



LUMIA book PC

User manual

Connect
Ideas.
Shape
solutions.



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Overview

LUMIA BOOK series product is a high-performance wall mounted industrial computer for automation, machine vision and other industries, supporting the Intel® Skylake-s / 7th. generation Intel® Kabylake-S Core i3/i5/i7 CPU. The product adopts solid aluminum magnesium alloy profile structure and anodic oxidation coating. Grounding isolation protection, profile embedded fan intelligent auxiliary cooling, wireless cable design, ensure the excellent heat dissipation and firmness of the product, fully enclosed design to prevent dust intrusion, but also fully consider the ergonomic structure design.

The hardware structure of the product adopts modular design. The product is composed of independent CPU, CPU core carrier board and customized expansion board. Mature modular circuits and devices ensure the stability of the product.

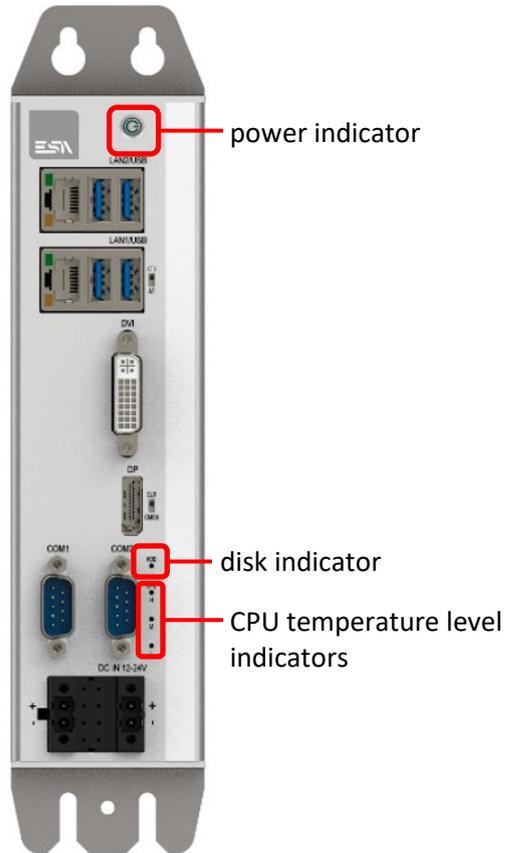
	BASIC MODULE
CPU	Intel Apollo Lake J3455 Intel Core i3-7100T Intel Core i5-7500T Intel Core i7-7700T
BIOS	AMI UEFI 64Mbit
SSD	1*2.5" SATA3.0 HDD/SSD 1*mSATA 64G/128G/256G
RAM	DDR4-2400/2133MHz 4GB/8GB/16GB
ETH	2 x Intel i210-AT 1000Mbps RJ-45
USB	4 x USB3.0(Type A)
Series port	2 x RS-232 /422/485 (DB9)
LED	1 x Power supply, 1 x Hard disk, 1 x CPU temperature (Red alarm, Yellow over temperature, Green normal)
Power input	DC 12~24V input, 2 x 2-pin terminal
Watch dog	Programmable, 1~255s
Switch	1 x Power switch, 1 x AT/ATX select switch, 1 x Clear/CMOS switch
GPU	Intel Gen.9 HD Graphics, HEVC/H265 High resolution
DVI-I/DP	1 x DVI-I max1920*1200@60Hz, VGA max2560*1600@60Hz, DP max4096*2304@60Hz
OS	RTOS: IN time, EC-Win, RTX-2014/2016&Ubuntu Preempt-RT Windows 10, Linux Fedora Ubuntu
Dimension (Basic)	(L)202mm x (W)152mm x (H)57.7mm
Installation	Wall/Din-Rail
Power	10~80W
Weight	2~4KG
Work Temperature	-20°C ~ 60°C (-4~140) with air flow (mSATA), 5~95%
Storage Temperature	-40°C ~ 80°C (-40~176) with air flow (mSATA), 5~95%
Storage humidity	10~90%@40°C
Certification	CE

Interfaces

Base Module

LED indicator

There are 1 power indicator, 1 hard disk indicator and 3 CPU temperature level indicators on the front panel

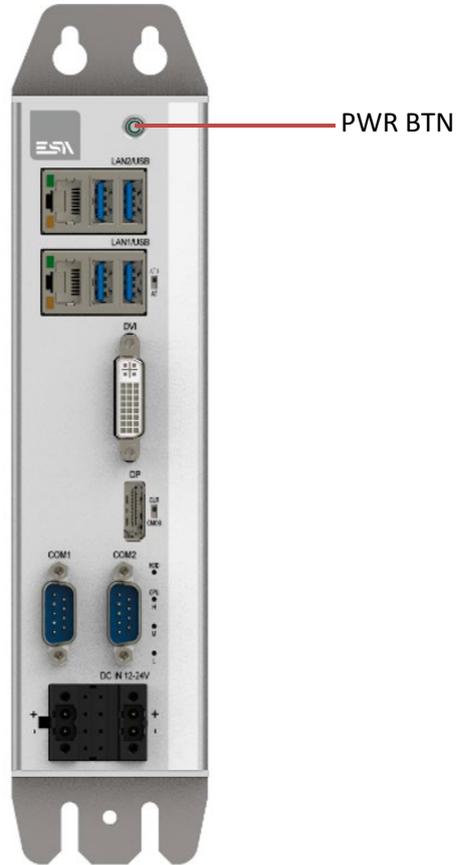


LED	Status	Description
CPU temperature level indicators	Red	Alarm
	Yellow	High temperature
	Green	Normal temperature



Power switch

The front panel of the machine provides a power on button, which can be pressed to power on the machine or shut down in the power on state



Power Input

In order to ensure the power connection is reliable, a 2-pin power input interface is provided on the front panel. The plug-in can supply power to the industrial computer and support DC12v-24v input. When connecting, pay attention to the positive and negative pole marks on the chassis. Do not use the mains (220V) connection.



The signal definition of the power input connector is as follows

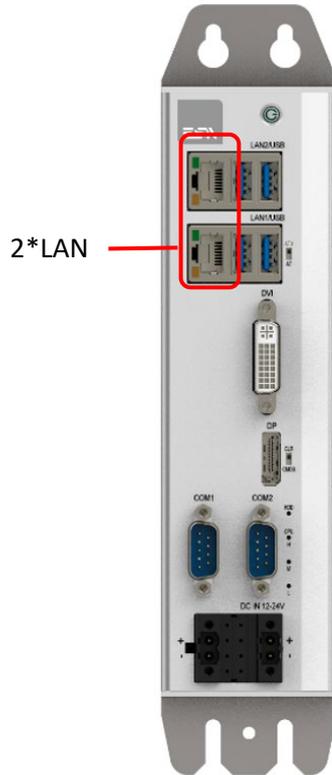
	Pin No.	Signal
③	1	DC 12V-24V
④	2	GND
①	3	DC 12V-24V
②	4	GND



1. When connecting the power supply, please confirm whether the output voltage of the power supply matches the power supply voltage of the PC.
2. Pay attention to the positive and negative signs on the casing, do not connect them reversely, otherwise it may cause hardware damage or electric shock.
3. Do not use mains power (220 V) to connect directly to the terminal.

LAN port

There are two ethernet ports on board, LAN1 and LAN2.



Type	Parameter
Net type	1000BASE-T/100BASE-TX/10BASE-T
Speed	1000M/100M/10M bps
Max length	100m/segment
Net card type	Intel® Ethernet Controller I210

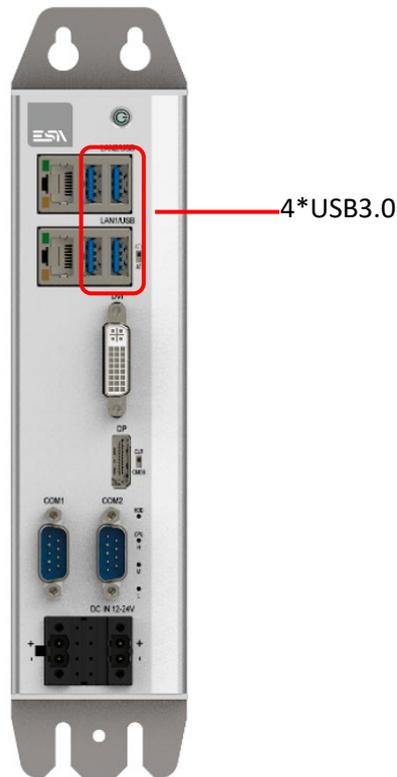
When the transmission speed is 1000Mbps, at least cat 5E and above network cable is required

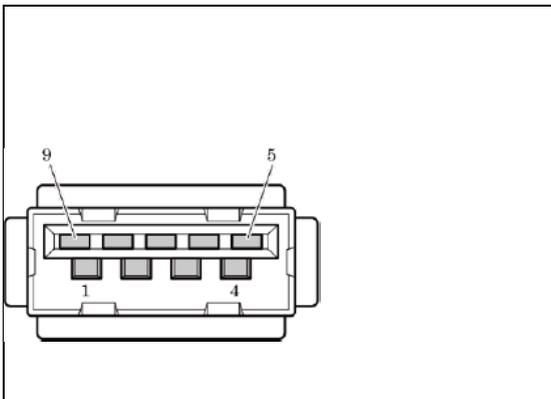
Ethernet port definition	Pin No.	Signal	
		100BASE-TX	1000BASE-T
	1	TX+	TRD+(0)
	2	TX-	TRD-(0)
	3	RX+	TRD+(1)
	4	N.C.	TRD+(2)
	5	N.C.	TRD-(2)
	6	RX-	TRD-(1)
	7	N.C.	TRD+(3)
	8	N.C.	TRD-(3)



USB

The front panel of LUMIA BOOK standard product provides four independent USB 3.0 interfaces, and a built-in USB 2.0 is provided on the carrier board to facilitate users to install USB hardware dongle.

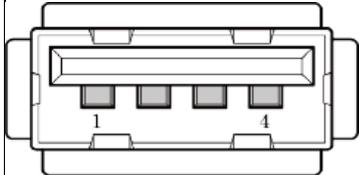


	Pin No.	Signal /Signal
	1	USB_VCC
	2	DATA-
	3	DATA+
	4	USB_GND
	5	SSRX-
	6	SSRX+
	7	USB_GND
	8	SSTX-
	9	SSTX+

The carrier board provides a built-in USB2.0 type-A interface, which is convenient for users to install USB dongle. When installing the dongle, you need to open the cover according to the instructions.



USB2.0 PIN DEFINITION :

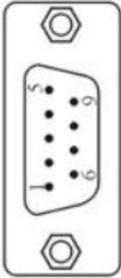
	Pin No.	Signal
	1	USB_VCC
	2	DATA-
	3	DATA+
	4	USB_GND

COM port

The front panel of LUMIA BOOK standard product provides two-way photoelectric isolated serial ports, COM1 and COM2 respectively. The standard DB9 male terminal is used, which can support RS232 / 422 / 485 communication protocol (selected by BIOS setting).

