Technical Manual

Of

Intel Apollo Lake Series CPU

Based SBC

NO.G03-NU691-F

Revision: 3.0

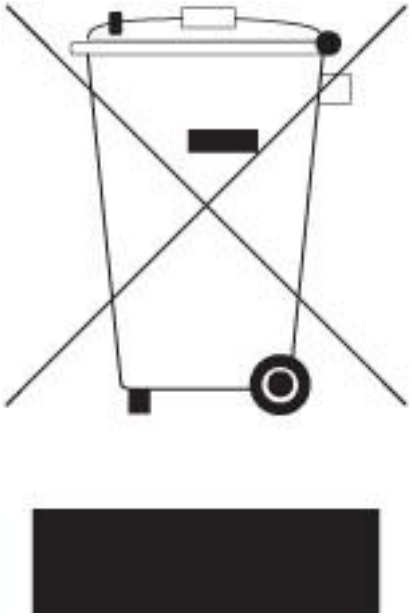
Release date: December 13, 2022

Trademark:

*** Specifications and Information contained in this documentation are furnished for information use only, and are subject to change at any time without notice, and should not be construed as a commitment by manufacturer.**

Environmental Protection Announcement

Do not dispose this electronic device into the trash while discarding. To minimize pollution and ensure environment protection of mother earth, please recycle.



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Environmental Safety Instruction

- Avoid the dusty, humidity and temperature extremes. Do not place the product in any area where it may become wet.

- 0 to 60 centigrade is the suitable temperature. (The figure comes from the request of the main chipset)

- Generally speaking, dramatic changes in temperature may lead to contact malfunction and crackles due to constant thermal expansion and contraction from the welding spots' that connect components and PCB. Computer should go through an adaptive phase before it boots when it is moved from a cold environment to a warmer one to avoid condensation phenomenon. These water drops attached on PCB or the surface of the components can bring about phenomena as minor as computer instability resulted from corrosion and oxidation from components and PCB or as major as short circuit that can burn the components. Suggest starting the computer until the temperature goes up.

- The increasing temperature of the capacitor may decrease the life of computer. Using the close case may decrease the life of other device because the higher temperature in the inner of the case.

- Attention to the heat sink when you over-clocking. The higher temperature may decrease the life of the device and burned the capacitor.

USER'S NOTICE

Manual Revision Information

Reversion	Revision History	Date
3.0	Third Edition	December 13, 2022

Item Checklist

- ☑ Motherboard
- ☑ Cable(s)

Chapter 1
Introduction of the Motherboard

1-1 Feature of Motherboard

- Onboard Intel® Apollo Lake Series Processor, with low power consumption and high performance
- Support 1* DDR3L 1866 MHz SO-DIMM, up to 8GB
- 2* HDMI ports & 1* VGA port, supports Triple Independent Display
- Onboard 2 * RJ-45 gigabit Ethernet LAN port
- Onboard 1* half-size Mini-PCIE slot & 1* SIM card slot
- Onboard 1* full-size MSATA slot &1* SATAIII device
- Support USB 3.0 data transport demand
- Support CPU Smart FAN
- Support Intel AES NI and TPM2.0 to secure customers' data
- Compliance with ErP standard
- Support Watchdog function
- Solution for Digital Signage, Cloud Applications, IoT & Industrial Automation

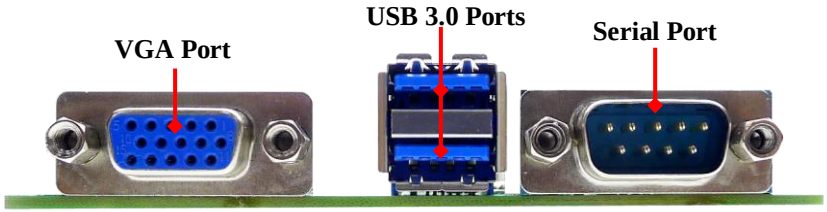
1-2 Specification

Spec	Description
Design	● NUC form factor; PCB size: 10.1 cm x 10.1 cm
Embedded CPU	● Intel® Apollo Lake series CPU ** for detailed CPU support information please visit our website*
Memory Slot	● 1*DDR3L SO-DIMM slot ● Support DDR3L 1866 MHz SO-DIMM up to 8GB
Expansion Slot	● 1* Half-size Mini-PCIE slot **(MPE)** ● 1* SIM card slot
Storage	● 1* SATAIII 6Gb/s port ● 1* Full-sizeMSATA slot **(MSATA)**
LAN Chip	● Integrated with 2* Realtek 8111H Gigabit LAN chip ● Support Fast Ethernet LAN function of providing 10/100/1000Mbps Ethernet data transfer rate
Audio Chip	● Realtek ALC662VD HD audio chip
BIOS	● AMI Flash ROM
Front Panel I/O	● 1* VGA port ● 2* USB 3.0 port ● 1* RS232/422/485 COM port
Rear Panel I/O	● 1* 12V DC-in system power Jack ● 1* Audio Line-Out & MIC combo jack ● 2* HDMI port ● 2* RJ-45 LAN port ● 2* USB 3.0 port
Internal I/O	● 1* 2-pin internal 12V DC-in power connector ● 1* SATA Power connector ● 1* JW_FP connector (on the backside) ● 1* CPUFAN connector (on the backside) ● 1* 9-Pin USB 2.0/1.1 header for 2* USB 2.0/1.1 ports ● 1* GPIO header ● 1* LAN LED activity header ● 1* SMBUS header

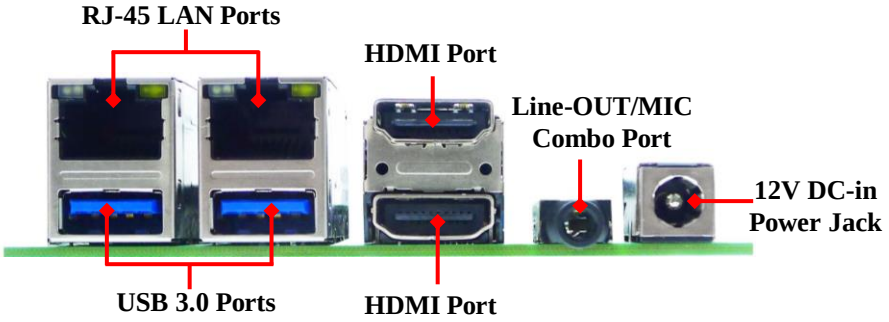
** **Note:** Many PCs now include XHCI USB controllers which allow for the support of USB 3.0 and higher USB speeds. This inclusion of XHCI controllers has lessened the need for EHCI USB controllers within platforms. However, legacy operating systems (OS) may not natively recognize XHCI controllers. You might need to pre-install XHCI driver while desiring to install a non-XHCI OS on Intel platforms which do not include EHCI controllers. Please contact your representative for more details.*

1-3 Layout Diagram

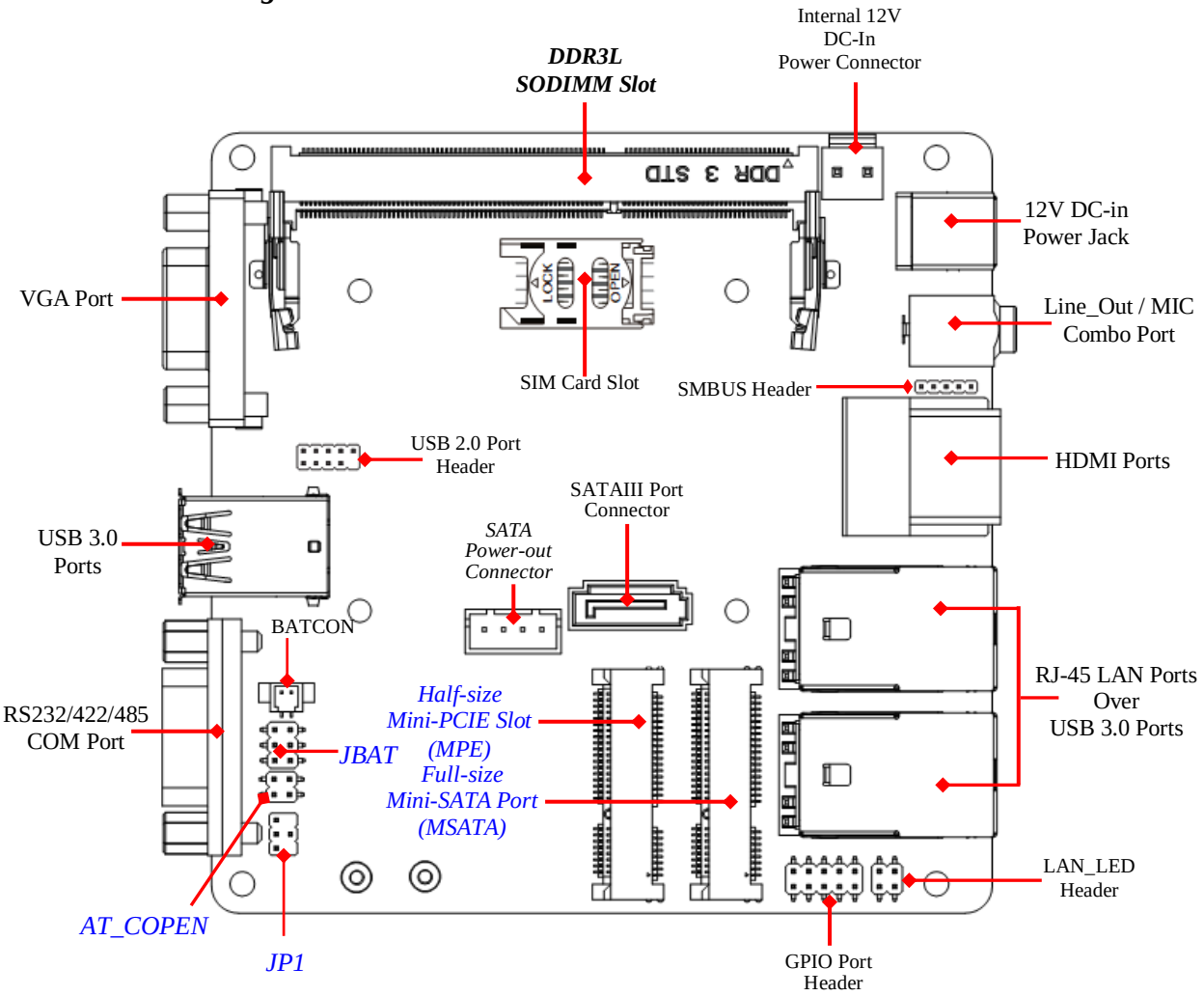
Front IO Panel Diagram:



