FWS-2277

Network Appliance

User's Manual 3rd Ed

Last Updated: June 2, 2025

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Packing List

Before setting up your product, please make sure the following items have been shipped:

Item	Quantity
● FWS-2277	1
● Power adapter	1
● Antenna	2

If any of these items are missing or damaged, please contact your distributor or sales representative immediately.

About this Document

This User's Manual contains all the essential information, such as detailed descriptions and explanations on the product's hardware and software features (if any), its specifications, dimensions, jumper/connector settings/definitions, and driver installation instructions (if any), to facilitate users in setting up their product.

Users may refer to the AAEON.com for the latest version of this document.

Safety Precautions

Please read the following safety instructions carefully. It is advised that you keep this manual for future references

1. All cautions and warnings on the device should be noted.
2. All cables and adapters supplied by AAEON are certified and in accordance with the material safety laws and regulations of the country of sale. Do not use any cables or adapters not supplied by AAEON to prevent system malfunction or fires.
3. Make sure the power source matches the power rating of the device.
4. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
5. Always completely disconnect the power before working on the system's hardware.
6. No connections should be made when the system is powered as a sudden rush of power may damage sensitive electronic components.
7. If the device is not to be used for a long time, disconnect it from the power supply to avoid damage by transient over-voltage.
8. Always disconnect this device from any AC supply before cleaning.
9. While cleaning, use a damp cloth instead of liquid or spray detergents.
10. Make sure the device is installed near a power outlet and is easily accessible.
11. Keep this device away from humidity.
12. Place the device on a solid surface during installation to prevent falls
13. Do not cover the openings on the device to ensure optimal heat dissipation.
14. Watch out for high temperatures when the system is running.
15. Do not touch the heat sink or heat spreader when the system is running
16. Never pour any liquid into the openings. This could cause fire or electric shock.

17. As most electronic components are sensitive to static electrical charge, be sure to ground yourself to prevent static charge when installing the internal components. Use a grounding wrist strap and contain all electronic components in any static-shielded containers.
18. If any of the following situations arises, please the contact our service personnel:
    i. Damaged power cord or plug
    ii. Liquid intrusion to the device
    iii. Exposure to moisture
    iv. Device is not working as expected or in a manner as described in this manual
    v. The device is dropped or damaged
    vi. Any obvious signs of damage displayed on the device
19. DO NOT LEAVE THIS DEVICE IN AN UNCONTROLLED ENVIRONMENT WITH TEMPERATURES BEYOND THE DEVICE'S PERMITTED STORAGE TEMPERATURES (SEE CHAPTER 1) TO PREVENT DAMAGE.

FCC Statement

This device complies with Part 15 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.

Caution:

There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions and your local government's recycling or disposal directives.

Attention:

Il y a un risque d'explosion si la batterie est remplacée de façon incorrecte.
Ne la remplacer qu'avec le même modèle ou équivalent recommandé par le constructeur.
Recycler les batteries usées en accord avec les instructions du fabricant et les directives gouvernementales de recyclage.

China RoHS Requirements (CN)

产品中有毒有害物质或元素名称及含量

AAEON System QO4-381 Rev.A2

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷电路板及其电子组件	×	○	○	○	○	○
外部信号连接器及线材	×	○	○	○	○	○
外壳	○	○	○	○	○	○
中央处理器与内存	×	○	○	○	○	○
硬盘	×	○	○	○	○	○
液晶模块	×	○	○	○	○	○
光驱	×	○	○	○	○	○
触控模块	×	○	○	○	○	○
电源	×	○	○	○	○	○
电池	×	○	○	○	○	○

本表格依据 SJ/T 11364 的规定编制。

○：表示该有毒有害物质在该部件所有均质材料中的含量均在 GB/T 26572 标准规定的限量要求以下。

×：表示该有害物质的某一均质材料超出了 GB/T 26572 的限量要求，然而该部件仍符合欧盟指令 2011/65/EU 的规范。

环保使用期限(EFUP (Environmental Friendly Use Period)) : 10 年

备注：

一、此产品所标示之环保使用期限，系指在一般正常使用状况下。

二、上述部件物质中央处理器、内存、硬盘、光驱、电源为选购品。

三、上述部件物质液晶模块、触控模块仅一体机产品适用。

China RoHS Requirement (EN)

Name and content of hazardous substances in product

AAEON System QO4-381 Rev.A2

Part Name	Hazardous Substances					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
PCB Assemblies	×	O	O	O	O	O
Connector and Cable	×	O	O	O	O	O
Chassis	O	O	O	O	O	O
CPU and Memory	×	O	O	O	O	O
Hard Disk	×	O	O	O	O	O
LCD Modules	×	O	O	O	O	O
CD-ROM/DVD-ROM	×	O	O	O	O	O
Touch Modules	×	O	O	O	O	O
Power	×	O	O	O	O	O
Battery	×	O	O	O	O	O

The table is prepared in accordance with the provisions of SJ/T 11364.

O：Indicates that said hazardous substance contained in all of the homogenous materials for this product is below the limit requirement of GB/T 26572.

×：Indicates that said hazardous substance contained in at least one of the homogenous materials used for this part is above the limit requirement of GB/T 26572. But this product still be compliance with 2011/65/EU Directive (allowed with 2011/65/EU Annex III of RoHS exemption with number 6(c),7(a),7(c)-1).

EFUP (Environment Friendly Use Period) value: 10 years.

Notes：

1. This product defined period of use is under normal condition.
2. In above part, CPU/Memory/ Hard Disk/CD-ROM/DVD-ROM/ Power are optional.
3. In above part, LCD Modules/ Touch Modules are for all-in-one product model.

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Chapter 1

Product Specifications

1.1 Specifications

System	
Form Factor	Desktop Network Appliance
Processor	Intel® Celeron® Processor N3350 SoC
Chipset	SoC
System Memory	Onboard LPDDR4, 4GB

Network	
Ethernet	Intel® Ethernet Controller I210, GbE x 2
Bypass	—

Display	
Graphic Controller	Intel® UHD Graphics
Connector	HDMI x 1

Storage	
HDD	—
CF/CFast/mSATA	Onboard eMMC, 16GB

Internal/Expansion Interface	
PCIe Slot	—
Mini-PCIe Slot	Full-size Mini Card Slot x 1
Keyboard and Mouse	—
USB	USB 3.2 Gen 1 x 2

Miscellaneous

RTC	Internal RTC
Watchdog Timer	1~255 steps by software programmable
Software Button	GPIO Programmable Push Button x 1
TPM	TPM SLB9670 VQ2.0 FW7.85 (Optional)
GPIO	4-Bit Input, 4-Bit Output (Optional)
Fan	Fan-less
MTBF (Hours)	TBD
Color	Black

Environmental

Power Requirement	12V DC Power Input Connector non-lock, 24W Power Adapter
Operating Temperature	32°F ~ 104°F (0°C ~ 40°C)
Storage Temperature	-4°F ~ 140°F (-20°C ~ 60°C)
Operating Humidity	10%~80% relative humidity, non-condensing
Storage Humidity	10%~80% @40°C; non-condensing
Vibration	0.5 Grms/ 5 ~ 500Hz / operation (mSATA) 1.5 Grms/ 5 ~ 500Hz / non-operation
Shock	10 G peak acceleration (11 m sec. duration), operation 20 G peak acceleration (11 m sec. duration), non-operation
Dimension (W x D x H)	4.53'' x 4.53'' x 1.26'' (115mm x 115mm x 32mm)

