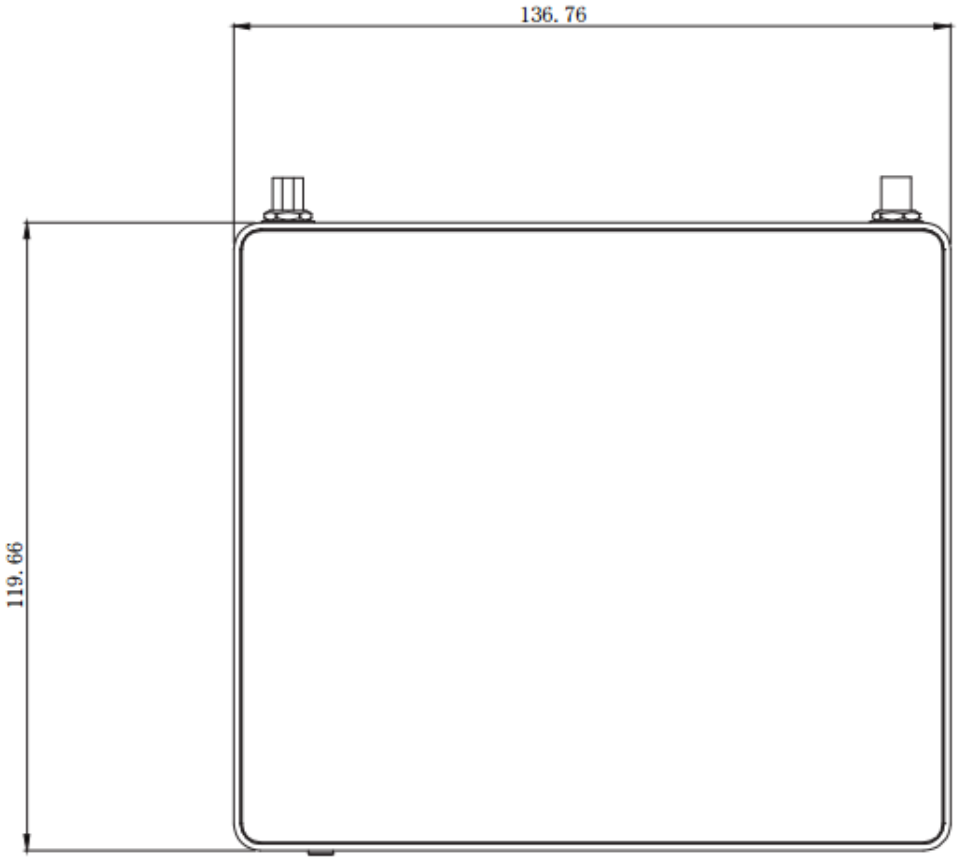
NCA-1020A

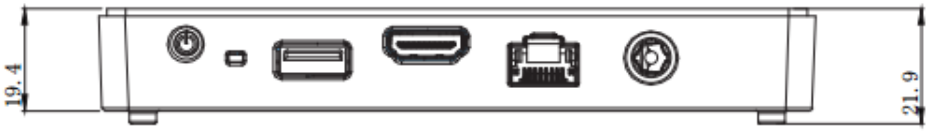




Unit: mm

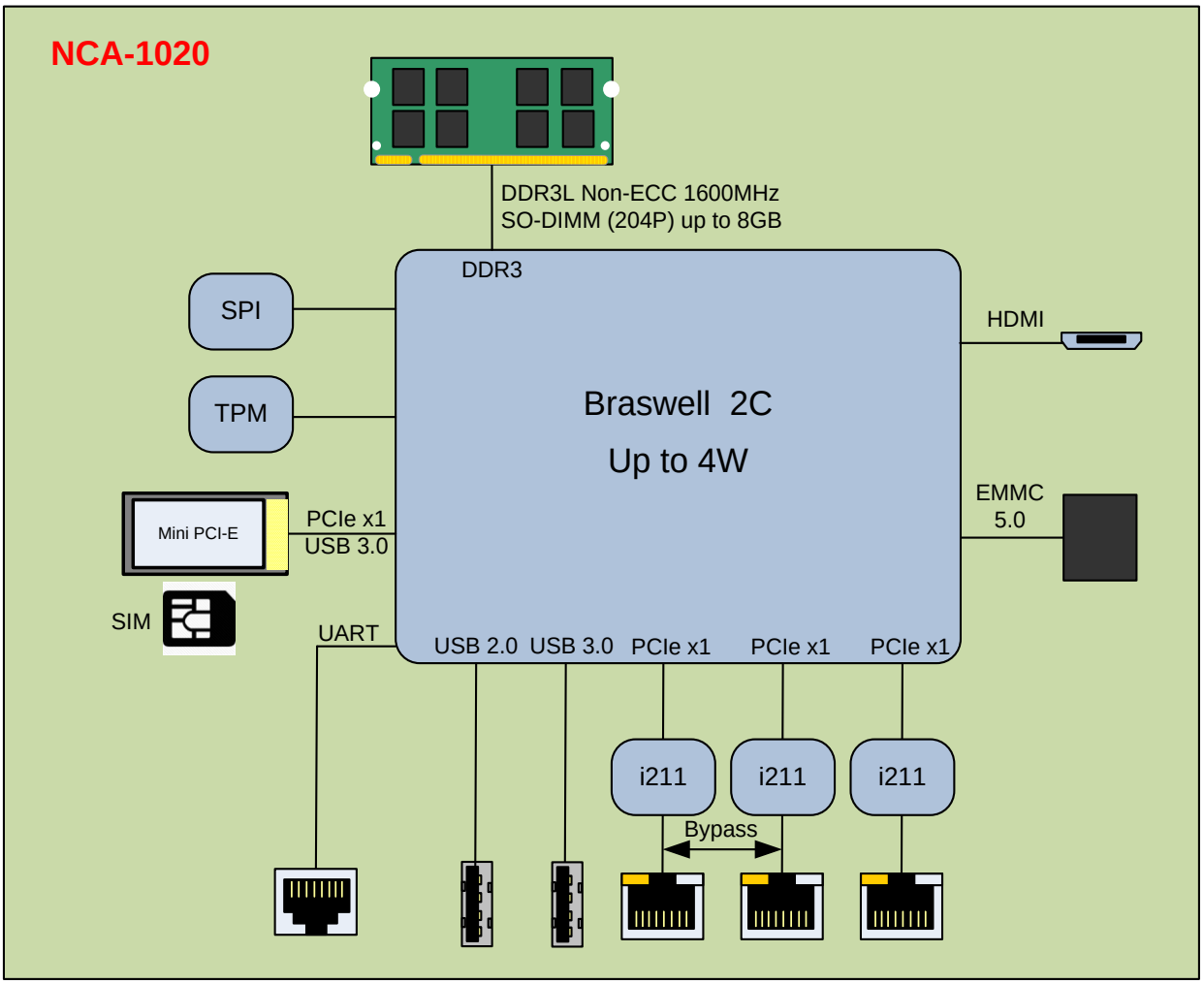
NCA-1020B



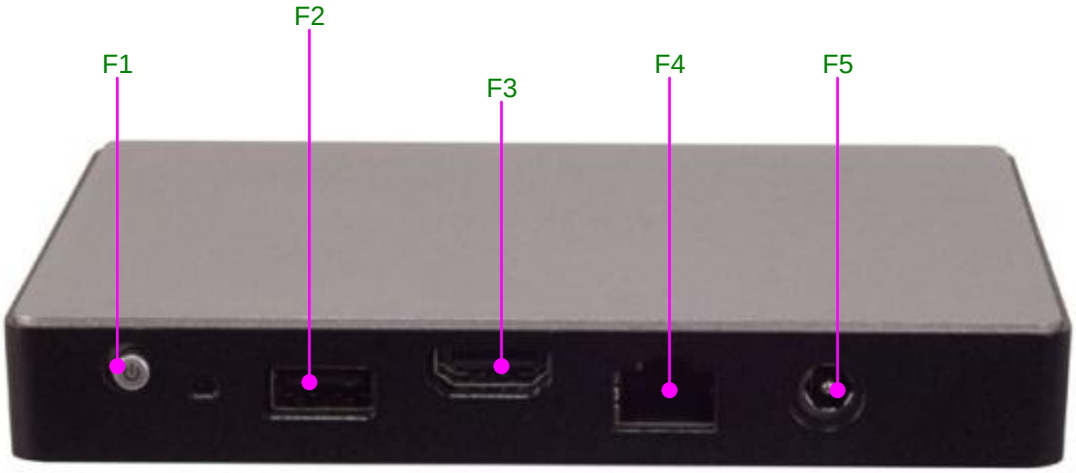


Unit: mm

Block Diagram

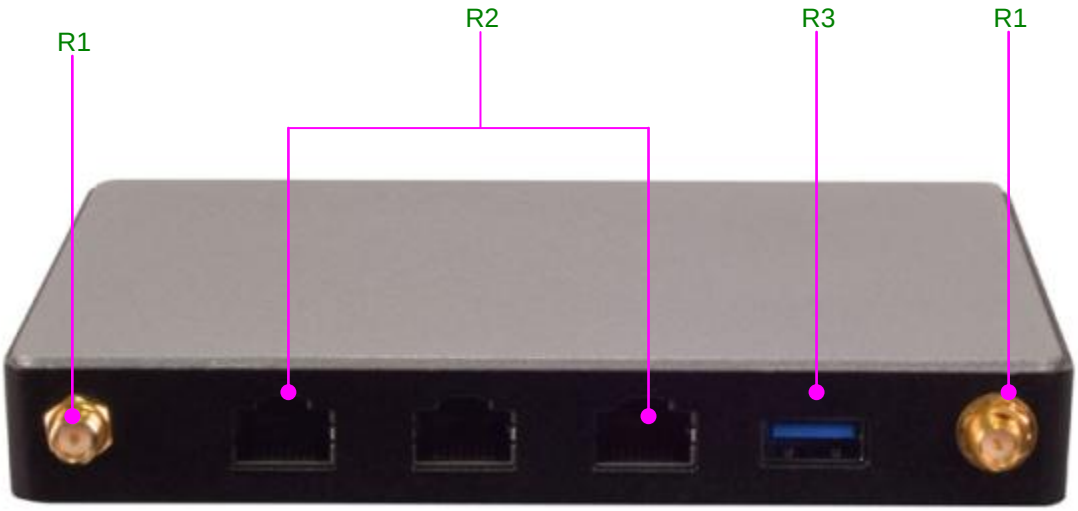


Front Panel



No.	Description	
F1	Power	1 x Power on/off switch
F2	USB	1 x USB 2.0 Type-A port
F3	HDMI	1 x HDMI display port
F4	Console	1 x RJ-45 console port
F5	DC Power Jack	1 x DC power jack

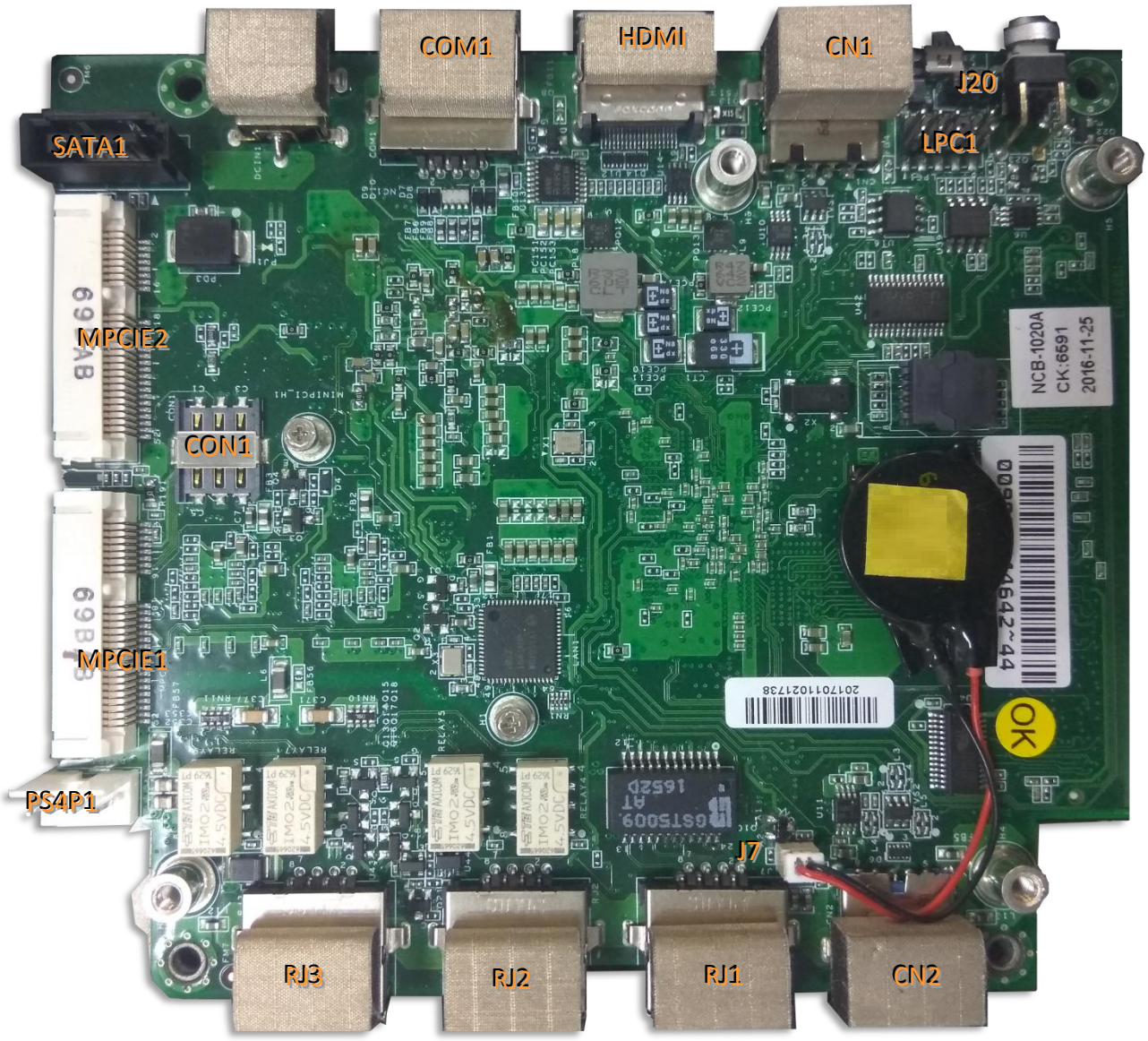
Rear Panel



No.	Description	
R1	Antenna	2 x SMA antenna holes
R2	LAN	3 x RJ-45 LAN ports (1 pair of bypass)
R3	USB	1 x USB 3.0 Type-A port

CHAPTER 3: BOARD LAYOUT

Jumpers and Connectors on the Motherboard



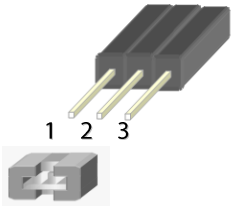

DIMM
NCB-1020_A_V0.2D

Jumper Setting and Connector Pin-out

Jumper Settings

J20: set the Reset Mode as Hardware (HW) Reset or Software (SW) Reset. Default "short pins" are 2-3 as Software Reset (1x3-pin 2.54mm 3P DIP).