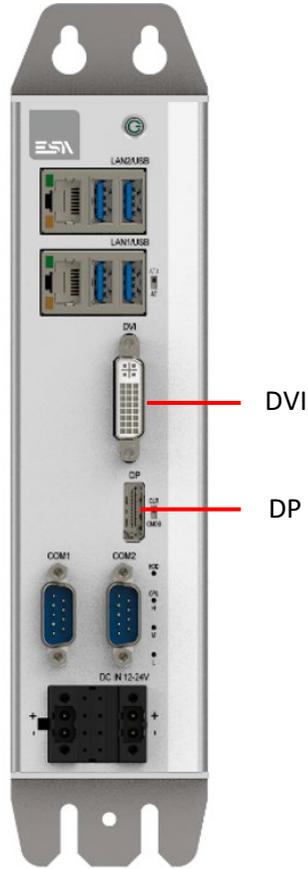


COM1 and COM2 DB9 male serial interface definition:

	Pin No.	Signal	
		RS232	RS485
 DB9 male	1	N.C.	B
	2	RXD	A
	3	TXD	N.C.
	4	N.C.	N.C.
	5	GND	GND
	6	N.C.	N.C.
	7	RTS	N.C.
	8	CTS	N.C.
	9	N.C.	N.C.

Display port

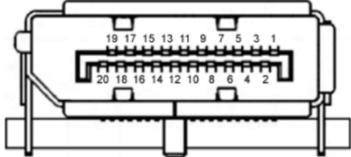
LUMIA BOOK provides standard DVI-I and DP interfaces.



The definition of terminal is as follows:

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	DATA2-	11	DATA1 SHIELD	21	N.C.
2	DATA2+	12	N.C.	22	DATA0 SHIELD
3	DATA2 SHIELD	13	N.C.	23	CLK+
4	N.C.	14	+5V	24	CLK-
5	N.C.	15	GND	C1	Analog Red
6	DDC CLK	16	HPD	C2	Analog Green
7	DDC DATA	17	DATA0-	C3	Analog Blue
8	N.C.	18	DATA0+	C4	Horizontal Sync Analog
9	DATA1-	19	DATA0 SHIELD	C5	Analog Ground
10	DATA1+	20	N.C.		

DP 20pin (female)



Pin No.	Signal	Pin No.	Signal
1	ML_Lane 0(p)	11	GND
2	GND	12	ML_Lane 3(n)
3	ML_Lane 0(n)	13	GND
4	ML_Lane 1(p)	14	GND
5	GND	15	AUX_CH(p)
6	ML_Lane 1(n)	16	GND
7	ML_Lane 2(p)	17	AUX_CH(n)
8	GND	18	Hot Plug
9	ML_Lane 2(n)	19	DP_PWR Return
10	ML_Lane 3(p)	20	DP_PWR

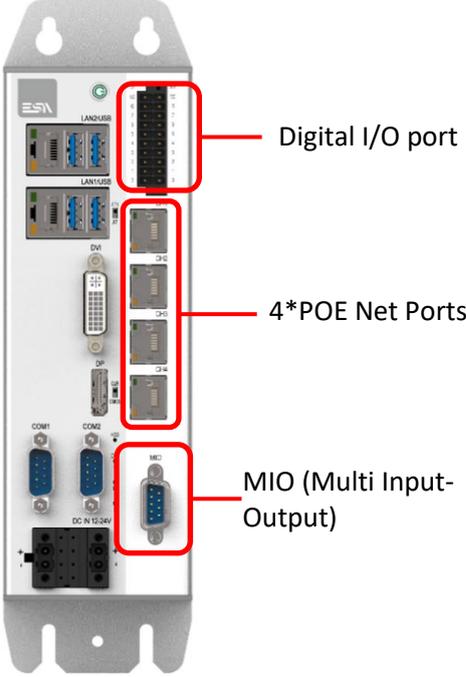


:

1. When the DVI or DP is not connected before the BIOS is set again, the display may not be able to display the relevant contents, and then the boot information will be displayed when the system is booted.
2. When using DVI, the working temperature should be from 0 to + 45 °C

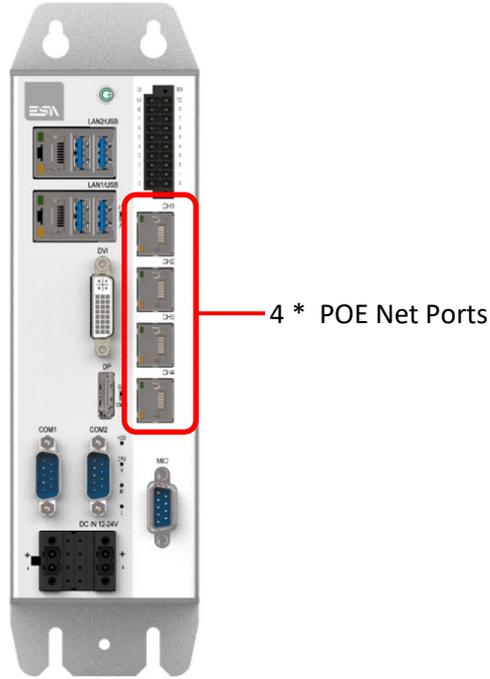


POE module



PoE ports

There are four 15W PoE Gigabit Ethernet ports on extension card, CH1、CH2、CH3、CH4.



Type	Parameter
Net type	1000BASE-T/100BASE-TX/10BASE-T
Speed	1000M/100M/10M bps
Max length	100m/segment
Net card type	Intel® Ethernet Controller I210

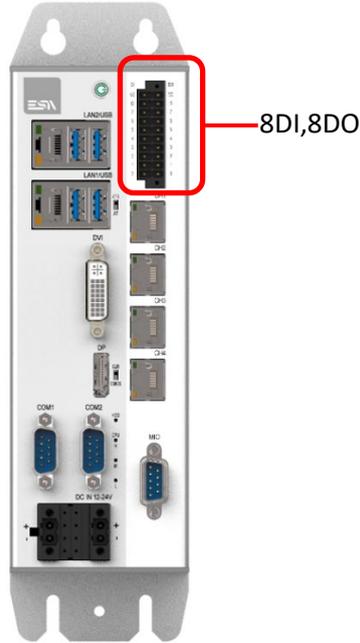
When the transmission speed is 1000Mbps, at least cat 5E and above network cable is required.

Net port signal definition:

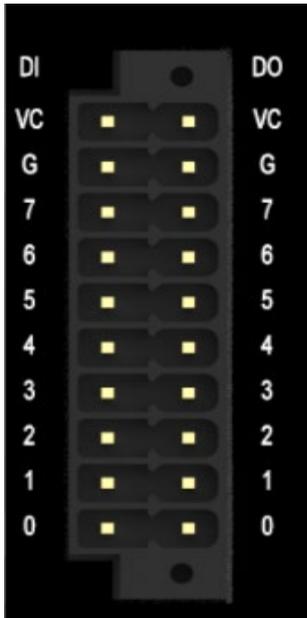
	Pin No.	Signal	
		100BASE-TX	1000BASE-T
	1	TX+	TRD+(0)
	2	TX-	TRD-(0)
	3	RX+	TRD+(1)
	4	N.C.	TRD+(2)
	5	N.C.	TRD-(2)
	6	RX-	TRD-(1)
	7	N.C.	TRD+(3)
	8	N.C.	TRD-(3)
	R13	VC1	VC1
	R14	VC2	VC2

Digital Inputs & Outputs

There are 8-DI and 8-DO on the terminals of the expansion board. The voltage of DO is determined by the VC voltage of DO side, and the voltage range is 5V ~ 24V



Pin No.	Signal	Pin No.	Signal
1	DI0	2	DO0
3	DI1	4	DO1
5	DI2	6	DO2
7	DI3	8	DO3
9	DI4	10	DO4
11	DI5	12	DO5
13	DI6	14	DO6
15	DI7	16	DO7
17	DI-G	18	DO-G
19	DI-VC (default5V)	20	DO-VC



Digital inputs

8 DI are available in the expansion board.

The type is PNP.

External VAC (the range is from 5 to 24V) must be connected to the DI signal trigger.

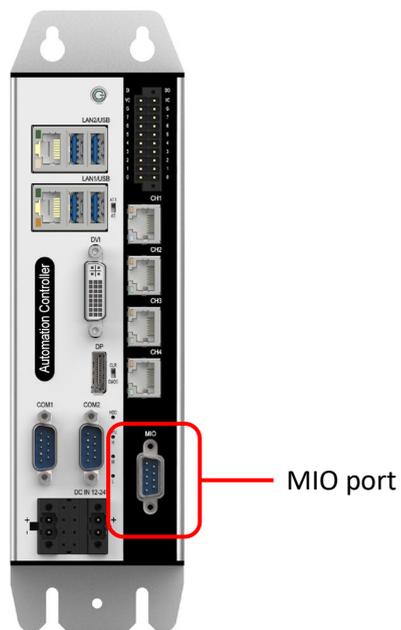
Digital Outputs

8 DOs are available on the expansion board.

The maximum output current for a single channel is 0,2A the input voltage of the DO is determined by the voltage between VC and G, and the voltage range is 5 to 24V.

MIO port

The MIO(MULTI-IO)port on the expansion board is a custom port that can be used for any custom connection.





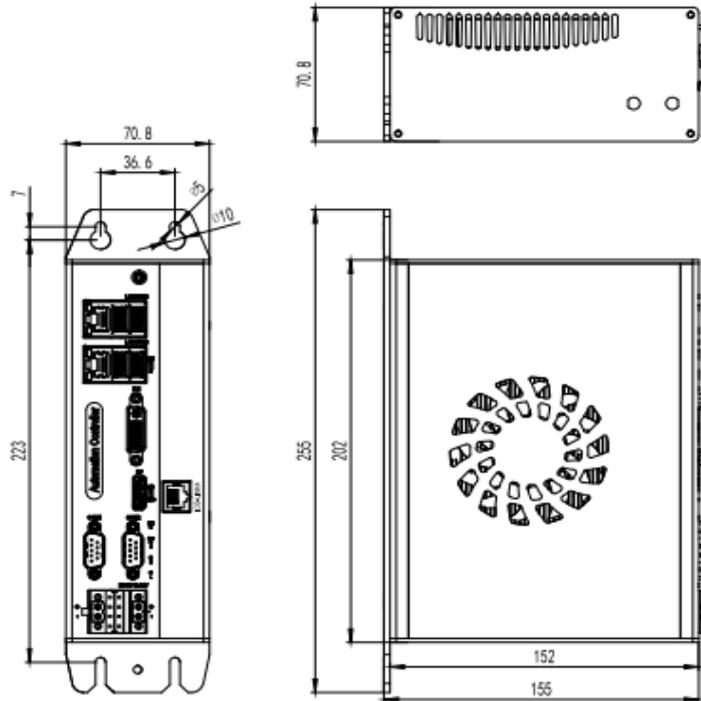
Product specification

Motherboard	CPU	Apollo lake J3455 Quad Core 2,3Ghz Intel Core i3-7100T Intel Core i5-7500T Intel Core i7-7700T
	Chipset	Intel H110
	BIOS	AMI UEFI 64 bits
I/O Interface	Disk	2.5" SATA 3.0 SSD (128GB / 256GB)
	Memory	4GB DDR3L 4GB DDR4 / 8GB DDR4
	LAN	2 x Intel i210AT 1000Mbps Ethernet card
	USB	4 x USB 3.0
	COM	2 x RS232/485/422 photo isolated ports with automatic data flow control
	Expansion module	Onboard miniPCIe slot for Wifi, 3G/4G additional cards
	Leds	Power Disk activity CPU temperature level (Green – Yellow – Red)
	Power supply	DC 12V to 24V inputs, 2x2-pin terminal interfaces
	MIO Port	Free for custom use
	KVM port	KVM extender transmitter port for both video and USB
	Switch	Power switch AT – ATX power supply mode Clear CMOS
	Display resolution	DP port – 4096 x 2304 @ 60Hz DVI-I (DVI-D + VGA) – 1920 x 1200 @ 60 Hz VGA – 2560 x 1600 @ 60Hz
	OS	Operating system
Common parameters	Housing	Alluminium profile with embedded advanced cooling system Anodized coating Grounding isolation protection
	Mounting	Wall mount DIN-Rail mounting
	Dimension (LxWxH - mm)	202 x 152 x 70.8
	Power input	DC 12V to 24V inputs, 2x2-pin terminal interfaces
	Consumption	65W
	Weight	2.5Kg
Eviroment	Working temperature	-20°C ~ + 60°C with airflow
	Storage temperature	-40°C ~ +80°C with airflow
	Storage humidity	10% ~ 90% @ 40°C non-condensing