I/O

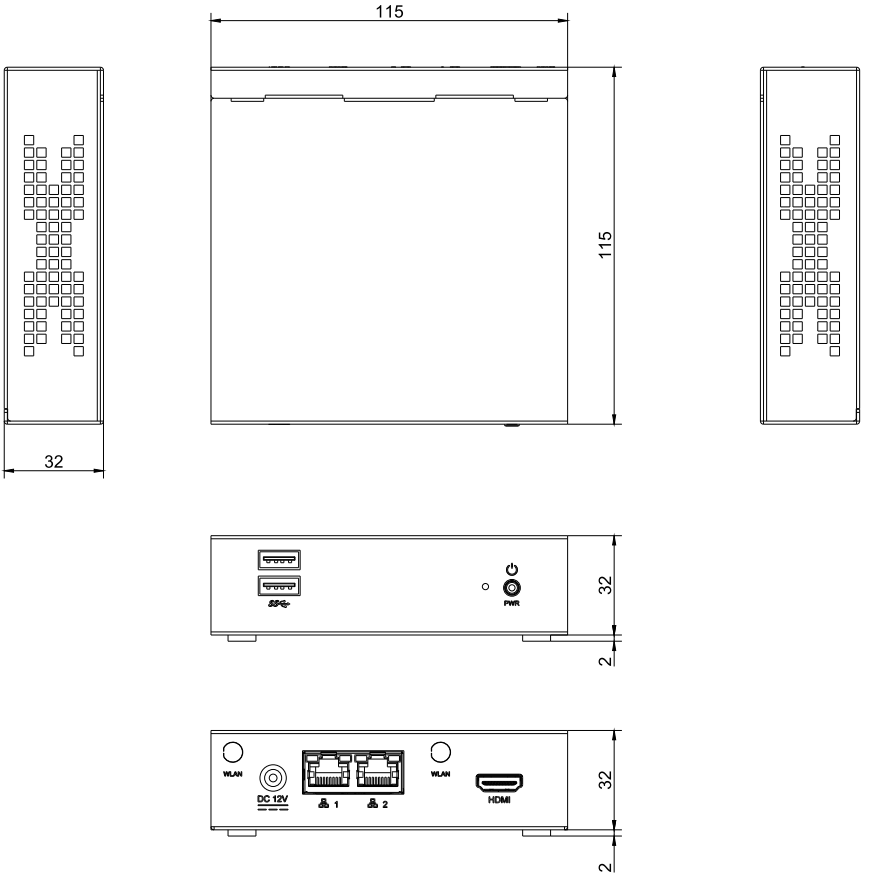
Front Panel	USB 3.2 Gen 1 x 2
	Power Button x 1
	Reset Button x 1
Rear Panel	DC Power Input Connector Non-Lock x 1
	1GbE RJ-45 x 2
	HDMI x 1

