SR700-X3

IP65 MIL-STD-810G Rugged Computer

Safety Information

Electrical safety

- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
- When adding or removing devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.
- Before connecting or removing signal cables from the motherboard, ensure that all power cables are unplugged.
- Seek professional assistance before using an adapter or extension cord. These devices could interrupt the grounding circuit.
- Make sure that your power supply is set to the correct voltage in your area.
- If you are not sure about the voltage of the electrical outlet you are using, contact your local power company.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your local distributor.

Operation safety

- Before installing the motherboard and adding devices on it, carefully read all the manuals that came with the package.
- Before using the product, make sure all cables are correctly connected and the power cables are not damaged. If you detect any damage, contact your dealer immediately.
- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.
- Avoid dust, humidity, and temperature extremes. Do not place the product in any area where it may become wet.
- Place the product on a stable surface.
- If you encounter any technical problems with the product, contact your local distributor

Statement

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- All product specifications are subject to change without prior notice

SR700-X3 User's Manual

Revision History

Revision	Date (yyyy/mm/dd)	Changes
V1.0	2019/10/16	First release
V2.0	2020/6/5	Upgrade Motherboard

Packing list

- ☐ SR700-X3 Rugged Fanless System
- ☐ CD (Driver + Quick Installation Guide)
- ☐ Testing Cable

If any of the above items is damaged or missing, please contact your local distributor.

SR700-X3 User's Manual

Table Contents

Chapter 1: Product Introduction

1.1 Specifications

SYSTEM

High Power Processor	i7-7820EQ Intel® 7th Gen Core™ i7-7820EQ (Frequency 3.0GHz, Turbo Boost Frequency up to 3.7GHz), Quad-Core, 8 Thread Support, 8MB SmartCache.
Memory type	Up to 32GB DDR4 SDRAM
Expansion Slot	1 x Full-size mPCIe (w/ SIM card supported) 1 x Full-size mPCIe (w/ mSATA supported) 1 x M.2 (M-Key), 2280 storage devices support (SATA)

DISPLAY

VGA	Intel® HD Graphics 530/630 Optional : NVidia® GTX1050 TI MXM graphics Resolution up to 1920x1200@60Hz or 2048x1152@60Hz with reduced blanking

STORAGE

mSATA	1 x Full-size mPCIe up to 512 GB
M.2	Up to 1TB
Ethernet	2 x Intel Gigabit Ethernet LAN Interfaces (10/100/1000Mbps)

FRONT I/O

VGA	1 x Rugged M12 connector
USB	1 x Rugged M12 connector (2 x USB 2.0 Ports)
Serial Port	1 x Rugged M12 connector (1 x RS-232, 1 x RS-485)
Ethernet	2 x Rugged M12 connectors
DC-IN	1 x Rugged M12 connector

APPLICATIONS, OPERATING SYSTEM

Applications	Commercial and Military Platforms Requiring Compliance to MIL-STD-810G Embedded Computing, Process Control, Intelligent Automation and manufacturing applications where Harsh Temperature, Shock, Vibration, Altitude, Dust and EMI Conditions. Used in all aspects of the military
Operating System	Windows 10 32/64Bit Ubuntu13.04, Ubuntu13.10, Ubuntu14.04, Fedora 20

Dimension	350 x 230 x 86 mm
Weight	8.6 Kg (18.9 lbs)
Chassis	SECC
Heatsink	Aluminum Alloy, Corrosion Resistant
Finish	Anodic aluminum oxide (Color Iron gray)
Cooling	Natural Passive Convection/Conduction. No Moving Parts.
Connectors	DC-IN : Phoenix Contact 1424136 Ethernet : Phoenix Contact 1424177 VGA : Phoenix Contact 1441833 USB : Phoenix Contact 1424177 COM : Phoenix Contact 1441833
Ingress Protection	IP65

MECHANICAL AND ENVIRONMENT

Reliability	No Moving Parts; Passive Cooling. Designed & Manufactured using ISO 9001/2000 Certified Quality Program.
Operating Temp	-40°C to 60°C
Storage Temp.	-40°C to 85°C

CERTIFICATION

MIL-STD-810G Test
Operating Tests

|		
Low Temperature	Method 502.5 Procedure 2	exposure(24h x 3 cycle) at -40℃ min.
High Temperature	Method 501.5 Procedure 2	60°C for 2 hours after temperature stabilization.
Humidity	Method 507.5 Procedure 2	RH -95%. Test cycles: ten 24-hours , functional test after 5th and 10th cycles
Vibration	Method 514.6 Category 20	10—500Hz 1.04Grms Test duration: 1 hours x 3 axis (total 3 hours)
Shock	Method 516.6 Procedure 1	20G, 11mSec, 3 per axis

Non-Operating Tests

Low Temperature Storage	Method 502.5	exposure(24h x 7 cycle) at -40℃ min.
High Temperature Storage	Method 501.5 Procedure 1	71°C for 2 hours after temperature stabilization.
Vibration	Method 514.6 Category 24	200 to 2000Hz Test duration: One hour per axis; rms = 7.7 gs
Shock	Method 516.6 Procedure V	40G, 11ms, 3 pluse.

EMC	CE, FCC compliant
Green Product	RoHS, WEEE compliance

1.2 Dimensions
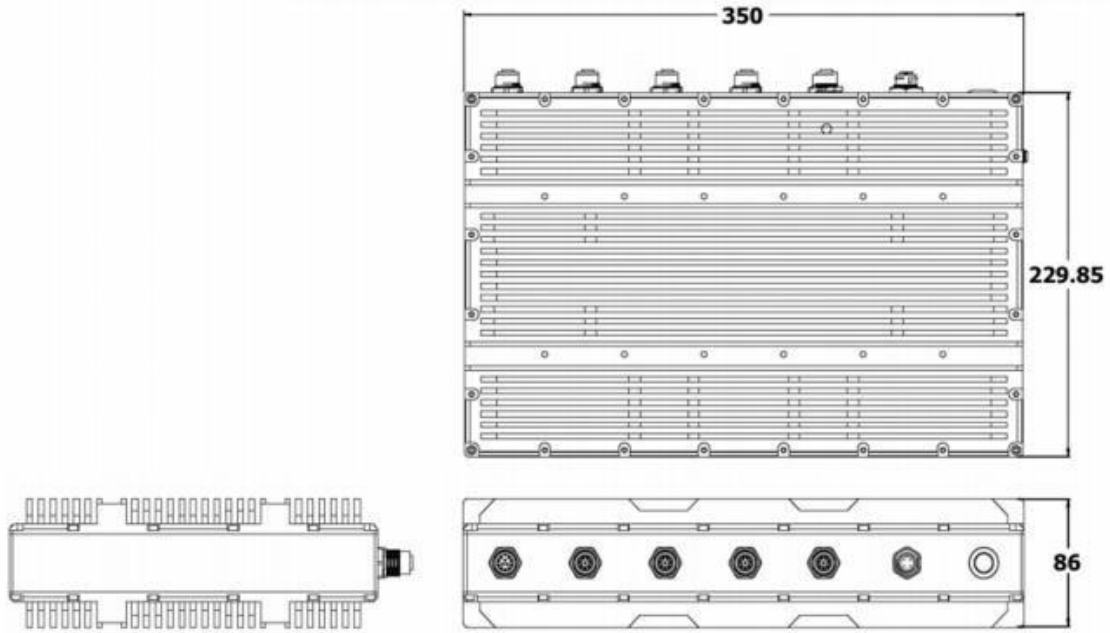
1.3 Panel Component
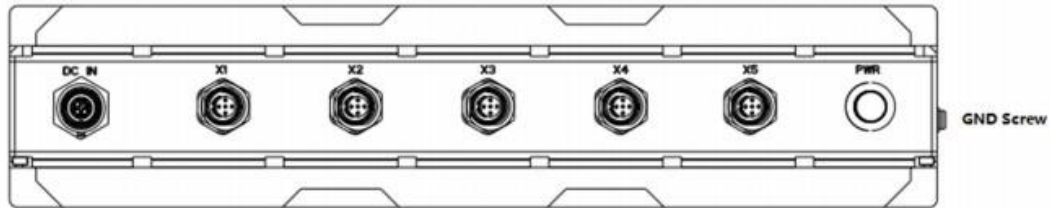
DC-IN	DC-IN 9-36V
X1	1 x Gigabit Ethernet Port
X2	1 x Gigabit Ethernet Port
X3	2 x USB2.0 Ports
X4	1 x VGA Port
X5	1 x RS232, 1 x RS485 Ports