	Vibration	5grms/ 5~500Hz random
	Impact	50g peak acceleration (max 11ms)
	Certifications	CE/FCC Class B

Dimensions



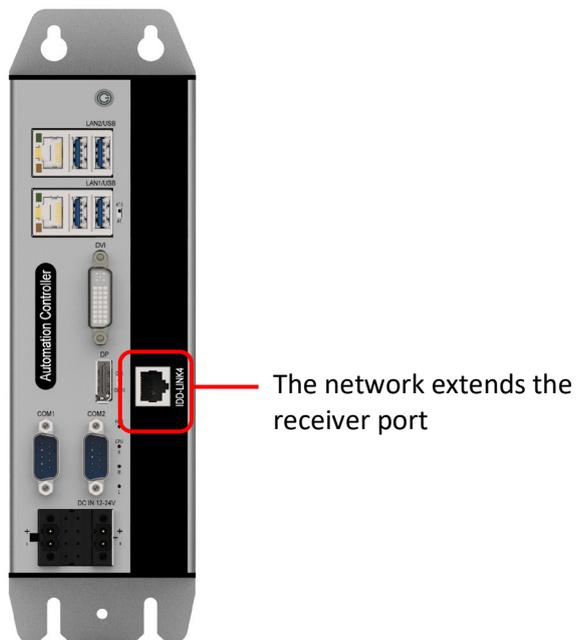


KVM Extender

The expansion board is equipped with a KVM network extender transmitter.

The Video and USB signals can both be remoted till 100 mtrs.

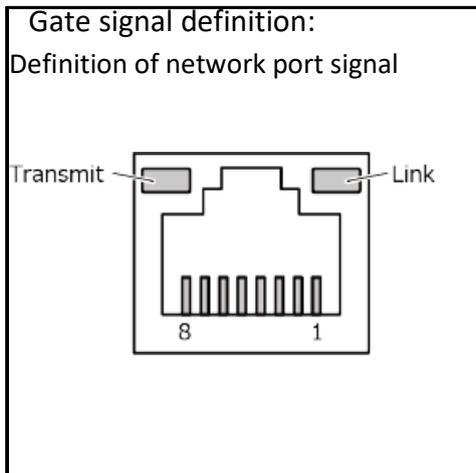
A receiver is necessary (ESA KVMRECEIVER) in order to connect remotely the industrial monitor.



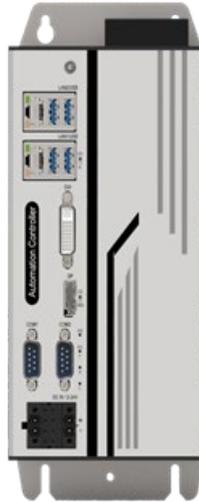
Network type	1000BASE-T/100BASE-TX/10BASE-T
Speed	1000M/100M/10M bps
Maximum cable distance	100m/segment
Network card model	Intel® Ethernet Controller I210

When the transmission speed is 1000Mbps, a network cable of at least CAT 5e and above is required.

Pin No.	Signal, the signal name	
	100BASE-TX	1000BASE-T
1	TX+	TRD+(0)
2	TX-	TRD-(0)
3	RX+	TRD+(1)
4	N.C.	TRD+(2)
5	N.C.	TRD-(2)
6	RX-	TRD-(1)
7	N.C.	TRD+(3)
8	N.C.	TRD-(3)
R13	VC1	VC1
R14	VC2	VC2

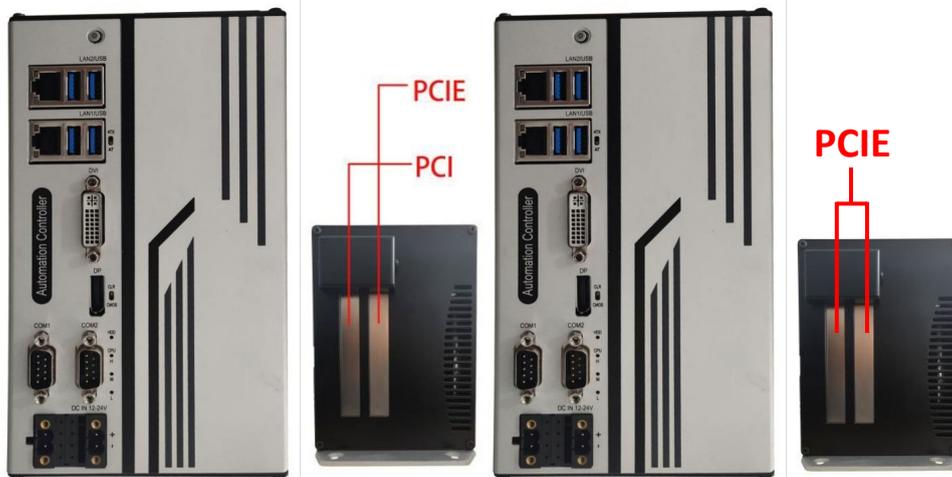


Expansion slot



The product is available with the following options:

- 2 x PCIE expansion slots
- 1 x PCI slot + 1 x PCIE slot

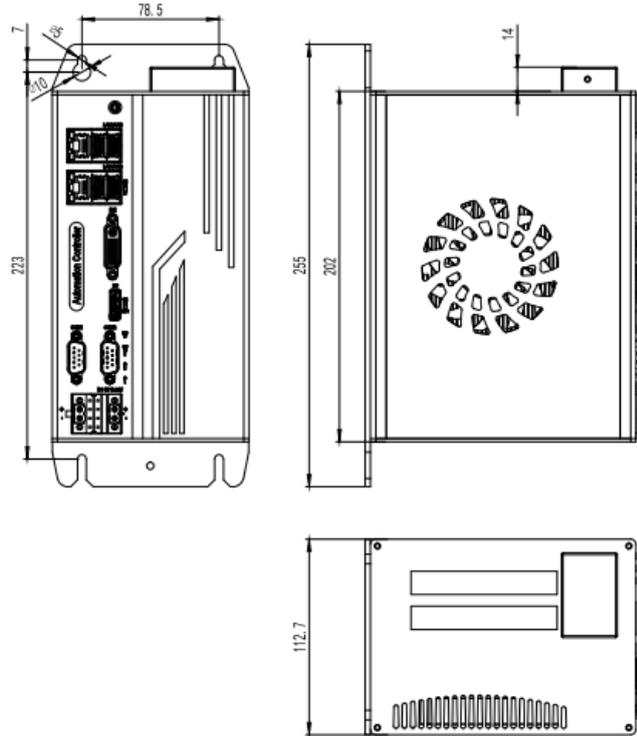




Product specification

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	BIOS	AMI UEFI 64 bits
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	Memory	4GB DDR3L 4GB DDR4 / 8GB DDR4
	LAN	2 x Intel i210AT 1000Mbps Ethernet card
	USB	4 x USB 3.0
	COM	2 x RS232/485/422 photo isolated ports with automatic data flow control
	Expansion module	Onboard miniPCIe slot for Wifi, 3G/4G additional cards
	Leds	Power Disk activity CPU temperature level (Green – Yellow – Red)
	Power supply	DC 12V to 24V inputs, 2x2-pin terminal interfaces
	2 x PCIE expansion	PCIE x 1 slots for additional cards
	1 x PCI + 1 x PCIE	PCI and PCIE x 1 slots for additional cards
	Display resolution	DP port – 4096 x 2304 @ 60Hz DVI-I (DVI-D + VGA) – 1920 x 1200 @ 60 Hz VGA – 2560 x 1600 @ 60Hz
OS	Operating system	WIN10 IoT 2016 LTSB High-end 64bit WIN7P Emb. Std MUI2 WIN7 Ultimate MUI 64bit WIN7P EN 64bit RTOS: Intime real time extension
Common parameters	Housing	Alluminium profile with embedded advanced cooling system Anodized coating Grounding isolation protection
	Mounting	Wall mount DIN-Rail mounting
	Dimension (LxWxH - mm)	202 x 152 x 112.7
	Power input	DC 12V to 24V inputs, 2x2-pin terminal interfaces
	Consumption	65W
	Weight	2.5Kg
Eviroment	Working temperature	-20°C ~ + 60°C with airflow
	Storage temperature	-40°C ~ +80°C with airflow
	Storage humidity	10% ~ 90% @ 40°C non-condensing
	Vibration	5grms/ 5~500Hz random
	Impact	50g peak acceleration (max 11ms)
	Certifications	CE/FCC Class B

Dimensions





BIOS Settings

This section describes how to set up your system using the BIOS configuration pages.

Properly setting the BIOS parameters allows the system to work correctly and improving the overall performance of the system.

Inappropriate or even incorrect BIOS parameter settings can greatly reduce the performance of the system, making the system work unstable or even not working properly.

When the BIOS settings in CMOS are corrupted, the system automatically forces the access to the BIOS setup pages.

All the new settings values are stored in the system's CMOS memory which is battery-powered and will not be lost even in case of power-off.

Force the BIOS settings

When the system is powered on the BIOS setting can be forced via the DEL or ESC button.

The message below is displayed during the product start-up.

Press or <ESC> to enter setup.

At this point press the key specified in the prompt information (usually the <ESC> key) to enter the BIOS setting pages.