Chapter 2

Hardware Information

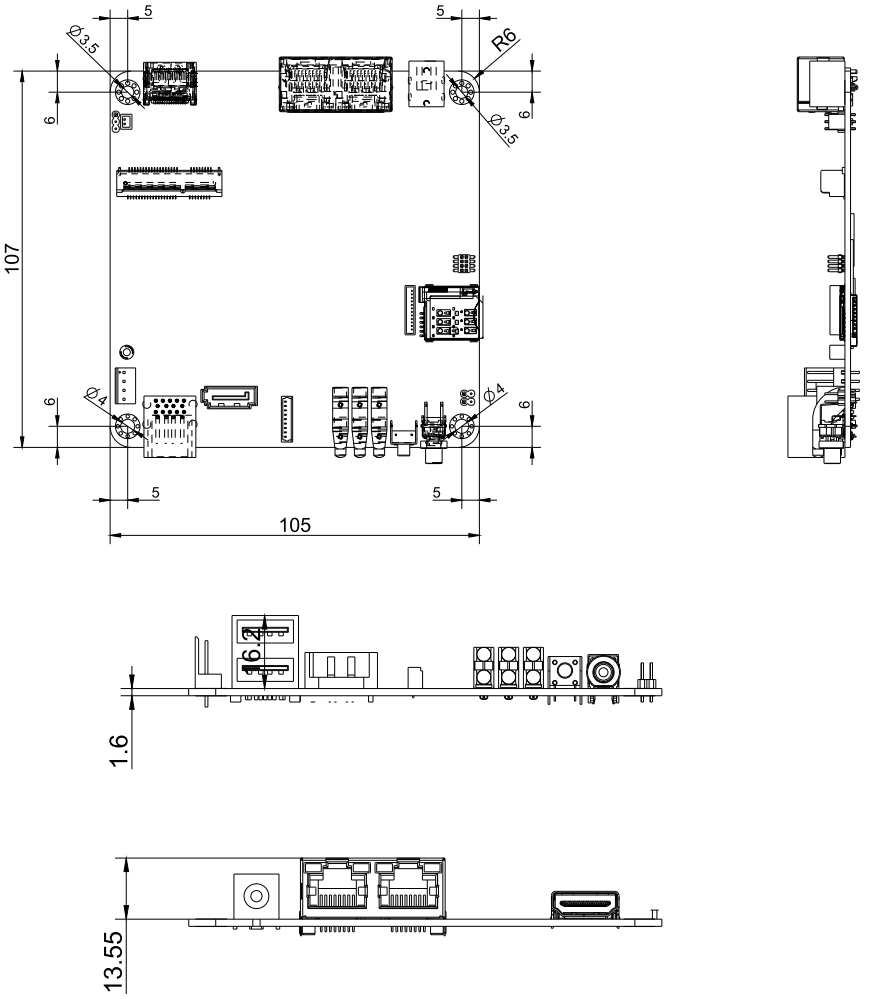
2.1 Dimensions

System

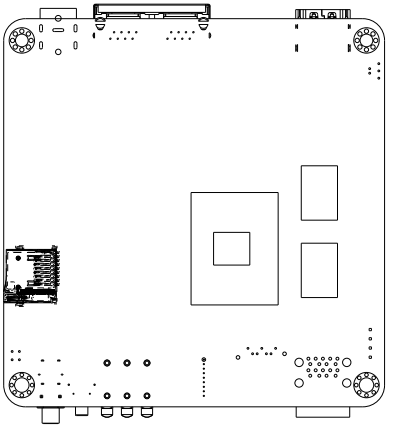


Board

Component Side

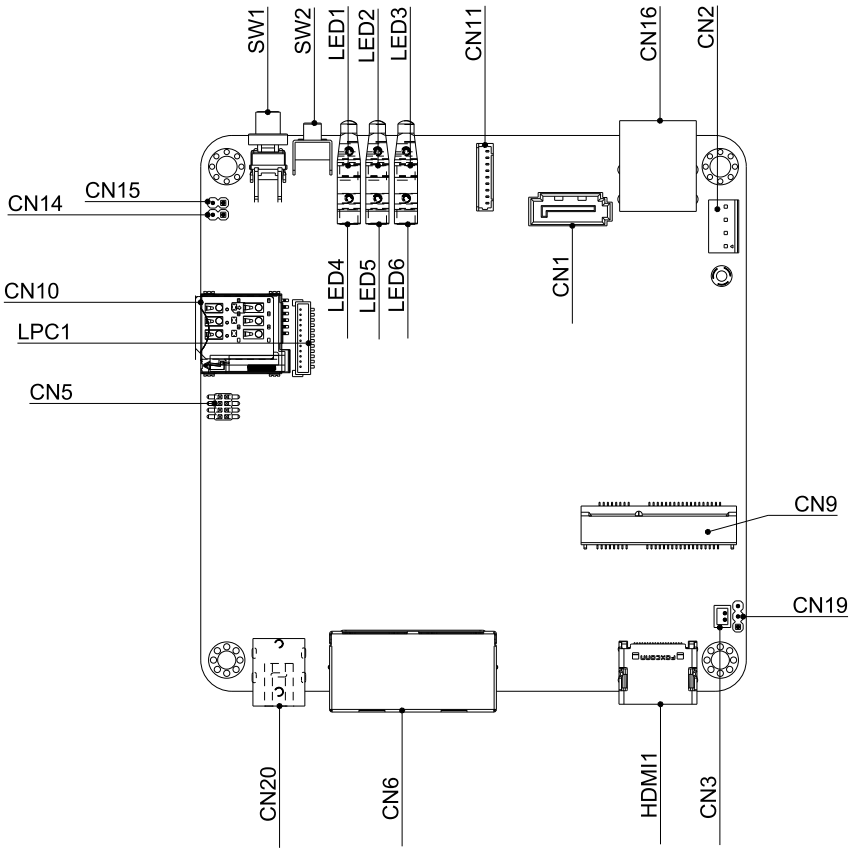


Solder Side

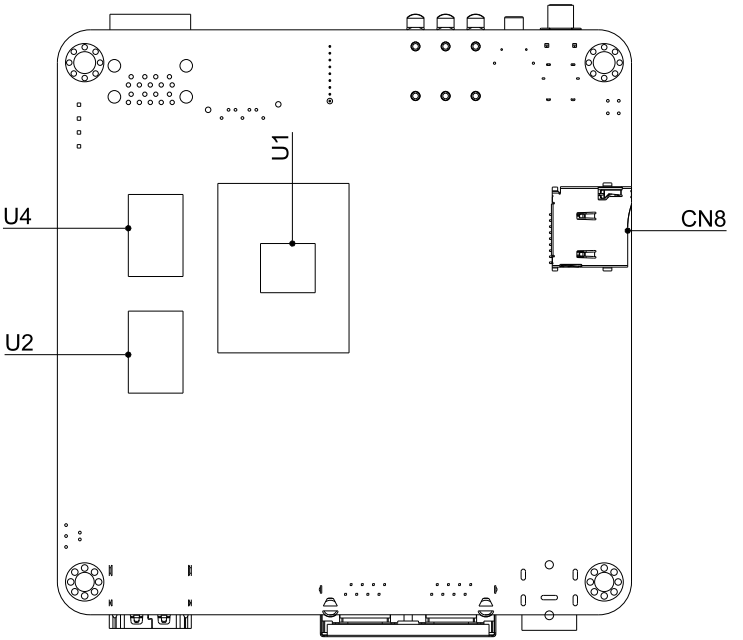


2.2 Jumpers and Connectors

Component Side



Solder side

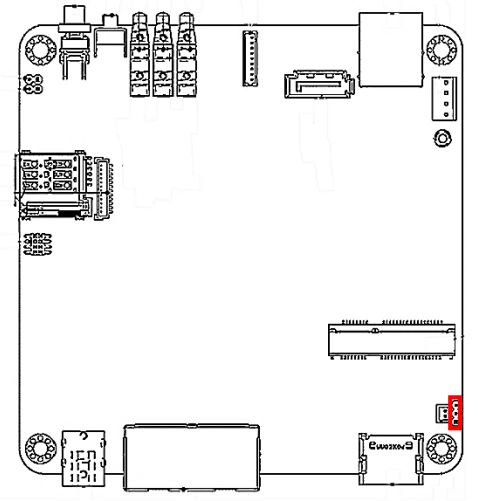


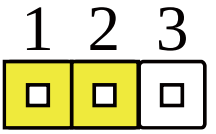
2.3 List of Jumpers

Please refer to the table below for all of the board's jumpers that you can configure for your application

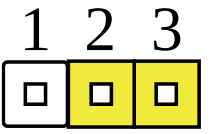
Label	Function
CN19	Clear CMOS

2.3.1 CMOS Setting Selection (CN19)





Normal



Clear CMOS

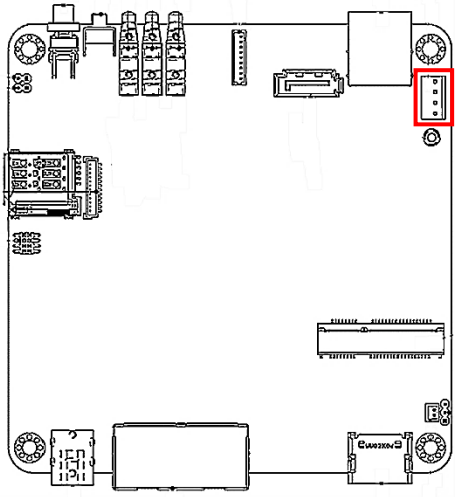
Normal	1-2
Clear CMOS	2-3

2.4 List of Connectors

Please refer to the table below for all of the board's connectors that you can configure for your application

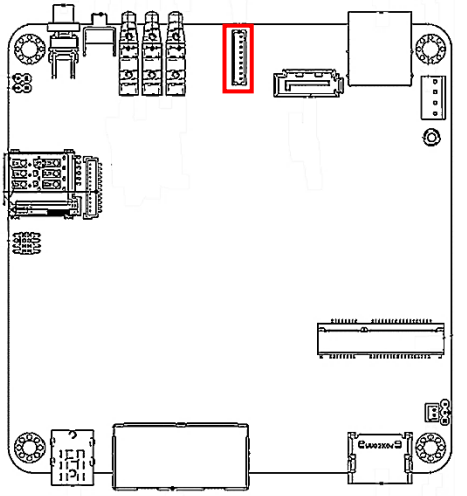
Label	Function
CN20	DC-INPUT (9V~24V)
CN6	LAN Port 1/2 RJ45
CN7	LAN Port 3 RJ45 (optional)
HDMI1	HDMI Connector
CN9	Mini Card (option) with Micro-SIM
CN2	SATA Power Connector (only +5V) (optional)
CN16	USB 3.0 x 2
CN1	SATA Connector (optional)
CN13	DIO Connector (optional)
CN11	Serial Port 1 (optional)
LED3~1	Status LED (optional)
SW2	Software Reset
SW1	Power Button
U21	Onboard Wi-Fi Chipset (optional)
CN10	Micro-SIM (optional)
CN8	Micro-SD (optional)
CN18	Micro-USB Console (Serial Port 2) (optional)
CN3	Battery Connector
CN5	BIOS Flash Download Header
CN14	HW Reset Header
CN15	PWRBTN Header

2.4.1 SATA Power Connector (CN2)



Pin	Signal	Pin	Signal
1	NA	2	GND
3	GND	4	+5V

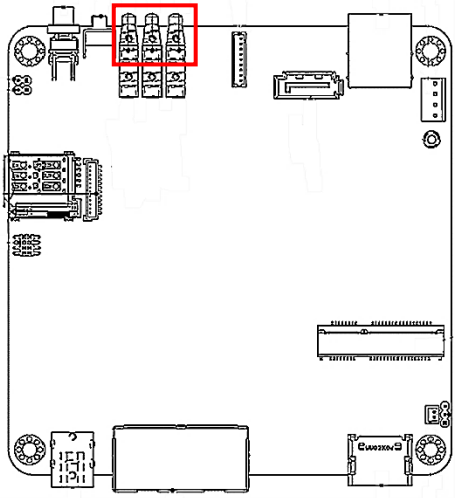
2.4.2 Serial Port 1 Connector (RS-232/485/422) (CN11)