Rear IO Panel Diagram:

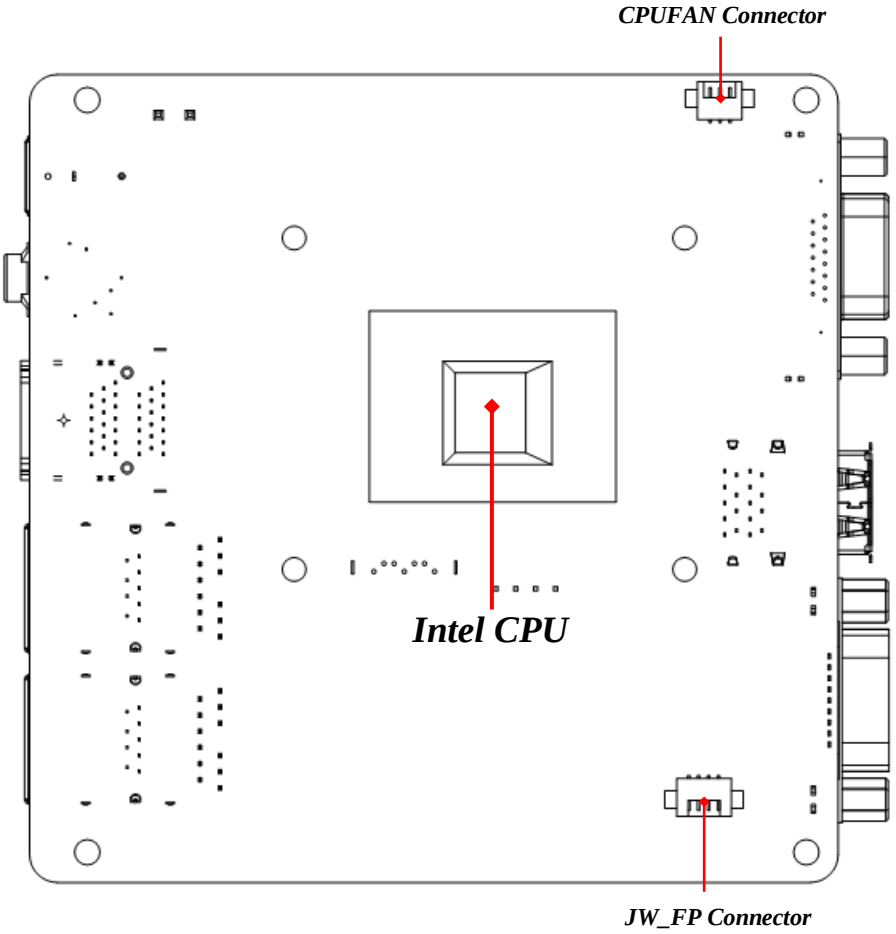


Internal Diagram-Front Side:



Note: 1. *SODIMM module should be* ***1.35V DDRIII*** *SODIMM and* ***not exceeding 8GB total capacity****.*
2*.* ***SIM card slot*** *only work* ***when*** *compatible SIM card installed & 3G LAN card installed in half-size Mini-PCIE* ***(MPE)*** *slot.*

Internal Diagram-Back Side:



Connectors

Connector	Name
VGA	VGA Port Connector
USB31	USB 3.0 Port Connector x2
COM	RS232/422/485 Serial Port Connector
DCIN	12V DC–in System Power Jack
AUDIO	Line-Out/MIC Combo Connector
HDMI	HDMI Port Connector x2
UL1/UL2	***Top***: RJ-45 LAN Port Connector ***Bottom:*** USB 3.0 Port Connector
ATX2P	Internal 12V DC–in System Power Connector
SATA	SATAIII Port Connector
SATAPW	SATA Power out Connector
JW_FP (backside)	Front Panel Connector
CPUFAN (backside)	CPUFAN Connector

Headers

Header	Name	Description
FP_USB	USB 2.0 Port Header	9-pin Block
LAN_LED	LAN Activity LED Header	4-pin Block
GPIO	GPIO Header	10-pin Block
SMBUS	SMBUS Header	5-pin Block

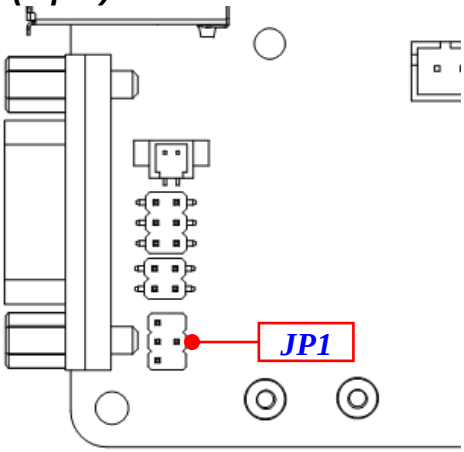
Jumper

Jumper	Name	Description
JP1	COM1 Port Pin9 Function Select	4-Pin Block
AT_ COPEN	***Pin(1-2):*** ATX/AT Mode Select ***Pin(3-4):*** Case Open	4-Pin Block
JBAT	***Pin (1-2):*** RTC Reset ***Pin (3-4):*** Clear CMOS RAM Setting ***Pin (5-6):*** TXE Override	6-Pin Block

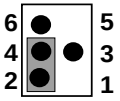
Chapter 2
Hardware Installation

2-1 Jumper Setting

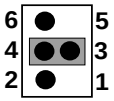
JP1 (4-pin): COM1 Port Pin9 Function Select



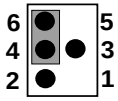
JP1→COM1 Pin-9



2-4 Closed:
RI=RS232;

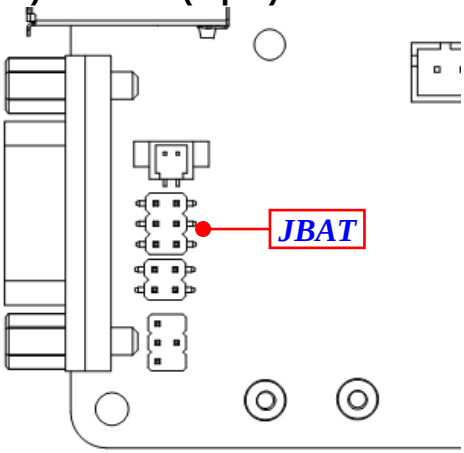


3-4 Closed:
RI= 5V;

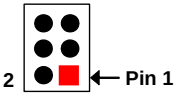


4-6 Closed:
RI= 12V.

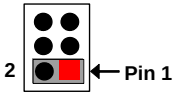
Pin (1-2) of JBAT (6-pin): RTC Reset



Pin (1-2) of JBAT→ RTC Reset

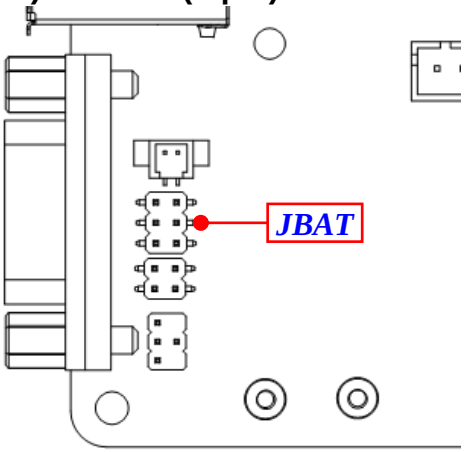


1-2 Open: Normal (Default);

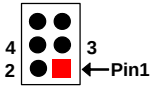


1-2 Closed: RTC Reset.