Navigation

Key	Description
<↑>	Move forward one item /Forward one item
<↓>	Move one item back /Backward one item
<←>	Move one item to the left (main course item) / Left one item (Main menu).
<→>	Move one item to the right (main course item) / Right one item (Main menu).
<Esc>	Exit or return to the main interface / Exit or return main page
<Enter>	Go to select item / Enter optional items
< + >	Add or change option / Add or change items
< - >	Reduce or change option / Reduce or change items
< F1 >	Get help information / For more information
< F2 >	Add the previous setting / Load setting from CMOS from CMOS
< F3 >	Add the default optimization setting / Load default optimized setting
< F4 >	Keep the settings and exit the BIOS settings interface / Save settings and exit BIOS pages



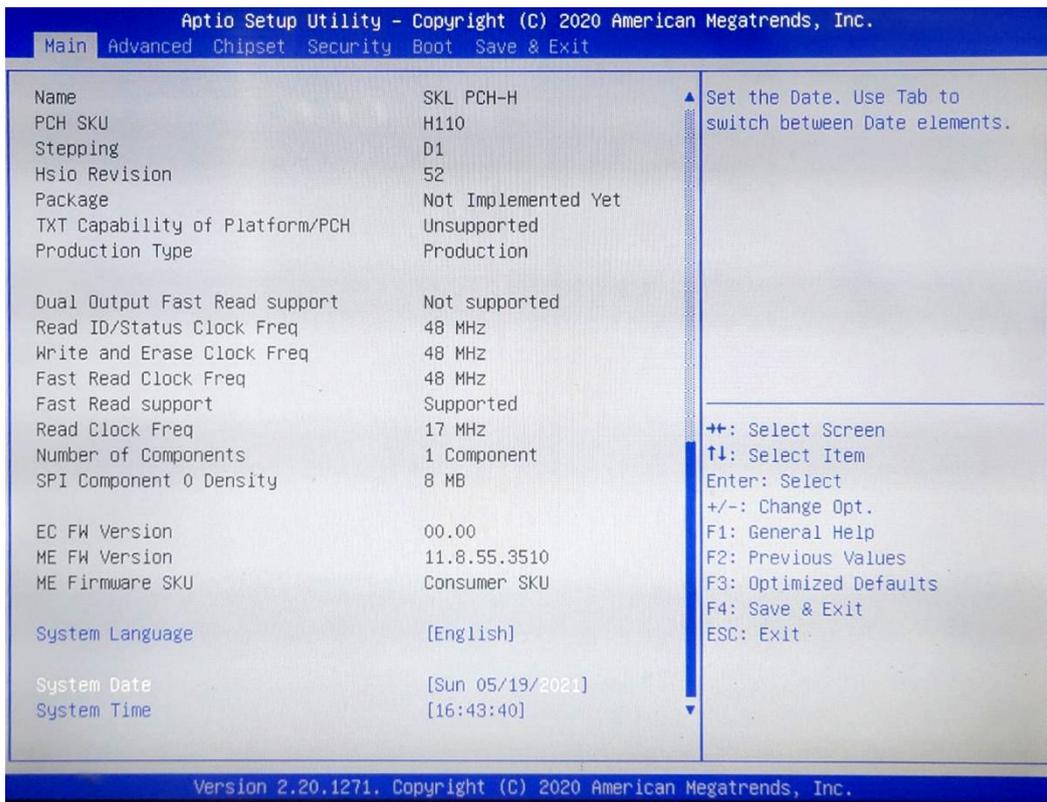
BIOS Update



: BIOS programs are updated frequently so the following BIOS settings interface and description could be similar but not exactly the same.

BIOS Homepage

Once entering the BIOS setting the Main page below will be display.



Main

In this menu, you can view the basic configuration information of the system, set the language, system time, and so on.

Advanced

In this menu, you can set the specific functions of the system.

Chipset

The system chipset can be functionally set up in this menu.

Security

Security features such as password protection for the system.



Boot

Definition of the Start-up sequence.

Save & Exit

Load or save the settings and exit the BIOS setting pages.



Main

This page is mainly used to confirm the basic configuration and information of the system.

Show items /Display items

Item	Content	Description
Project Version	xxxxx x.xx x64	Display the BIOS release
Build Date and Time	xx/xx/xxxx xx:xx:xx	Display the BIOS build Date & Time

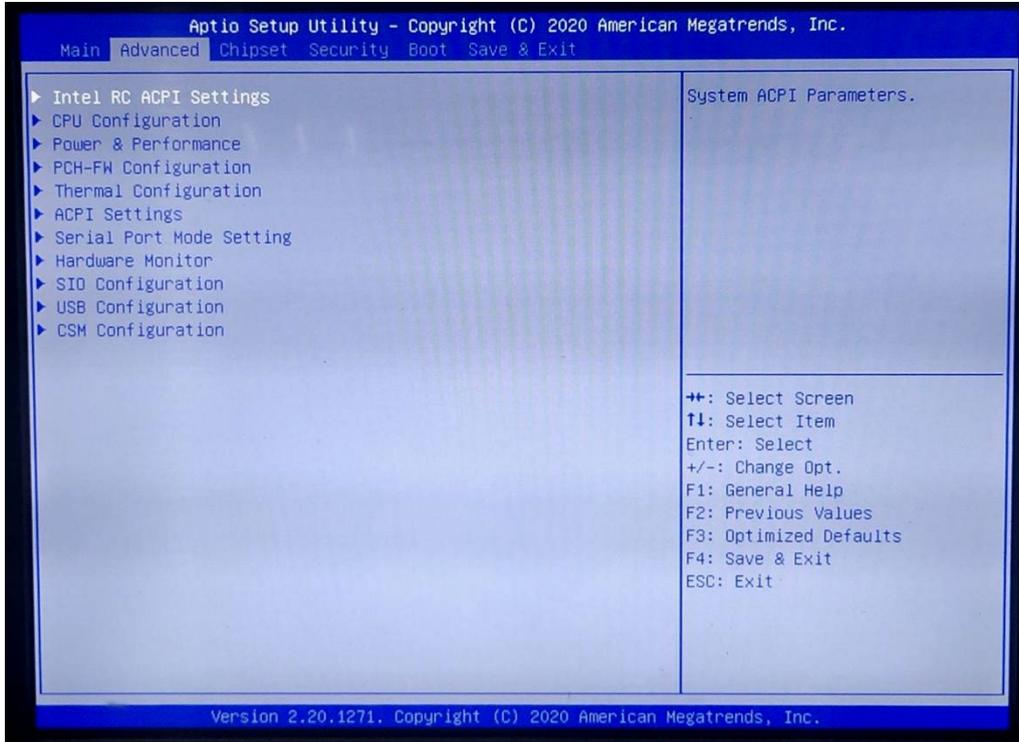
General configuration

Item	Content	Description
System Language	[English]	Set the language of the BIOS, the default is English
System Date	Week Day Month / Day / Year	Set the system date
System Time	Hour : Minute : Second	Set the system time



Advanced

In this menu, the user can define the general functions of the system.



Serial Port Mode Setting

This is the setting for communication ports.

Hardware Monitor

The main function of this item is the setting of fan speed.

USB Configuration

The main function of this item is the setting of the USB interface.

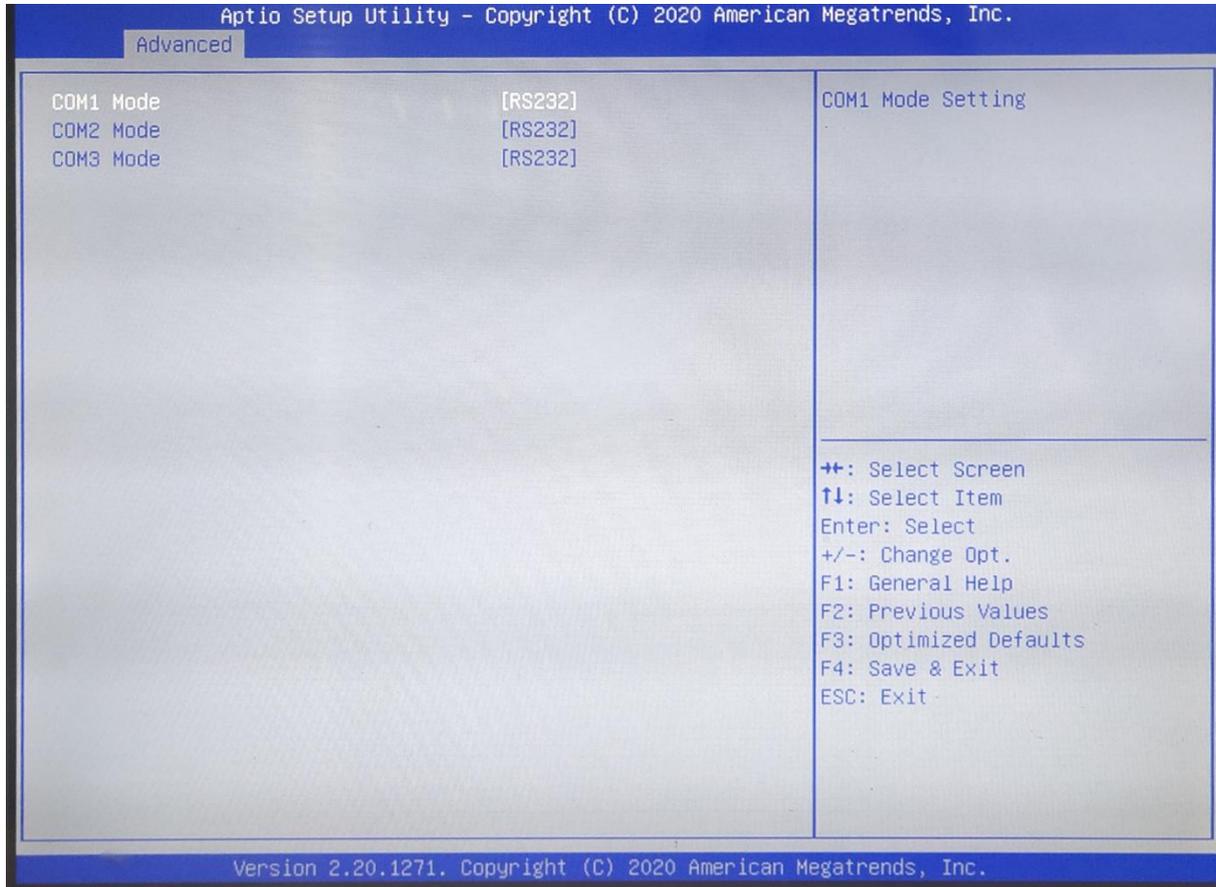
CSM Configuration

This is the setting for UEFI and Legacy mode selection.