Pin	Signal	Pin	Signal
1	DCD (485DATA-/422TX-)	6	CTS
2	DSR	7	DTR (422RX-)
3	RXD (422RX+)	8	RI
4	RTS	9	GND
5	TXD (485DATA+/422TX+)		

2.5 GPIO Mapping

2.5.1 LED GPIO Mapping (LED1~3)

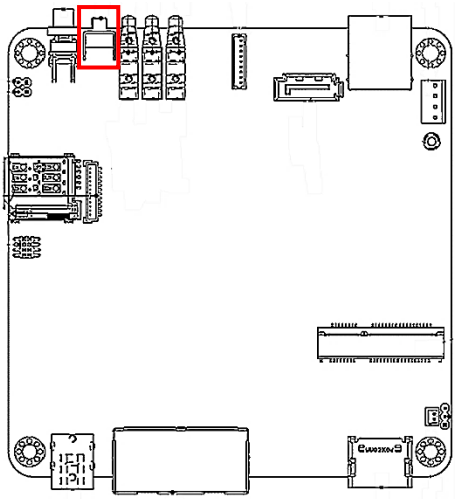


LED	On SIO81866	Color	Control	Power
LED1	GP10	Blue	Addr 0xA00h[bit0] "0"=on,"1"=off	VSB
	GP22	Red	Addr 0xA01h[bit2] "0"=on,"1"=off	VSB
	GP23	Green	Addr 0xA01h[bit3] "0"=on,"1"=off	VSB
LED2	GP56	Blue	Addr 0xA04h[bit6] "0"=on,"1"=off	VCC
	GP54	Red	Addr 0xA04h[bit4] "0"=on,"1"=off	VSB
	GP40	Green	Addr 0xA03h[bit0] "0"=on,"1"=off	VSB
LED3	GP61	Blue	Addr 0xA05h[bit1] "0"=on,"1"=off	VCC
	GP60	Red	Addr 0xA05h[bit0] "0"=on,"1"=off	VCC
	GP57	Green	Addr 0xA04h[bit7] "0"=on,"1"=off	VCC

2.5.2 DIO Connector GPIO Mapping (CN13)

Pin	Signal	GPIO Mapping	Pin	Signal	GPIO Mapping
2	Bit0	Mapping SIO GP80	7	Bit4	Mapping SIO GP84
3	Bit1	Mapping SIO GP81	8	Bit5	Mapping SIO GP85
4	Bit2	Mapping SIO GP82	9	Bit6	Mapping SIO GP86
5	Bit3	Mapping SIO GP83	10	Bit7	Mapping SIO GP87

2.5.3 Switch GPIO Mapping (SW2)



SW2 GPIO Mapping
Mapping SIO GP64

Chapter 3

AMI BIOS Setup

3.1 System Test and Initialization

The system uses certain routines to perform testing and initialization. If an error, fatal or non-fatal, is encountered, a few short beeps or an error message will be outputted. The board can usually continue the boot up sequence with non-fatal errors.

The system configuration verification routines check the current system configuration against the values stored in the CMOS memory. If they do not match, an error message will be outputted, in which case you will need to run the BIOS setup program to set the configuration information in memory.

There are three situations in which you will need to change the CMOS settings:

- You are starting your system for the first time
- You have changed your system's hardware
- The CMOS memory has lost power and the configuration information is erased

The system's CMOS memory uses a backup battery for data retention, which is to be replaced once emptied.

3.2 AMI BIOS Setup

The AMI BIOS ROM has a pre-installed Setup program that allows users to modify basic system configurations, which is stored in the battery-backed CMOS RAM and BIOS NVRAM so that the information is retained when the power is turned off.

To enter BIOS Setup, press <Del> or <F2> immediately while your computer is powering up.

The function for each interface can be found below.

Main – Date and time can be set here. Press <Tab> to switch between date elements

Advanced – Enable/ Disable boot option for legacy network devices

Chipset – For hosting bridge parameters

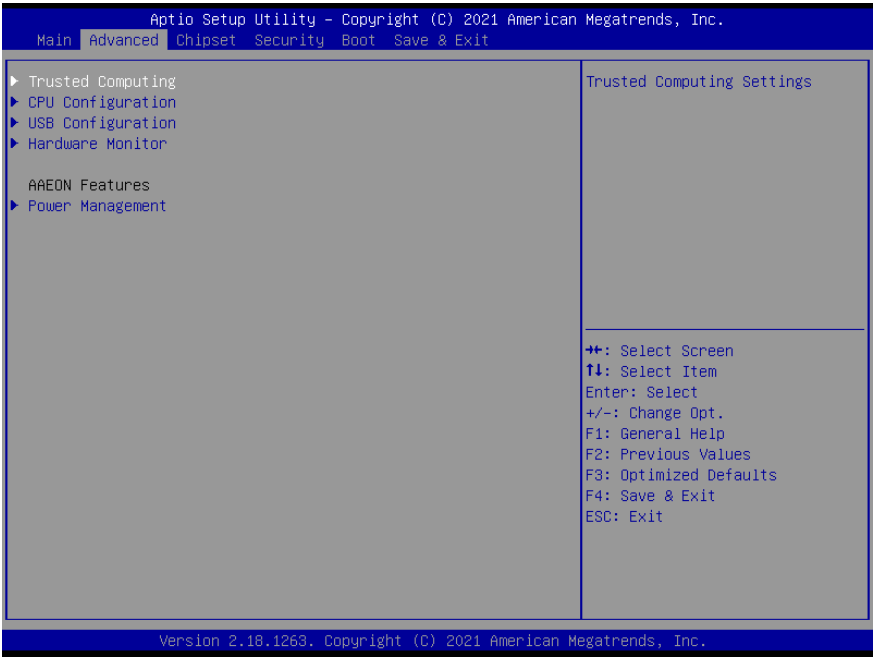
Boot – Enable/ Disable quiet Boot Option

Security – The setup administrator password can be set here

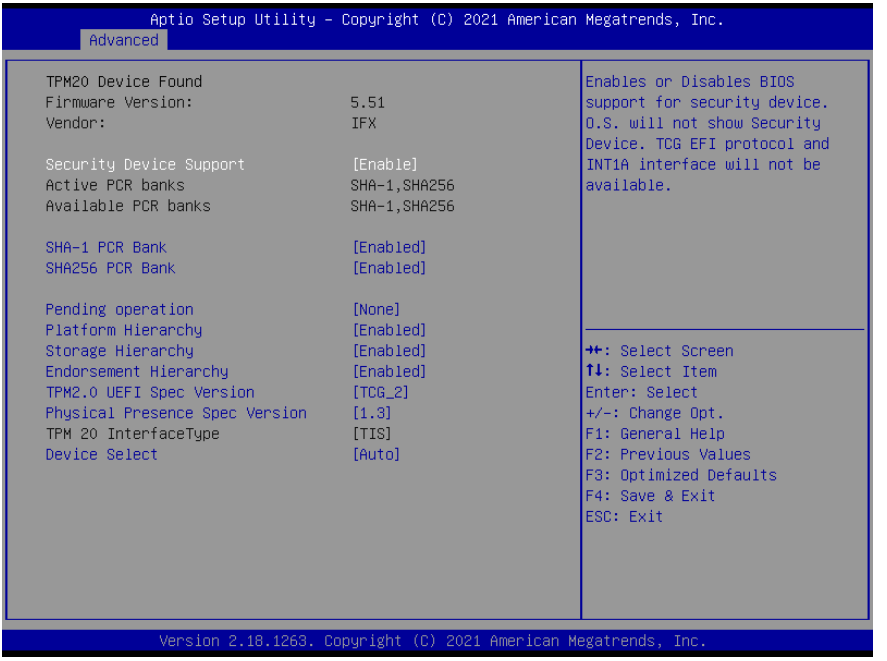
Save & Exit –Save your changes and exit the program