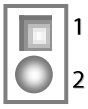
Pin	Description	Pin	Description	Pin	Description
1	HR_RST	**2**	BTN_RST_N1	**3**	SW_GPIO



Pin	Description	Pin	Description
1.2 	HW reset (Default)	2.3 	SW reset

J7: Battery Pin Header

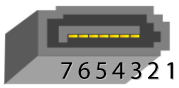
Pin	Description
1	BAT_D
2	GND



SATA1: SATA Port, SMD Type

180° SATA Connector

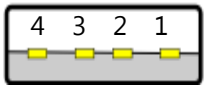
Pin	Description	Pin	Description
1	GND	**2**	TX+
3	TX-	**4**	GND
5	RX-	**6**	RX+
7	GND		



Connector Pin Assignments

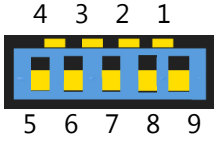
CN1: USB 2.0 Type-A ports in single form factor

Pin	Description	Pin	Description
1	VCC 5V	**2**	D-
3	D+	**4**	GND



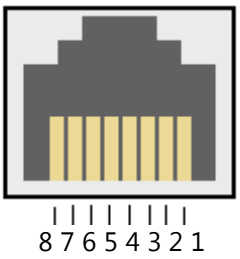
CN2: USB3.0 CONN

Pin	Description	Pin	Description		
1	VCC 5V	**2**	D-	**3**	D+
4	GND	**5**	USB3_RX-	**6**	USB3_RX+
7	GND	**8**	USB3_TX-	**9**	USB3_TX+



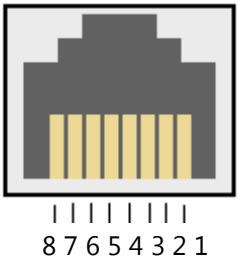
COM1: RJ-45 console port for serial console

Pin	Description
1	NC
2	NC
3	Transmitted Data (TxD)
4	GND
5	GND
6	Received Data (RxD)
7	NC
8	NC



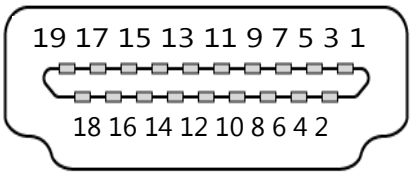
RJ1/2/3: RJ45 LAN Connectors

Pin	Description
1	MDI0+
2	MDI0-
3	MDI1+
4	MDI2+
5	MDI2-
6	MDI1-
7	MDI3+
8	MDI3-



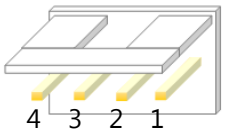
HDMI: HDMI Connector

Pin	Description	Pin	Description
1	DATA+	**2**	GND
3	DATA2-	**4**	DATA1+
5	GND	**6**	DATA1-
7	DATA0+	**8**	GND
9	DATA0-	**10**	CLK+
11	GND	**12**	CLK-
13	NC	**14**	NC
15	SCL	**16**	SDA
17	GND	**18**	GND
19	HOT_PLUG_DET		



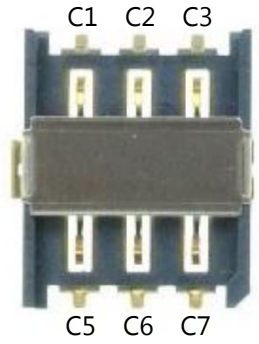
PS4P1: 4-pin SATA power connector at 2.54mm for SATA storage device

Pin	Description
1	12V
2	GND
3	GND
4	5V



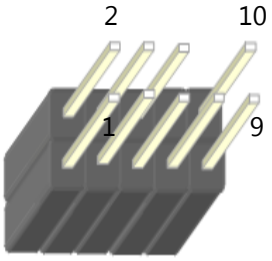
CON1: SIM Slot

Pin	Description	Pin	Description
C1	VCC	**C2**	RST
C3	CLK	**C5**	GND
C6	VPP	**C7**	I/O
PAD1	GND	**PAD2**	GND

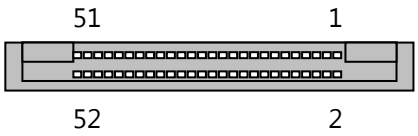


LPC1: Debug port

Pin	Description	Pin	Description
1	CLK_33M_P80	**2**	LPC_AD1
3	PLTRST_PORT80_N	**4**	LPC_AD0
5	LPC_FRAME_N	**6**	P3V3
7	LPC_AD3	**8**	Key ping
9	LPC_AD2	**10**	GND

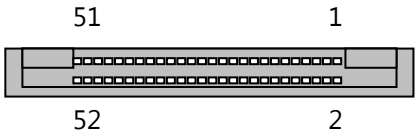


MPCIE1: Mini PCIe Socket(PCIE & USB)



Pin	Description	Pin	Description
1	WAKE	**2**	3.3V
3	NC	**4**	GND
5	NC	**6**	1.5V
7	CLKREQ	**8**	NC
9	GND	**10**	NC
11	CLK-	**12**	NC
13	CLK+	**14**	NC
15	GND	**16**	NC
17	NC	**18**	GND
19	NC	**20**	NC
21	GND	**22**	RESET
23	PCIE_RX-	**24**	3.3V
25	PCIE_RX+	**26**	GND
27	GND	**28**	1.5V
29	GND	**30**	SMB_CLK
31	PCIE_TX-	**32**	SMB_DAT
33	PCIE_TX+	**34**	GND
35	GND	**36**	USB_D-
37	GND	**38**	USB_D+
39	3.3V	**40**	GND
41	3.3V	**42**	NC
43	GND	**44**	NC
45	NC	**46**	NC
47	NC	**48**	1.5V
49	NC	**50**	GND
51	NC	**52**	3.3V

MPCIE2: Mini PCIe Socket(mSATA)



Pin	Description	Pin	Description
1	NC	**2**	3.3V
3	NC	**4**	GND
5	NC	**6**	NC
7	NC	**8**	NC
9	GND	**10**	NC
11	NC	**12**	NC
13	NC	**14**	NC
15	GND	**16**	NC
17	NC	**18**	GND
19	NC	**20**	NC
21	GND	**22**	NC
23	RX+	**24**	3.3V
25	RX-	**26**	GND
27	GND	**28**	NC
29	GND	**30**	NC
31	TX-	**32**	NC
33	TX+	**34**	GND
35	GND	**36**	NC
37	GND	**38**	NC
39	3.3V	**40**	GND
41	3.3V	**42**	NC
43	GND	**44**	NC
45	NC	**46**	NC
47	NC	**48**	NC
49	NC	**50**	GND
51	NC	**52**	3.3V

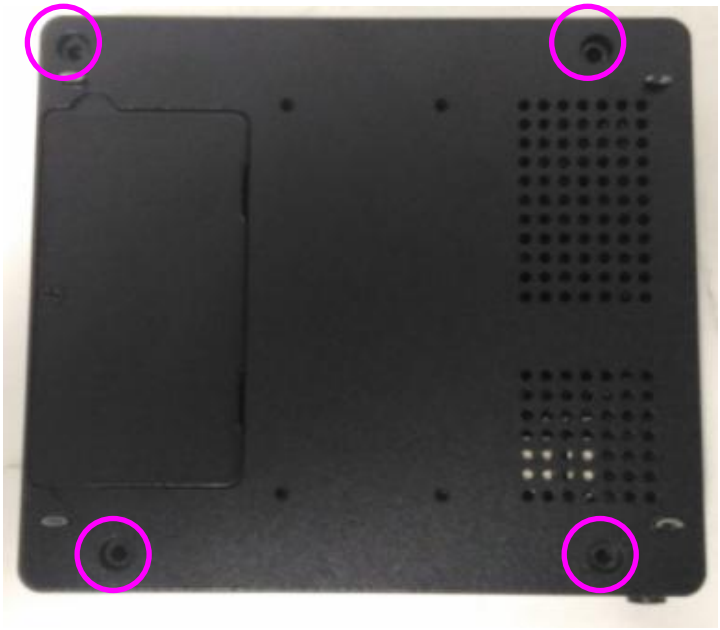
CHAPTER 4: HARDWARE SETUP

Preparing the Hardware Installation

To access some components and perform certain service procedures, you must perform the following procedures first.

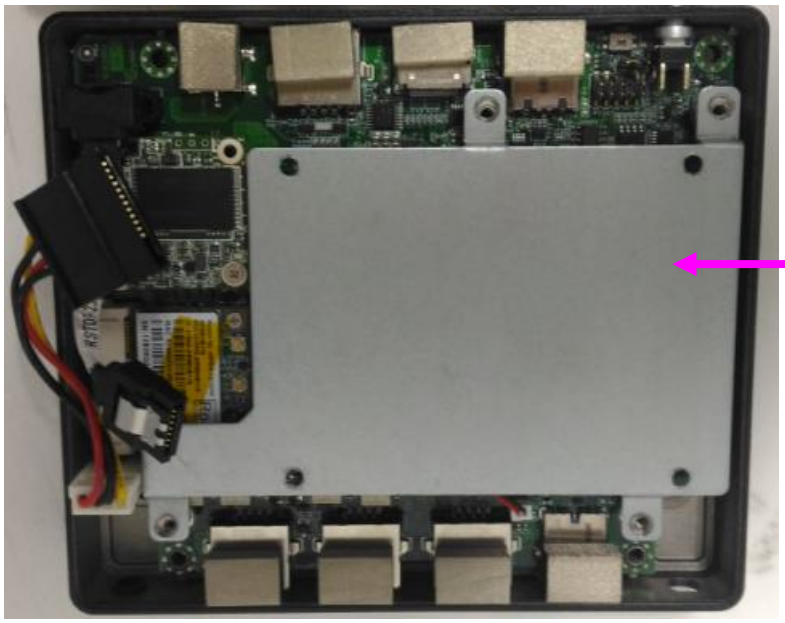
Warning: 1. To reduce the risk of personal injury, electric shock, or damage to the equipment, please remove all power sources. 2. Please wear ESD protected gloves before conducting the following steps. 3. NOT pile any object onto the system.

1. Power off NCA-1020 completely and remove all power connections.
2. Turn the system upside down and locate the four footing screws.
3. Remove the 4 screws from the bottom, as circled in the figures below.



4. Turn the system back to its original position and gently lift the top compartment up.

5. Remove the SSD bracket in order to install hardware components and SSD.



Installing the System Memory

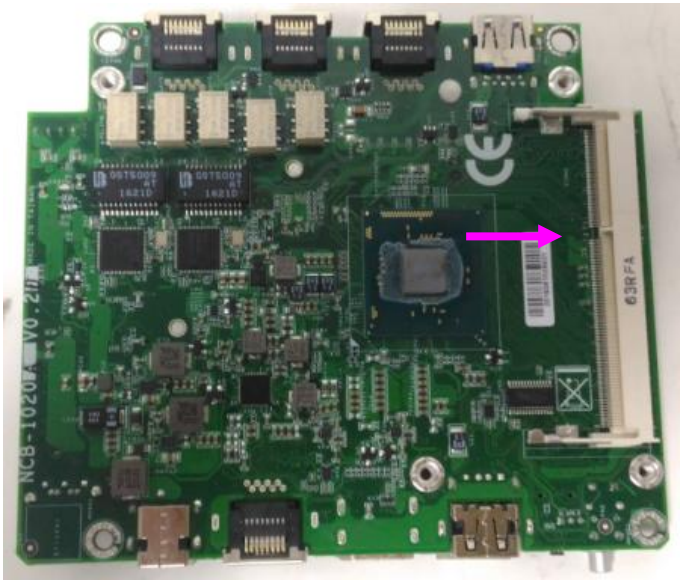
The motherboard supports a 204-pin DIMM DDR3L 1600 MHz non-ECC up to 8GB, which is located on the bottom side of the motherboard. Please follow the steps below to install the DIMM memory module properly.

Note: you may have to remove the SSD installation bracket first.

1. Assuming that the previous steps, including system power-off, lifting the chassis and removal of the SSD bracket, have been taken properly, then remove the 4 screws at the four corners that secure the motherboard.

2. Gently take the motherboard out of its original place.

3. Locate the DIMM socket at the back of the motherboard.



4. Align the DIMM module and make sure the notches of the module aligned with the socket keys in the slot.

5. Insert the module into the slot at a diagonal angle and press it down until it's firmly seated by the clips at both sides.

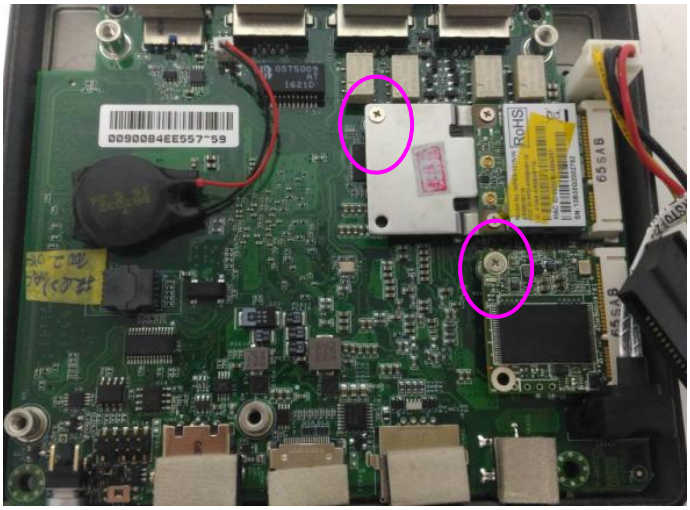
Installing Mini-PCIe Modules

The motherboard provides two mini-PCIe sockets: a mini-PCIe socket with USB and PCIe signals and an mSATA mini socket. Please follow the procedures below for installation.

Note: You may have to remove the SSD installation bracket first.