Serial port mode settings

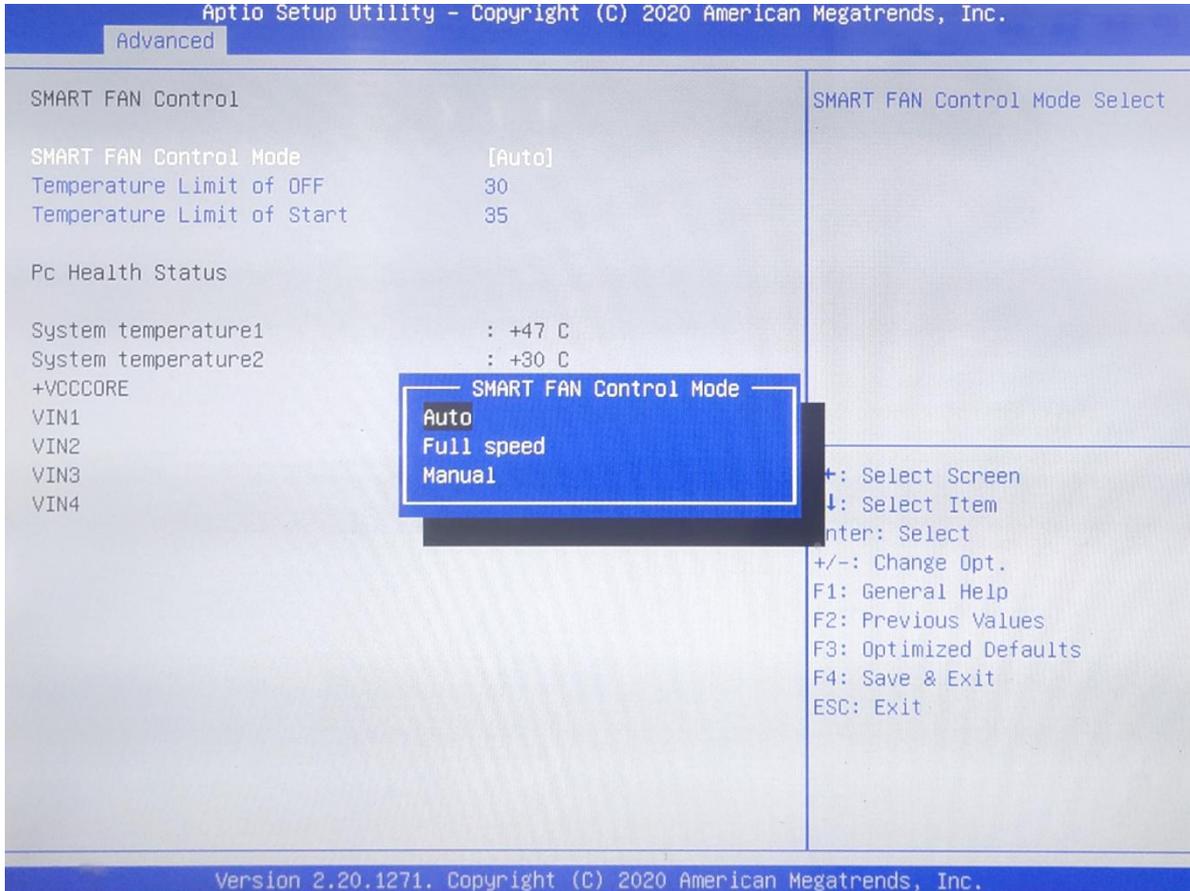
The serial port standard (232 / 422 / 485) can be selected in this page.





Hardware Monitor

The fan speed management can be defined in this page.

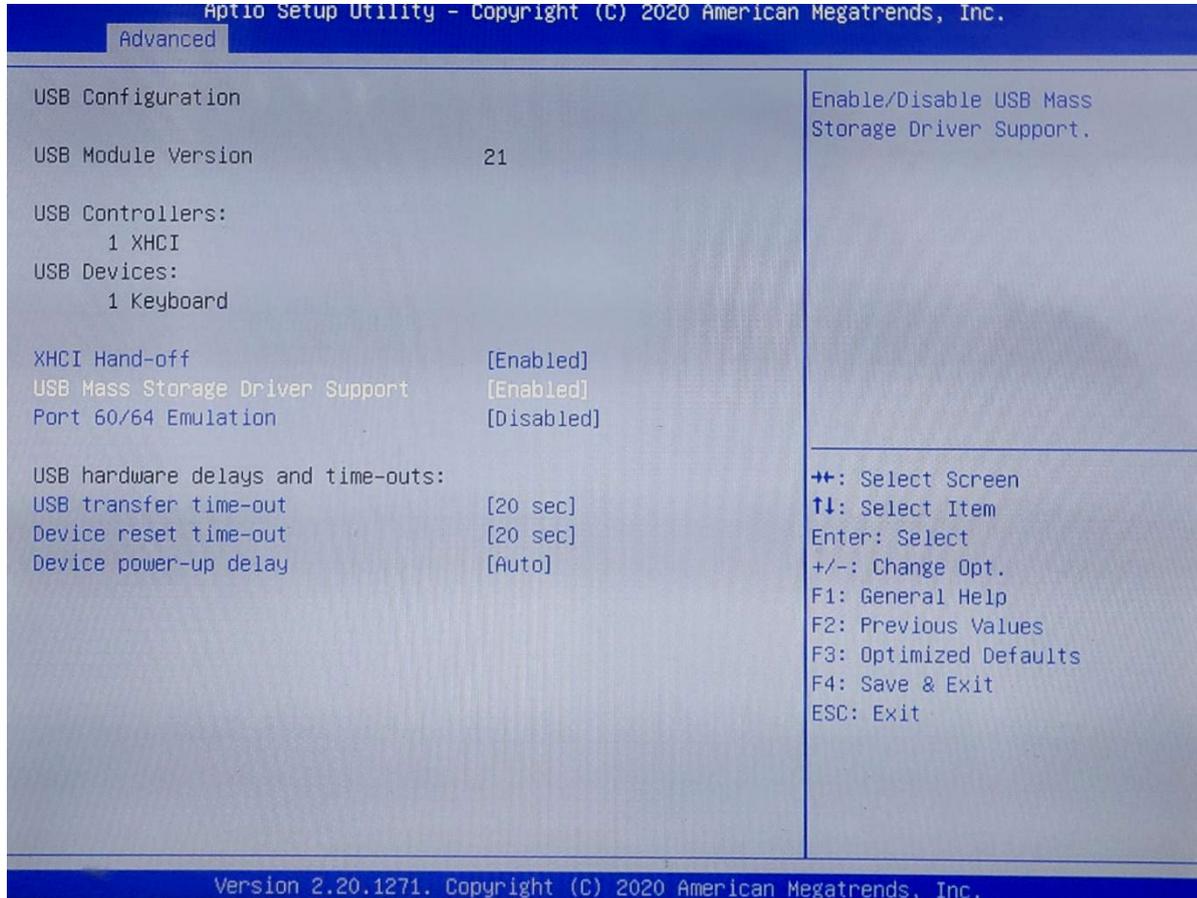


- Auto: Automatic speed management based on the CPU temperature
- Full speed: Always at the highest speed
- Manual: Manual mode. The user can select the desired speed



USB Configuration

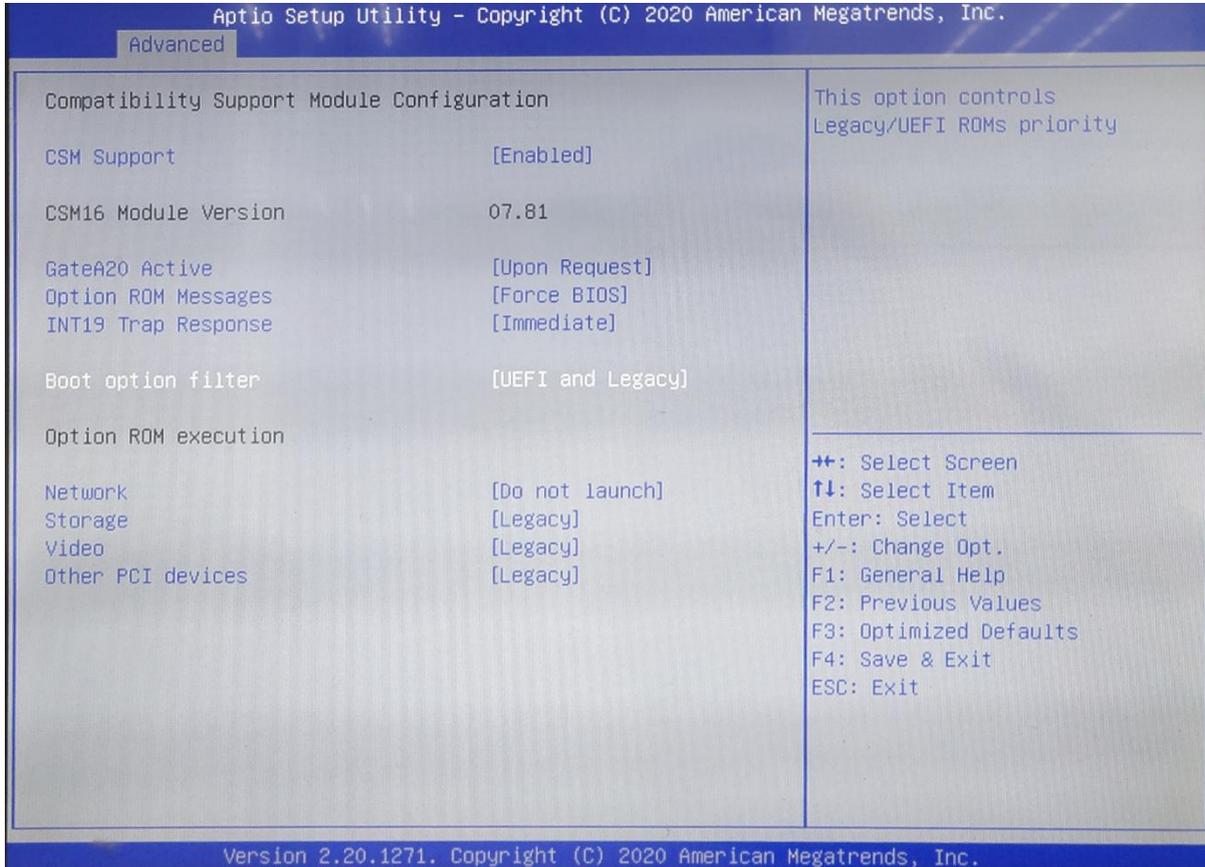
In this page the user can define the usb functionality.





CSM Configuration

The startup mode of UEFI and Legacy can be selected in this page.





Chipset

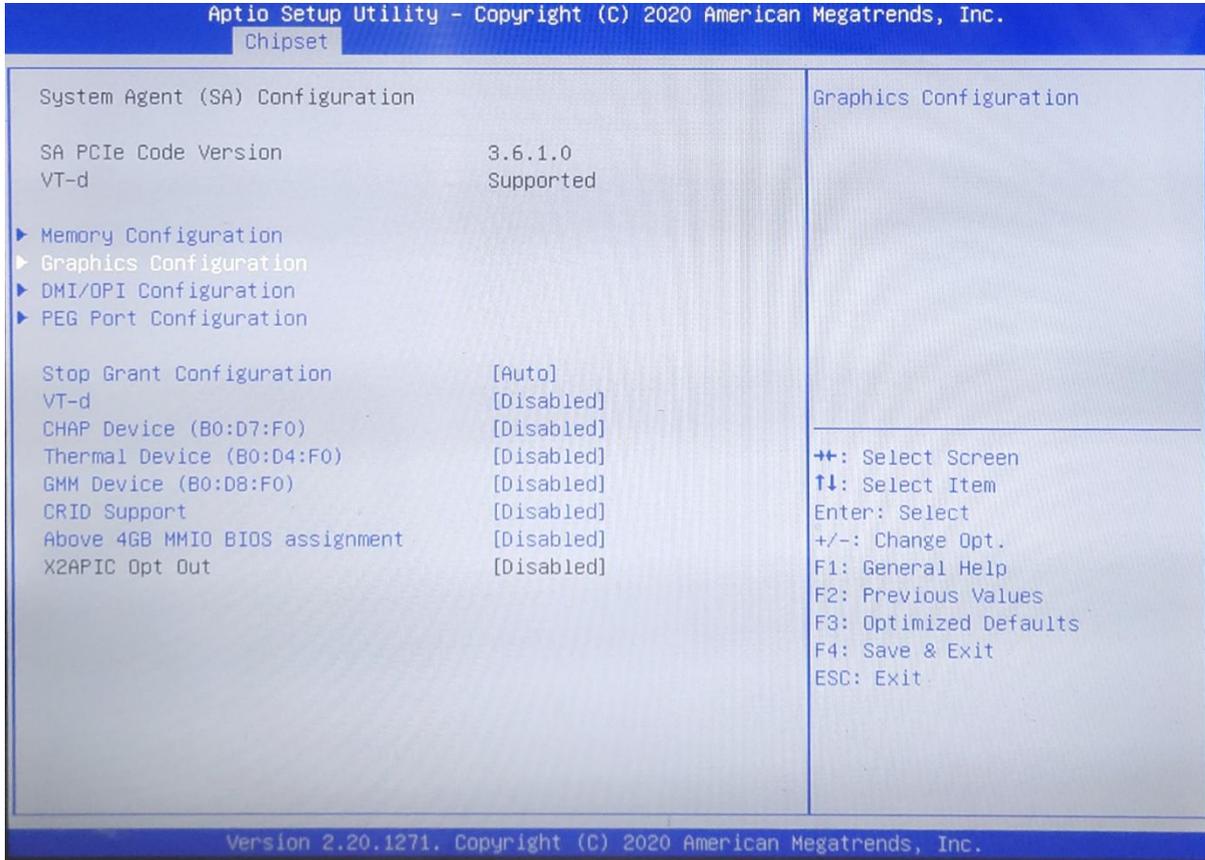
Display and modify the chipset setting.