3.3 Setup Submenu: Main

3.4 Setup Submenu: Advanced



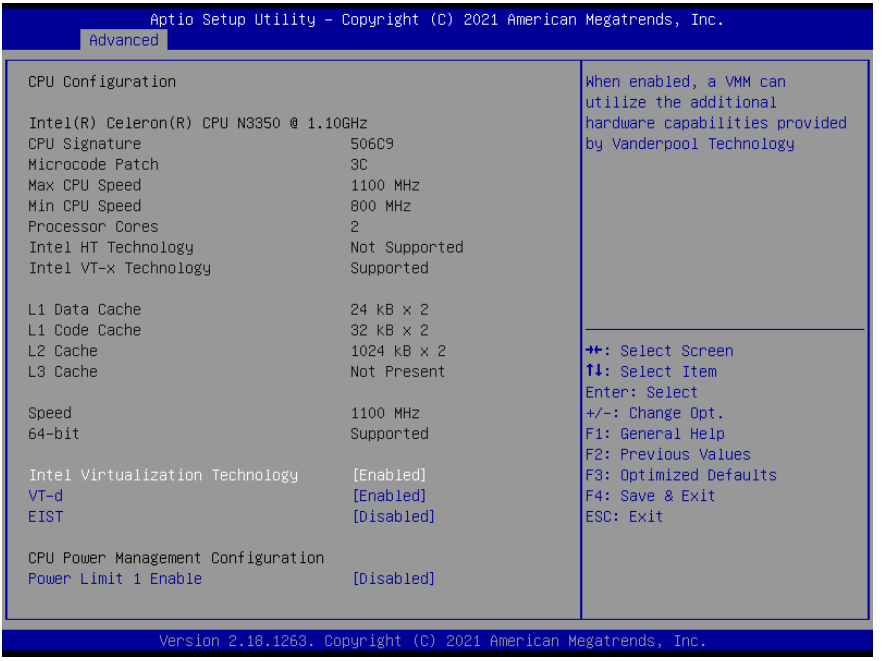
3.4.1 Trusted Computing



Options Summary		
Security Device Support	Enable	Optimal Default, Failsafe Default
	Disable	
Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.		
SHA-1 PCR Bank	Enabled	Optimal Default, Failsafe Default
	Disabled	
Enable or Disable SHA-1 PCR Bank		
SHA256 PCR Bank	Enabled	Optimal Default, Failsafe Default
	Disabled	
Enable or Disable SHA256 PCR Bank.		
Pending operation	None	Optimal Default, Failsafe Default
	TPM Clear	
Schedule an Operation for the Security Device. **NOTE**: Your Computer will reboot during restart in order to change State of Security Device.		

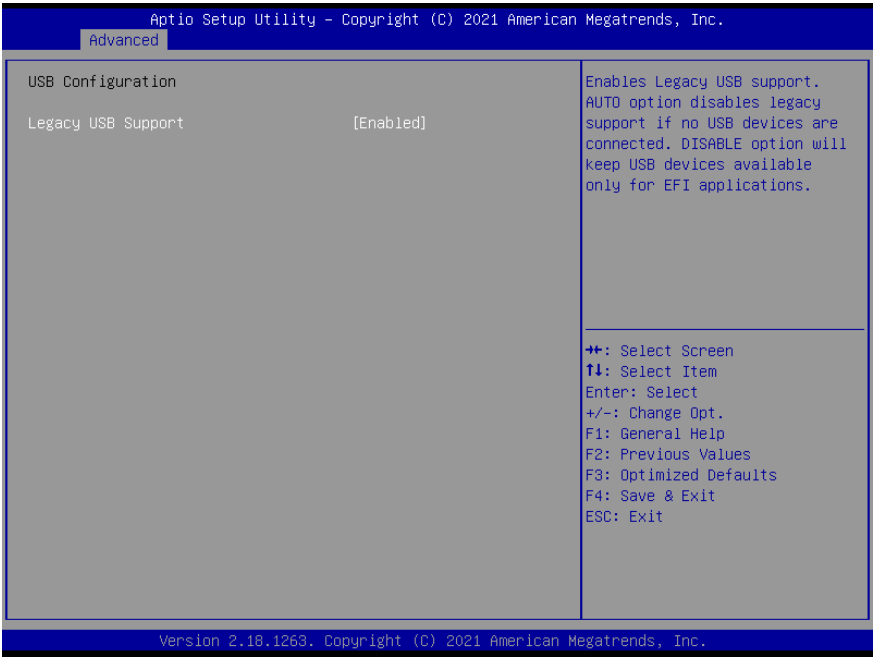
Options Summary		
Platform Hierarchy	Enabled	Optimal Default, Failsafe Default
	Disabled	
Enable or Disable Platform Hierarchy		
Storage Hierarchy	Enabled	Optimal Default, Failsafe Default
	Disabled	
Enable or Disable Storage Hierarchy		
Endorsement Hierarchy	Enabled	Optimal Default, Failsafe Default
	Disabled	
Enable or Disable Endorsement Hierarchy		
TPM 2.0 UEFI Spec Version	TCG_2	Optimal Default, Failsafe Default
	TCG_1_2	
Select the TCH2 Spec Version Support. TCG_1_2: The Compatible mode for Win8/Win10 TCG_2: Support new TCG2 protocol and event format for Win10 or later		
Physical Presence Spec Version	1.3	Optimal Default, Failsafe Default
	1.2	
Select to Tell O.S. to support PPI Spec Version 1.2 or 1.3. Note some HCK tests might not support 1.3		
Device Select	Auto	Optimal Default, Failsafe Default
	TPM 1.2	
	TPM 2.0	
TPM 1.2 will restrict support to TPM 1.2 devices 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.		