1. Locate the mini-PCIe sockets.
2. Insert modules as shown in the image below.

3. Press the module down and apply screws to secure it.

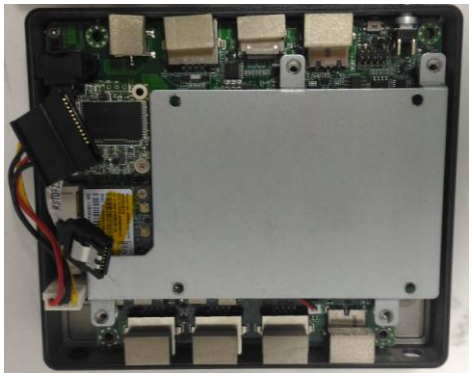


Installing Disk Drives

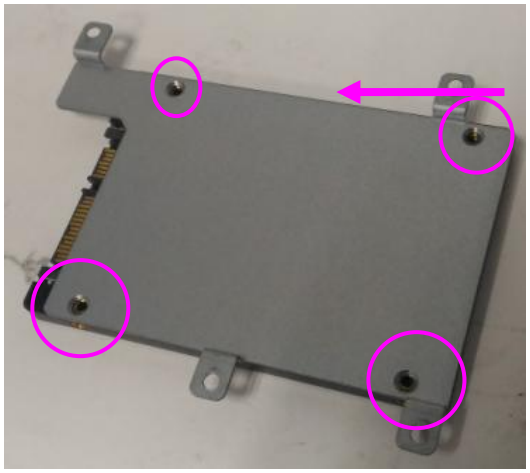
The system supports 1 x 2.5" SATA SSD as data storage (SSD is recommended due to heat and vibration concerns). Please follow the steps below for installation.

1. Attach a SATA 2.5" SSD onto the SSD bracket.

Note: the SSD bracket should have been removed in previous steps.

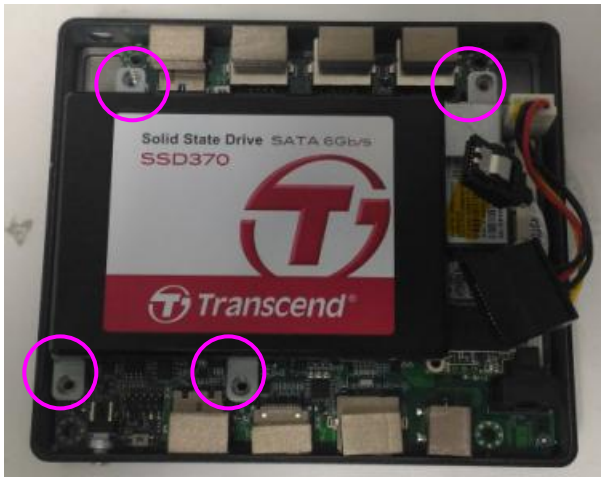


2. Make sure the screw holes are aligned and then apply screws to secure the installation between the SSD and the bracket.



Remove the bracket

3. Place the SSD-installed bracket back onto the motherboard. Make sure the screw holes are aligned.



4. Connect the SATA signal and power cables.

Installing SMA Antenna (optional)

The system can be customized to enable SMA antenna connectivity. Please follow the steps below to install the antenna.

1. Plug the female connector of the SMA antenna cable to the "MAIN" and "ALT" connectors (antenna connector of a wireless network module), as shown in the image below.

2. Plug the male connector of the SMA antenna onto the designated port as shown in the image below.

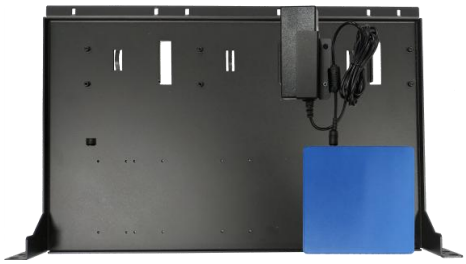
3. Use the supplied rings to secure the male connector from the front panel.

4. Tighten the rings and install the antenna. When installing the antenna, rotate it until it is tightened.

Rackmounting the System (with the Adapter Holder)

With the Rack mount Kit, this system can be fixed onto the post along with the system's power adapter. This rack mount assembly is designed to hold up to three NCA-1020 systems. Please contact Lanner's sales representative for this kit.

1 Unit



2 Units

3 Units

What's in the Rack Mount Kit

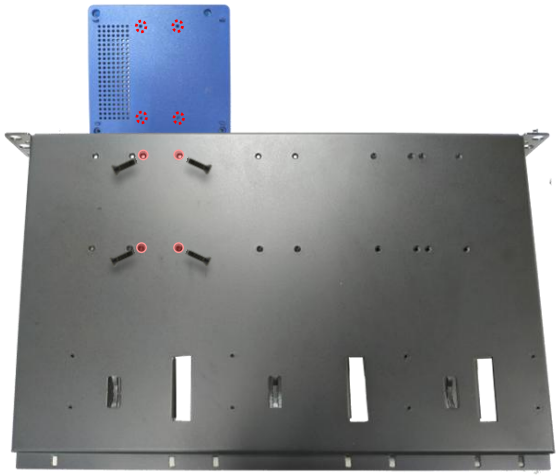
- 1x Rack Tray

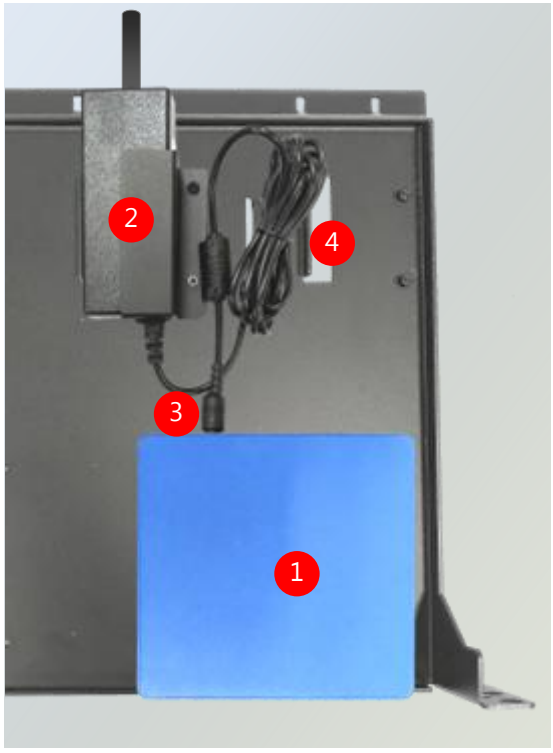
- 3x Adapter Holder
- 1x Screw Pack
- 1x Cable Tie Pack

- 2x Ear Extension Bracket
- 1x M6 Mounting Screw Pack

Attaching the System to the Tray

1. Fix the system onto the tray using **four long screws**. Flip over the tray to locate the screw holes as shown below.



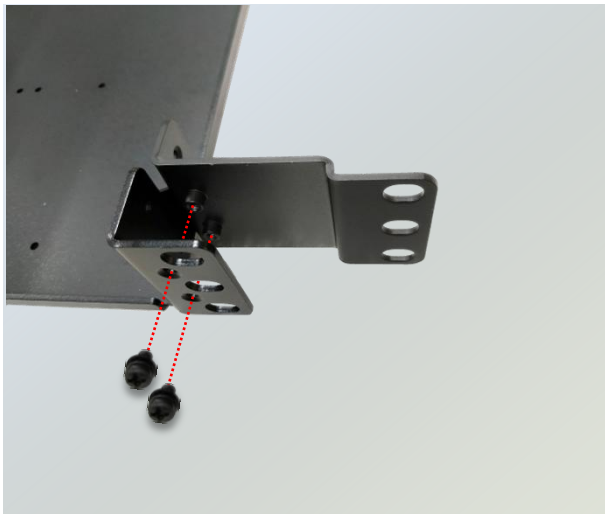


2. Flip the tray back to the up-front side and lock the **adapter holder** along with the **power adapter** onto the tray using **two short screws**.

3. Connect the power adapter to the system.

4. Use the **cable tie** to bundle the cable securely if needed.

5. (Optional) Attach the ear extension brackets to both ears of the tray and fix them using the screws provided.



Installing the System to the Rack

Fix the tray onto the rack using the mounting screws provided.

CHAPTER 5: BIOS SETUP

Main

BIOS is a firmware embedded on an exclusive chip on the system's motherboard. Lanner's BIOS firmware offering including market-proven technologies such as Secure Boot and Intel Boot Guard technology deliver solid commitments for the shield protection against malware, uncertified sequences and other named cyber threats.

Main Setup

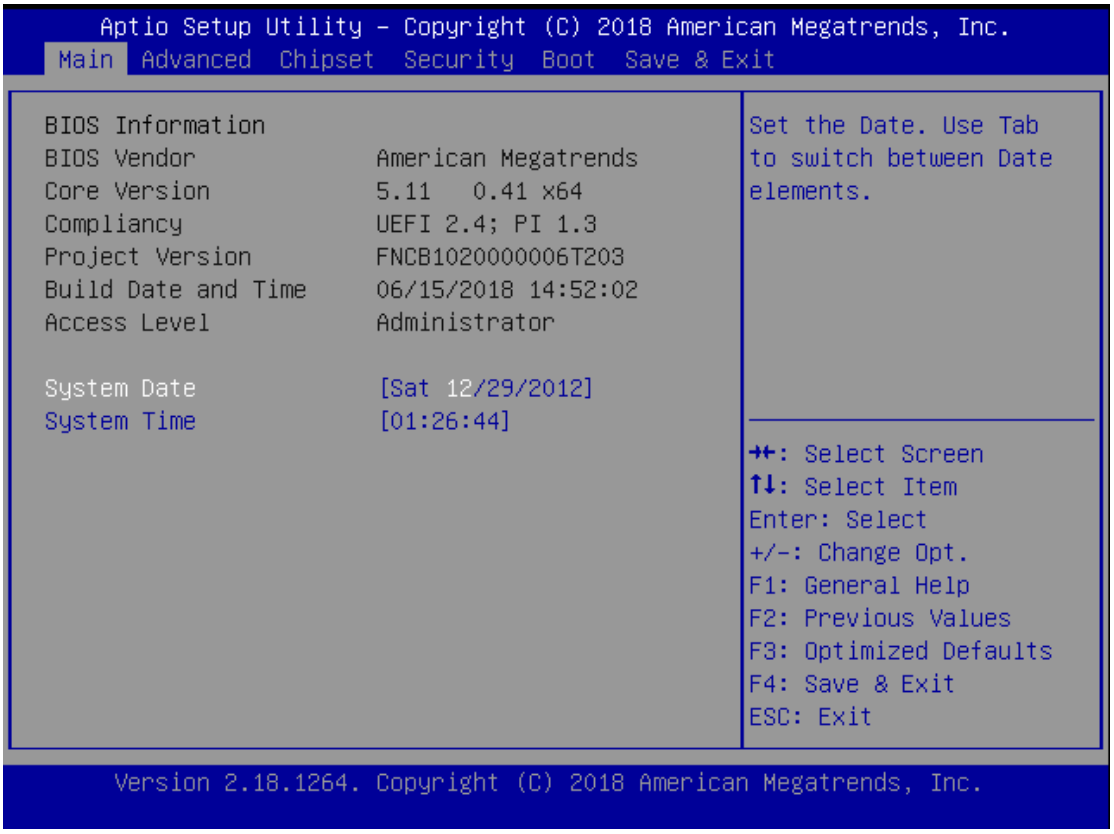
To enter the BIOS setup utility, simply follow the steps below:

1. Boot up the system.
2. Pressing the **<Tab>** or **<Del>** key immediately allows you to enter the Setup utility, and then you will be directed to the BIOS main screen. The instructions for BIOS navigations are as below:

Control Keys	Description
→←	select a setup screen
↑↓	select an item/option on a setup screen
<Enter>	select an item/option or enter a sub-menu
+/-	adjust values for the selected setup item/option
F1	display General Help screen
F2	retrieve previous values, such as the last configured parameters during the last time you entered BIOS
F3	load optimized default values
F4	save configurations and exit BIOS
<Esc>	exit the current screen

Note: the images in the following section are for reference only.

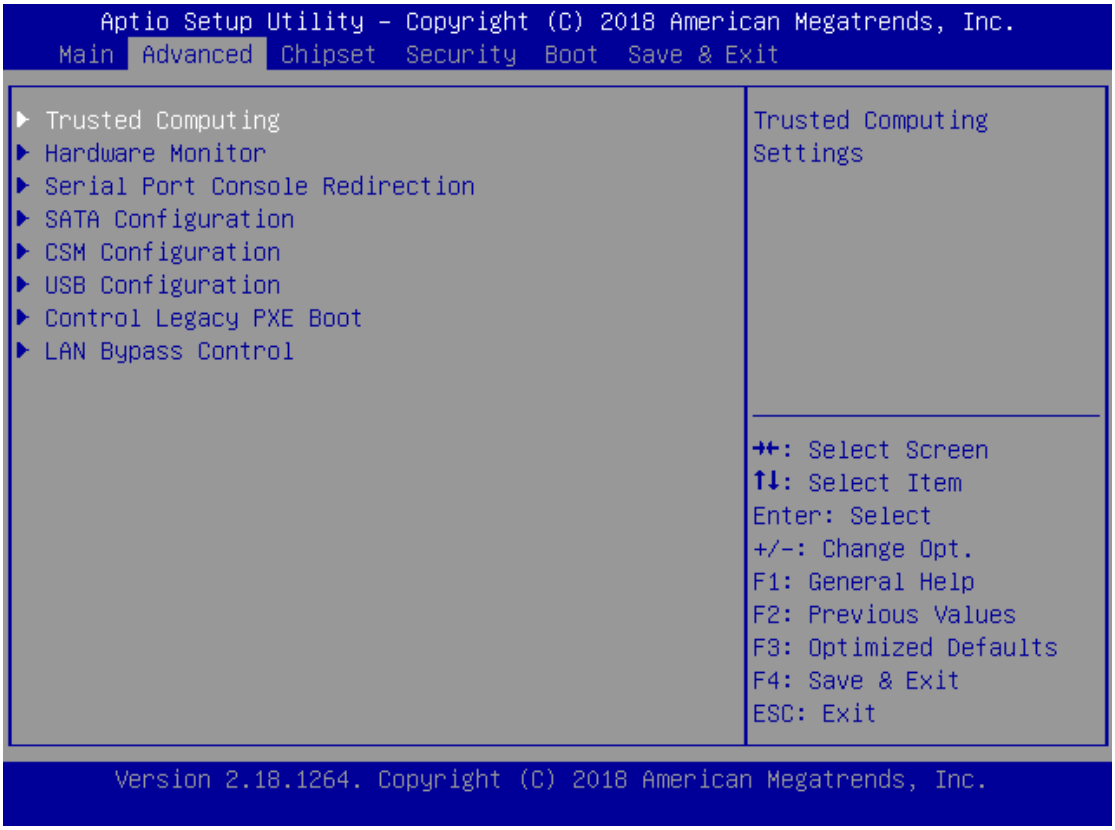
Setup main page contains BIOS information and project version information.



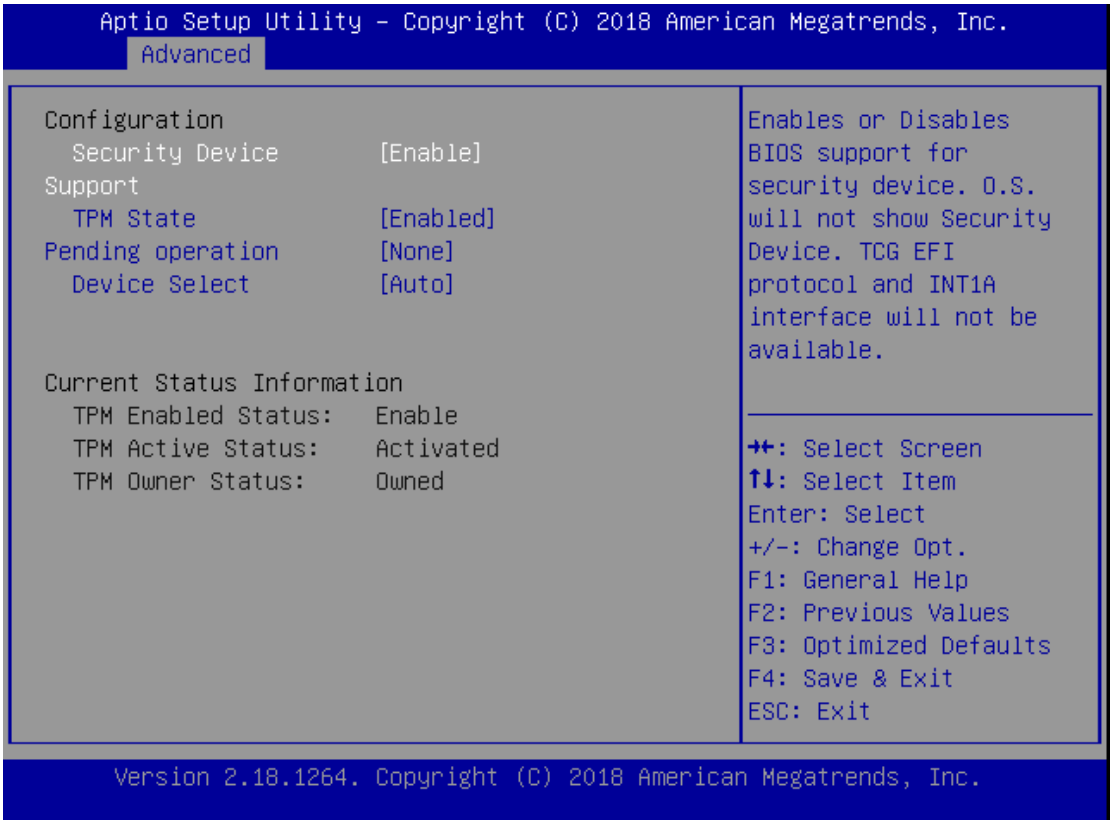
Feature	Description
BIOS Information	BIOS Vendor: American Megatrends Core Version: AMI Kernel version, CRB code base, X64 Compliancy: UEFI version, PI version Project Version: BIOS release version Build Date and Time: MM/DD/YYYY Access Level: Administrator / User
System Date	To set the Date, use **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

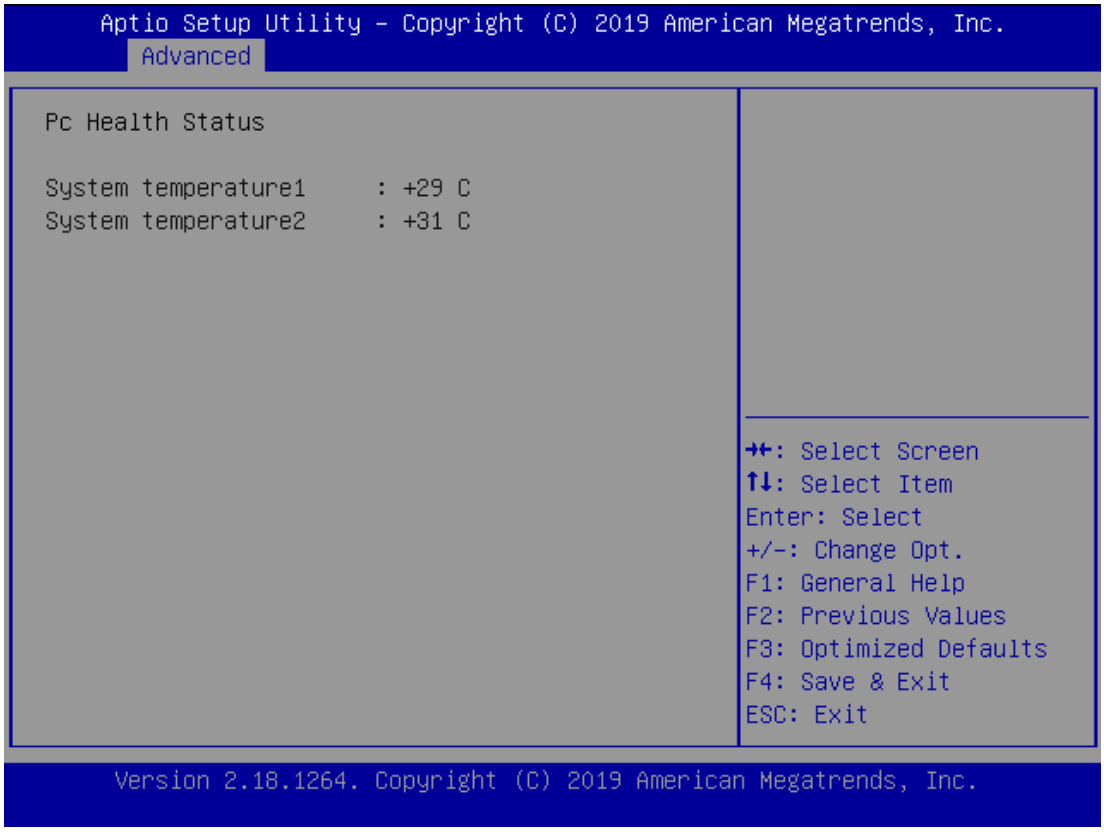


Trusted Computing (TPM1.2)

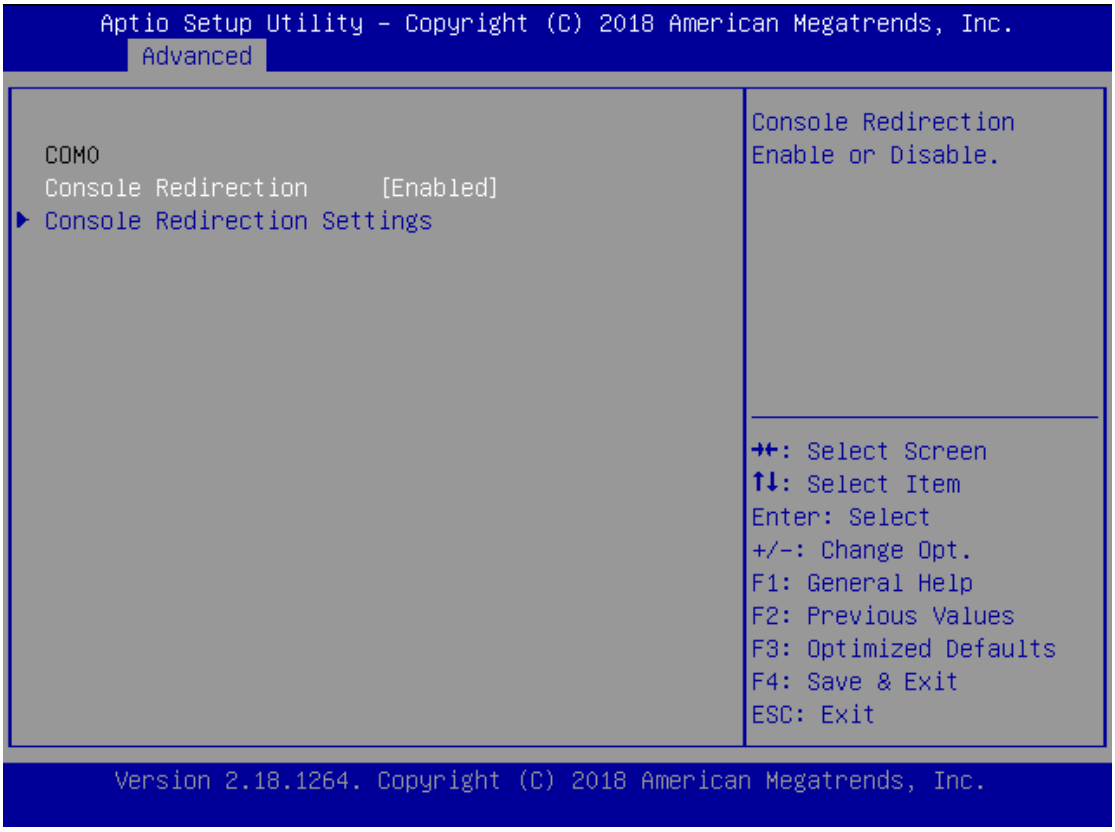


Feature	Options	Description
Security Device Support	Enabled Disabled	Enables or disables BIOS support for security device. By disabling this function, OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
TPM State	Enabled Disabled	Enables or disables Security Device. NOTE: Your computer will reboot during restart in order to change State of the Device.
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.
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.

Hardware Monitor

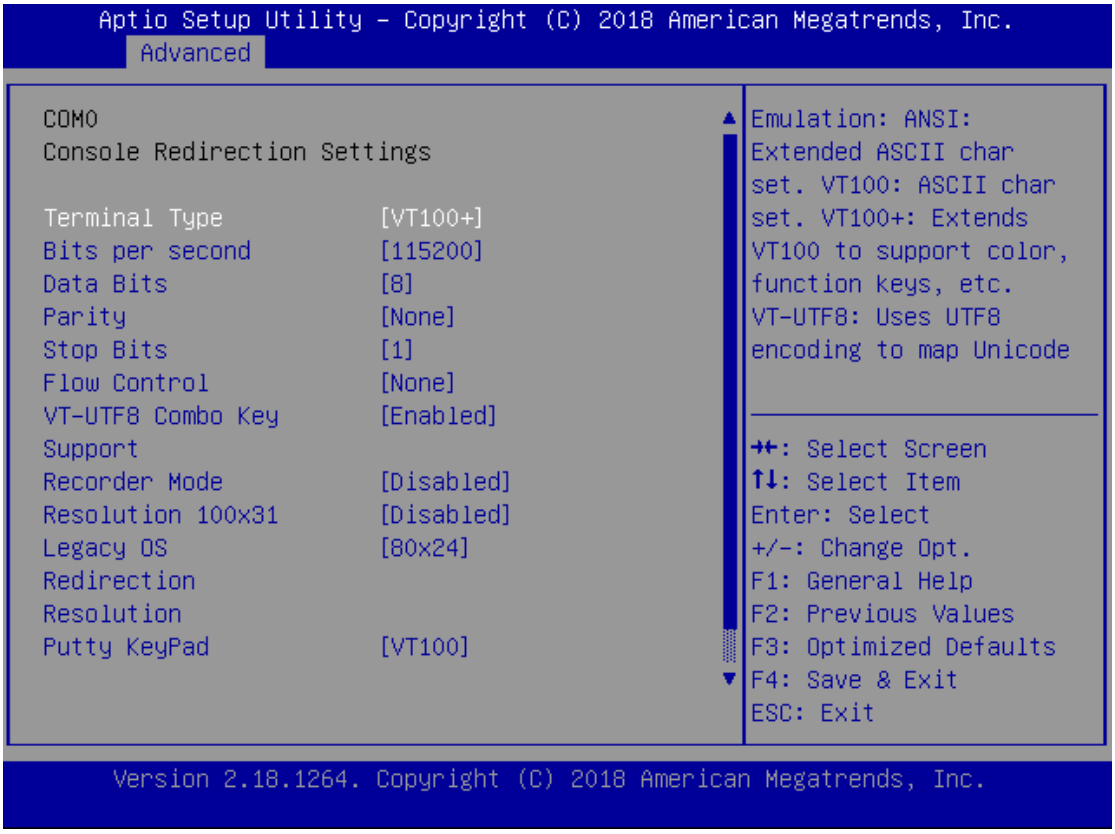


Serial Port Console Redirection



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

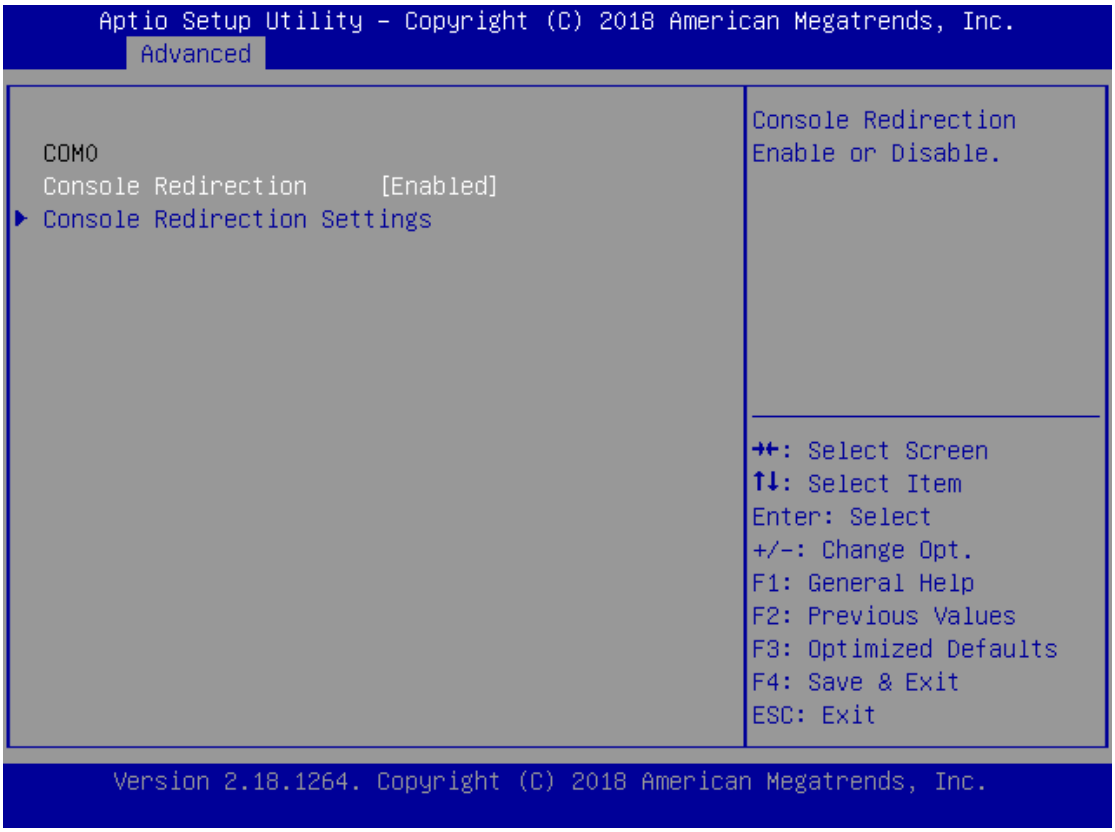
Console Redirection Settings



Feature	Options	Description
Terminal Type	VT100 VT100+ VT-UTF8 ANSI	**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 **ANSI**: Extended ASCII char set
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.
Stop Bits	1 2	Indicates the end of a serial data packet.
Flow Control	None Hardware RTS/CTS	Flow Control can prevent data loss from buffer overflow.

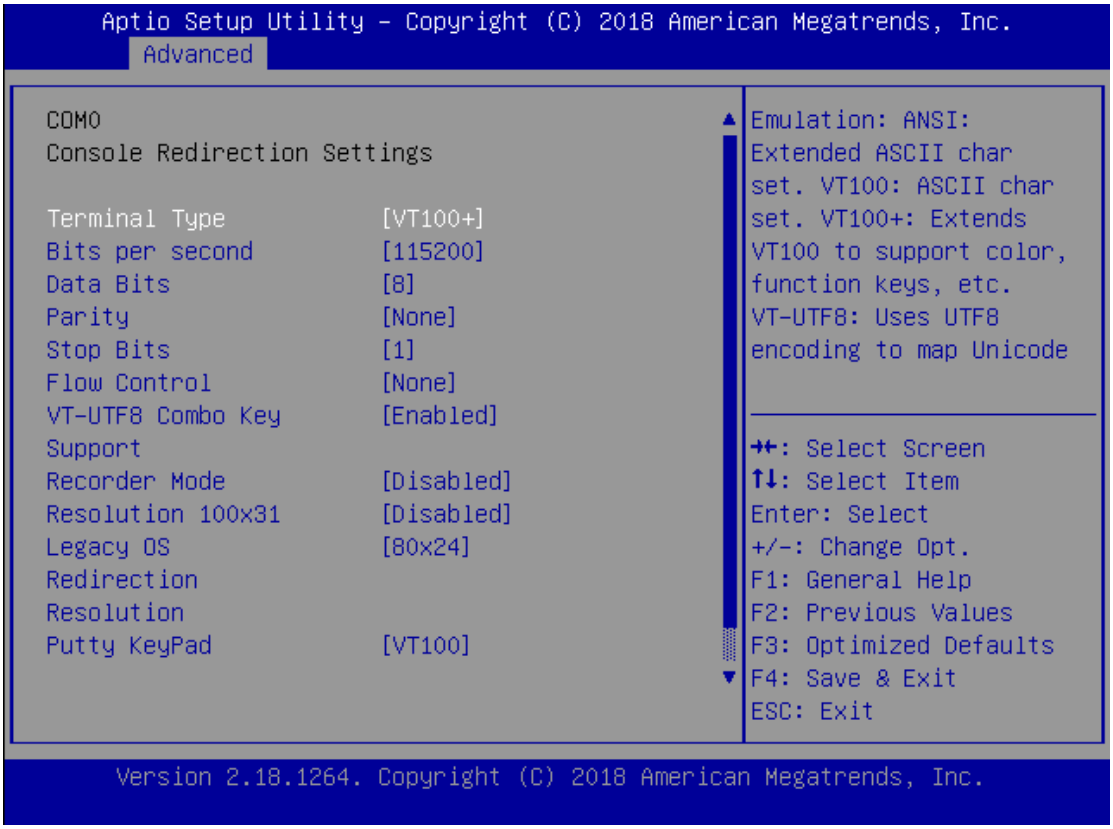
VT-UTF8 Combo Key Support	Disabled Enabled	Enables VT-UTF8 Combination Key Support for ANSI/VT100 terminals
Recorder Mode	Disabled Enabled	With this mode enabled, only text will be sent. This is to capture Terminal data.
Resolution 100x31	Disabled Enabled	Enables or disables extended terminal resolution
Putty KeyPad	VT100 LINUX XTERM86 SCO ESCN VT400	Selects FunctionKey and KeyPad on Putty.

Serial Port Console Redirection



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

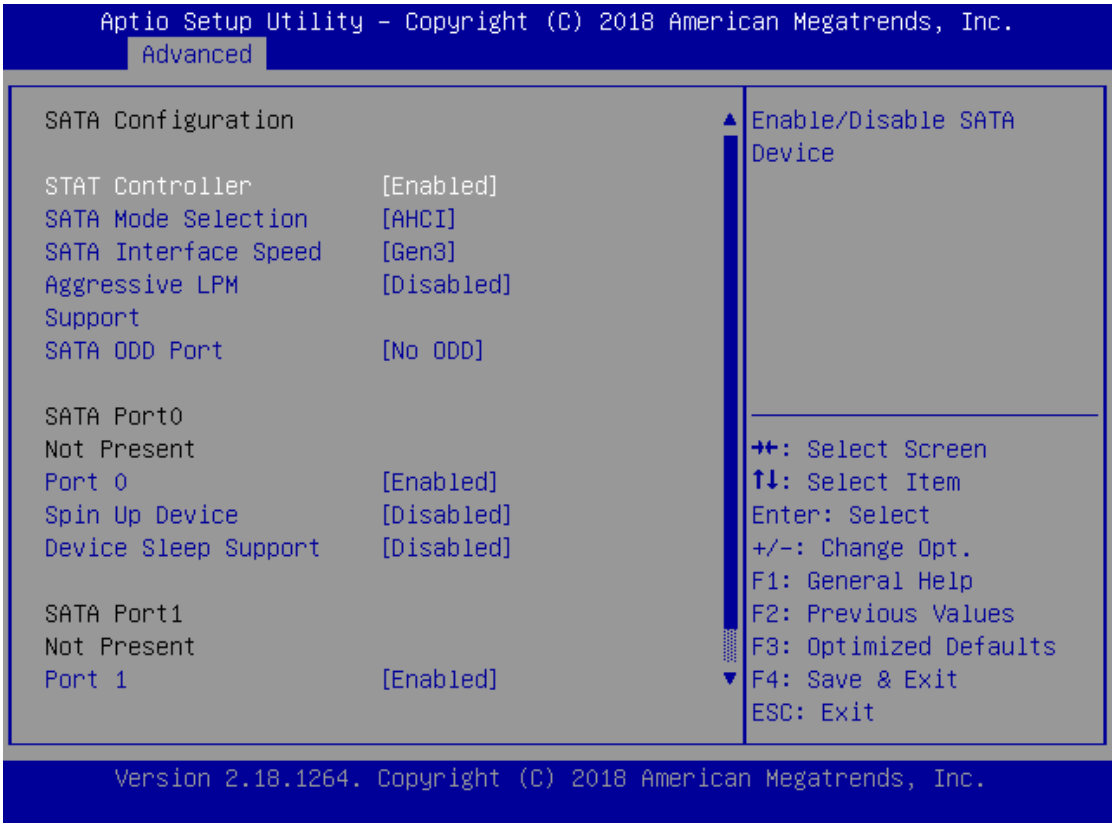
Console Redirection Settings



Feature	Options	Description
Terminal Type	VT100 VT100+ VT-UTF8 ANSI	**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 **ANSI**: Extended ASCII char set
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.
Stop Bits	1 2	Indicates the end of a serial data packet.
Flow Control	None Hardware RTS/CTS	Flow Control can prevent data loss from buffer overflow.

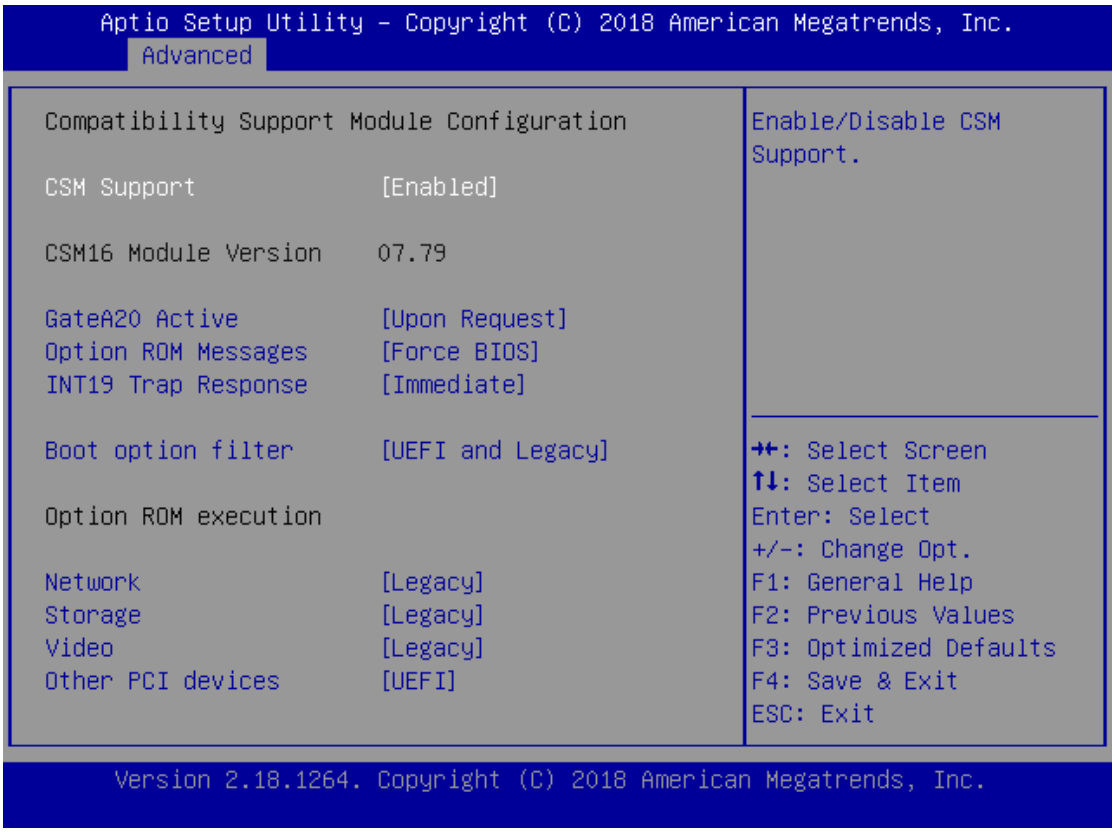
VT-UTF8 Combo Key Support	Disabled Enabled	Enables VT-UTF8 Combination Key Support for ANSI/VT100 terminals
Recorder Mode	Disabled Enabled	With this mode enabled, only text will be sent. This is to capture Terminal data.
Resolution 100x31	Disabled Enabled	Enables or disables extended terminal resolution
Putty KeyPad	VT100 LINUX XTERM86 SCO ESCN VT400	Selects FunctionKey and KeyPad on Putty.
Redirection After BIOS POST	Always Enable BootLoader	When Bootloader is selected, then Legacy Console Redirection is disabled before booting to legacy OS. When Always Enable is selected, then Legacy Console Redirection is enabled for legacy OS. The default setting for this option is set to Always Enable.

SATA Configuration



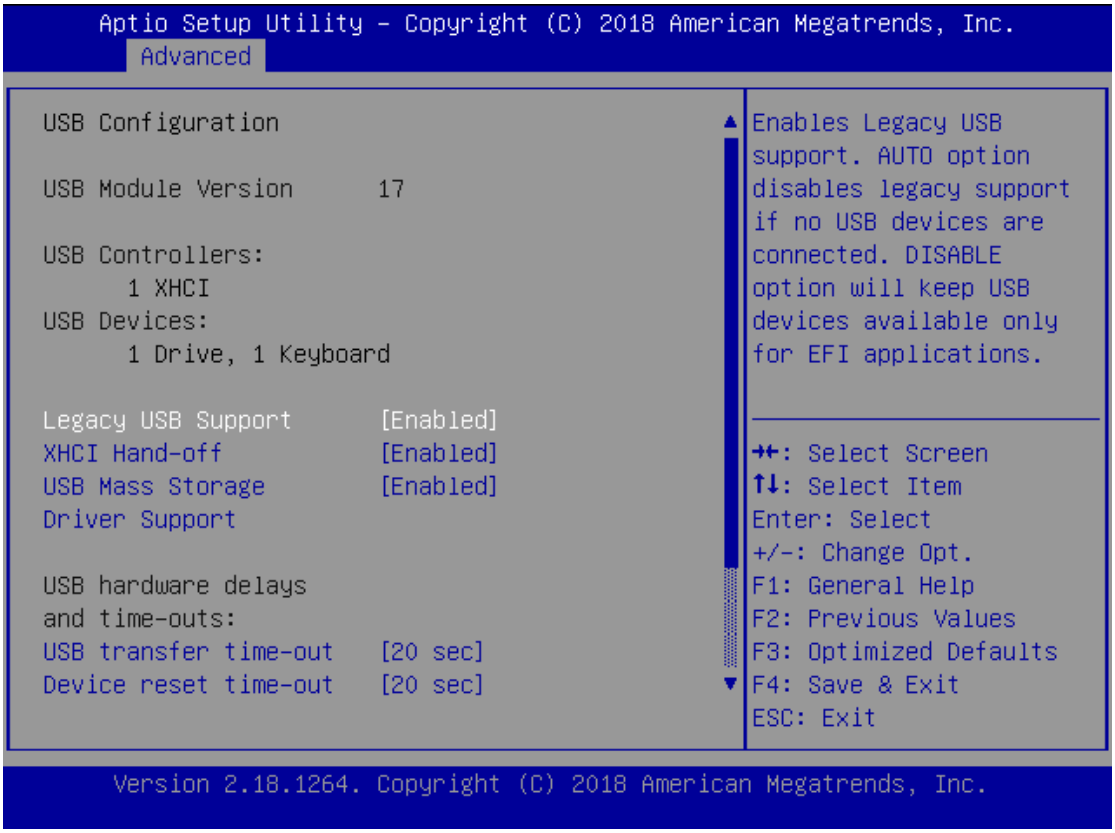
Feature	Options	Description
STAT Controller	Disabled Enabled	Enable/Disable SATA Device
SATA Mode Selection	AHCI	Determines how SATA controller operate.
SATA Interface Speed	Gen1 Gen2 Gen3	Select SATA Interface Speed, CHV A1 always with Gen1 Speed.
Aggressive LPM Support	Enabled Disabled	Enable PCH to aggressively enter link power state.
SATA ODD Port	Port0 ODD Port1 ODD No ODD	SATA ODD is Port0 or Port1
SATA Port0 Present/Not Present		
Port 0/1	Disabled Enabled	Enable / Disable SATA Port.
Spin Up Device	Enabled Disabled	If enabled for any of ports Staggered 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.
Device Sleep Support	Enabled Disabled	Enable/Disable Device Sleep Support on that port.

CSM Configuration



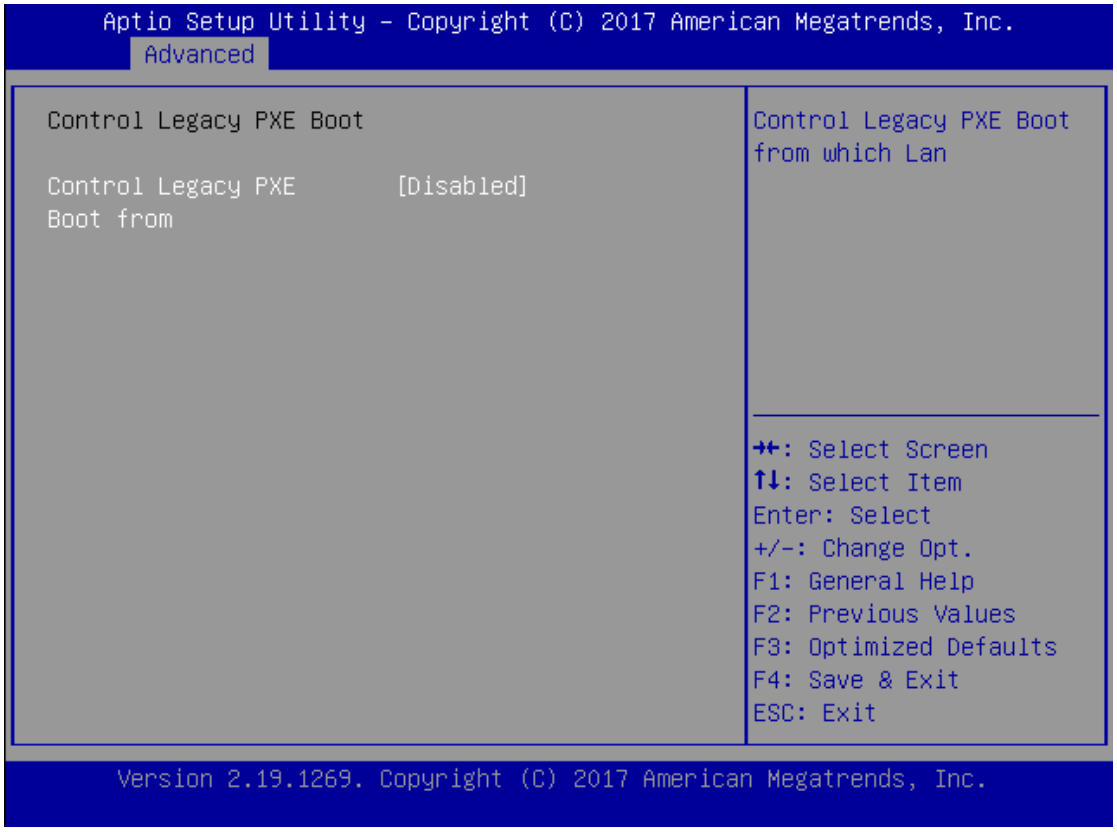
Feature	Options	Description
CSM Support	Disabled Enabled	Enables or disables CSM Support
GateA20 Active	Upon Request Always	UPON REQUEST - GA20 can be disabled using BIOS services. ALWAYS - do not allow disabling GA20; this option is useful when any RT code is executed above 1MB.
Option ROM Messages	Force BIOS Keep Current	Set display mode for Option ROM
INT19 Trap Response	Immediate Postponed	BIOS reaction on INT19 trapping by Option ROM: IMMEDIATE - execute the trap right away; POSTPONED - execute the trap during legacy boot.
Boot option filter	UEFI and Legacy Legacy only UEFI only	This option controls Legacy/UEFI ROMs priority
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



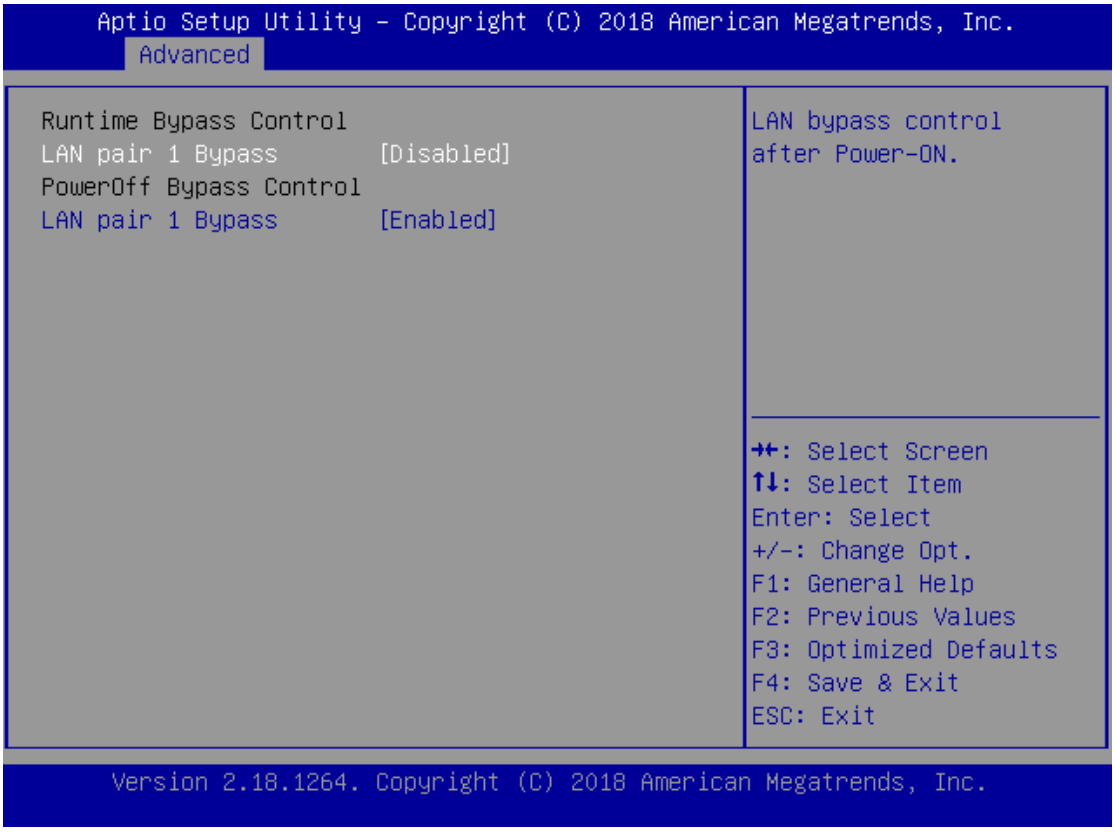
Feature	Options	Description
Legacy USB Support	Enabled Disabled Auto	Enables Legacy USB support. **Auto** option disables legacy support if no USB devices are connected; **Disabled** option will keep USB devices available only for EFI applications.
XHCI Hand-off	Enabled Disabled	This is a workaround 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	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.

Control Legacy PXE Boot



Feature	Options	Description
Control Legacy PXE Boot from	Disabled LAN1 LAN2 LAN3	Control Legacy PXE Boot from which Lan

LAN Bypass Control



Runtime Bypass Control

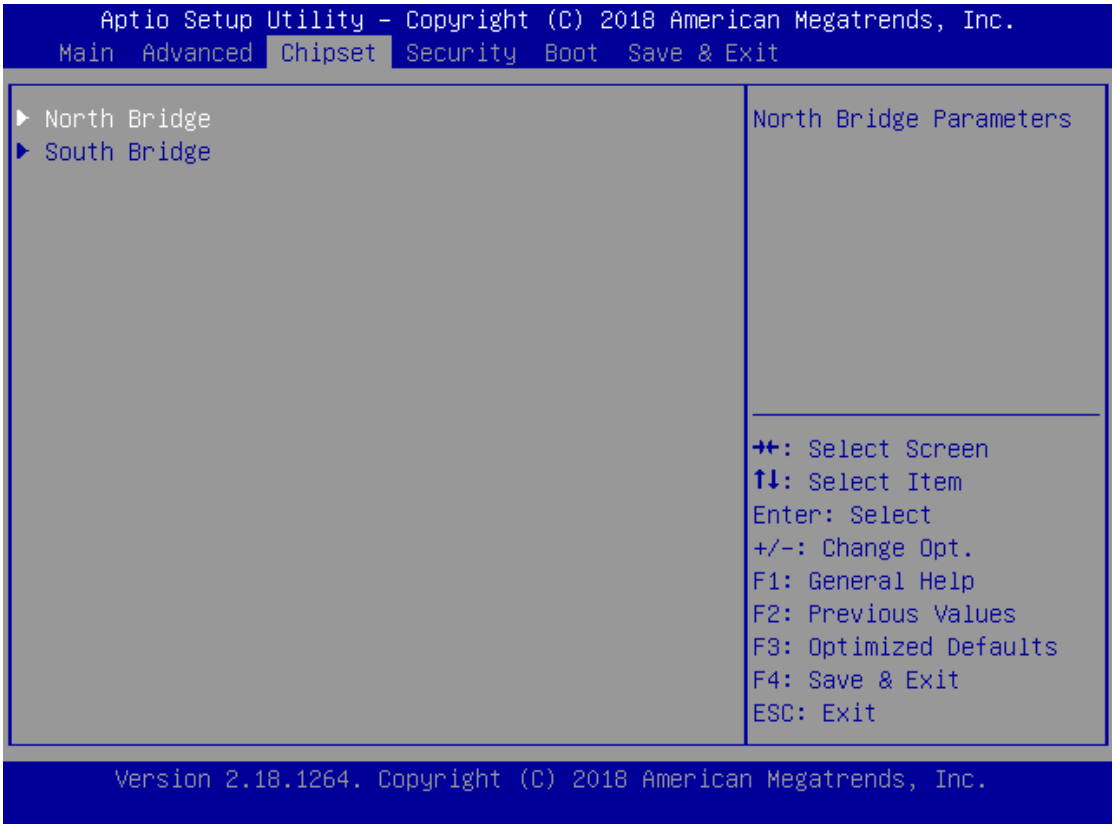
Feature	Options	Description
LAN pair 1 Bypass	Enabled Disabled	LAN bypass control after Power-ON.

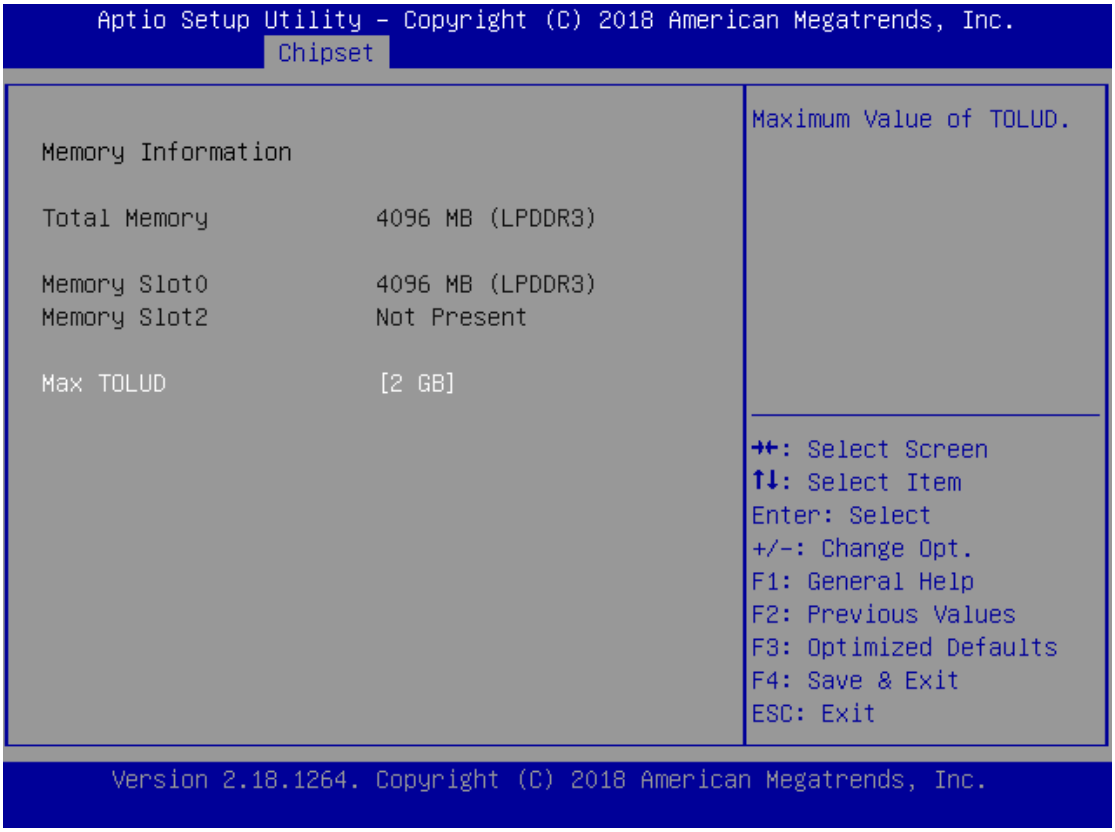
PowerOff Bypass Control

Feature	Options	Description
LAN pair 1 Bypass	Enabled Disabled	LAN Bypass control after Power-Off.

Chipset Page

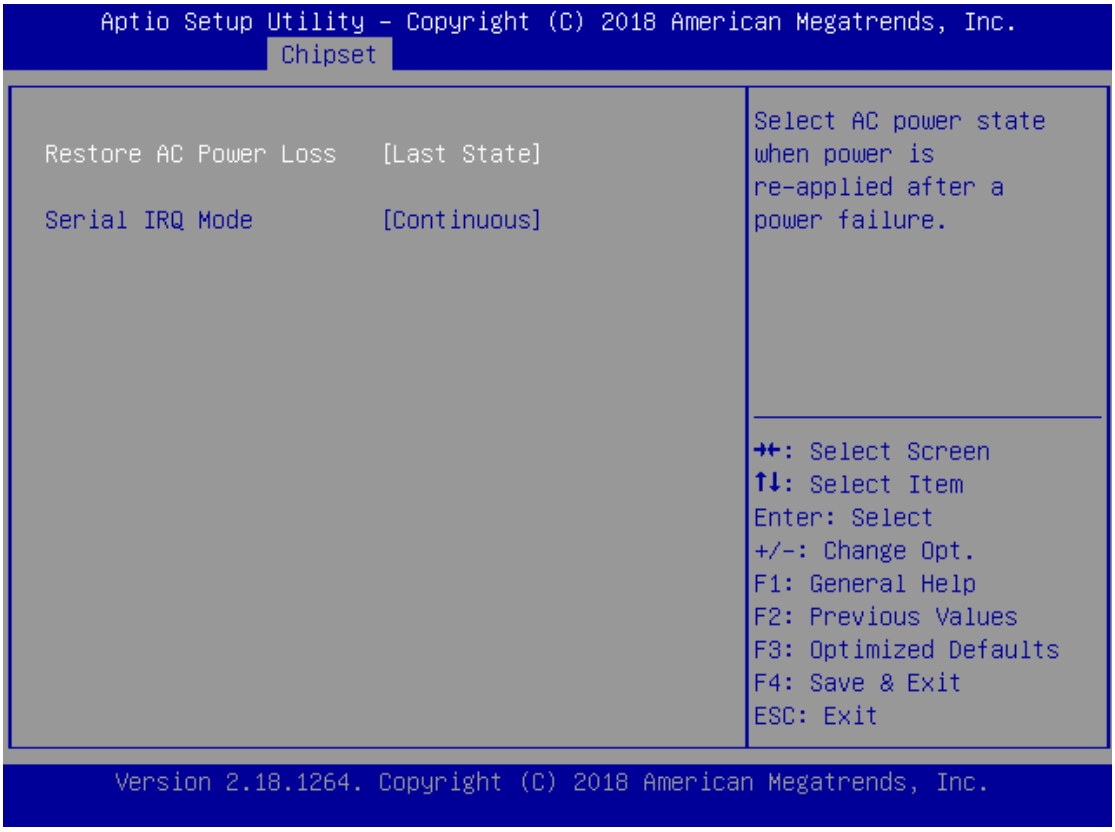
Select the Chipset menu item from the BIOS setup screen to enter the Platform Setup screen. Users can select any of the items in the left frame of the screen.





Feature	Options	Description
Max TOLUD	2 GB 2.25 GB 2.5 GB 2.75 GB 3 GB	Maximum Value of TOLUD.

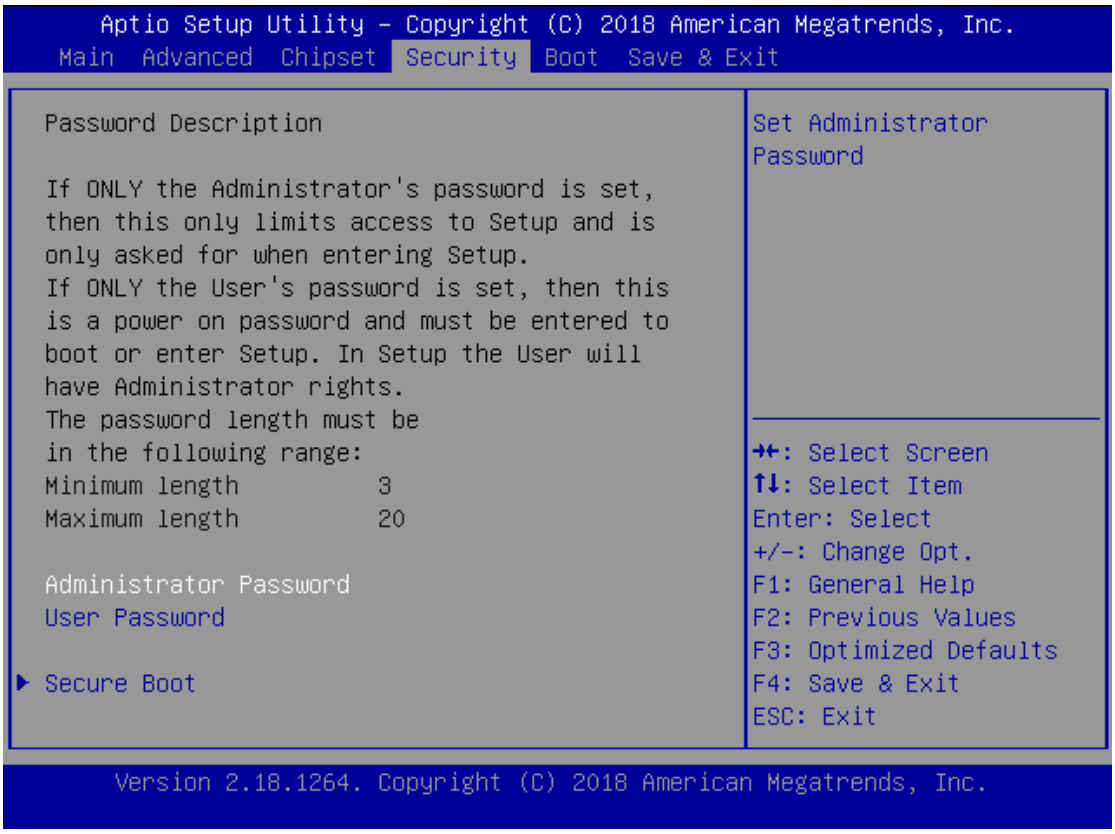
South Bridge



Feature	Options	Description
Restore AC Power Loss	Power Off Power On Last State	Select AC power state when power is re-applied after a power failure.
Serial IRQ Mode	Quiet Continuous	Configure Serial IRQ Mode.

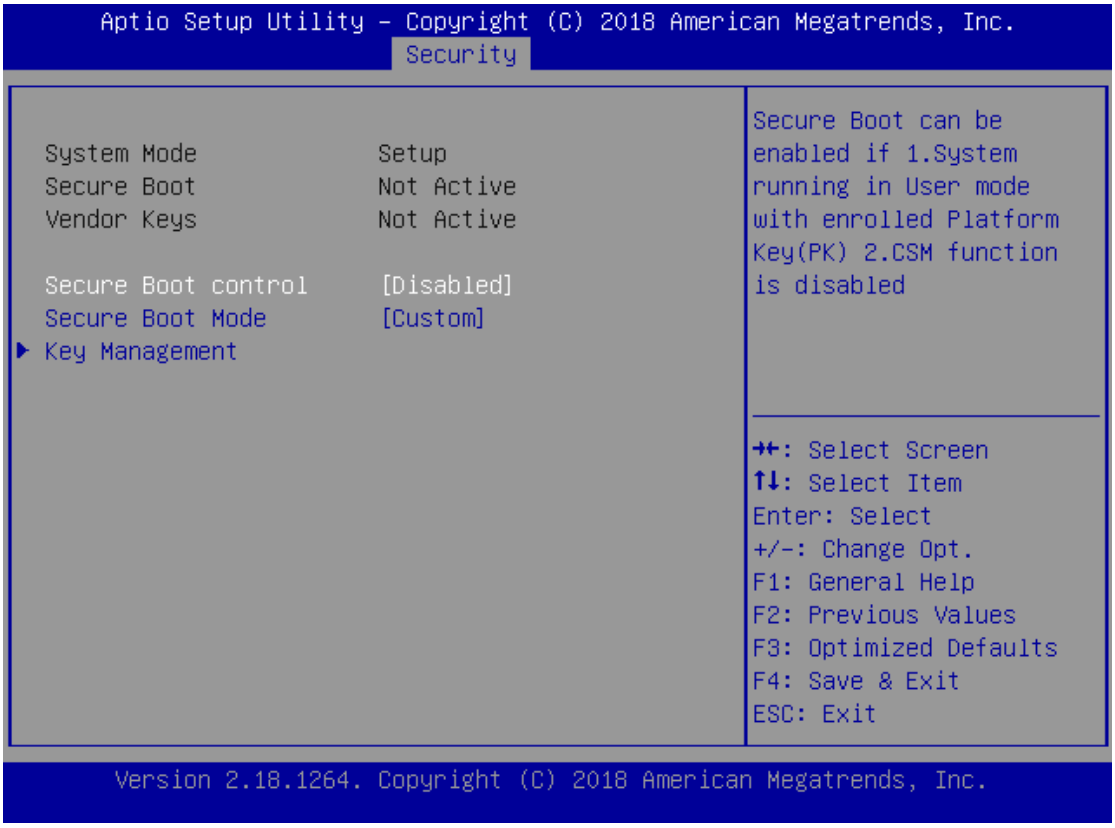
Security

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.



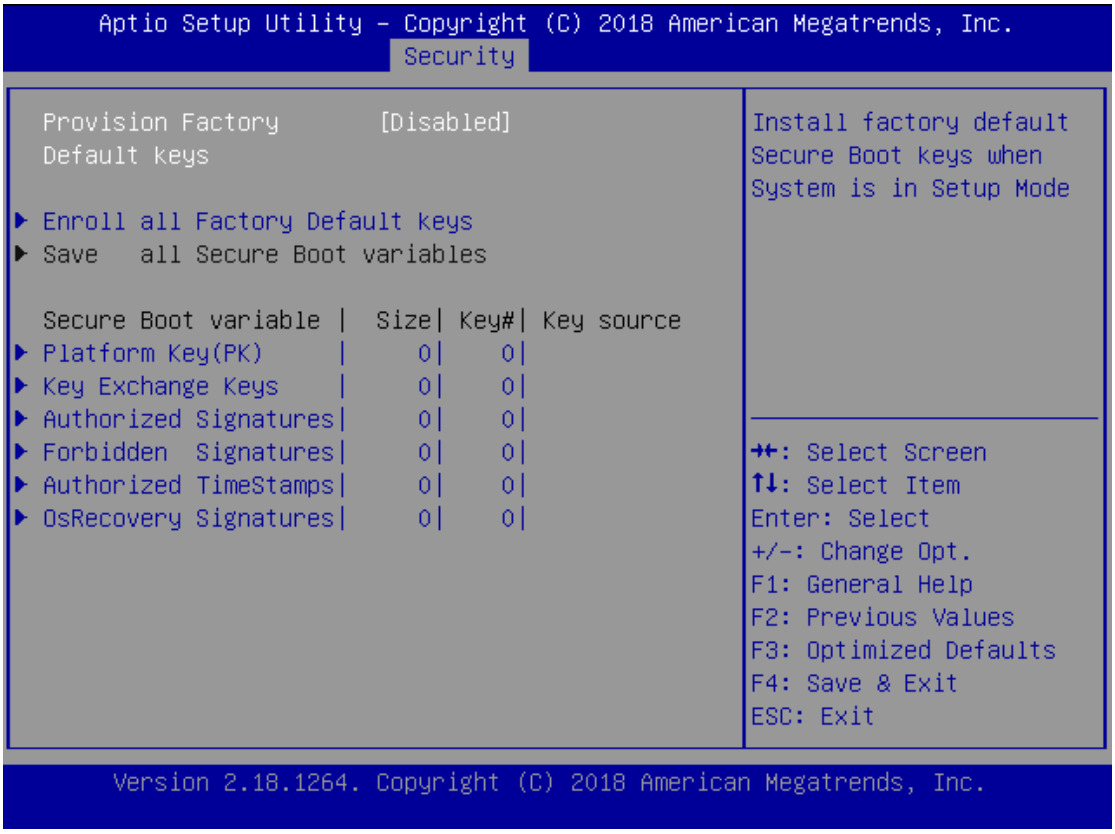
Feature	Description
Administrator Password	If ONLY the Administrator's password is set, it only limits access to Setup and is only asked for when entering Setup.
User Password	If ONLY the User's password is set, it serves as a power-on password and must be entered to boot or enter Setup. In Setup, the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

Secure Boot



Feature	Options	Description
Secure Boot control	Disabled Enabled	Secure Boot can be enabled if 1.System running in User mode with enrolled Platform Key(PK) 2.CSM function is disabled
Secure Boot Mode	Standard Custom	Secure Boot mode selector. 'Custom' Mode enables users to change Image Execution policy and manage Secure Boot Keys

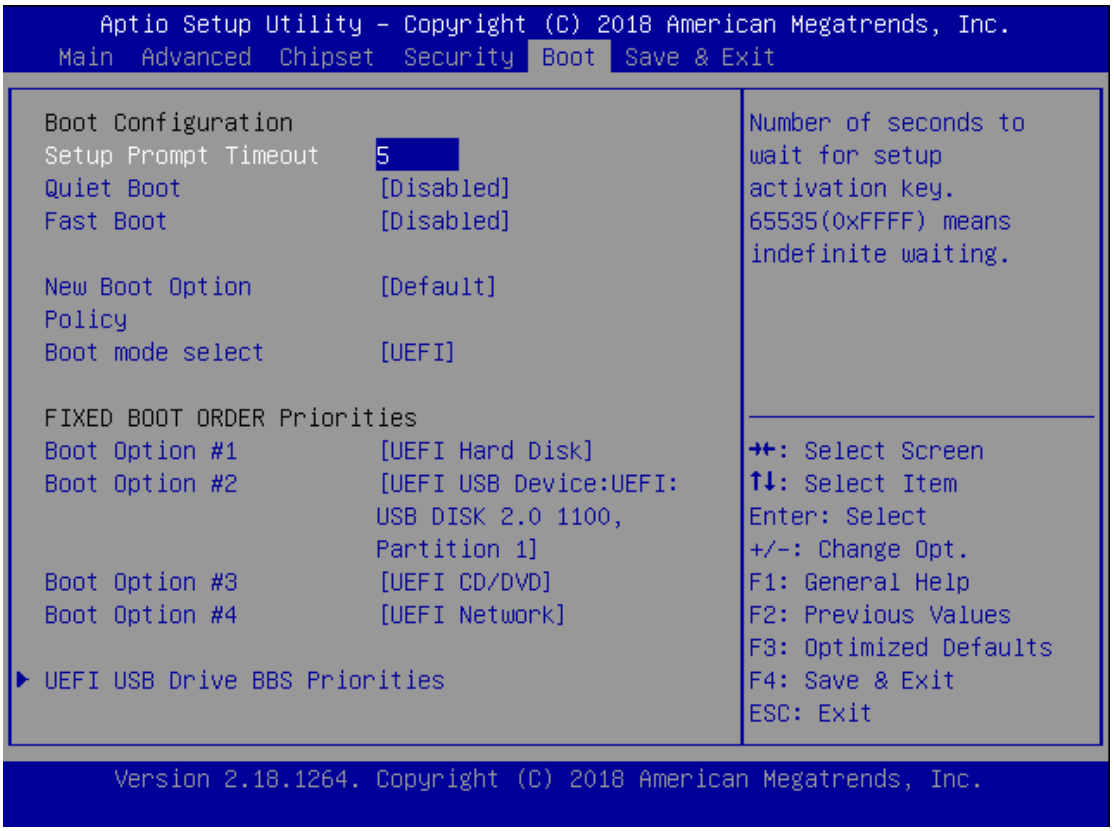
Key Management



Feature	Options	Description
Provision Factory Default keys	Disabled Enabled	Install factory default Secure Boot keys when System is in Setup Mode
Enroll all Factory Default keys	None	Force System to User Mode - install all Factory Default keys

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.

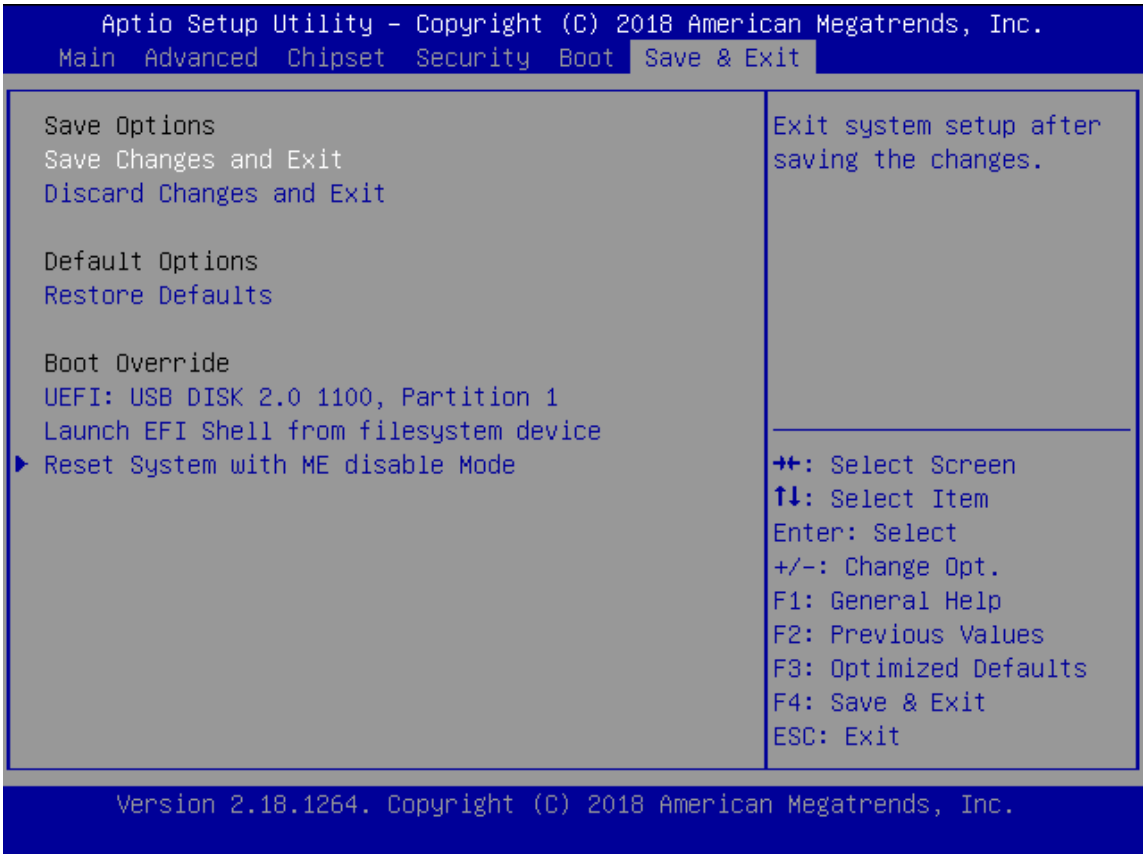


Feature	Options	Description
Setup Prompt Timeout	5	The number of seconds to wait for setup activation key. 65535 means indefinite waiting.
Quiet Boot	Disabled Enabled	Enables or disables Quiet Boot option.
Fast Boot	Disabled Enabled	Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.
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.

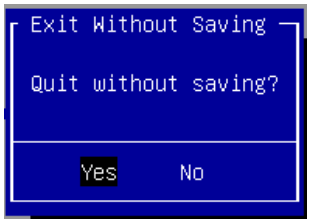
Save and Exit Menu

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.



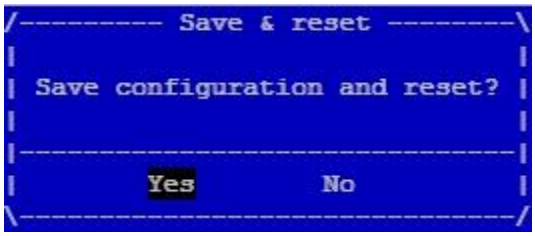
■ Discard Changes and Exit

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.



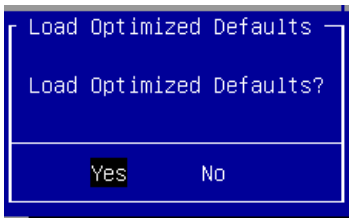
■ Save Changes and Reset

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**

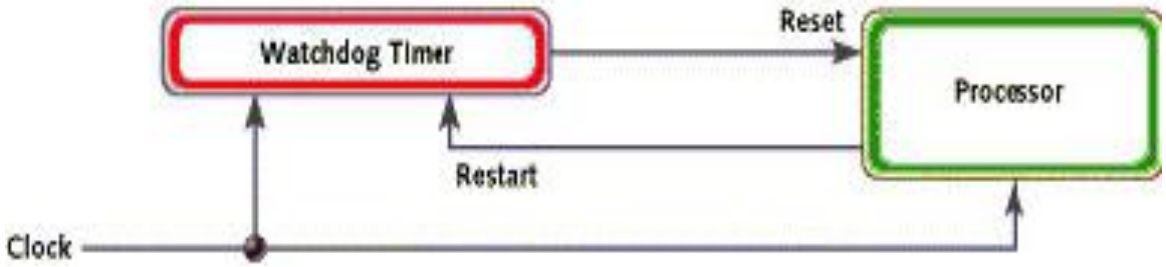
Restore default values for all setup options. Select "**Yes"** to load Optimized defaults.



Note: The items under Boot Override were not same with image. It should depend on devices connected to this system.

APPENDIX A: PROGRAMMING WATCHDOG TIMER

A watchdog timer is a piece of hardware that can be used to automatically detect system anomalies and reset the processor in case there are any problems. Generally speaking, a watchdog timer is based on a counter that counts down from an initial value to zero. The software selects the counter's initial value and periodically restarts it. Should the counter reach zero before the software restarts it, the software is presumed to be malfunctioning, and the processor's reset signal is asserted. Thus, the processor will be restarted as if a human operator had cycled the power.



APPENDIX B: SETTING UP CONSOLE REDIRECTION

Console redirection lets you monitor and configure a system from a remote terminal computer by re-directing keyboard input and text output through the serial port. The following steps illustrate how to use this feature. The BIOS of the system allows the redirection of the console I/O to a serial port. With this configured, you can remotely access the entire boot sequence through a console port.

1. Connect one end of the console cable to console port of the system and the other end to the serial port of the Remote Client System.
2. Configure the following settings in the BIOS Setup menu:
   BIOS > **Advanced** > **Serial Port Console Redirection** > **Console Redirection Settings**, select **115200** for the Baud Rate, **None**. for Flow control, **8** for the Data Bit, **None** for Parity Check, and **1** for the Stop Bit.
3. Configure console redirection related settings on the client system. You can use a terminal emulation program that features communication with serial COM ports such as *TeraTerm* or *Putty*. Make sure the serial connection properties of the client conform to those set for the server.

APPENDIX C: PROGRAMMING THE LCM

The LCD panel module (LCM) is designed to provide real-time operating status and configuration information for the system. For sample LCM code, please go to *the Lanner Support Website at* http://www.lannerinc.com/download-center/ and browse the *download center* for the driver and the program library can also be found in the folder.

The system supports the following 2 kinds of LCM:

• Parallel Text-based LCM: The LCM connects to the motherboard's parallel port. The LCD screen can display 2 lines, 16 (or 20) characters per line.

• USB and Serial Text or Graphic-based LCM: Our next generation LCM. Lanner engineers design a common source code to be deployed on these two differently interfaced LCM modules. Jumpers are used to select between text and graphic types. See next section.

For Parallel Text-based LCM

Build

To build program source code on Linux platform, please use the following steps as a guideline:

1. Extract the source file:

```
# tar -xzvf plcm_drv_v0XX.tgz
```

(0XX is the version of the program.)

2. Change directory to the extracted folder:

```
# cd plcm_drv_v0XX
```

(0XX is the version of the program.)

Note: Apply our Parallel Text-based LCM to the environment of virtualization, please use the version 013 or above of the program.

3. Type "make" to build source code:

```
# make
```

After compiling, the executable programs (plcm_test, plcm_cursor_char, ppdev_test, Test) and the driver (plcm_drv.ko) will appear in the program's folder.

Note: The OS supported by Parallel Text-based LCM function includes platforms based on Linux Kernel series 2.4.x, Linux Kernel series 2.6.x and Linux Kernel series 3.0.x or above.

Install

Install the driver and create a node in the /dev directory by:

```
#insmod plcm_drv.ko
#mknod /dev/plcm_drv c 248 0
```

Note: If you cannot install the driver, check whether you have enabled the parallel port in the BIOS setting. Once the message of "insmod": error inserting 'plcm_drv.ko': -1 Input/output error"

appears, please check whether the major number is repeated or not. The major number needed with the "mknod" command varies with different software versions; please look up the Readme file for this value.

Execute

This section contains sample executable programs that you could test on your platform. It demonstrates some useful functionality that the LCM provides. Note that the installation needs to be completed before proceeding with these executions.

To execute, run the command:

```
#./plcm_test
```

Backlight Off/On turning off/on the backlight of the LCM display

Display Off turning off the LCM display

Cursor Off/On NOT showing/showing the cursor on the LCM display

Blinking off/On turning off/on the cursor blinking

Writing "Lanner@Taiwan" displaying the specific sentences

Reading "Lanner@Taiwan" reading the specific sentence

CGram Test displaying the user-stored characters

Keypad Testing Get the keypad input: the 1st button is read in as Left, the 2nd button is read in as Up, the 3rd button is read in as Right, and the 4th button is read in as Down)

Corresponding Commands for "plcm_test"

You can directly input the specific command to have its corresponding function worked on your LCM. This will be much more convenient once you would like to merely execute the keypad testing.

-**On**

— Turn on the backlight of the LCM display.

— To execute, please type:

```
#./plcm_test -On
```

-**Off**

— Turn off the backlight of the LCM display.

— To execute, please type:

```
#./plcm_test –Off
```

-**LCM1**

— Writing "Lanner@Taiwan" in line1.

— To execute, please type:

```
#./plcm_test -LCM1
```

-**LCM2**

— Writing "2013-11-05" in line 2.

— To execute, please type:

```
#./plcm_test -LCM2
```

Keypad

— Get the keypad input: the 1st button is read in as Left, the 2nd button is read in as Up, the 3rd button is read in as Right, and the 4th button is read in as Down.

— To execute, please type:

```
#./plcm_test –Keypad
```

Commands for plcm_cursor_char

This Run this command for cursor shift & single text update

```
# ./plcm_cursor_char
```

Please read the options below

Insert line select Item 1 to set the starting line as either line 1 or line 2

Move cursor right select Item 2 to move the cursor to the right

Move cursor left select Item 3 to move the cursor to the left

Add a char select Item 4 to display a character on the

LCM screen

Clean display select Item 5 to clear up the LCM display

Leave select Item 6 to exit the program

Test

This program is a testing script and runs through the following procedures in sequence:

—**rmmod plcm_drv** (remove the kernel mode driver module)

— **insmod plcm_drv.ko** (install the kernel mode driver module)

— **./plcm_test** (execute the driver testing program)

— **./plcm_test -stop** (stop executing the driver testing program)

— **rmmod plcm_drv** (remove the kernel mode driver module)

To execute, please type:

```
#./Test
```

Virtualization Implemented by Parallel

Port Pass Through

By the utilization of the parallel port pass through, the Parallel Text-based LCM implements the following three kinds of virtualization in the Guest OS.

- QEMU/KVM
- Xen
- VMWare Player

Here, we take the Fedora 20 x86_64 operation system, for instance, to explain 3 virtualizations respectively for parallel port pass through. Use the procedures listed below for step-by-step instructions separately based on your case.

In the case of QEMU/KVM or Xen, please use the following steps as a guideline to implement the virtualization:

1. Make sure that the Guest OS has been installed.
2. Add the following 4 lines into the xml file (for example, add to /etc/libvirt/qemu/<yourvirtualmachine>.xml in linux KVM):

```
<parallel type='dev'>
<source path='/dev/parport0'/>
<target port='0'/>
</parallel>
```

3. Open a terminal in the Guest OS and then issue the following commands to install Linux Kernel drivers.

```
# modprobe parport
# modprobe parport_pc
# modprobe ppdev
```

4. Check that whether the /dev/parport0 exists or not. You may not find proper /dev/parport0 in the device list, please reconfirm the setup of xml file in the Guest OS.
5. Reboot the Guest OS.

Note: It is necessary for you to install "insmod parport.ko", "parport_pc.ko" and "ppdev.ko" Linux Kernel drivers in virtualization environment before executing the "ppdev_test" testing program.

In the case of VMWare Player, please use the following steps as a guideline to implement the virtualization:

1. Make sure that the Guest OS has been installed.
2. To set up the parallel port pass through, please enter VMWare Player's --> Virtual Machine Setting --> VMWare Player's setting page to select /dev/parport0 as a parallel port device.
3. Open a terminal in the Guest OS and then issue the following commands to install Linux Kernel drivers.

```
# modprobe parport
# modprobe parport_pc
# modprobe ppdev
```

4. Check that whether the /dev/parport0 exists or not. You may not find proper "/dev/parport0" in the device list, please reconfirm the setup of VMWare Player's setting page described in Step 2.
5. Reboot the Guest OS.

Note: It is still necessary to install "insmod parport.ko", "parport_pc.ko" and "ppdev.ko" Linux Kernel drivers in virtualization environment before executing the "ppdev_test" testing program.

APPENDIX D: 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