Select System Agent (SA) Configuration



System Agent Configuration

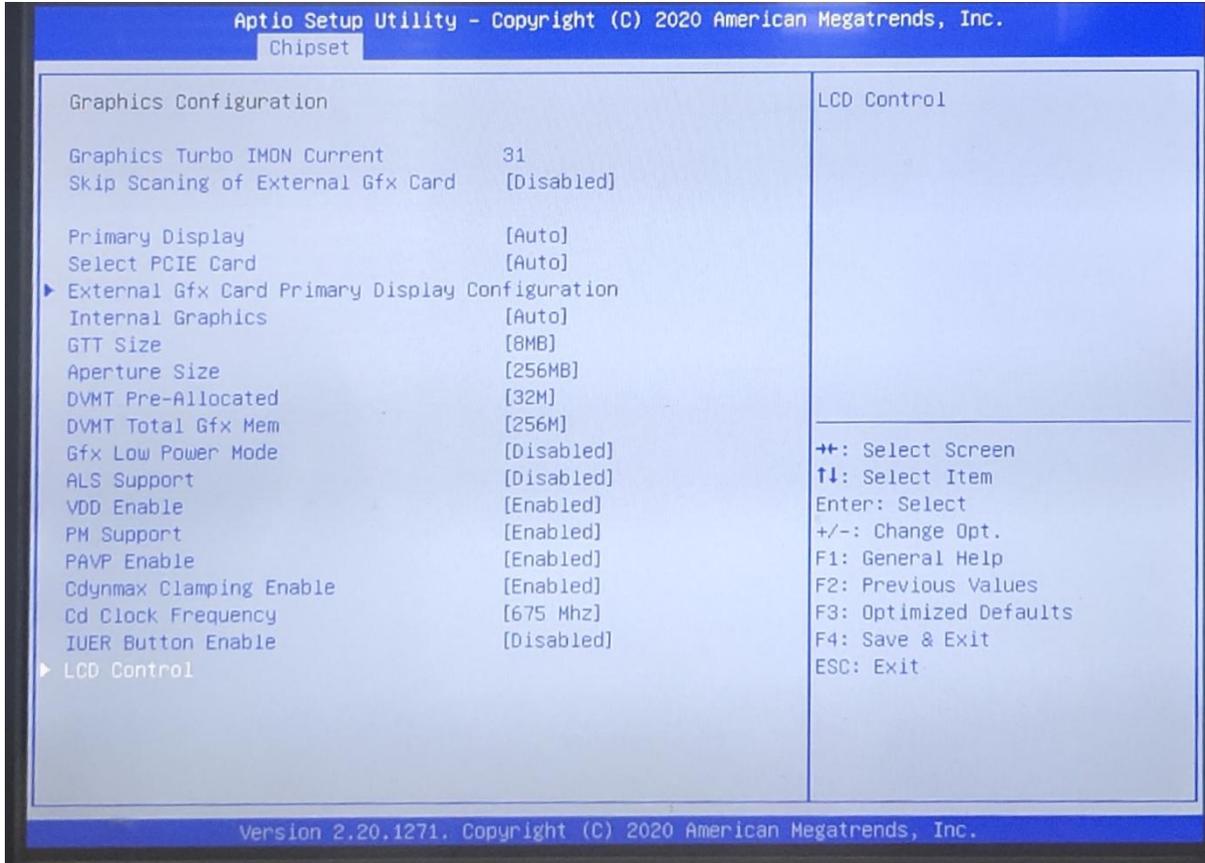


The graphics Configuration (display settings) option is mainly used here



Graphic Configuration

Display settings.

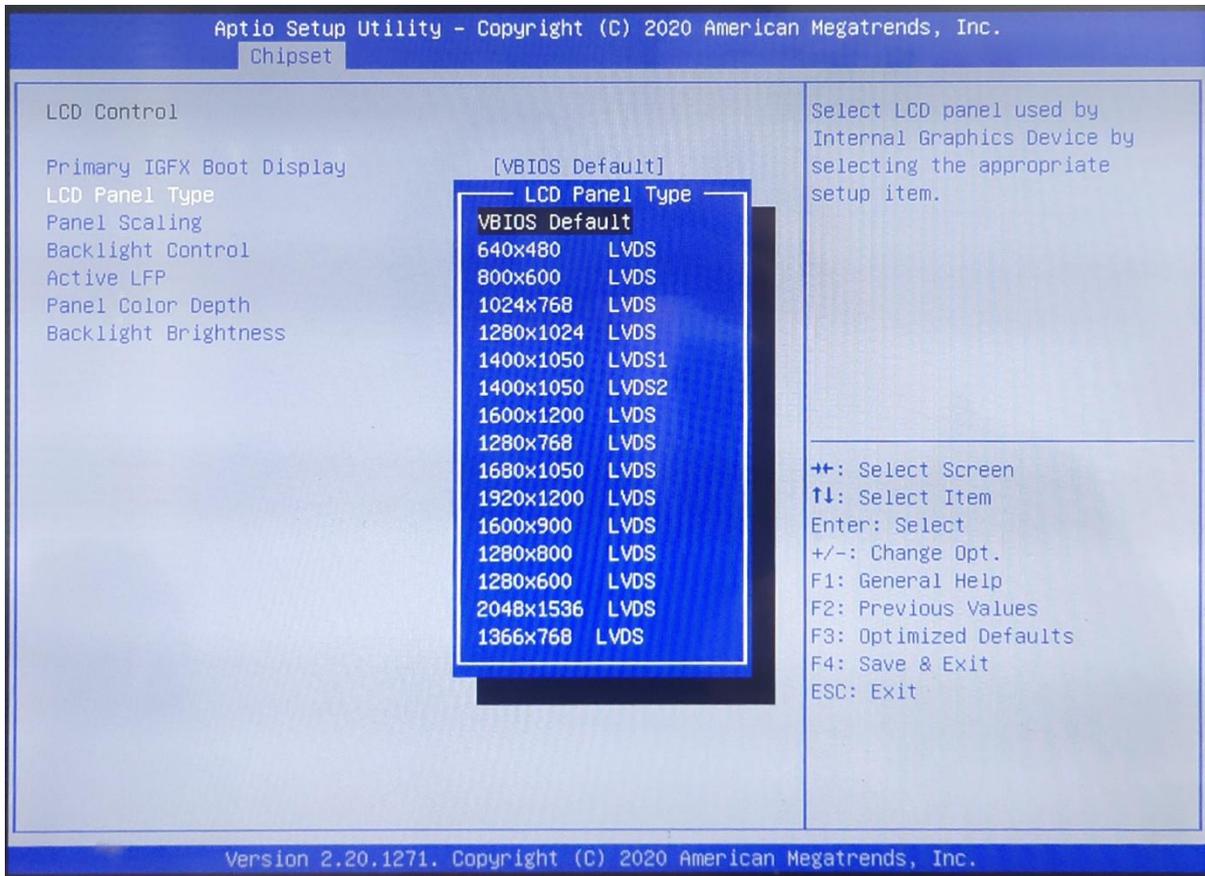


The LCD Control parameters (resolution and channel of the built-in LCD display, etc.) is mainly used here



LCD Panel Type

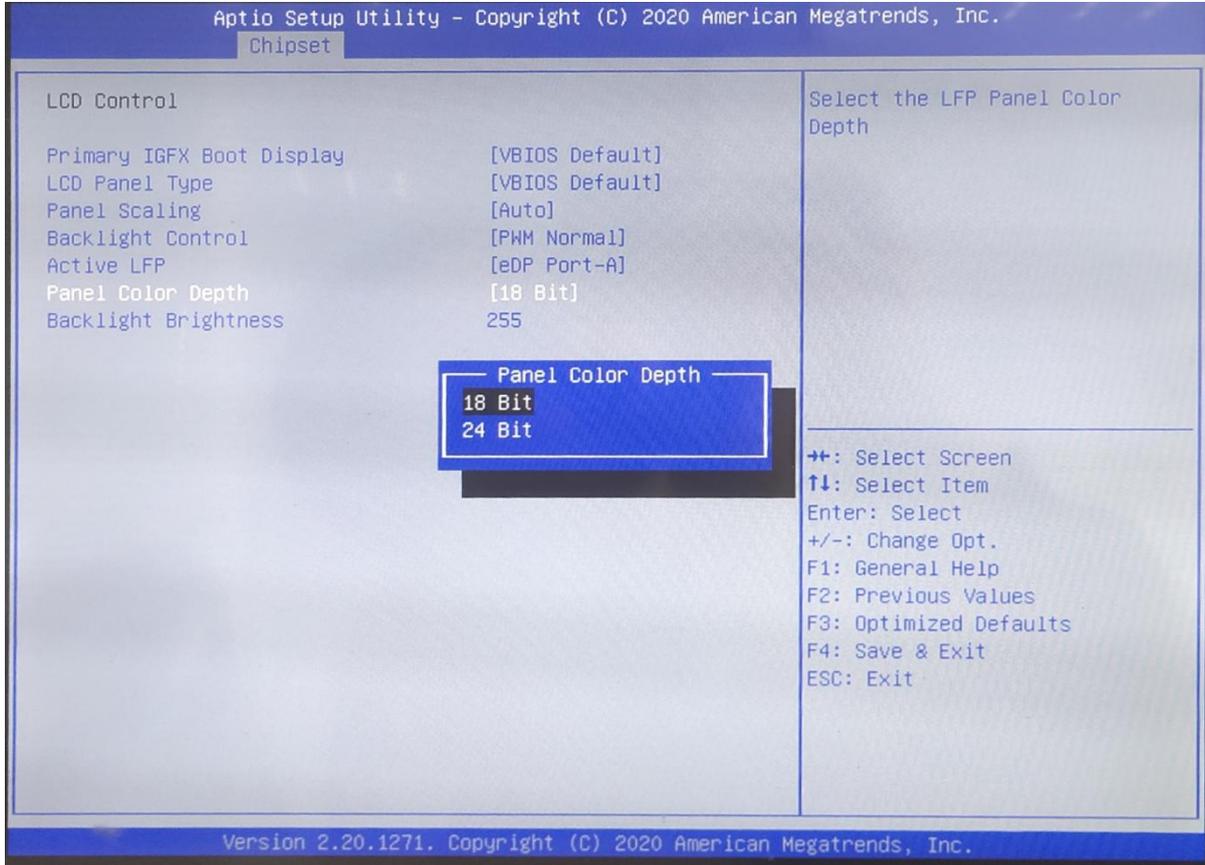
Resolution of the integrated video interface.





Color depth

This option selects the color depth of the LCD display.





Security

Set the password for the system protection.

```
Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
Main  Advanced  Chipset  Security  Boot  Save & Exit

Password Description
-----
If ONLY the Administrator's password is set,
then this only limits access to Setup and is
only asked for when entering Setup.
If ONLY the User's password is set, then this
is a power on password and must be entered to
boot or enter Setup. In Setup the User will
have Administrator rights.
The password length must be
in the following range:
Minimum length           3
Maximum length           20

Administrator Password
User Password

Set Administrator Password

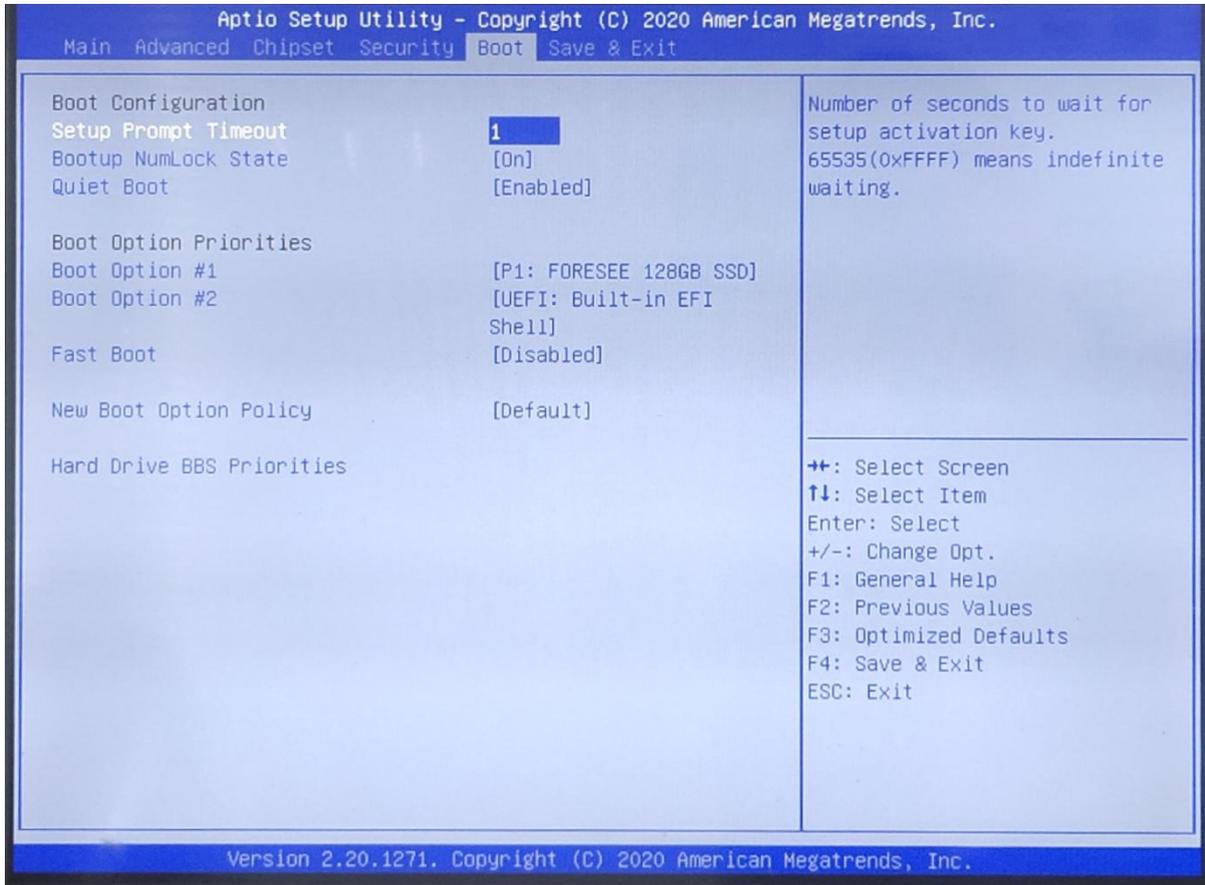
-----
**+: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
F12: Save BIOS Screen
ESC: Exit

Version 2.20.1271. Copyright (C) 2020 American Megatrends, Inc.
```



Boot

Set the BIOS start-up parameters and the device boot-up order.



Save & Exit

Save and setting the new parameter values.

This menu is used to save settings or load default configuration parameters, exit BIOS settings, and so on.

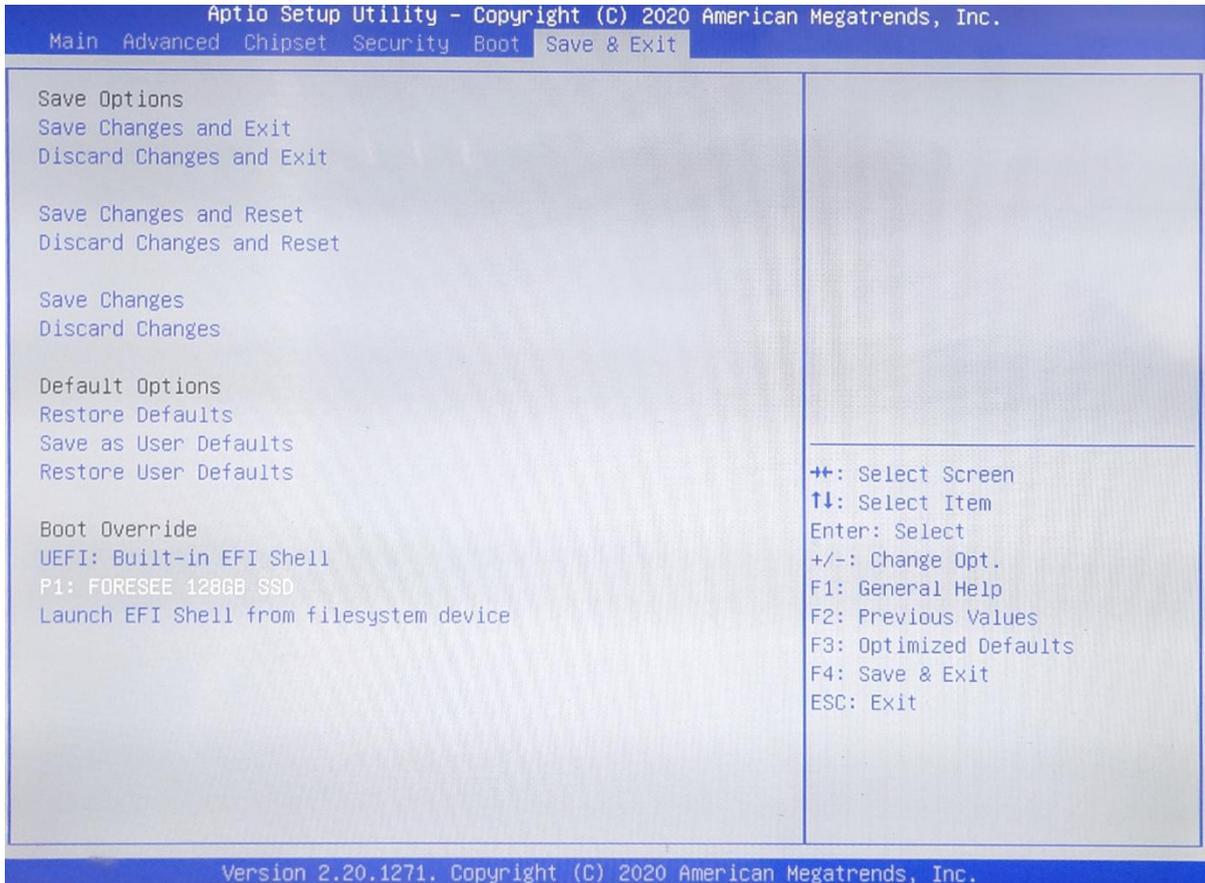


Figure 3.4-14 LUMIA BOOK SERIES BIOS-Save-Exit

Figure 3. 4-14 LUMIA BOOK series BIOS-Save&Exit

- **Save Changes and Reset**
 Save the setpoint and restart the system.
 Save the settings and restart the system.
- **Discard Changes and Reset**
 Discard the setup changes and restart the system.
- **Discard the configuration change and restart the system.**
- **P1 : FORESEE 128GB SSD**
 Displays the hard drive boot

Installation

This section is focused on the hardware installation and drive software setup.

Hardware installation

SSD, Wifi modules, expansion cards

The hard disk interface (3) of SSD is on the carrier board.

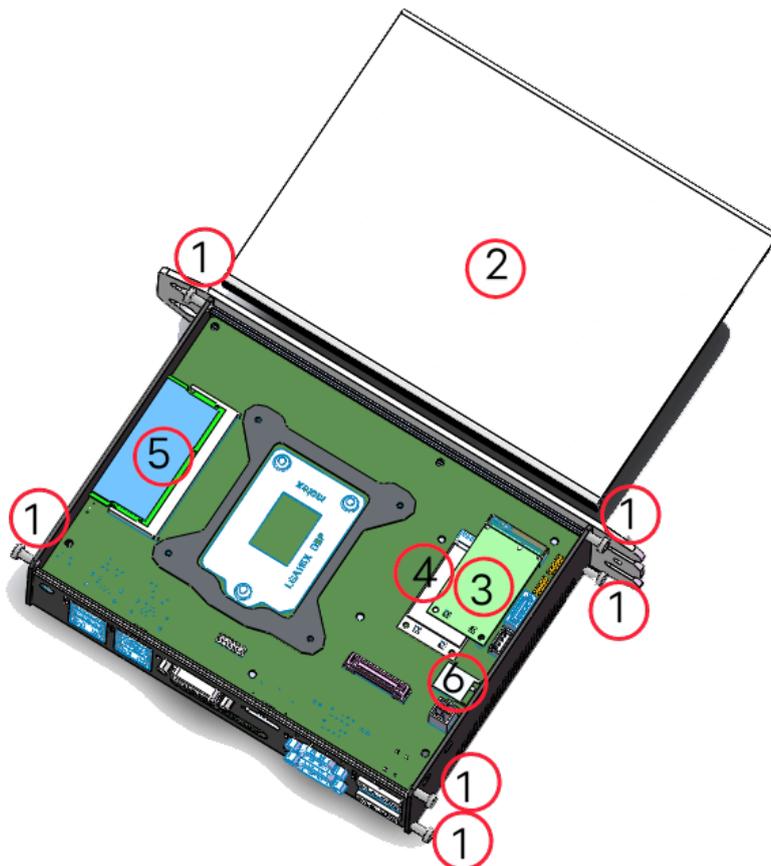
The miniPCIe card (network card)(4) is under the carrier board.

The SIM card slot (6) is under the network card (6) and can be used to install 4G, WiFi, Bluetooth, SIM card and other functional modules.

The memory module (5) is on the left.