3.4.2 CPU Configuration



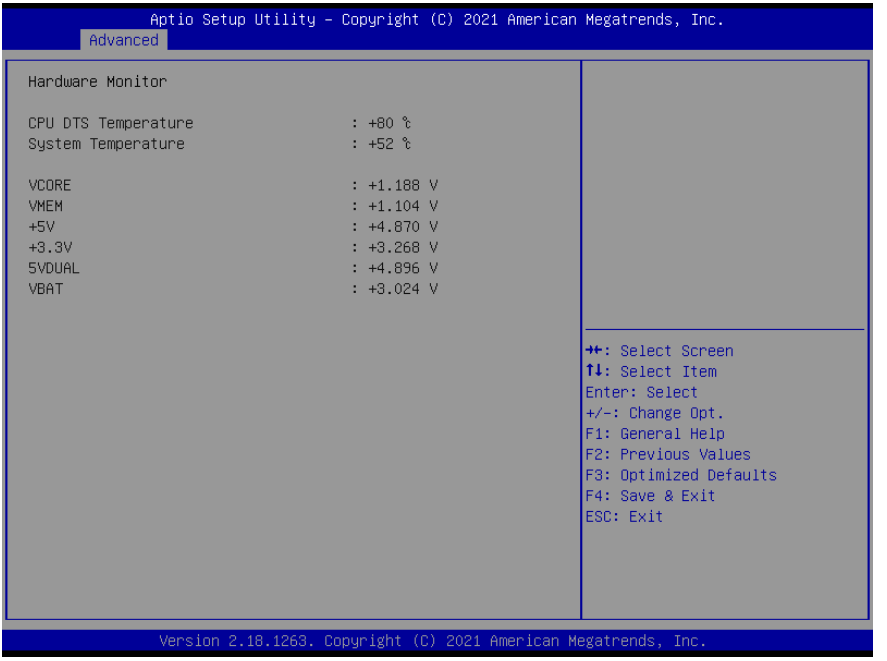
Options Summary		
Intel Virtualization Technology	Enabled	Optimal Default, Failsafe Default
	Disabled	
When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology		
VT-d	Enabled	Optimal Default, Failsafe Default
	Disabled	
Enable/Disable CPU VT-d		
EIST	Enable	
	Disable	Optimal Default, Failsafe Default
Enable/Disable Intel SpeedStep		
Power Limit 1 Enable	Enable	
	Disable	Optimal Default, Failsafe Default
Enable/Disable Power Limit 1		

3.4.3 USB Configuration



Options Summary		
Legacy USB Support	Enabled	Optimal Default, Failsafe Default
	Disabled	
	Auto	
Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.		

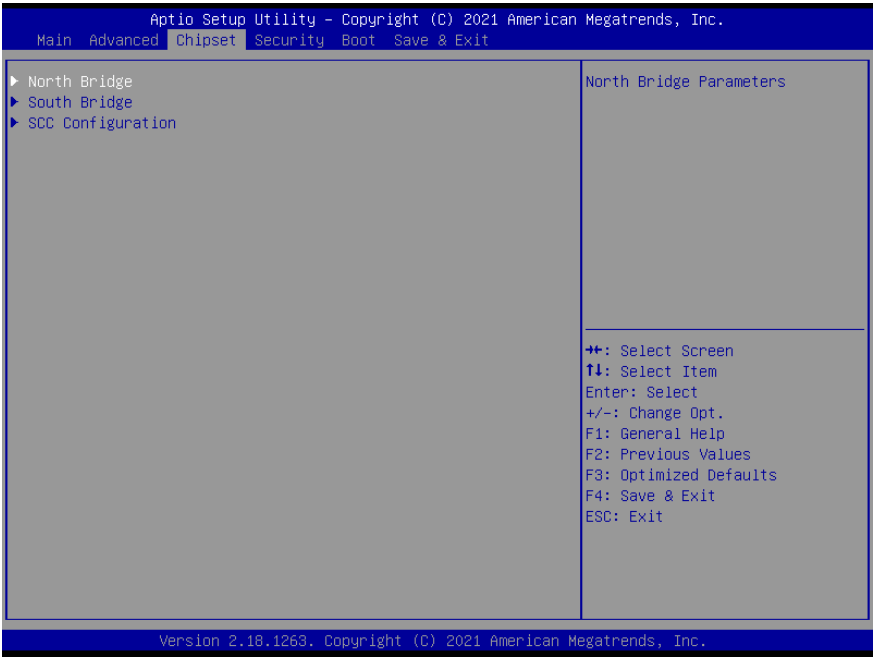
3.4.4 Hardware Monitor



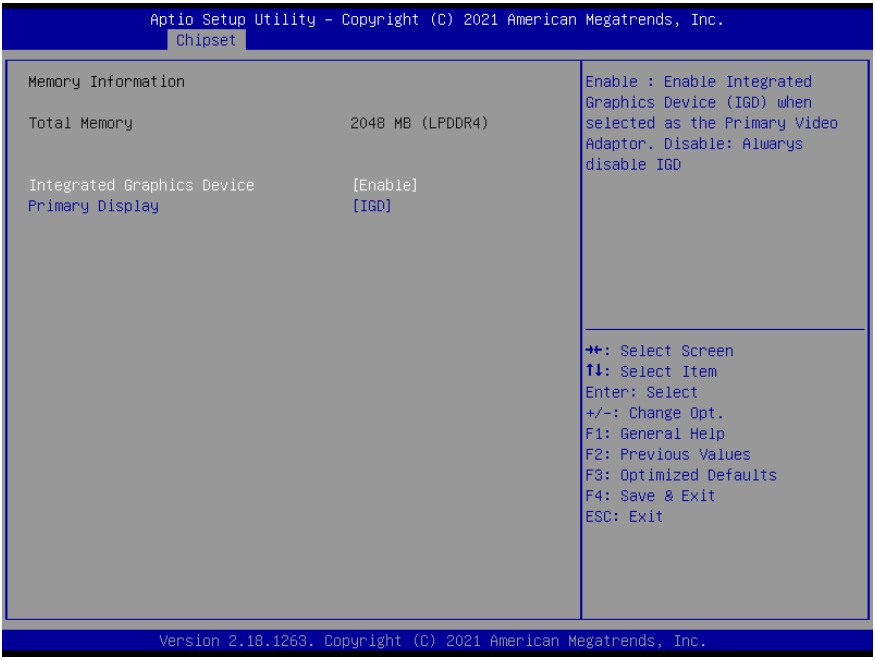
3.4.5 Power Management

Options Summary		
Power Mode	ATX Type	Optimal Default, Failsafe Default
	AT Type	
Select power supply mode.		
Restore AC Power Loss	Last State	Optimal Default, Failsafe Default
	Always On	
	Always Off	
RTC wake system from S5	Disabled	Optimal Default, Failsafe Default
	Fixed Time	
	Dynamic Time	
Fixed Time : System will wake on the hr :: min :: sec specified Dynamic Time : System will wake on the current time + Increase minutes(s).		