7STARLAKE

Chapter 2: Connector pin definition
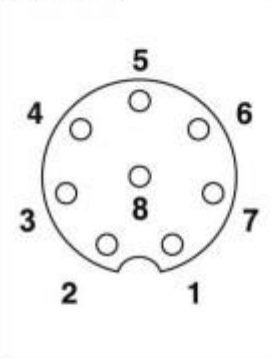
2.1 DC-IN Power Connector

Pin	Definition
1	(+)
2	(+)
3	(−)
PE	(−)
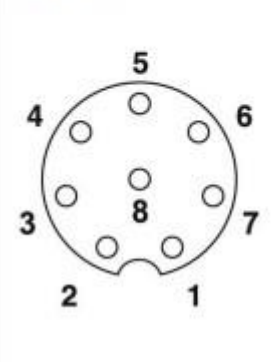
2.2 LAN (X1, X2), (M12, A-code, 8pin)

Pin	Signal
1	D1+
2	D1-
3	D2+
4	D2-
5	D3+
6	D3-
7	D4+
8	D4-
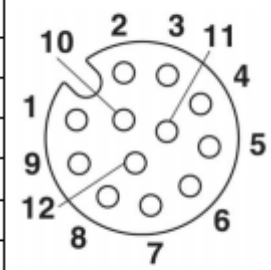
2.3 USB2.0 (X3), (M12, A-code, 8pin)

Pin	Signal
1	VCC
2	Data -
3	Data +
4	GND
5	VCC
6	Data -
7	Data +
8	GND
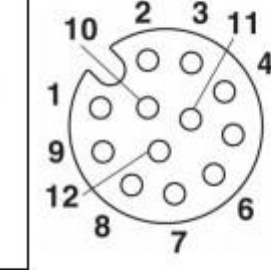
2.4 VGA (X4), (M12, 12pin)

Pin	Signal
1	RED
2	R_Ground
3	GREEN
4	G_Ground
5	BLUE
6	B_Ground
7	H-Sync
8	
9	V-Sync
10	
11	DDC DATA
12	DDC CLOCK

2.5 COM, RS232+485 (X5), (M12, 12pin)

Pin	Signal	Function
1	DCD	
2	RXD	
3	TXD	
4	DTR	
5	GND	RS-232
6	DSR	
7	RTS	
8	CTS	
9	RI	
10	RXD(D+)	
11	GND	RS-485
12	DCD(D-)	

Appendix
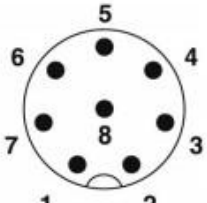
1. TEST Power cable (M12, S-code, 4pin)

Pin	Definition	Cable color
1	(+)	Red
2	(+)	White
3	(−)	Black
PE	(−)	Green
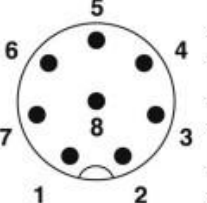
2. TEST LAN cable (M12, A-code, 8pin)

M12		RJ45	
Pin	Signal	Pin	Signal
1	D1+	1	D1+
2	D1-	2	D1-
3	D2+	3	D2+
4	D2-	6	D2-
5	D3+	5	D3+
6	D3-	4	D3-
7	D4+	7	D4+
8	D4-	8	D4-

T568B
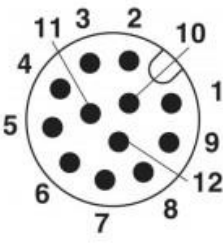
3. TEST USB2.0 cable, (M12, A-code, 8pin)

M12		USB	
Pin	Signal	Pin	Signal
1	VCC	1	VCC
2	D-	2	D-
3	D+	3	D+
4	Ground	4	Ground
5	VCC	5	VCC
6	D-	6	D-
7	D+	7	D+
8	Ground	8	Ground

(Port1)

(Port2)

4. TEST VGA cable, (M12, 12pin)
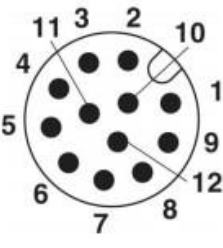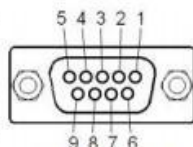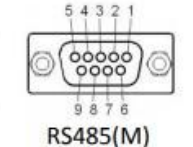
M12		DB15
Pin	Signal	Pin
1	RED	1
2	R_Ground	6
3	GREEN	2
4	G_Ground	7
5	BLUE	3
6	B_Ground	8
7	H-Sync	13
8	Ground	10
9	V-Sync	14
10	Ground	11
11	DDC DATA	12
12	DDC CLOCK	15

DB15

(view into male end)

5. TEST COM Port cable, (M12, 12pin)

M12(P)		Pin define		DB9(M)
	1	DCD	1	
	2	RXD	2	
	3	TXD	3	
	4	DTR	4	
	5	GND	5	
	6	DSR	6	D-SUB 9P(M) RS232
	7	RTS	7	
	8	CTS	8	
	9	VCC	9	
	10	RXD(D+)	2	
	11	GND	5	RS485(M)
	12	DCD(D-)	1	

Chapter 3: AMI BIOS UTILITY

This chapter provides users with detailed descriptions on how to set up a basic system configuration through the AMI BIOS setup utility.

3.1 Starting

To enter the setup screens, perform the following steps:
- Turn on the computer and press the <Del> key immediately.
- After the <Del> key is pressed, the main BIOS setup menu displays. Other setup screens can be accessed from the main BIOS setup menu, such as the Chipset and Power menus.

3.2 Navigation Keys

The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process.
Some of the hot keys are <F1>, <F10>, <Enter>, <ESC>, and <Arrow> keys.

> **Some of the navigation keys may differ from one screen to another.**

Left/Right	The Left and Right <Arrow> keys moves the cursor to select a menu.
Up/Down	The Up and Down <Arrow> keys moves the cursor to select a setup screen or sub-screen.
+− Plus/Minus	The Plus and Minus <Arrow> keys changes the field value of a particular setup setting.
Tab	The <Tab> key selects the setup fields.
F1	The <F1> key displays the General Help screen.
F10	The <F10> key saves any changes made and exits the BIOS setup utility.
Esc	The <Esc> key discards any changes made and exits the BIOS setup utility.
Enter	The <Enter> key displays a sub-screen or changes a selected or highlighted option in each menu.

3.3 Main Menu
The Main menu is the screen that first displays when BIOS Setup is entered, unless an error has occurred.
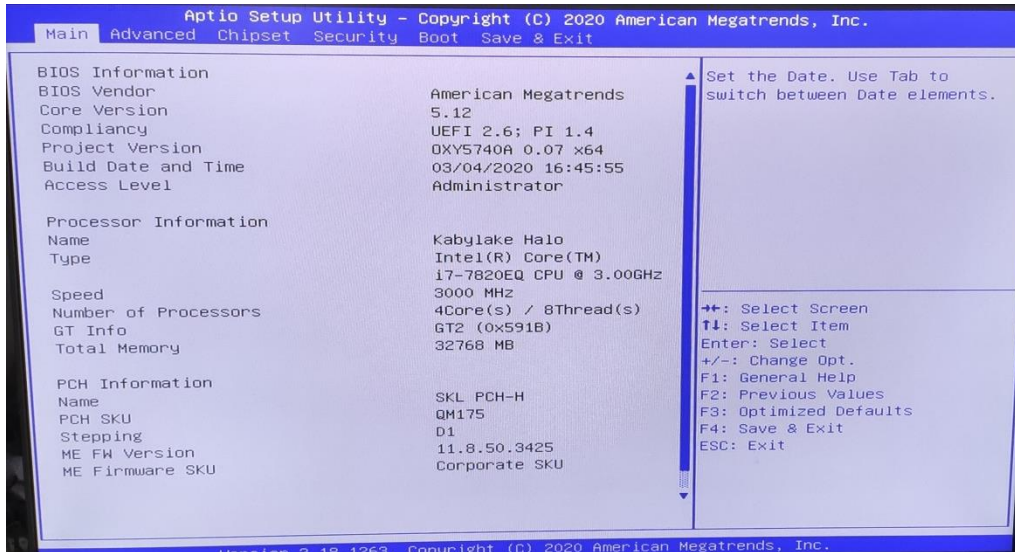
System Date
Use this function to change the system date.
Select System Date using the Up and Down <Arrow> keys. Enter the new values through the keyboard. Press the Left and Right <Arrow> keys to move between fields.
The date setting must be entered in MM/DD/YY format.

System Time
Use this function to change the system time.
Select System Time using the Up and Down <Arrow> keys. Enter the new values through the keyboard. Press the Left and Right <Arrow> keys to move between fields.
The time setting is entered in HH:MM:SS format.
Note: The time is in 24-hour format. For example, 5:30 A.M. appears as 05:30:00, and 5:30 P.M. as 17:30:00.

Access Level
Display the access level of the current user in the BIOS.

3.4 Advanced Menu
The Advanced Menu allows you to configure your system for basic operation. Some entries are defaults required by the system board, while others, if enabled, will improve the performance of your system or let you set some features according to your preference. ***Setting incorrect field values may cause the system to malfunction.***
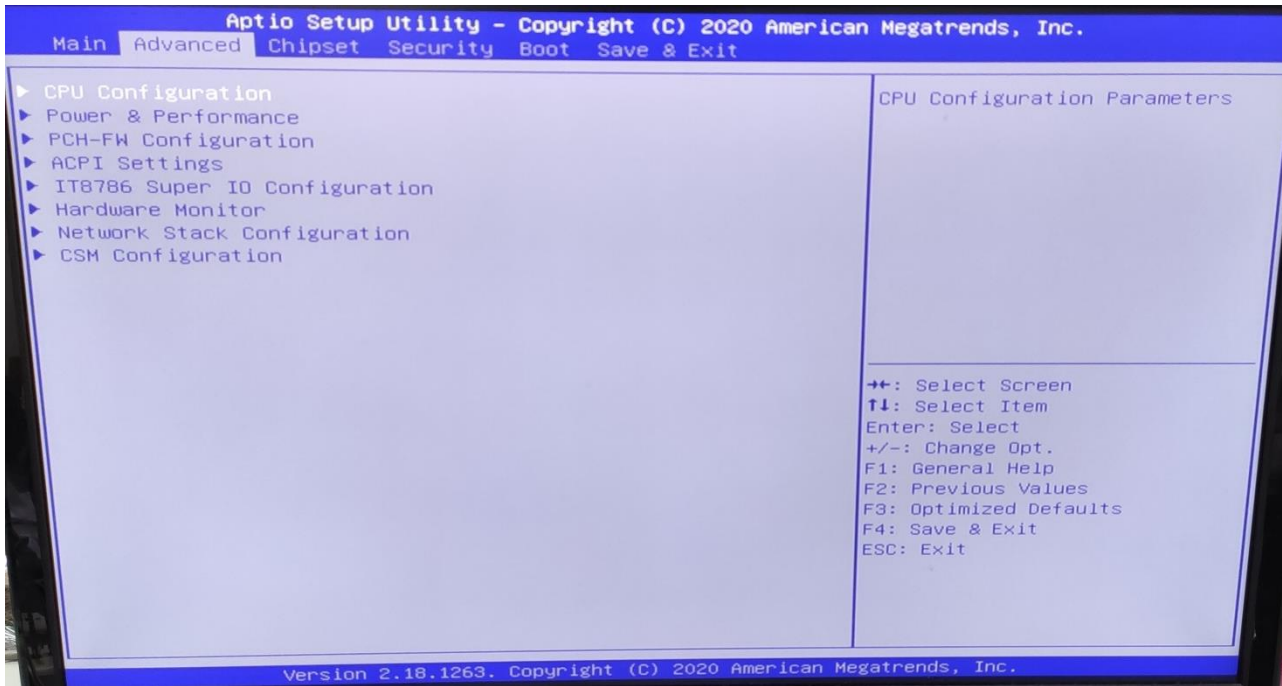
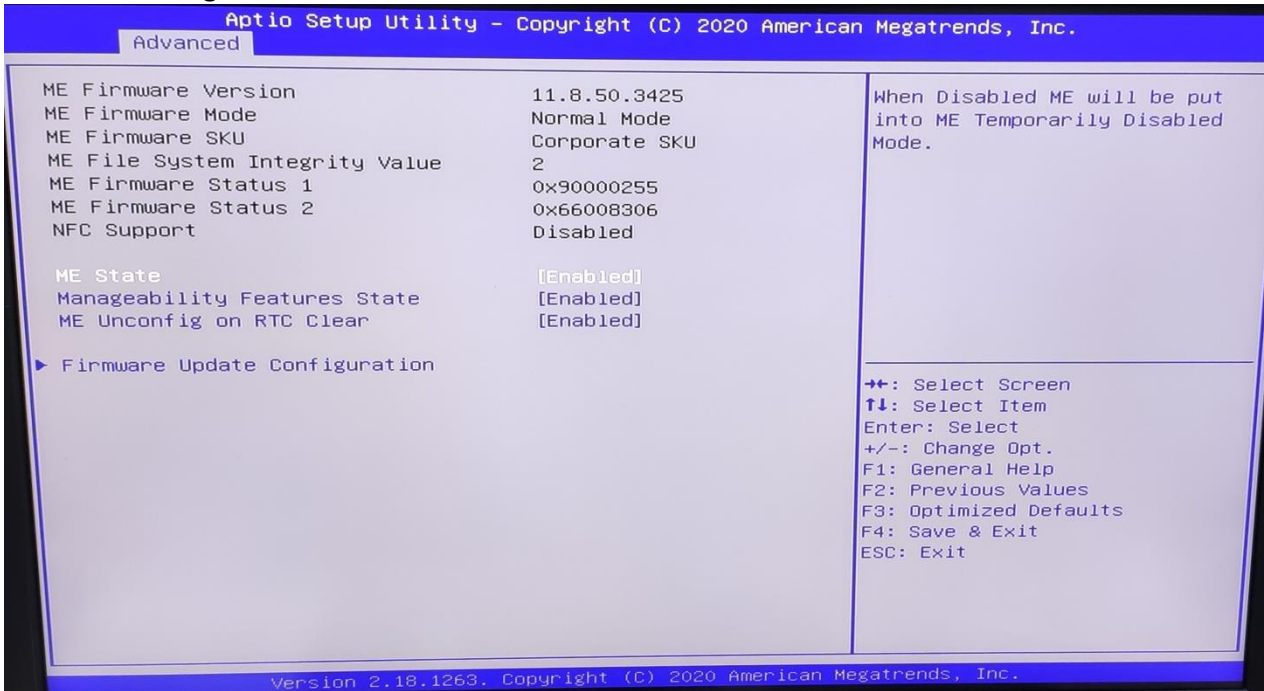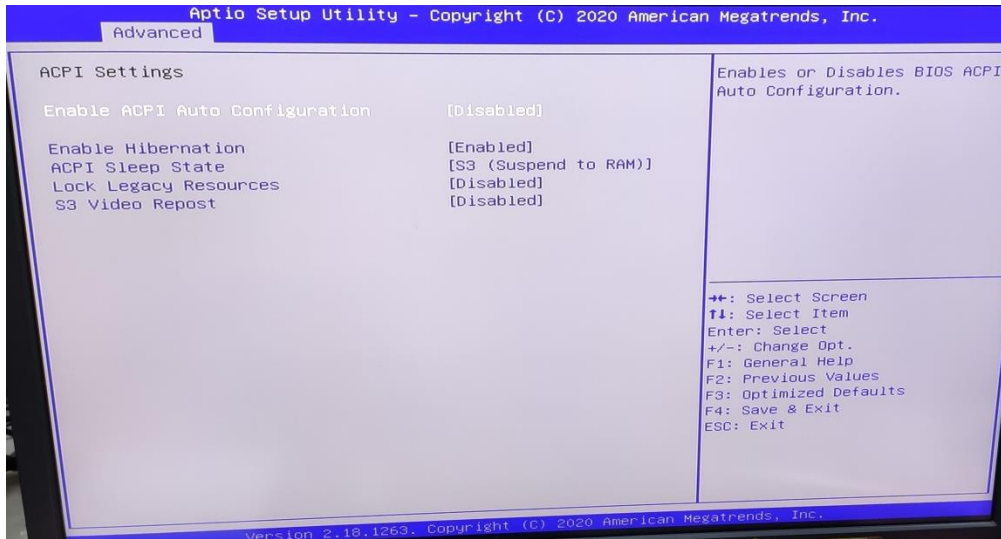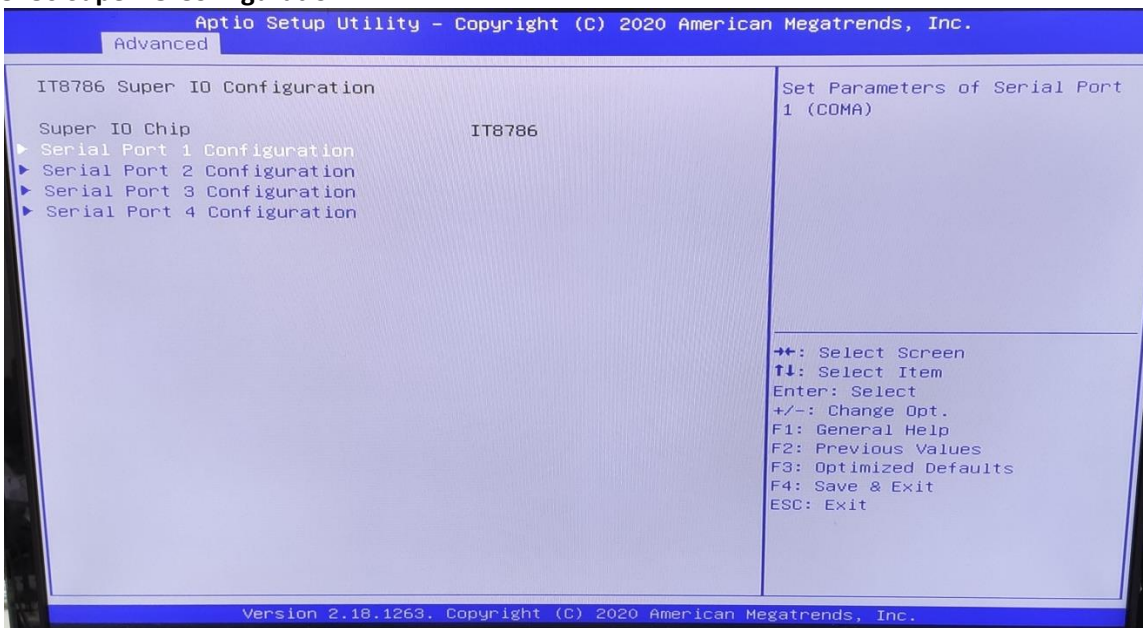### 3.4.1 CPU Configuration
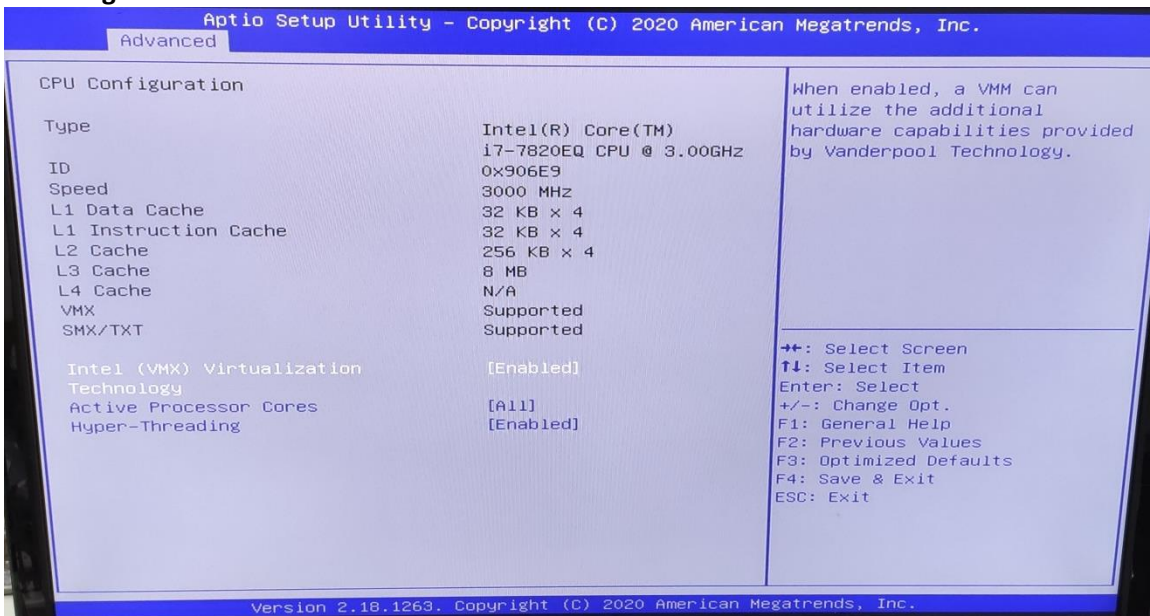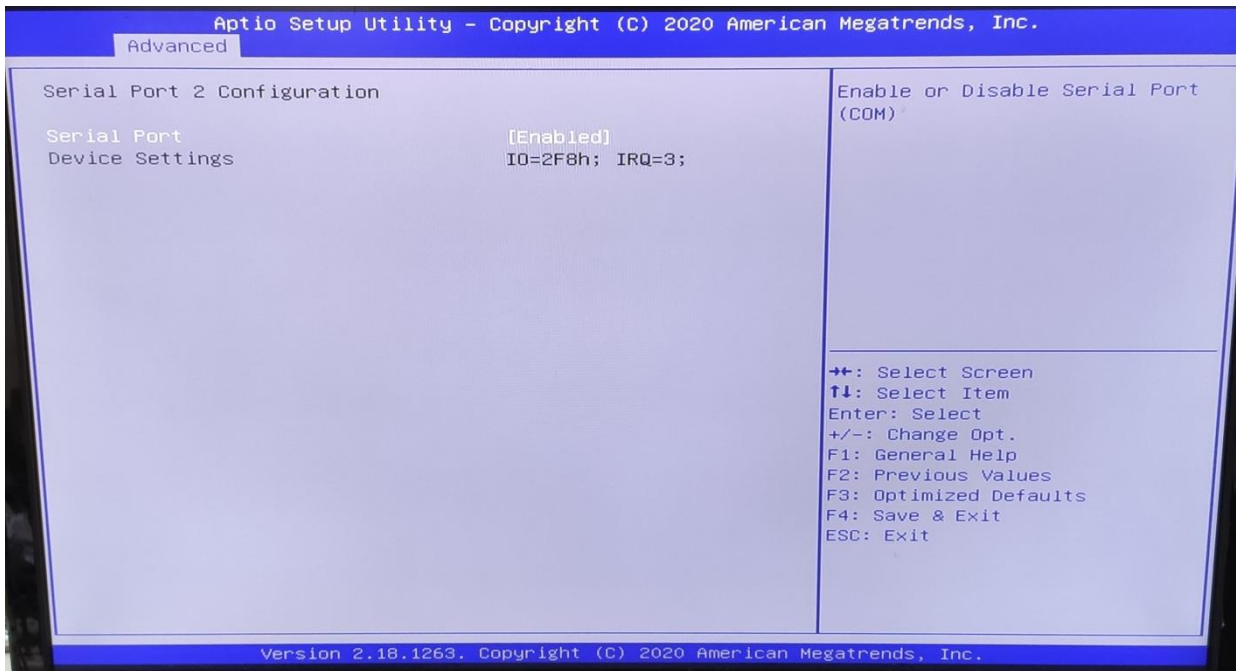

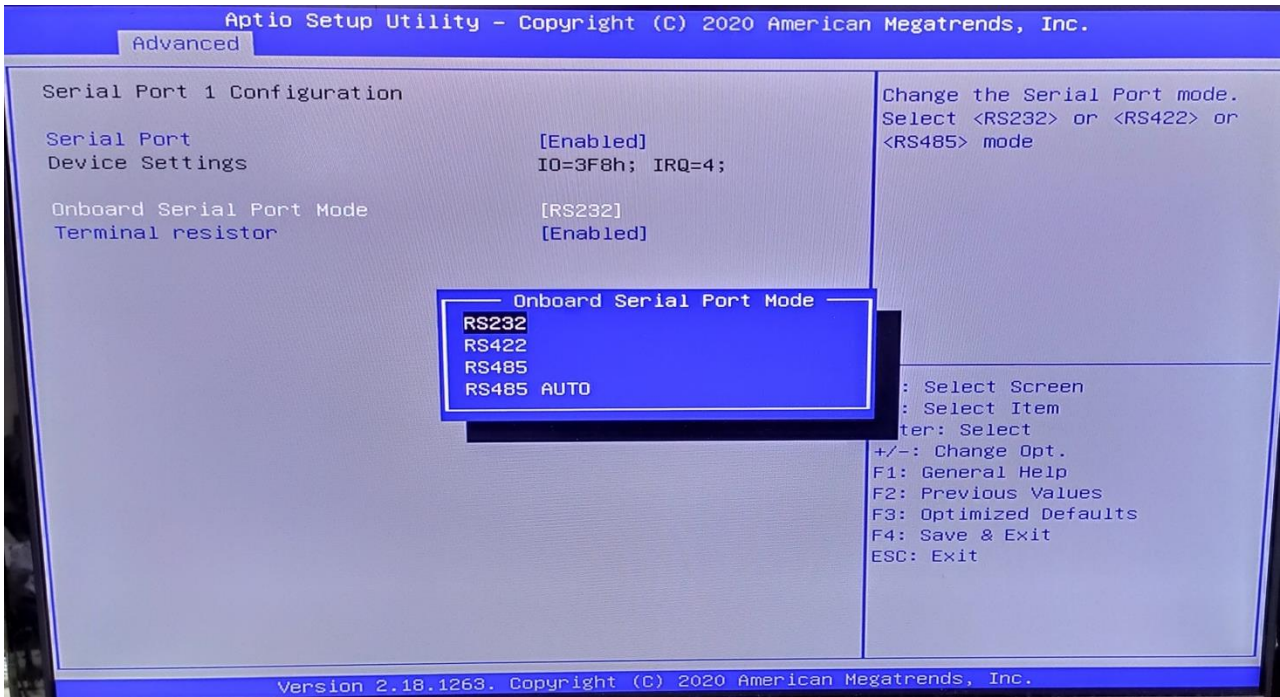### 3.4.2 Power & Performance
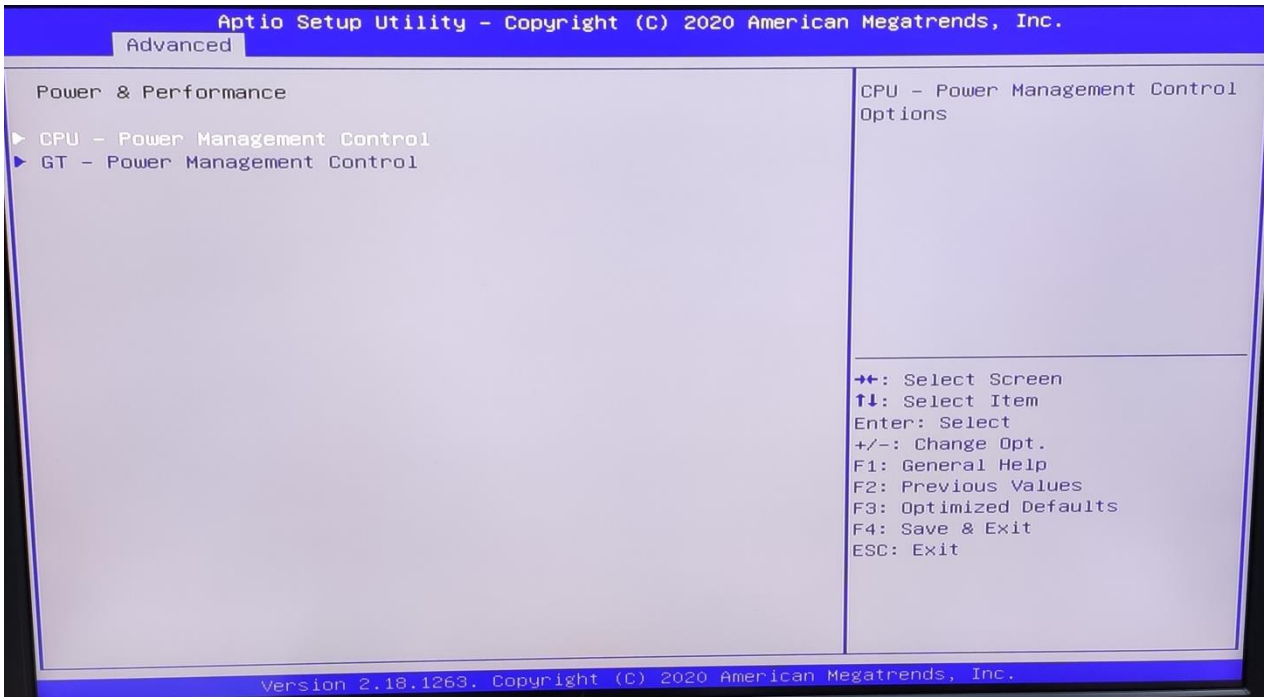
3.4.3 PCH-FW Configuration