In order to install or remove these additional components follow the procedure below:

- Remove the 6 M3 screws (1)
- Open the back cover (2) to expose the carrier plate.



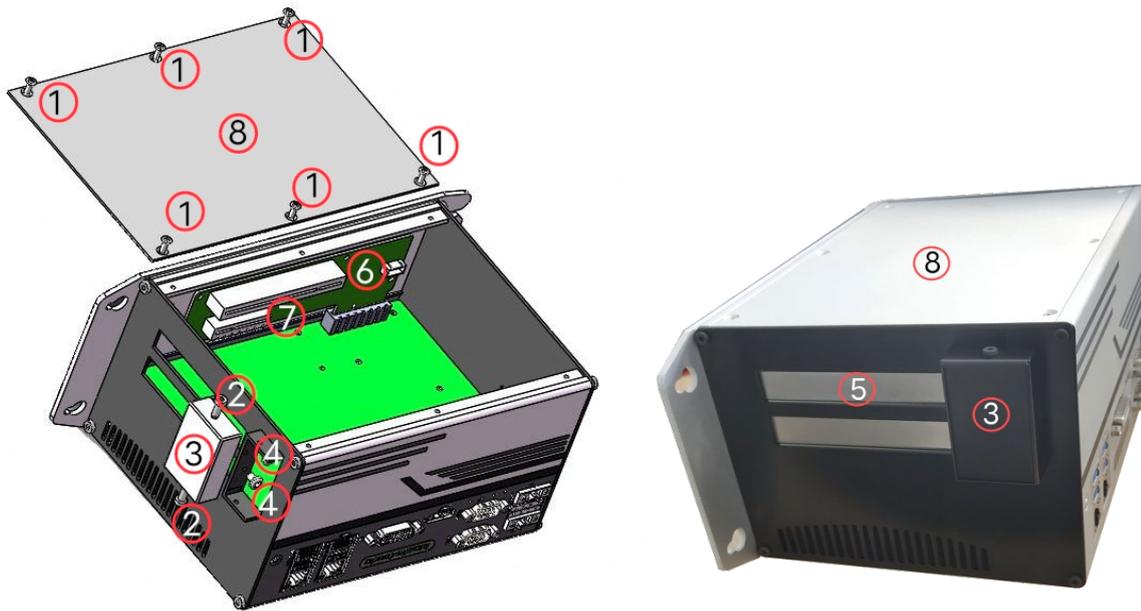


-
1. Disconnect the power supply before opening the product cover.
 2. Pay attention to electrostatic discharge.
-

LUMIA with expansion module

In order to open the product please follow the procedure below:

- Remove the 6 M3 sink screws (1) on the cover (8).
- Remove the left hood(3) up and down black hexagonal screws(2).
- Remove two screws(4) of stainless steel bar(5)
- Install the PCI/PCIE expansion card on the corresponding PCI(6) and PCIE (7) card slots locking the additional card with 2 M3 three-combination screws (4).



1. Disconnect the power supply before opening the product cover.
2. Pay attention to electrostatic discharge.

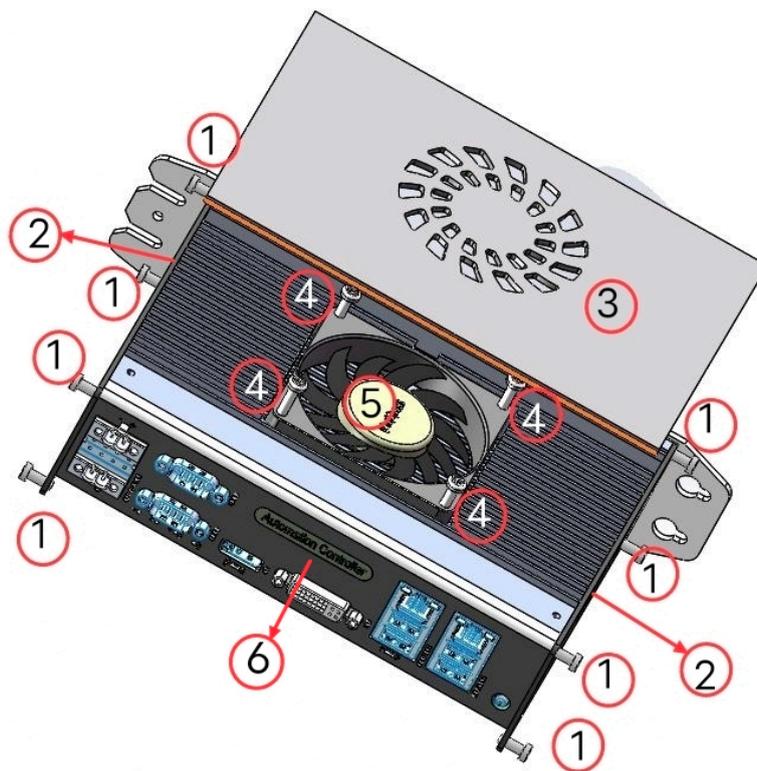
Cooling Fan

In the LUMIA BOOK high-performance model the auxiliary cooling is necessary. The fan is embedded into the aluminum profile. Before installing the new fan the old one has to be removed.

Follow the procedure below:

- Remove the 8 M3 corner screws (1) on the left and right
- Remove the front connector plate(6)
- The fan cover(3) can be removed
- Remove the 4 screws fixing the fan to the alluminium profile (4).
- Remove the fan(5).

The installation sequence is the reversed one.

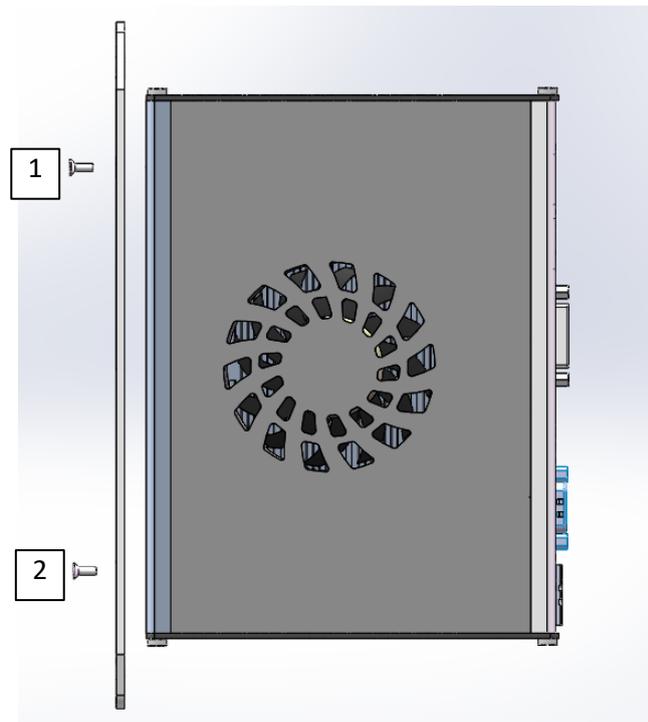


1. When removing the fan, you need to disconnect the fan's power cable
2. Power off the complete unit before removing the fan.

Wall Mounting plate

LUMIA BOOK series products support wall mounted installation. The mounting plate is fixed on the shell of the product by two screws.

When installing or replacing, just remove the two m3 countersunk screws (1-2).



Safety prevention and maintenance



The precautions outlined in this chapter should be strictly followed.

Not to follow these precautions may result in serious damage to the machine

Safety Guidelines

Follow the safety precautions outlined in this section below.

General safety guidelines

- Always follow the electrostatic precautions below when turning on the machine.
- Once the machine needs to be installed, moved or modified, be sure to turn off the power and disconnect the power connection.
- Do not apply voltage levels beyond the specified voltage range. Otherwise, it may cause fire or electric shock.
- When the machine is running, electric shock may occur once the chassis of the machine is opened.
- It is forbidden to drop or insert any object into the ventilation system.
- If a large amount of dust, water or liquid enters the machine, turn off the power immediately, unplug the power connection, and then contact the machine supplier.
- These activities are forbidden:
 - Do not drop the machine on hard ground. Do
 - Do not strike the machine or push excessive force on it.
 - Do not use the machine in locations where the ambient temperature exceeds the rated temperature.

Antistatic precautions

Failure to take ESD precautions during machine installation can cause permanent damage to the machine and cause serious injury to the user.

Electrostatic discharge (ESD) can cause serious damage to machine electrical components.

Dry climates are more prone to ESD.

Therefore, once the machine is opened to handle any electrical components, the following anti-static precautions must be strictly followed: Failure to take ESD precautions during installation may be in the permanent damage to the machine and serious injury to the user. Electrostatic discharge (ESD) can cause serious damage to the electrical parts of the machine. Dry climate is more prone to ESD. Therefore, once the machine is turned on and any electrical parts need to be handled, the following anti-static precautions must be strictly followed:

- Wear anti-static wristband: wearing simple anti-static wristband can help avoid ESD damaging any electrical parts.
- Self grounding: touch any grounded conductive material before handling any electrical parts. During the handling of electrical parts, any conductive material that is grounded should be touched frequently.
- Use of anti-static pad: in the case of configuration of electrical parts or related operations, it should be placed on the anti-static pad. This can reduce the possibility of ESD damage.
- Touch only the edge of the electrical parts: when handling the electrical parts, the way of holding the edge should be adopted to hold the electrical parts.

Product disposal



Dispose of used batteries in accordance with relevant instructions and relevant provisions of local laws and regulations.

If the wrong type of battery is replaced, there may be a risk of explosion, and the onboard battery can only be replaced by a certified engineer.

Outside the EU – if you need to dispose of waste electrical and electronic products outside the EU, please contact your local authority to ensure that the correct disposal method is adopted.

Within the EU: The EU wide legislation implemented by EU Member States stipulates that the waste electrical and electronic products carrying the left mark must be disposed separately from ordinary household waste.

This includes monitors and electrical accessories, such as signal or power lines.

Please follow the national guidelines for the disposal of electrical and electronic products.



Maintenance and cleaning

Follow these guidelines to maintain or clean the machine.

Please read the following details before cleaning any parts or parts of the machine. Do not spray or spray liquid directly on the product.

- There is no need to clean the interior. Avoid liquid entering the interior.
- Be careful not to damage small, removable parts inside.
- Please turn off the power before cleaning.
- Do not drop any object or allow any liquid to enter the equipment through the opening.
- When cleaning, be careful of any allergic reactions to solvents or chemicals.
- Avoid eating, drinking and smoking near the work area.

Cleaning Tools

Only special products can be used to clean some parts.

In such cases, such products are clearly indicated in the cleaning tips.

Below is a list of items that can be used for cleaning

- **Cloth** – although tissue or tissue paper can be used, a soft, clean cloth is recommended.
- **Water or external alcohol** - Cloth dipped with water or alcohol for external use should be used.
- **Use solvents** - Use of solvents is not recommended, otherwise the plastic parts may be damaged.
- **Vacuum cleaners** - Vacuum cleaner - a vacuum cleaner designed for computers is the best way to clean. Dust and dirt can restrict airflow, which can lead to corrosion of the circuit.
- **Cotton Swabs** - Swab – a swab dipped in alcohol or water for external use is an excellent tool for wiping hard to touch equipment areas.
- **Foam sign** - Foam sign - when possible, it is better to use foam sign and other non pilling signs for cleaning.



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