3.5 Setup Submenu: Chipset

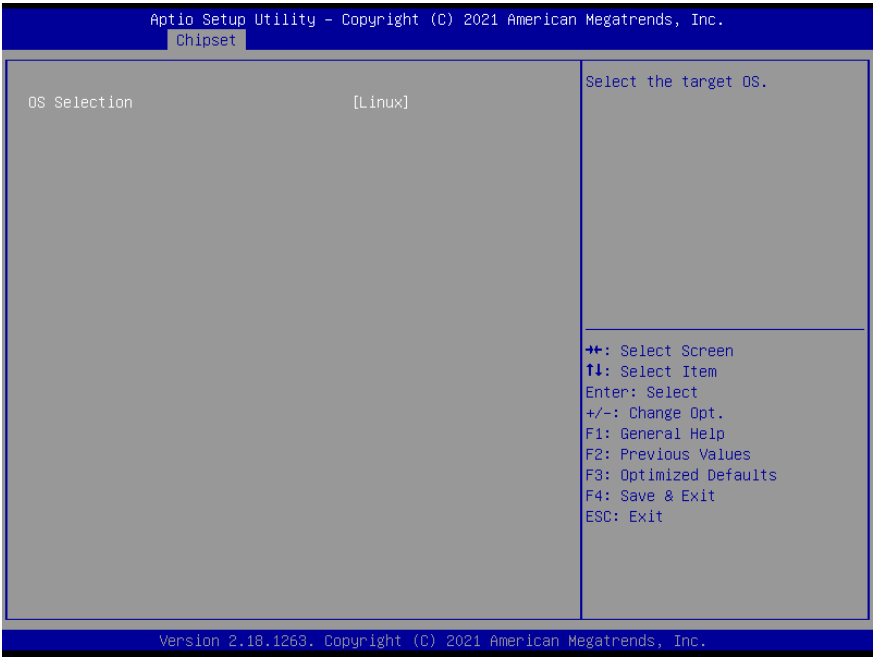


3.5.1 North Bridge



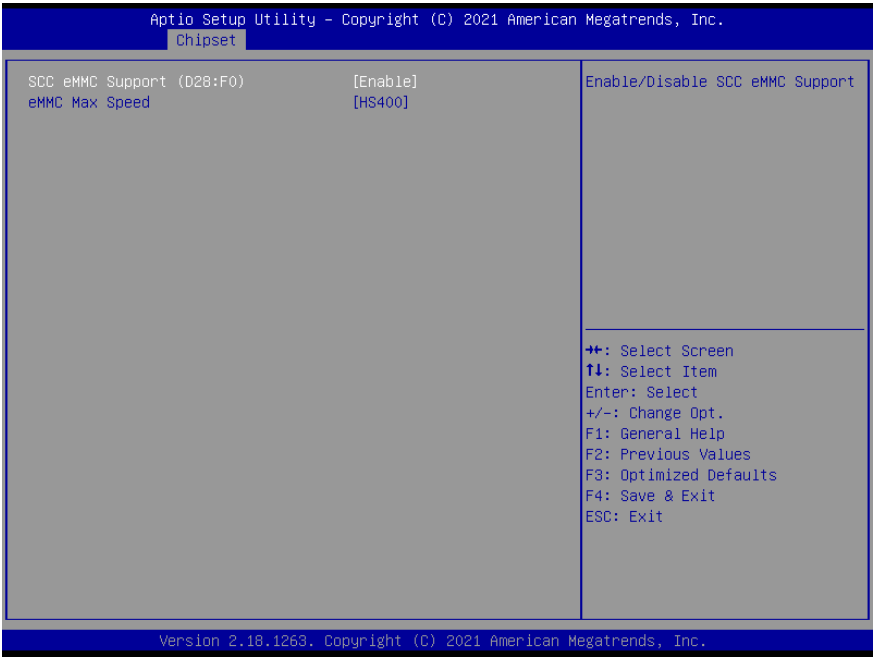
Options Summary		
Integrated Graphics Device	Enabled	Optimal Default, Failsafe Default
	Disabled	
Enable: Enable Integrated Graphics Device (IGD) when selected as the Primary Video Adaptor. Disable: Always disable IGD		
Primary Display	IGD	Optimal Default, Failsafe Default
	PCIe	
Select which of IGD/PCI Graphics device should be Primary Display		

3.5.2 South Bridge



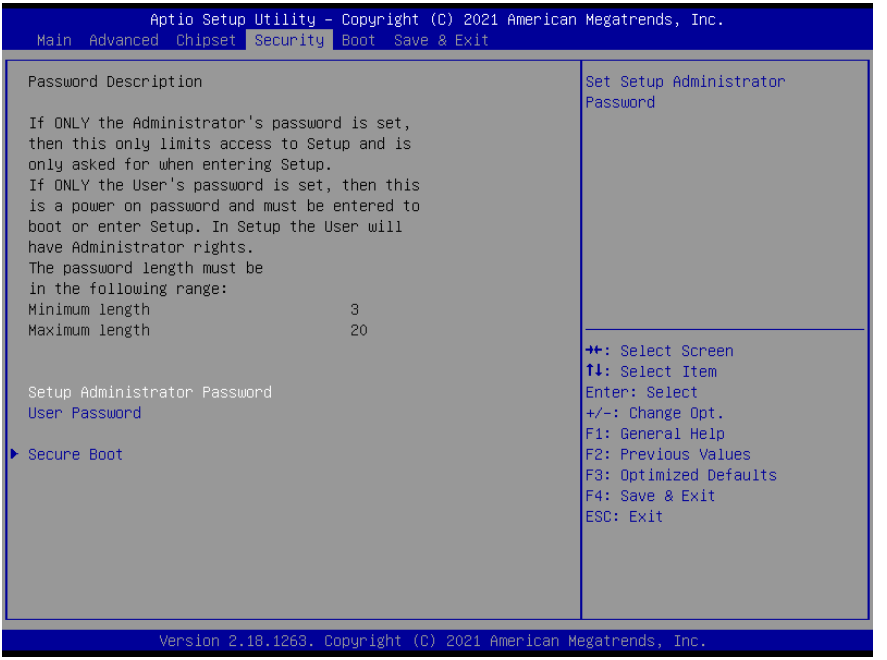
Options Summary		
OS Selection	Windows	
	Linux	Optimal Default, Failsafe Default
Select the target OS		

3.5.3 SCC Configuration



Options Summary		
SCC eMMC Support (D28:F0)	Enabled	Optimal Default, Failsafe Default
	Disabled	
Enable/Disable SCC eMMC Support		
eMMC Max Speed	HS400	Optimal Default, Failsafe Default
	HS200	
	DDR50	
Select the eMMC max Speed allowed		

3.6 Setup Submenu: Security



Change User/Administrator Password

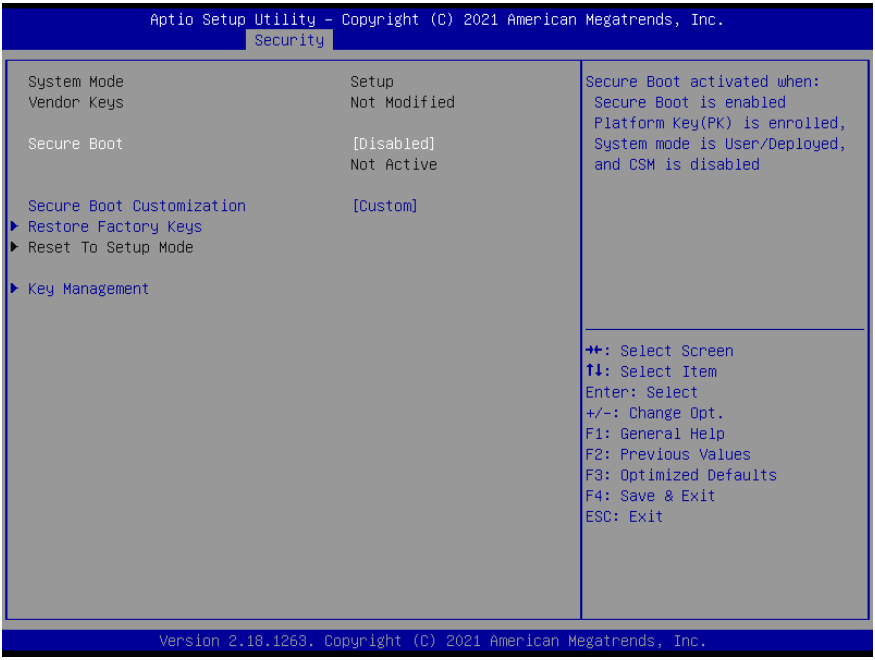
You can set a User Password once an Administrator Password is set. The password will be required during boot up, or when the user enters the Setup utility. Please Note that a User Password does not provide access to many of the features in the Setup utility.