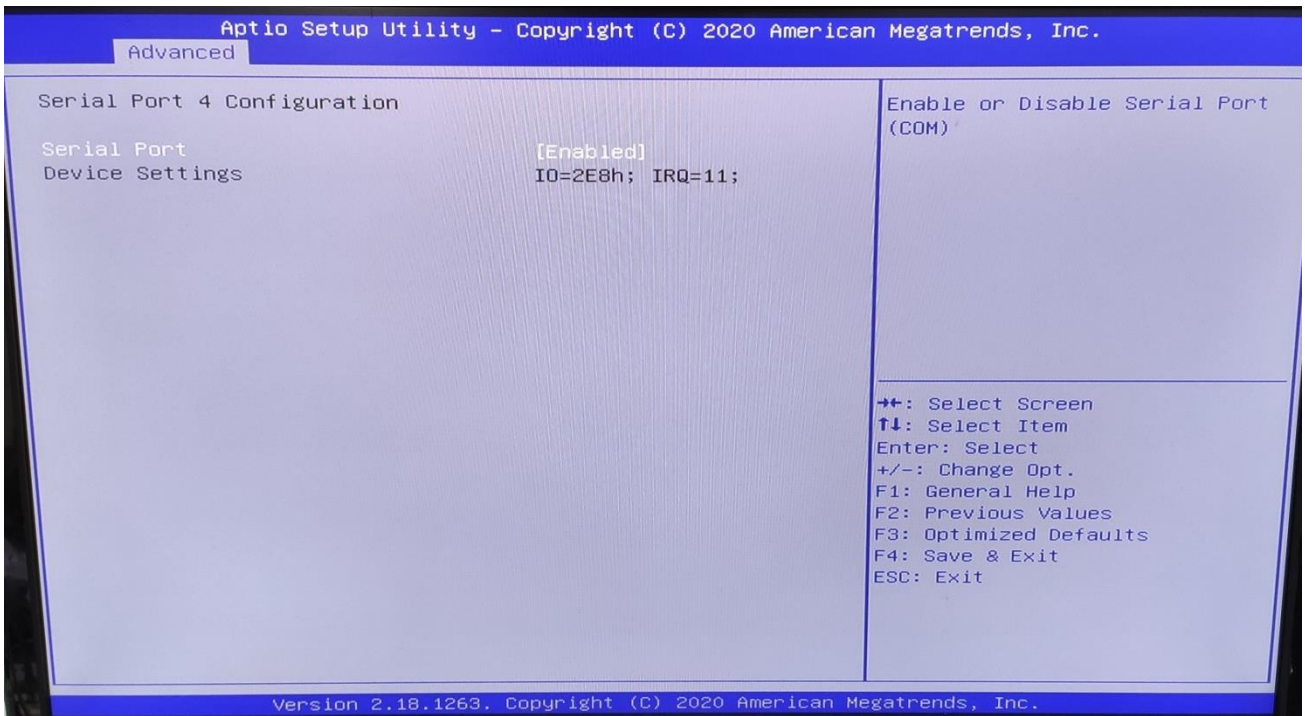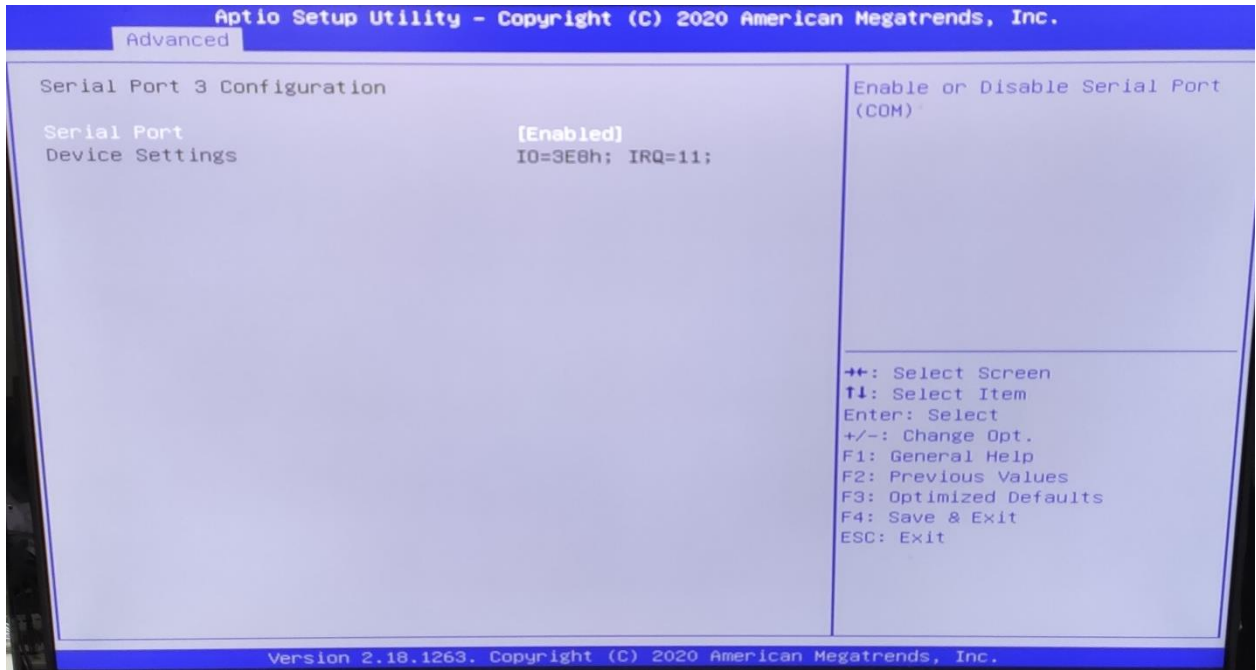### 3.4.4 ACPI Setting

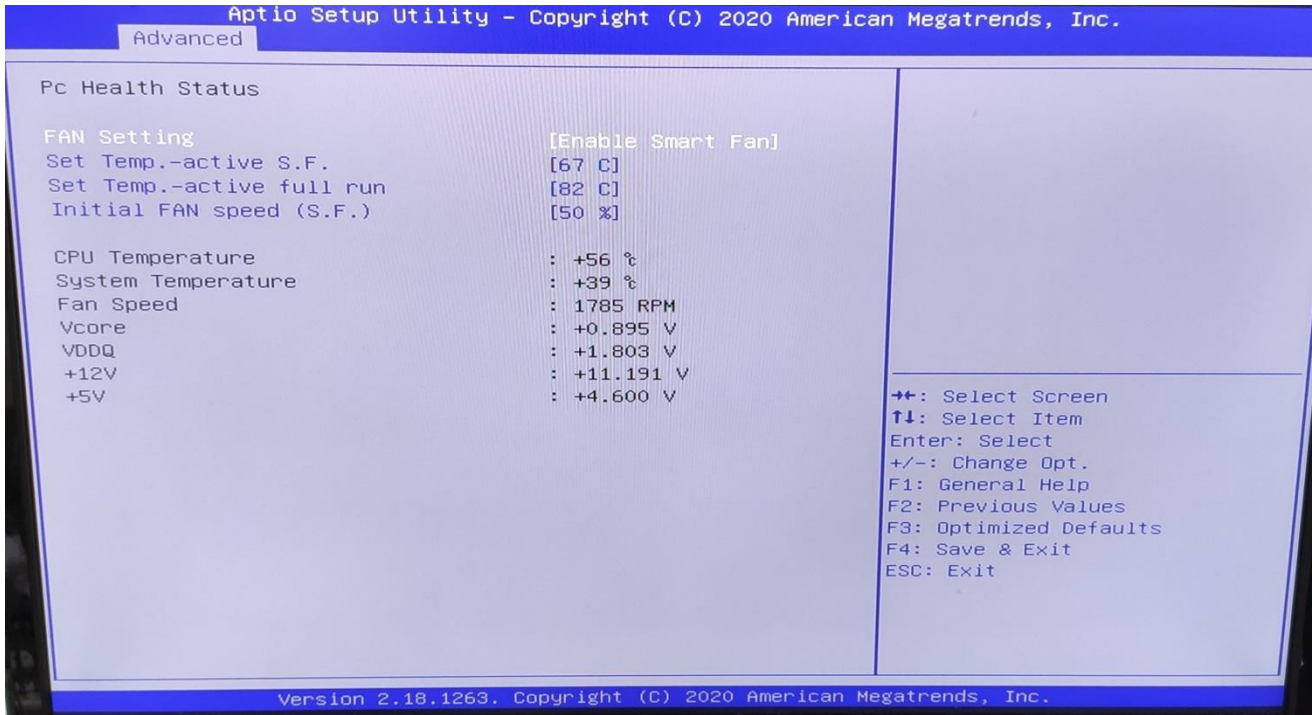### 3.4.5 IT8786 Super IO Configuration

User can choose a mode (RS232/RS422/RS485) on each serial port.

3.4.6 Hardware Monitor

```
              Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
       Advanced

  Pc Health Status

  FAN Setting                         [Enable Smart Fan]
  Set Temp.-active S.F.               [67 C]
  Set Temp.-active full run           [82 C]
  Initial FAN speed (S.F.)            [50 %]

  CPU Temperature                     : +56 ℃
  System Temperature                  : +39 ℃
  Fan Speed                           : 1785 RPM
  Vcore                               : +0.895 V
  VDDQ                                : +1.803 V
  +12V                                : +11.191 V
  +5V                                 : +4.600 V
                                                      →←: Select Screen
                                                      ↑↓: Select Item
                                                      Enter: Select
                                                      +/-: Change Opt.
                                                      F1: General Help
                                                      F2: Previous Values
                                                      F3: Optimized Defaults
                                                      F4: Save & Exit
                                                      ESC: Exit


              Version 2.18.1263. Copyright (C) 2020 American Megatrends, Inc.
```

3.4.7 CSM Configuration

```
              Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
       Advanced

  Compatibility Support Module Configuration           Enable/Disable CSM Support.

  CSM Support                         [Enabled]

  CSM16 Module Version                07.81

  GateA20 Active                      [Upon Request]
  Option ROM Messages                 [Force BIOS]
  INT19 Trap Response                 [Immediate]

  Boot option filter                  [UEFI and Legacy]

  Option ROM execution

  Network                             [Do not launch]
  Storage                             [Legacy]       →←: Select Screen
  Video                               [Legacy]       ↑↓: Select Item
  Other PCI devices                   [UEFI]         Enter: Select
                                                      +/-: Change Opt.
                                                      F1: General Help
                                                      F2: Previous Values
                                                      F3: Optimized Defaults
                                                      F4: Save & Exit
                                                      ESC: Exit


              Version 2.18.1263. Copyright (C) 2020 American Megatrends, Inc.
```

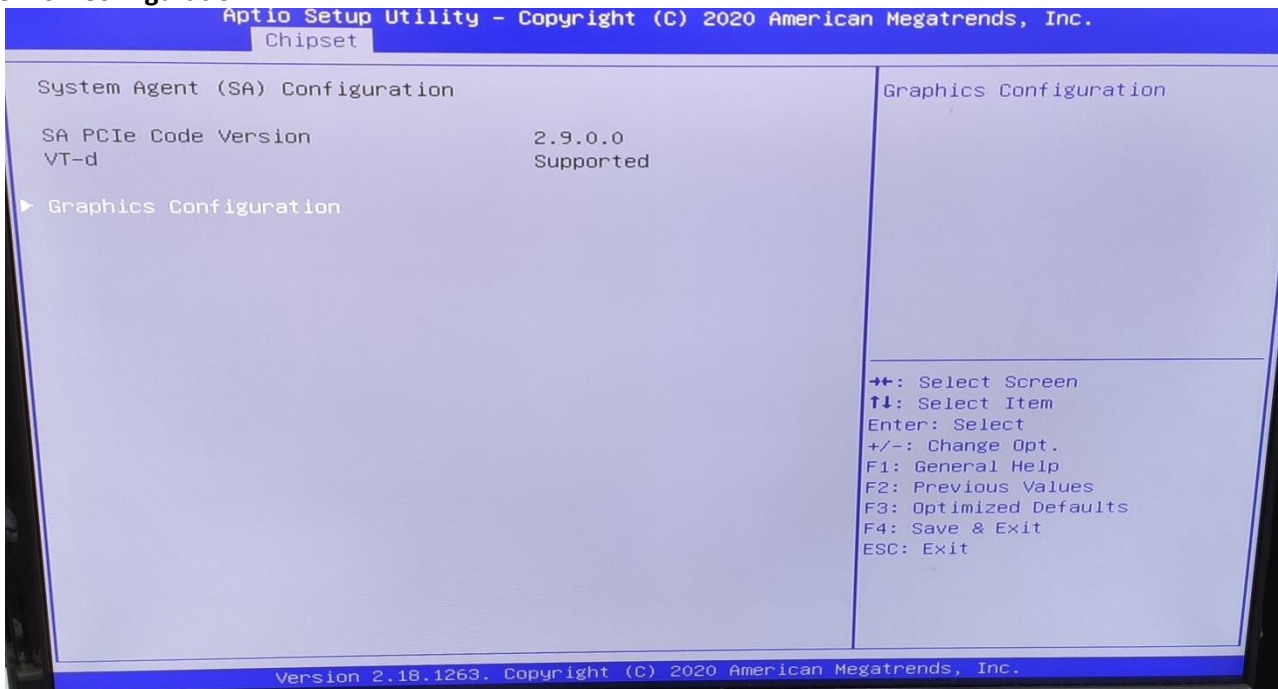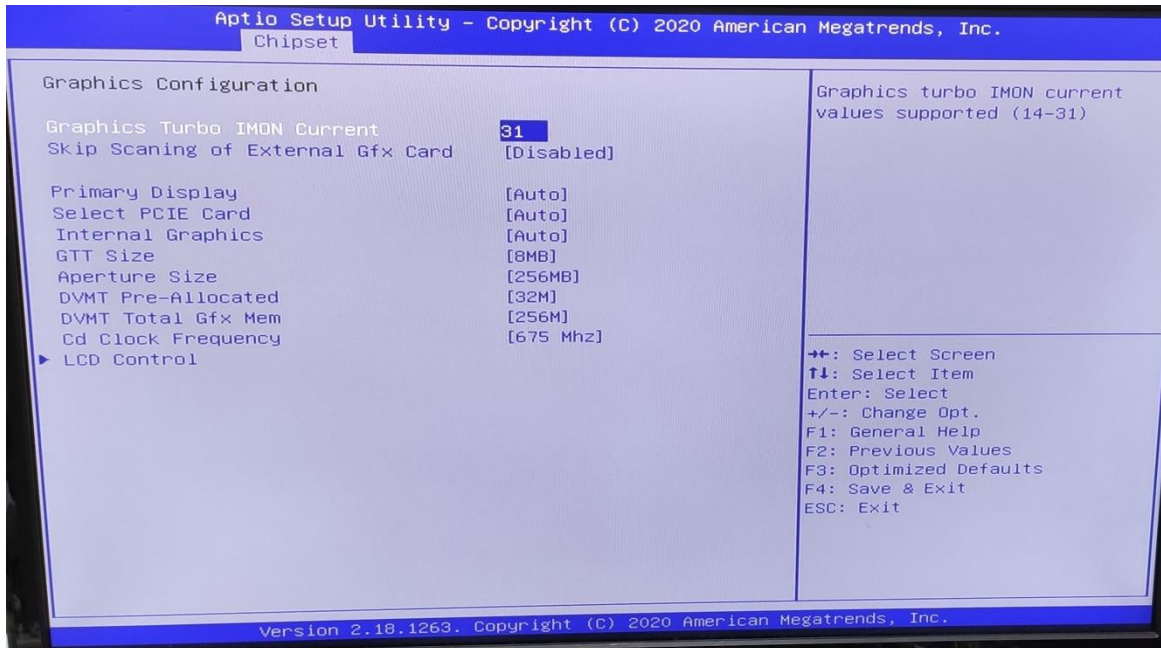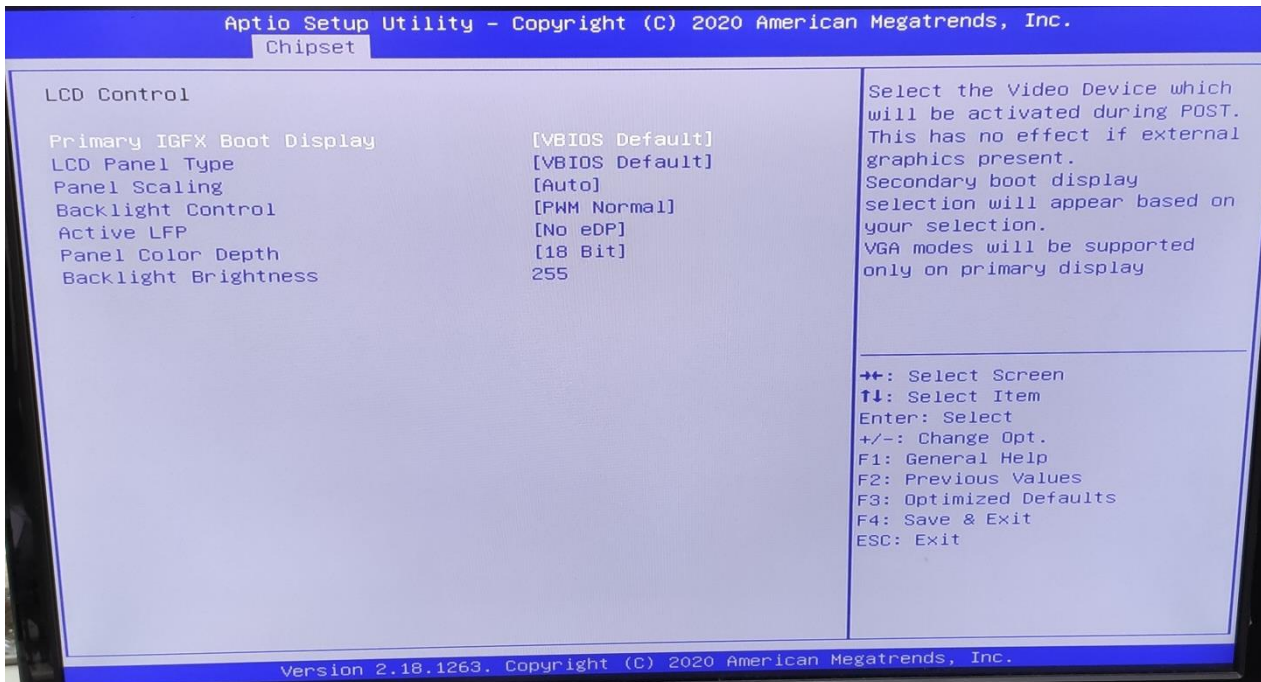### 3.5 Chipset

3.5.1 SA Configuration

3.5.1.1 Graphics Configuration

3.5.1.2 LCD Control

Primary IGFX Boot Display: 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.

LCD Panel Type: Select LCD panel used by Internal Graphics Device by selecting the appropriate setup item.
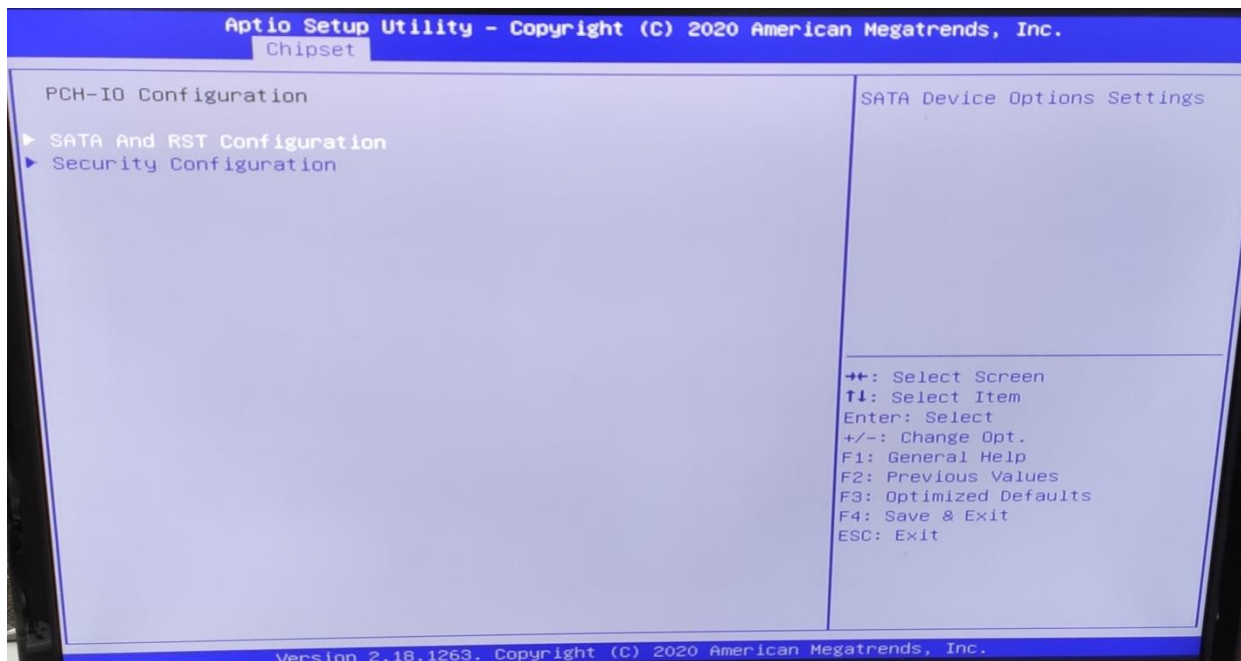
SDVO-LFP Panel Type: Select SDVO panel used by Internal Graphics Device by selecting the appropriate setup item.

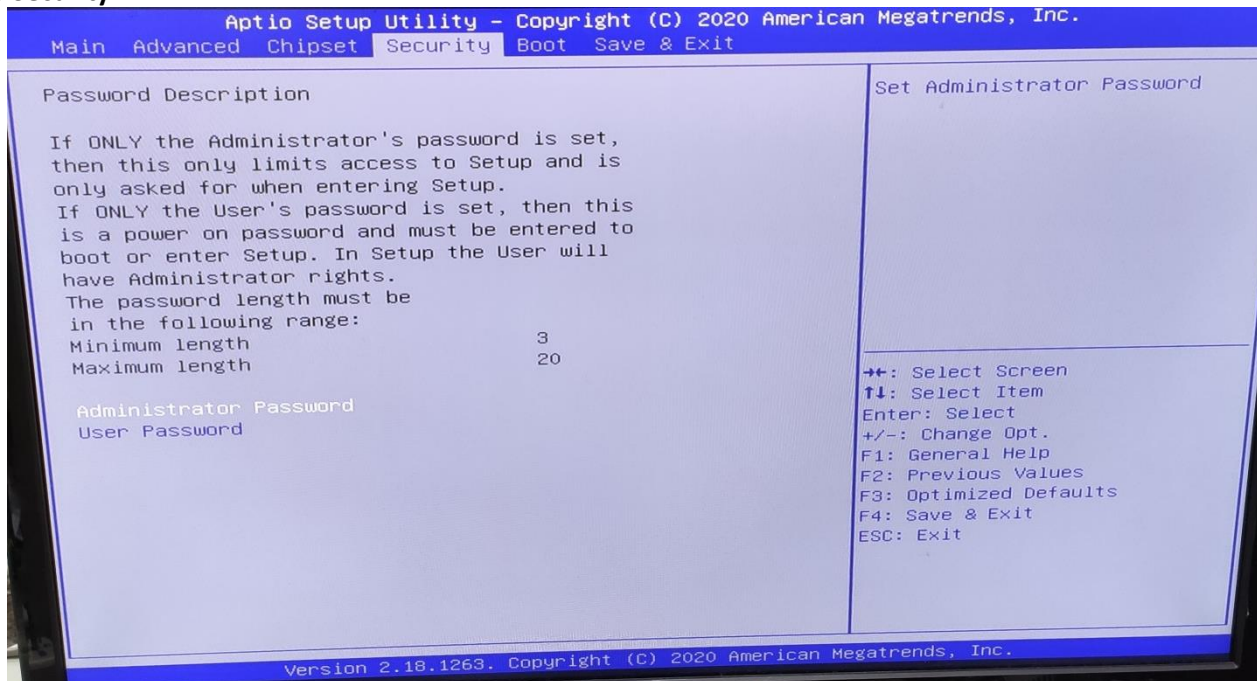**Panel Scaling:** Select the LCD panel scaling option used by the Internal Graphics Device.

Backlight control: backlight control setting

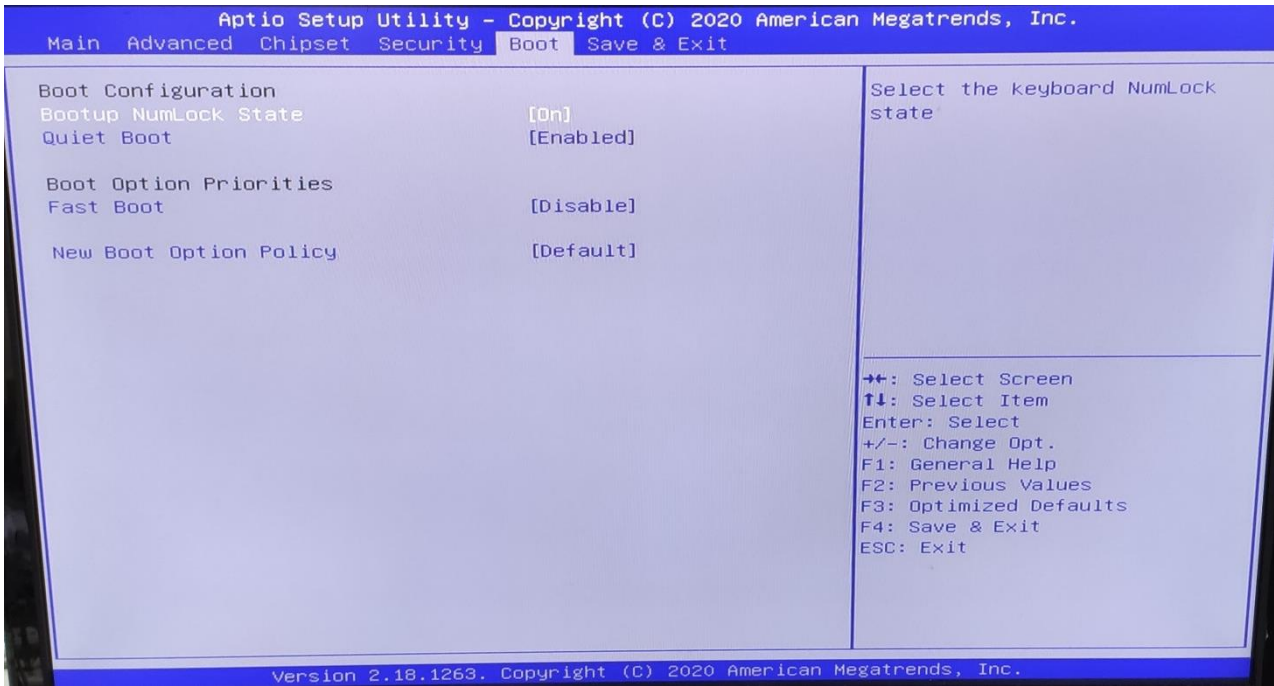**Panel Color Depth:** select the LFP panel color depth.

3.5.2 PCH-IO Configuration

3.6 Security

3.7 Boot

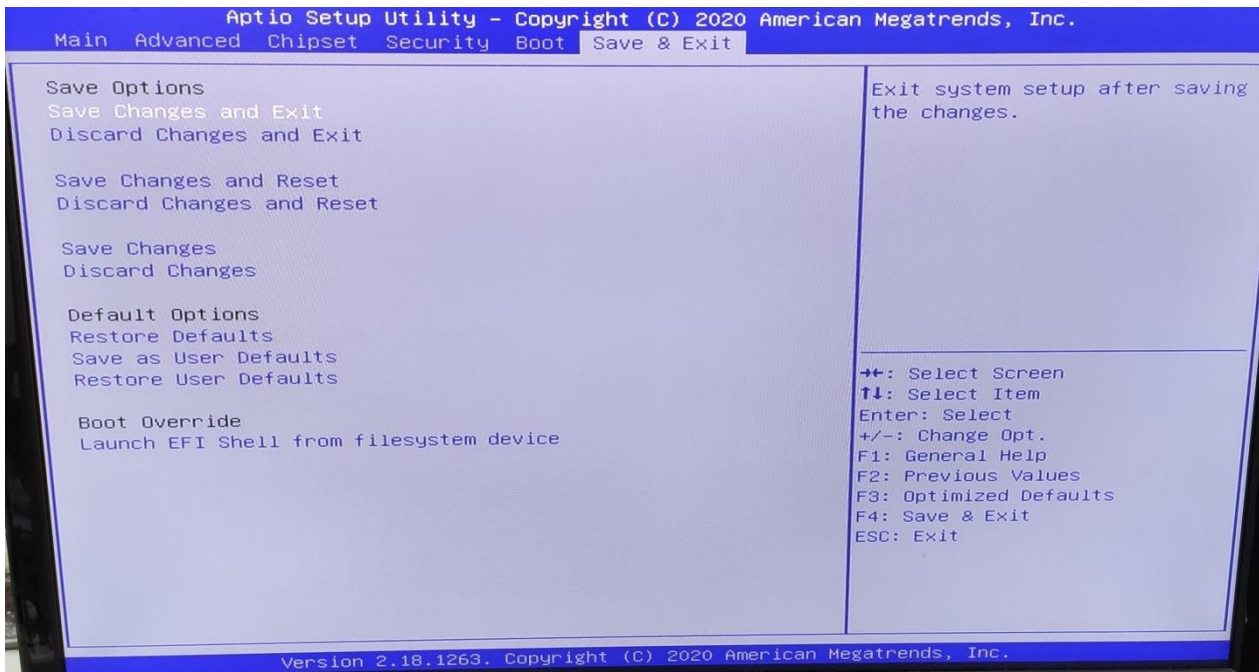**Bootup NumLock State:** Select the keyboard NumLock state.
Quiet Boot: Enables or disables Quiet Boot option.
Fast Boot: Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.
Boot option priorities
Boot Option #1: Sets the system boot order.

3.8 Save & Exit

This screen provides functions for handling changes made to the BIOS settings and the exiting of the Setup program.

Save Changes and Exit
Exit system setup after saving the changes.
Discard Changes and Exit
Exit system setup without saving any changes.
Save Changes and Reset
Reset the system after saving the changes.
Discard Changes and Reset
Reset system setup without saving any changes.
Save Options
Save Changes: Save Changes done so far to any of the setup options.
Discard Changes: Discard Changes done so far to any of the setup options.