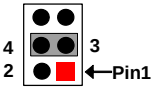
Pin (3-4) of JBAT (6-pin): Clear CMOS RAM Setting



Pin (3-4) of JBAT→Clear CMOS

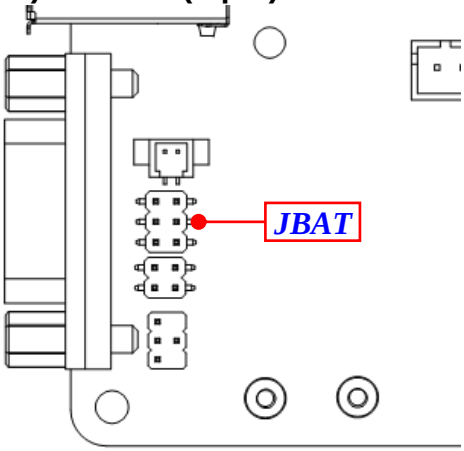


3-4 Open: Normal(Default);

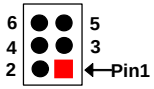


3-4 Closed: Clear CMOS(One Touch).

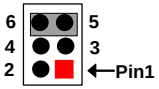
Pin (5-6) of JBAT (6-pin): TXE Override



Pin (5-6) of JBAT→ TXE Override

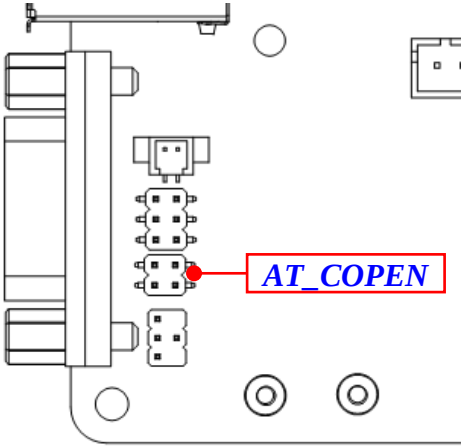


5-6 Open: Normal (Default);

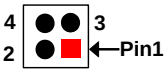


5-6 Closed: TXE Override.

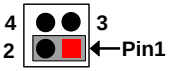
Pin (1-2) of AT_COPEN (4-pin): *ATX Mode & AT Mode Select*



Pin(1-2) of AT_COPEN→ATX/AT Mode Select



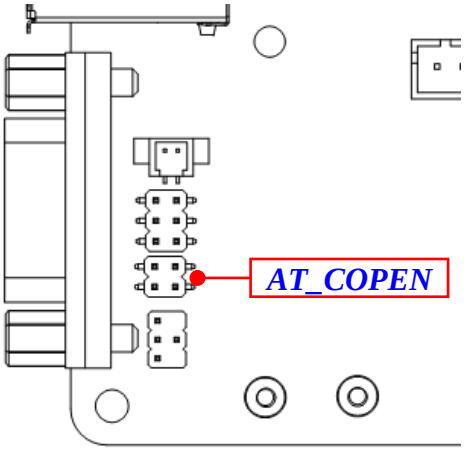
1-2 Open: ATX Mode Selected;



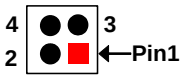
1-2 Closed: AT Mode Selected.

***Note: ATX Mode Selected:** Press power button to power on after power input ready;*
***AT Mode Selected:** Directly power on as power input ready.*
User needs to restart the system for the settings to take effect.

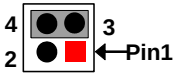
Pin (3-4) of AT_COPEN (4-pin):Case Open Message Display Function Select



Pin(3-4) of AT_MODE→Case Open Detect



3-4 Open: Normal (Default);



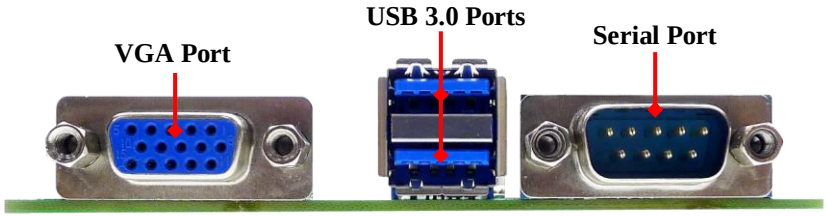
3-4Close: Case Open Detect Function Selected (One Touch).

Pin 3-4 Closed: When Case open function pin short to GND, the Case open function was detected. When Used, needs to enter BIOS and enable 'Case Open Detect' function. In this case if your case is removed, next time when you restart your computer, a message will be displayed on screen to inform you of this.

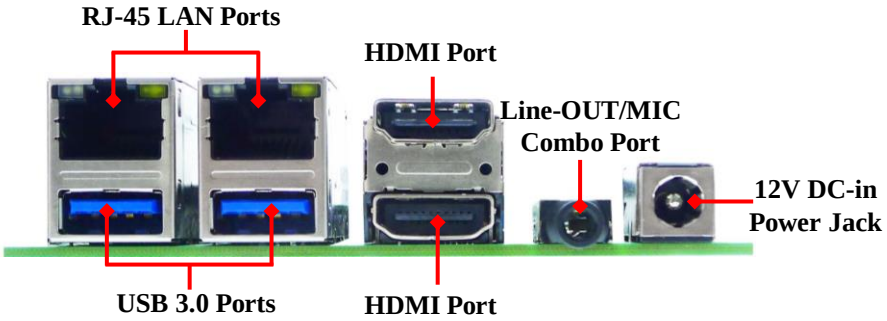
2-2 Connectors and Headers

2-2-1 Connectors

Front IO Panel Diagram:



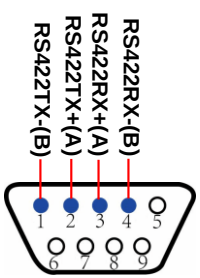
Rear IO Panel Diagram:



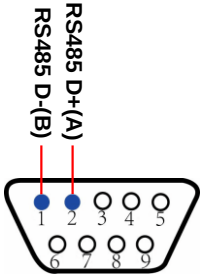
Icon	Name	Function
	**VGA Port**	To connect display device that support VGA specification.
	***RS232/422/485 Serial Port***	Mainly for user to connect external MODEM or other devices that supports Serial Communications Interface.
	**USB 3.0 Port**	To connect USB keyboard, mouse or other devices compatible with USB specification. USB 3.0 ports supports up to 5Gbps data transfer rate.
	**RJ-45 LAN Port**	This connector is standard RJ-45 LAN jack for Network connection.
	**HDMI Port**	To connect display device that support HDMI specification.
	**Line-Out/MIC Combo Connector**	This connector can functions as audio Line-Out jack and MIC jack with compatible cables & devices.
	**Power Connector**	12V DC–in system power connector For user to connect compatible power adapter to provide power supply for the system.

COM1: rs232/422/485 Serial Port Connector

COM1 port can function as RS232/422/485 port. In normal settings COM1 functions as RS232 port. With compatible COM cable COM1 can function as RS422 or RS 485 port. User also needs to go to BIOS to set **'Transmission Mode Select'** for COM1 at first, before using specialized cable to connect different pins of this port.

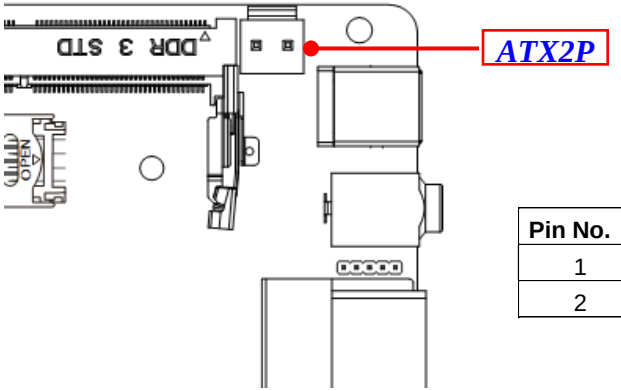


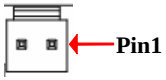
For RS422 Mode



For RS485 Mode

ATX2P (2-pin): Internal 12V DC-in power connector

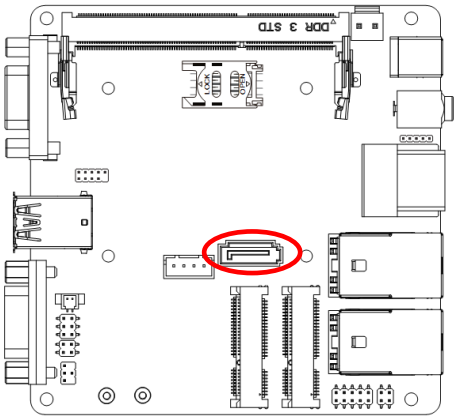




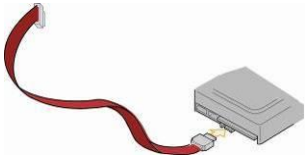
Pin No.	Definition
1	+12V DC_IN
2	GND

SATA (7-pin Block): SATAIII Port connector

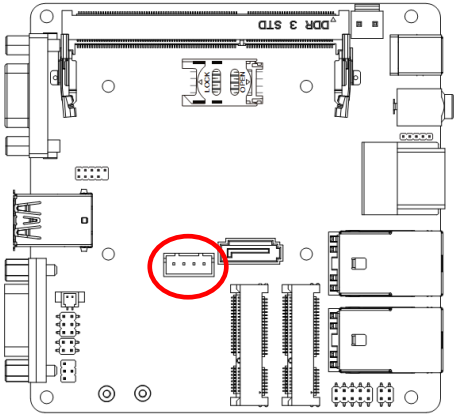
The board comes with a SATAIII port that supports 6GB/s transfer rate.



Pin No.	Definition
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND

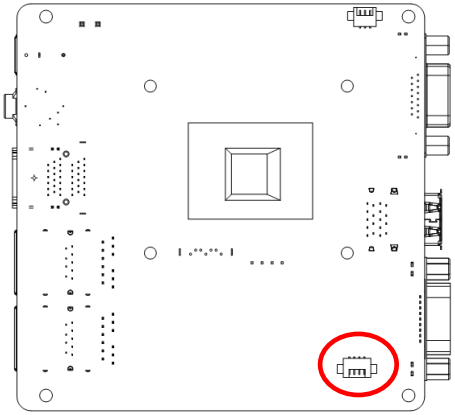


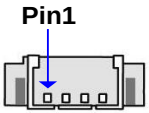
SATAPW (4-pin): SATA HDD Power-Out Connector



Pin No.	Definition
1	+5V
2	GND
3	GND
4	+12V

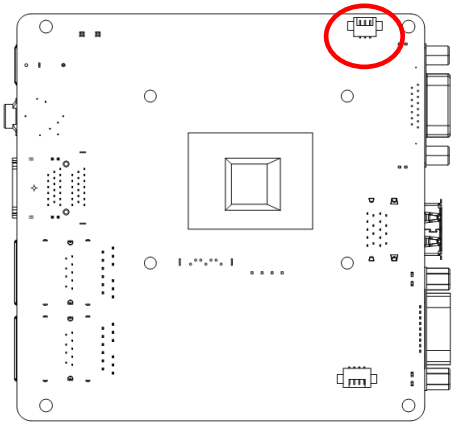
FP_CON1 (4-pin): Front Panel Connector

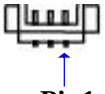




Pin No.	Definition
1	Power_SW
2	GND
3	PWRLED -
4	PWRLED+

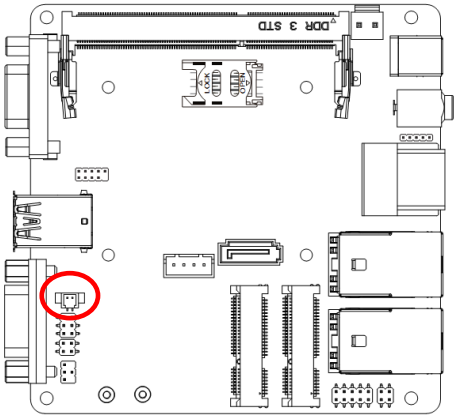
CPUFAN (3-pin): CPUFAN Connector

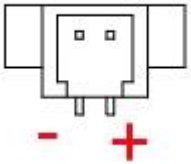




Pin No.	Definition
1	VCC
2	GND
3	Fan Detect

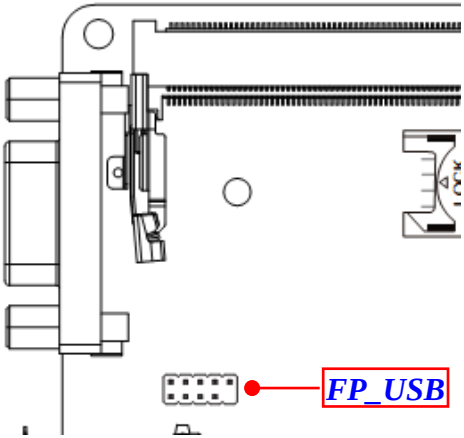
BATCON (2-pin): Battery Connector

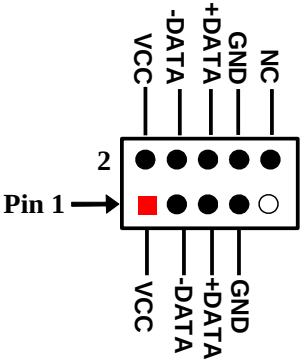




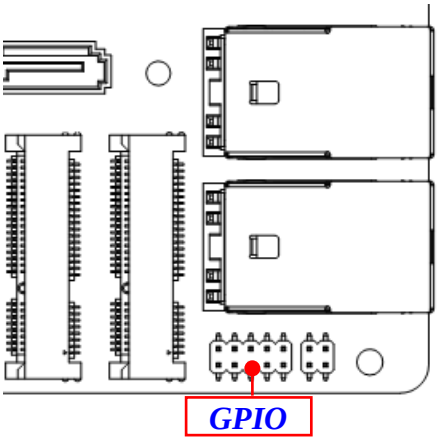
2-2-2 Headers

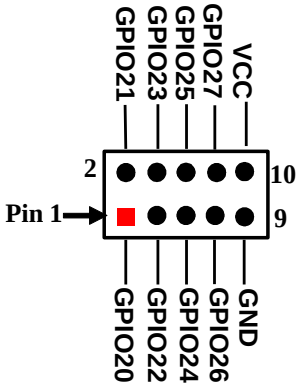
FP_USB (9-pin): USB 2.0 Port Header



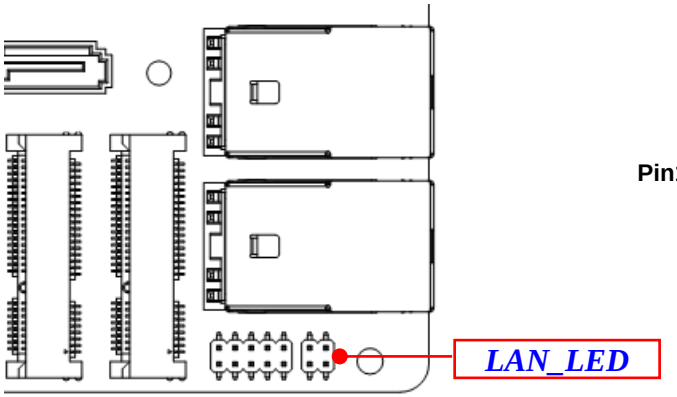


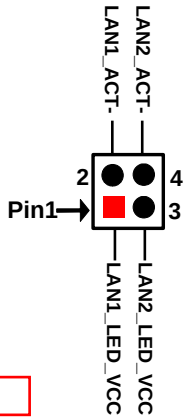
GPIO (10-pin): GPIO Port Header



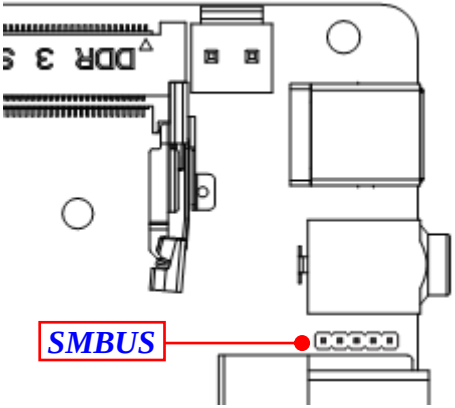


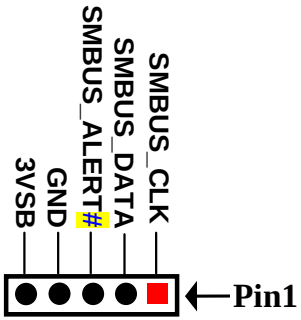
LAN_LED (2-pin): LAN Activity LED Header





SMBUS (5-Pin): SM BUS Header





Chapter 3
Introducing BIOS

Notice!	The BIOS options in this manual are for reference only. Different configurations may lead to difference in BIOS screen and BIOS screens in manuals are usually the first BIOS version when the board is released and may be different from your purchased motherboard. Users are welcome to download the latest BIOS version form our official website.

The BIOS is a program located on a Flash Memory on the motherboard. This program is a bridge between motherboard and operating system. When you start the computer, the BIOS program will gain control. The BIOS first operates an auto-diagnostic test called POST (power on self test) for all the necessary hardware, it detects the entire hardware device and configures the parameters of the hardware synchronization. Only when these tasks are completed done it gives up control of the computer to operating system (OS). Since the BIOS is the only channel for hardware and software to communicate, it is the key factor for system stability, and in ensuring that your system performance as its best.

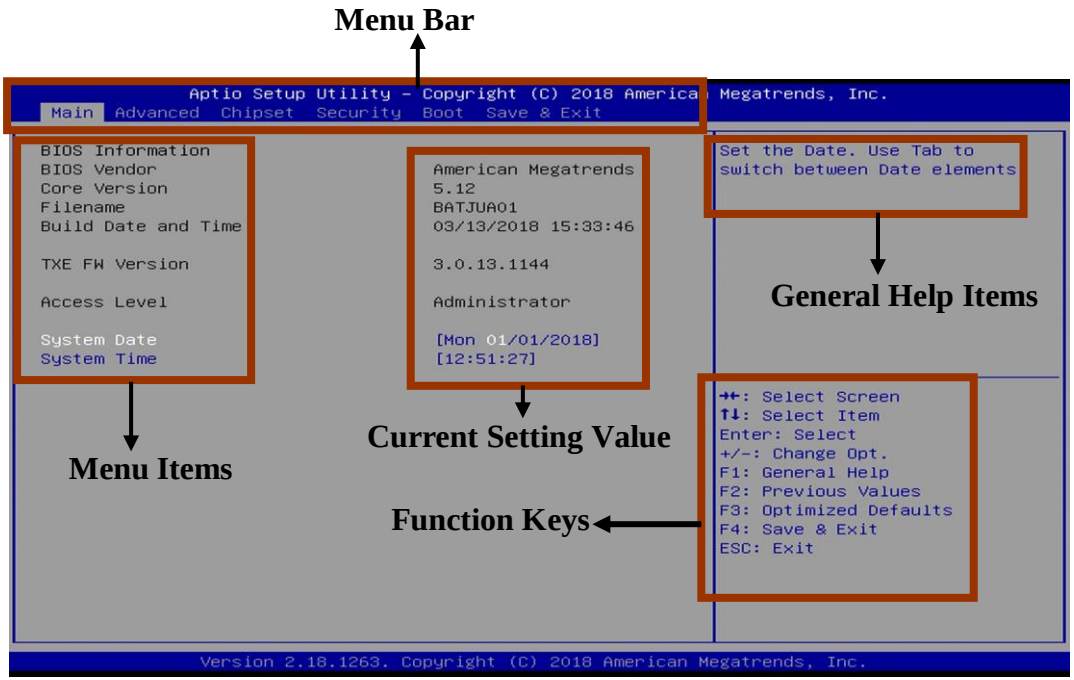
3-1 Entering Setup

Power on the computer and by pressing <Del> immediately allows you to enter Setup. If the message disappears before your respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON or pressing the “RESET” button on the system case. You may also restart by simultaneously pressing <Ctrl>, <Alt> and <Delete> keys. If you do not press the keys at the correct time and the system does not boot, an error message will be displayed and you will again be asked to

Press **<Del>** to enter Setup/ Press **<F7>** to enter Popup Menu.

3-2 BIOS Menu Screen

The following diagram show a general BIOS menu screen:



3-3 Function Keys

In the above BIOS Setup main menu of, you can see several options. We will explain these options step by step in the following pages of this chapter, but let us first see a short description of the function keys you may use here:

- Press←→ (left, right) to select screen;
- Press ↑↓ (up, down) to choose, in the main menu, the option you want to confirm or to modify.
- Press <Enter> to select.

- Press <+>/<–> keys when you want to modify the BIOS parameters for the active option.
- [F1]: General help.
- [F2]: Previous value.
- [F3]: Optimized defaults.
- [F4]: Save & Exit.
- Press <Esc> to quit the BIOS Setup.

3-4 Getting Help

Main Menu

The on-line description of the highlighted setup function is displayed at the top right corner the screen.

Status Page Setup Menu/Option Page Setup Menu

Press **[F1**] to pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window, press <**Esc**>.

3-5 Menu Bars

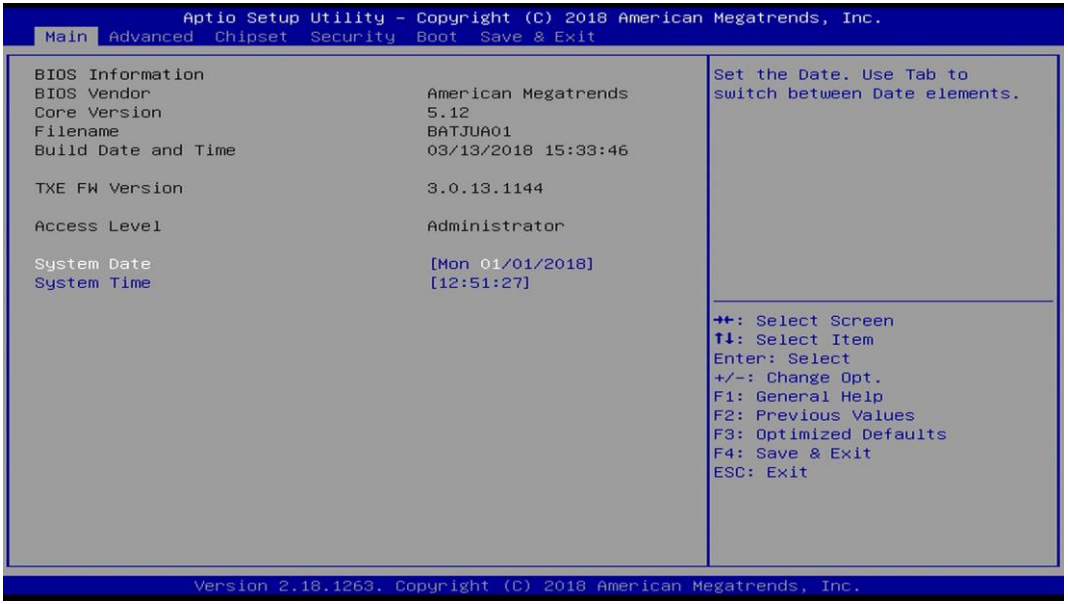
There are six menu bars on top of BIOS screen:

Main	To change system basic configuration
Advanced	To change system advanced configuration
Chipset	To change chipset configuration
Security	Password settings
Boot	To change boot settings
Save & Exit	Save setting, loading and exit options.

User can press the right or left arrow key on the keyboard to switch from menu bar. The selected one is highlighted.

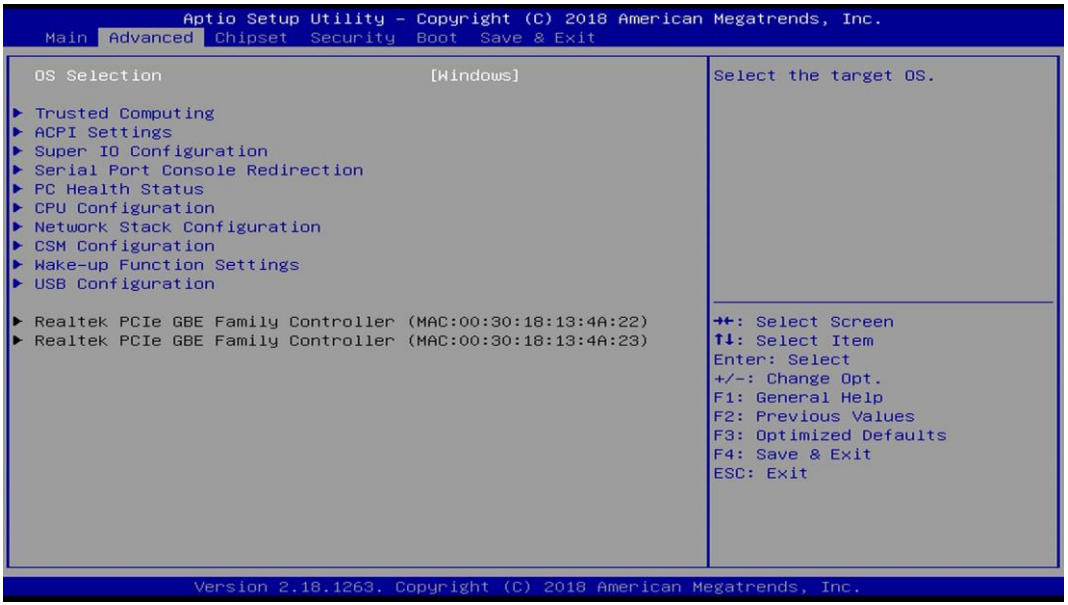
3-6 Main Menu

Main menu screen includes some basic system information. Highlight the item and then use the <+> or <-> and numerical keyboard keys to select the value you want in each item.



System Date
Set the date. Please use [Tab] to switch between data elements.
System Time
Set the time. Please use [Tab] to switch between time elements.

3-7 Advanced Menu



OS Selection

The optional settings: [Windows]; [Intel Linux]; [MSDOS].

**** Note:*** *User need to go to this item to select the OS mode before installing corresponding OS driver, otherwise problems will occur when installing the driver.*

- **Trusted Computing**

Press [Enter] to enable or disable '**Security Device Support**'.

TPM20 Device Found

Security Device Support

Use this item to enable or disable BIOS support for security device.

The optional settings: [Disabled]; [Enabled].

Active PCR Banks

The optional setting is: [SHA-1].

Available PCR Banks

The optional setting is: [SHA-1, SHA256].

► **ACPI Settings**

Press [Enter] to make settings for the following sub-items:

ACPI Settings

ACPI Sleep State

Use this item to select the highest ACPI sleep state the system will enter when the suspend button is pressed.

The optional settings are: [Suspend Disabled]; [S3 (Suspend to RAM)].

► **Super I/O Configuration**

Press [Enter] to make settings for the following sub-items:

Super IO Configuration

► **Serial Port 1 Configuration**

Press [Enter] to make settings for the following items:

Serial Port 1 Configuration

Serial Port

Use this item to enable or disable serial port (COM).

The optional settings are: [Disabled]; [Enabled].

Change Settings

Use this item to select an optimal settings fro Super IO Device.

Use this item to select an optimal setting for super IO device.

The optional settings are: [Auto]; [IO=3F8h; IRQ=4]; [IO=2F8h; IRQ=3]; [IO=3E8h; IRQ=4]; [IO=2E8h; IRQ=3].

Transmission Mode Select

The optional settings are: [RS422]; [RS232]; [RS485].

Mode Speed Select

The optional settings are: [RS232/RS422/RS485=250kbps]; [RS232=1Mbps, RS422/RS485=10Mbps].

Serial Port FIF0 Mode

The optional settings are: [16-Byte FIF0]; [32-Byte FIF0]; [64-Byte FIF0]; [128-Byte

FIF0].

ERP Support
The optional settings are: [Disabled]; [Enabled].
This item should be set as [**Disabled**] if you wish to have all active wake-up functions.

Case Open Detect
Use this item to detect case has already open or not, show message in POST.

WatchDog Reset Timer
Use this item to enable or disable WDT reset function. When set as [Enabled], the following sub-items shall appear:

WatchDog Reset Timer Value
User can set a value in the range of [10] to [255].
WatchDog Reset Timer Unit
The optional settings are: [Sec.]; [Min.].
WatchDog Wake-up Timer
This item support WDT wake-up.
The optional settings are: [Enabled]; [Disabled].
When set as [Enabled], the following sub-items shall appear:

WatchDog Wake-up Timer Value
User can select a value in the range of [10] to [4095] seconds when '**WatchDog Wake-up Timer Unit**' set as [Sec]; or in the range of [1] to [4095] minutes when '**WatchDog Wake-up Timer Unit**' set as [Min].

WatchDog Wake-up Timer Unit
The optional settings are: [Sec.]; [Min.].

ATX Power Emulate AT Power
This item support Emulate AT power function, MB power On/Off control by power supply. Use needs to select 'AT or ATX Mode' on MB jumper at first (refer to ***Page 9***, Pin 1-2 of AT_COPEN block for ATX Mode & AT Mode Select).

- **Serial Port Console Redirection**

COM1

Console Redirection

The optional settings: [Disabled]; [Enabled]. When set as [Enabled], the following sub-items shall appear:

- **Console Redirection Settings**

The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.

Press [Enter] to make settings for the following items:

Terminal Type

The optional settings: [VT100]; [VT100+]; [VT-UTF8]; [ANSI].

Emulation: [ANSI]: Extended ASCII char set; [VT100]: ASCII char set; [VT100+]: Extends VT100 to support color, function keys, etc.; [VT-UTF8]: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.

Bits per second

Use this item to select serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.

The optional settings: [9600]; [19200]; [38400]; [57600]; [115200].

Data Bits

The optional settings: [7]; [8].

Parity

A parity bit can be sent with the data bits to detect some transmission errors.

The optional settings: [None]; [Even]; [Odd]; [Mark]; [Space].

[Even]: parity bit is 0 if the num of 1's in the data bits is even; [Odd]: parity bit is 0 if num of 1's in the data bits is odd; [Mark]: parity bit is always 1; [Space]: Parity bit is always 0; [Mark] and [Space] Parity do not allow for error detection.

Stop Bits

Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.

The optional settings: [1]; [2].

Flow Control

Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a “stop” signal can be sent to stop the data flow. Once the buffers are empty, a “start” signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.

The optional settings: [None]; [Hardware RTS/CTS].

VT-UTF8 Combo Key Support

Use this item to enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals.

The optional settings: [Disabled]; [Enabled].

Recorder Mode

With this mode enable only text will be sent. This is to capture Terminal data.

The optional settings: [Disabled]; [Enabled].

Resolution 100x31

Use this item to enable or disable extended terminal resolution.

The optional settings: [Disabled]; [Enabled].

Legacy OS Redirection Resolution

On Legacy OS, the Number of Rows and Columns supported redirection.

The optional settings: [80x24]; [80x25].

Putty KeyPad

Use this item to select FunctionKey and KeyPad on Putty.

The optional settings: [VT100]; [Intel Linux]; [XTERMR6]; [SCO]; [ESCN]; [VT400].

Redirection After BIOS POST

The optional settings are: [Always Enable]; [BootLoader].

Whet [Bootloader] is selected, then Lagacy Console Redirection is disabled before booting to legacy OS. When [Always Enable] is selected, then Legacy Console is enabled for legacy OS. Default setting for this option is set to [Always Enable].

Serial Port for Out-of-Band Management/
Windows Emergency Management Services (EMS)

Console Redirection

The optional settings: [Disabled]; [Enabled]. When set as [Enabled], the following sub-items shall appear:

- **Console Redirection Settings**

The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.

Press [Enter] to make settings for the following items:

Out-of-Band Mgmt Port

The optional setting is: [COM1].

Terminal Type

The optional settings: [VT100]; [VT100+]; [VT-UTF8]; [ANSI].

[VT-UTF8] is the preferred terminal type for out-of-band management. The next best choice is [VT100+] and them [VT100]. See above, in Console Redirection Settings page, for more help with Terminal Type/Emulation.

Bits per second

Use this item to select serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.

The optional settings: [9600]; [19200]; [57600]; [115200].

Flow Control

Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a “stop” signal can be sent to stop the data flow. Once the buffers are empty, a “start” signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.

The optional settings: [None]; [Hardware RTS/CTS]; [Software Xon/Xoff].

Data Bits

The default setting is: [8].

**This item may or may not show up, depending on different configuration.*

Parity
The default setting is: [None].
**This item may or may not show up, depending on different configuration.*
Stop Bits
The default setting is: [1].
**This item may or may not show up, depending on different configuration.*

► **PC Health Status**
Press [Enter] to view current hardware health status, make further settings in '**SmartFAN Configuration**'.

► **SmartFAN Configuration**
Press [Enter] to make settings for SmartFan Configuration:
SmartFAN Configuration

CPUFAN Smart Mode
The optional settings are: [Disabled]; [Enabled].
When set as [Enabled], the following sub-items shall appear:
CPUFAN Full-Speed Temperature
Use this item to set CPUFAN full speed temperature. Fan will run at full speed when above this pre-set temperature.
CPUFAN Full-Speed Duty
Use this item to set CPUFAN full-speed duty. Fan will run at full speed when above this pre-set duty.
CPUFAN Idle-Speed Temperature
Use this item to set CPUFAN idle speed temperature. Fan will run at idle speed when below this pre-set temperature.
CPUFAN Idle-Speed Duty
Use this item to set CPUFAN idle speed duty. Fan will run at idle speed when below this pre-set duty.

► **CPU Configuration**
Press [Enter] to view current CPU configuration and make settings for the following sub-items:

VT-d

Use this item to enable or disable CPU VT-d.

The optional settings: [Enabled]; [Disabled].

EIST

Use this item to enable or disable Intel SpeedStep.

The optional settings: [Disabled]; [Enabled].

C-States

Use this item to enable or disable C-State.

The optional settings: [Disabled]; [Enabled].

Enhanced C-states

Use this item to enable or disable C1E. When enabled, CPU will switch to minimum speed when all cores enter C-state.

The optional settings: [Disabled]; [Enabled].

Max Package C State

This item controls Max Package C state that the processor will support.

The optional settings: [PC2]; [PC1]; [C0].

Max Core C State Limit

This item controls the max Core C State that cores will support.

The optional settings: [Fused Value]; [Core C10]; [Core C9] [Core C8]; [Core C 7]; [Core C 6]; [Core C1]; [Unlimited].

- **Network Stack Configuration**

Press [Enter] to go to '**Network Stack**' screen to make further settings.

Network Stack

The optional settings are: [Enabled]; [Disabled].

When set as [Enabled], the following sub-items shall appear:

Ipv4 PXE Support

The optional settings are: [Disabled]; [Enabled].

Use this item to enable Ipv4 PXE Boot Support. When set as [Disabled], Ipv4 boot option will not be created.

Ipv6 PXE Support

The optional settings are: [Disabled]; [Enabled].

Use this item to enable Ipv6 PXE Boot Support. When set as [Disabled], Ipv6 boot option will not be created.

PXE Boot Wait Time

Use this item to set wait time to press [ESC] key to abort the PXE boot.

Media Detect Count

Use this item to set number of times presence of media will be checked.
The optional settings range from [1] to [50].

- **CSM Configuration**

Press [Enter] to make settings for the following sub-items:

Compatibility Support Module Configuraton

Boot option filter

This item controls Legacy/UEFI ROMs priority.
The optional settings are: [UEFI and Legacy]; [Legacy only]; [UEFI only].

Network

This item controls the execution of UEFI and Legacy PXE OpROM.
The optional settings are: [Do not launch]; [UEFI]; [Legacy].

Storage

This item controls the execution of UEFI and Legacy Storage OpROM.
The optional settings are: [Do not launch]; [UEFI]; [Legacy].

Video

This item controls the execution of UEFI and Legacy Video OpROM.
The optional settings are: [UEFI]; [Legacy].

Other PCI devices

This item determines OpROM execution policy for devices other than Network, storage or video.
The optional settings are: [Do not launch]; [UEFI]; [Legacy].

- **Wake-up Function Settings**

Press [Enter] to make settings for the following sub-items:

Wake-up System with Fixed Time

Use this item to enable or disable system wake on alarm event.
The optional settings: [Disabled]; [Enabled].

When set as [Enabled], system will wake on the hour/min/sec specified.

Wake-up System with Dynamic Time

Use this item to enable or disable system wake on alarm event.

System will wake on the current time + Increase minutes.

The optional settings: [Disabled]; [Enabled].

When set as [Enabled], system will wake on the current time + increased minute(s).

USB3.0 Wake-up from S4

Use this item to enable or disable USB 3.0 wake-up fromS4.

The optional settings: [Disabled]; [Enabled].

******Note****: This function is supported when '****ERP Support****' is set as [Disabled].*

USB2.0 Wake-up from S4

Use this item to enable or disable USB 2.0 wake-up fromS4.

The optional settings: [Disabled]; [Enabled].

******Note****: This function is supported when '****ERP Support****' is set as [Disabled].*

- **USB Configuration**

Press [Enter] to make settings for the following sub-items:

USB Configuration

Legacy USB Support

The optional settings are: [Enabled]; [Disabled]; [Auto].

[Enabled]: To enable legacy USB support.

[Disabled]: To keep USB devices available only for EFI specification,

[Auto]: To disable legacy support if no USB devices are connected.

XHCI Hand-off

This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.

The optional settings are: [Enabled]; [Disabled].

USB Mass Storage Driver Support

The optional settings are: [Disabled]; [Enabled].

USB Hardware Delays and Time-outs:

USB Transfer Time-out

Use this item to set the time-out value for control, bulk, and interrupt transfers.
The optional settings are: [1 sec]; [5 sec]; [10 sec]; [20 sec].

Device Reset Time-out

Use this item to set USB mass storage device start unit command time-out.
The optional settings are: [10 sec]; [20 sec]; [30 sec]; [40 sec].

Device Power-up Delay

Use this item to set maximum time the device will take before it properly reports itself to the host controller.
The optional settings: [Auto]; [Manual].
'Auto' uses default value: for a root port it is 100 ms, for a hub port the delay is taken from hub descriptor.
Select [Manual] you can set value for the following sub-item: '**Device Power-up Delay in Seconds'.**

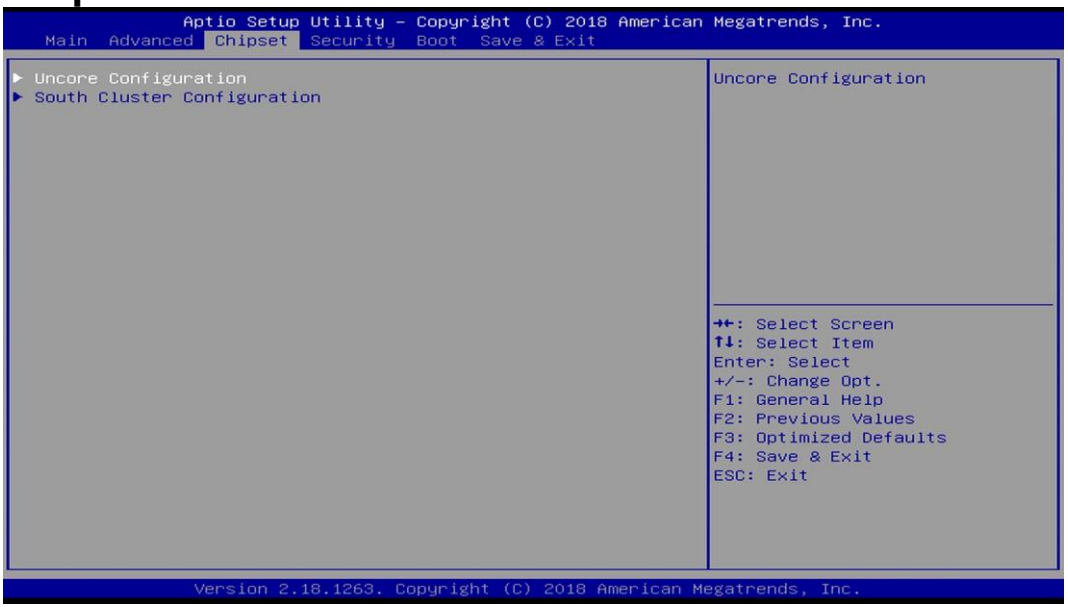
Device Power-up Delay in Seconds

The delay range is from [1] to [40] seconds, in one second increments.

► **Realtek PCIe GBE Family Controller(MAC:XX:XX:XX:XX:XX:XX)/ Realtek PCIe GBE Family Controller(MAC:XX:XX:XX:XX:XX:XX)**

These items show current network brief information.

3-8 Chipset Menu



► **Uncore Configuration**

Press [Enter] to make settings for the following sub-items:

GTT Size

The optional settings are: [2MB]; [4MB]; [8MB].

DVMT Pre-Allocated

Use this item to select DVMT 5.0 pre-allocated (fixed) graphics memory size used by the internal graphics device.

The optional settings are: [64M]; [96M]; [128M]; [160M]; [192M]; [224M]; [256M]; [288M]; [320M]; [352M]; [384M]; [416M]; [448M]; [480M]; [512M].

DVMT Total Gfx Mem

Use this item to select DVMT 5.0 total graphics memory size used by the internal graphics device.

The optional settings are: [128M]; [256M]; [MAX].

Primary IGFX Boot Display
Use this item to select the video device which will be activated during POST. This has no effect if external graphics present. Secondary boot display selection will appear based on your selection. VGA modes will be supported only on primary display.
The optional settings are: [Auto]; [CRT]; [HDMI1]; [HDMI2].
Secondary IGFX Boot Display
Use this item to select Secondary Display Device.
The optional settings are: [Disabled]; [CRT]; [HDMI1]; [HDMI2].

Memory Information

The working memory information will be on display.

► **South Cluster Configuration**

▸ **PCI Express Configuration**
Press [Enter] to make settings for the following sub-items:
Peer Memory Write Enable
The optional settings: [Disabled]; [Enabled].
Compliance Mode
The optional settings: [Disabled]; [Enabled].
Onboard PCIE LAN1/ Onboard PCIE LAN2
The optional settings: [Disabled]; [Enabled].

▸ **SATA Configuration**
Press [Enter] to make settings for the following sub-items:
SATA Controller(s)
The optional settings are: [Enabled]; [Disabled].
When set as [Enabled], the following items shall appear:
SATA Mode Selection
The default setting is: [AHCI].
Use this item to enable or disable each SATA port.
SATA Port
SATA Port

The optional settings: [Disabled]; [Enabled].

mSATA

mSATA

Use this item to enable or disable MSATA port.

The optional settings: [Disabled]; [Enabled].

HD-Audio Support

Use this item to enable or disable HD-Audio Support.

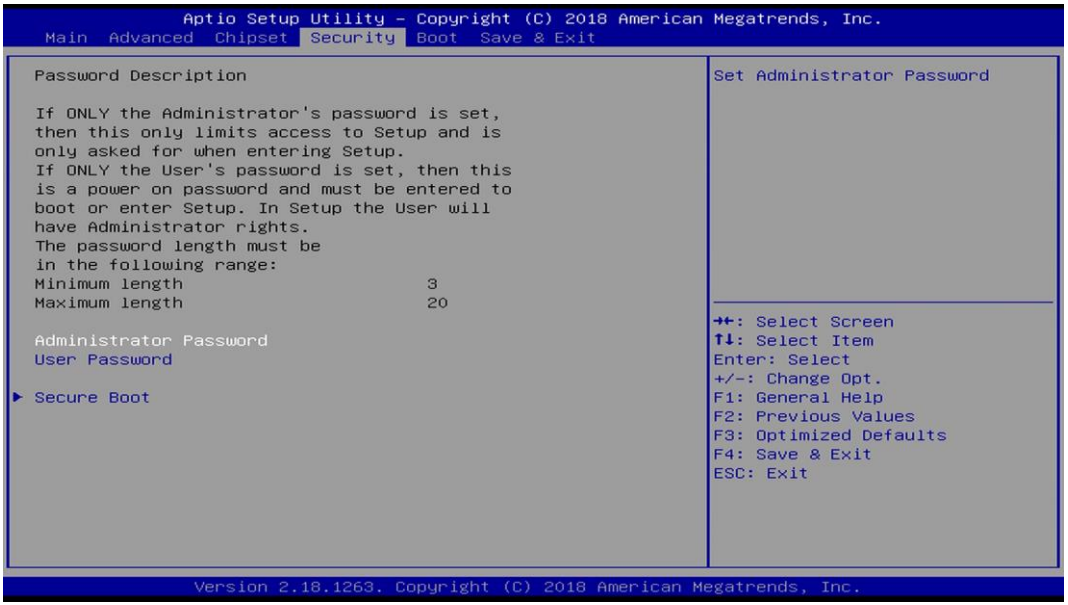
The optional settings are: [Disabled]; [Enabled].

System State after Power Failure

Use this item to specify what state to go to when power re-applied after a power failure (G3 state).

The optional settings are: [Always On]; [Always Off]; [Former State].

3-9 Security Menu



Security menu allow users to change administrator password and user password settings.

Administrator Password

If there is no password present on system, please press [Enter] to create new administrator password. If password is present on system, please press [Enter] to verify old password then to clear/change password. Press again to confirm the new administrator password.

User Password

If there is no password present on system, please press [Enter] to create new administrator password. If password is present on system, please press [Enter] to verify old password then to clear/change password. Press again to confirm the new administrator password.

- **Secure Boot**

  Press [Enter] to make customized secure settings:

  Secure Boot Control

  The optional settings are: [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

  The optional settings are: [Standard]; [Custom].

  Set UEFI Secure Boot Mode to Standard mode or Custom mode. This change is effective after save. After reset, this mode will return to Standard mode.

  **When set as [Custom], user can make further settings in 'Key Management'.*

  - **Key Management**

    This item enables experienced users to modify Secure Boot variables, witch includes the following items:

    Provision Factory Default Keys

    This item is for user to install factory default secure boot keys when system is in Setup Mode.

    - **Enroll all Factory Default Keys**

      This item forces system to User Mode-install all Factory Default keys.

- **Save all Secure Boot Variables**

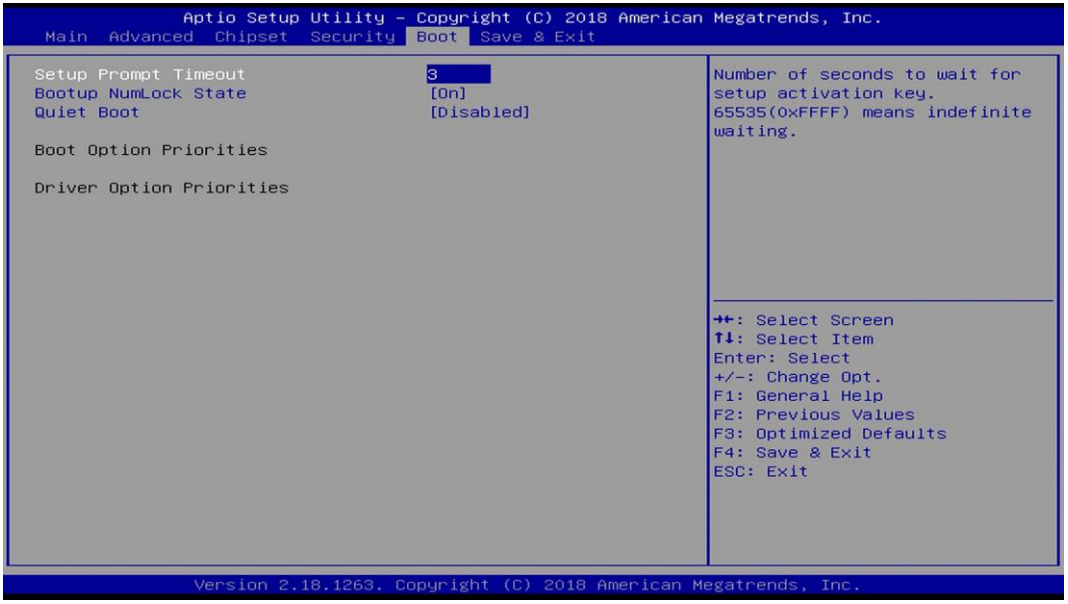
This item will save NRRAM content of all Secure Boot variables to the files (WFI_SIGNATURE_LIST data format) in root folder on a target file system device.

- **Platform Key (PK)/Key Exchange Keys/Authorized Signature/Forbidden Signature/ Authorized TimeStamps/OS Recovery Signatures**

Use this item to enroll Factory Defaults or load the keys from a file with:

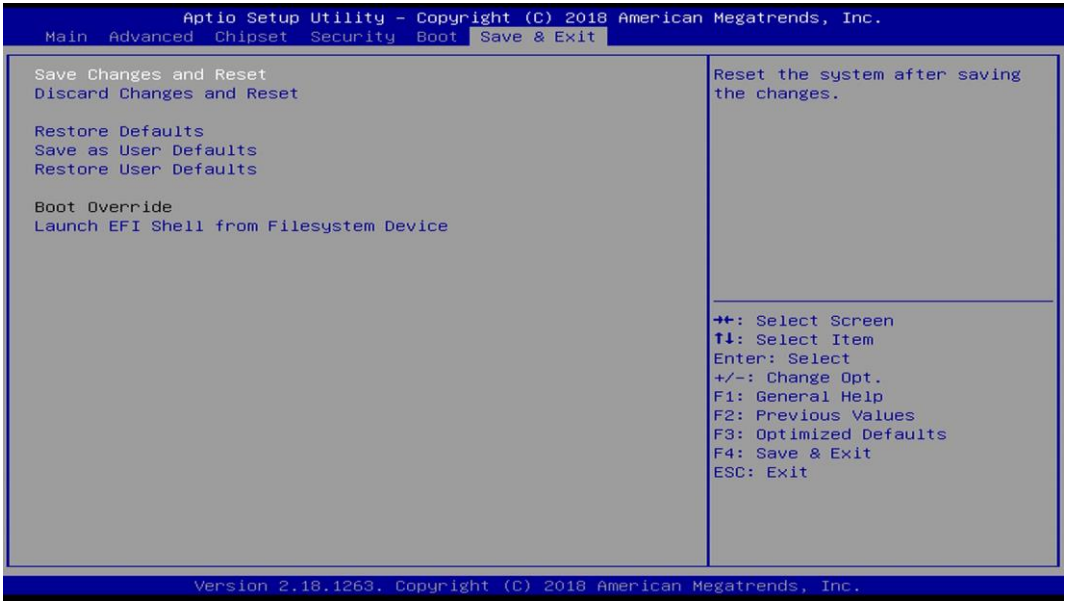
1. Public Key Certificate in:
   a) EFI_SIGNATURE_LIST
   b) EFI_ CERT_X509 (DER encoded)
   c) EFI_ CERT_RSA2048 (bin)
   d) EFI_ CERT_SHA256 (bin)
2. Authenticated UEFI Variable

3-10 Boot Menu



Setup Prompt Timeout
Use this item to set number of seconds to wait for setup activation key.
Bootup Numlock State
Use this item to select keyboard numlock state.
The optional settings are: [On]; [Off].
Quiet Boot
The optional settings are: [Disabled]; [Enabled].
Boot Option Priorities
Boot Option #1/ Boot Option #2…
Use this item to decide system boot order from available options.

3-11 Save & Exit Menu



Save Changes and Reset
This item allows user to reset the system after saving the changes.

Discard Changes and Reset
This item allows user to reset the system without saving any changes.

Restore Defaults
Use this item to restore /load default values for all the setup options.
Save as User Defaults
Use this item to save the changes done so far as user defaults.
Restore User Defaults
Use this item to restore defaults to all the setup options.

Boot Override

The available options here are dynamically updated and make system boot to any boot option selected.
Lauch EFI Shell from filesystem device
Use this item to launch EFI shell application (shell.efi) from one of the available filesystem device.