Select the password you wish to set, press Enter to open a dialog box to enter your password (you can enter no more than six letters or numbers). Press Enter to confirm your entry, after which you will be prompted to retype your password for a final confirmation. Press Enter again after you have retyped it correctly.

Removing the Password

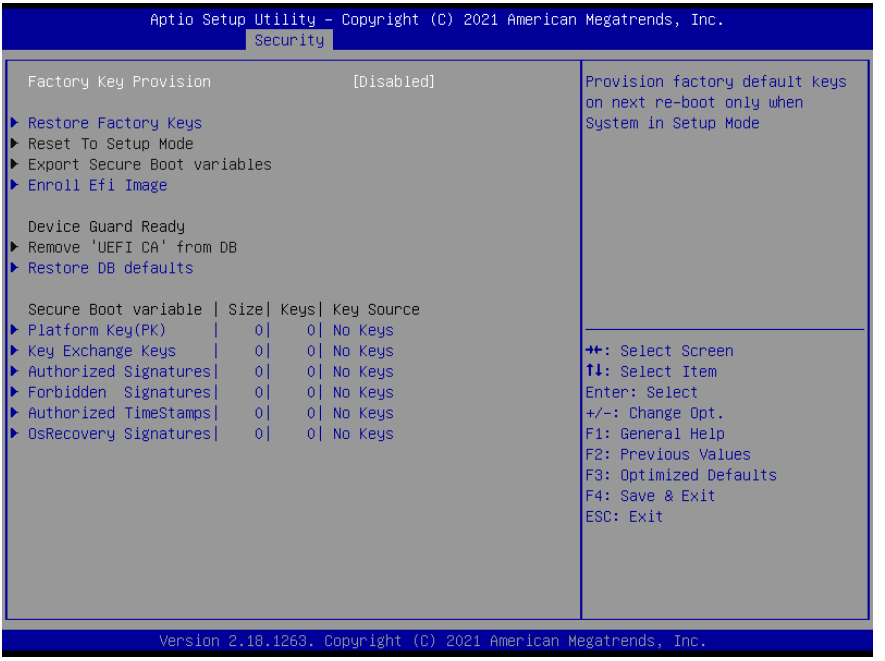
Highlight this item and type in the current password. At the next dialog box press Enter to disable password protection.

3.6.1 Secure Boot



Options Summary		
Secure Boot	Disabled	Optimal Default, Failsafe Default
	Enabled	
Secure Boot activated when: Secure Boot is enabled Platform Key(PK) is enrolled, System mode is User/Deployed, and CSM is disabled		
Secure Boot Customization	Standard	
	Custom	Optimal Default, Failsafe Default
Secure Boot Mode - Custom & Standard, Set UEFI Secure Boot Mode to STANDARD mode or CUSTOM mode, this change is effect after save. And after reset, the mode will return to STANDARD mode.		
Restore Factory Keys	Force System to User Mode.Configure NVRAM to contain OEM-defined factory default Secure Boot keys	

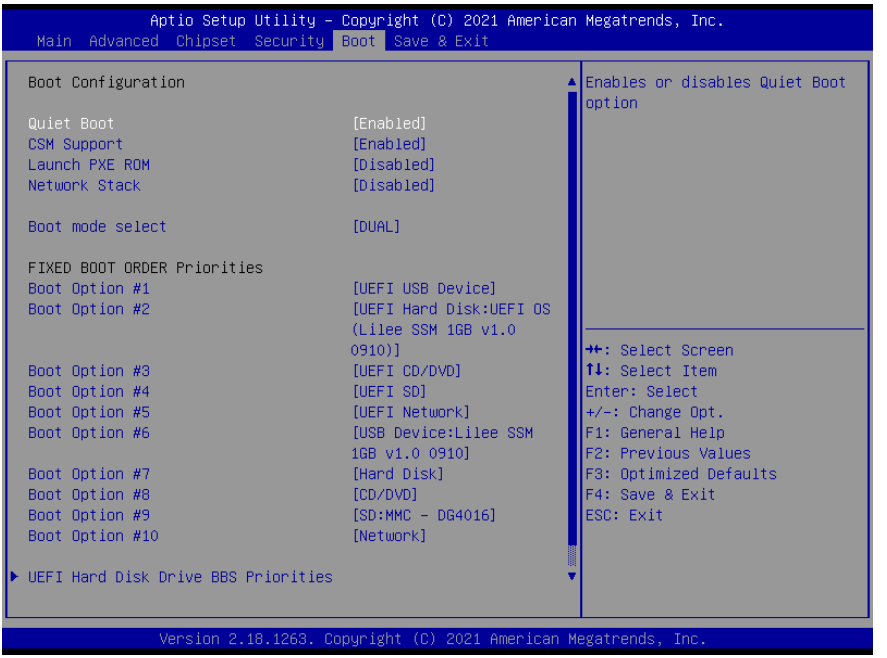
3.6.1.1 Key Management



Options Summary		
Factory Key Provision	Disabled	Optimal Default, Failsafe Default
	Enabled	
Provision factory default keys on next re-boot only when System in Setup Mode		
Restore Factory Keys		
Force System to User Mode. Configure NVRAM to contain OEM-defined factory default Secure Boot keys		
Enroll Efi Image		
Allow the image to run in Secure Boot mode. Enroll SHA256 Hash certificate of a PE image into Authorized Signature Database (db)		
Restore DB defaults		
Restore DB variable to factory defaults		
Secure Boot Variables		

Options Summary
Enroll Factory Defaults or load certificates from a file: 1. Public Key Certificate in: a) EFI_SIGNATURE_LIST b) EFI_CERT_X509 (DER encoded) c) EFI_CERT_RSA2048 (bin) d) EFI_CERT_SHAXXX 2. Authenticated UEFI Variable 3. EFI PE/COFF Image(SHA256) Key Source: Default, External, Mixed

3.7 Setup Submenu: Boot



Options Summary		
Quiet Boot	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable Quiet Boot option.		
CSM Support	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable CSM Support.		
Launch PXE ROM	Enabled	
	Disabled	Optimal Default, Failsafe Default
Controls the execution of UEFI and Legacy PXE OpROM		
Network Stack	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enable/Disable UEFI Network Stack.		
PXE boot wait time		
Wait time to press ESC key to abort the PXE boot		

Options Summary		
Boot mode select	LEGACY	
	UEFI	
	DUAL	Optimal Default, Failsafe Default
Select boot mode LEGACY / UEFI		
UEFI Hard Disk Drive BBS Priorities.		
Specifies the Boot Device Priority sequence from available UEFI Hard Disk Drives		
USB Drive BBS Priorities		
Specifies the Boot Device Priority sequence from available USB Drives.		
SD Drive BBS Priorities		
Specifies the Boot Device Priority sequence from available SD Drives		

3.8 Setup Submenu: Save & Exit

Chapter 4

Driver Installation

4.1 Driver Installation

Drivers for the FWS-2277 can be downloaded from the product page on the AAEON website by following this link:

https://www.aaeon.com/en/p/desktop-network-appliance-sd-wan-intel-apollo-lake-fws-2277

Download the driver(s) you need, extract them to their respective folders and follow the steps below to install them.

Step 1 – Install LAN Driver

1. Open the **Intel LAN** folder
2. Follow the "readme" to install

Step 2 – Install USB UART Driver

1. Open the **USB UART** folder
2. Run the **2500_installer.EXE** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically