

HWAINTEK

HG31

Edge Gateway

Manual



Jiangsu Huaying Intelligent Technology Co., Ltd

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1.Outline

This chapter mainly provides a brief introduction to the HG31 series products, and gives a detailed list of machine parameters. Corresponding exterior dimensions and simple instructions for indicator lights are given for different series of products.

1.1 Brief Introduction

The HG31 series ultra-compact embedded platform with Intel Elkhart Lake processors provides a reliable I/O design for the maximum number of connections. The all-aluminum enclosure with industry-leading process is ideal for industrial automation and applications that operate reliably in harsh environments. The HG31 series panel computer adopts the data protection architecture independently developed by Zhuoxin Chuangchi to achieve industrial-grade security guarantee on data.

The HG31 series is an intelligent and powerful embedded system that supports a wide range of application development and convenient service deployment, and excels in intelligent transportation, facility management, industrial automation, and Internet of Things (IoT) applications.

1.2 Specification description

CPU	Intel Elkhart Lake Pentium® J6426 , N6415 , Celeron® J6412 , J6413 , N6210 , N6211
BIOS	AMI 128 Mbit SPI Flash
memory	Dual Chan el DDR4 4800MT/s SO-DIMM , MAX. 32GB
storage	1 x M. 2 2280 , support SATA 3.0
	1 x Nano SIM
external I/O	1 x DP 1.4 a up to 4 096 x 2304 x 36b pp@60H z/ 5120 x 3200 x 24bpp@60H z
	1 x HDMI 1.4 , up to 4 0 9 6 x 2160 x 2 4 b p p @ 3 0 H z
	3 GbE LAN (1 x Intel I2 26-V, 2 x Intel I2 10-AT support external PoE power supply)
	1 x RS - 232, 2xRS - 232 /485 , 1 x RS - 232 /422 /485
	2 x USB 3.0 , 2 x USB 2.0
	4 x LED (Power \ SATA \ USER 1 \ USER 2)
	1 x Reset resetting key
expansion	3 x internet USB 2.0
	1 x M. 2 E-Key 2230 support t WiFi PCIe
	1 x M. 2 B-Key 3052 support 4G /5G
power supply	DC 9 ~ 36 V
Power	6 0 W
dimension	172 x 125 x 62.5m m (L x W x H)
system	Windows 1064 bit 、 Linux
installation	Back hanging , DIN - RAIL
operating temperature	0 ~ 5 0 °C
storage temperature	- 4 0 °C ~ 85 °C
relative humidity	10 ~ 95 %@ 40 °C (non-condensing)

1.3 Packing list

When unpacking the box, please first check the accessories for obvious damage, and confirm that the random accessories are consistent. Specific accessories see table 1-1.

Table 1-1 accessories list

Accessories		
1	E2 11 series industrial computer	1
2	Matching adapter power cord	1
3	Wall Hanging Kit	1
4	mounting screw	4

1.4 Appearance and installation dimensions

The main appearance dimensions and installation dimensions of the HG31 series are shown in Figure 1-2, and all size units are mm.

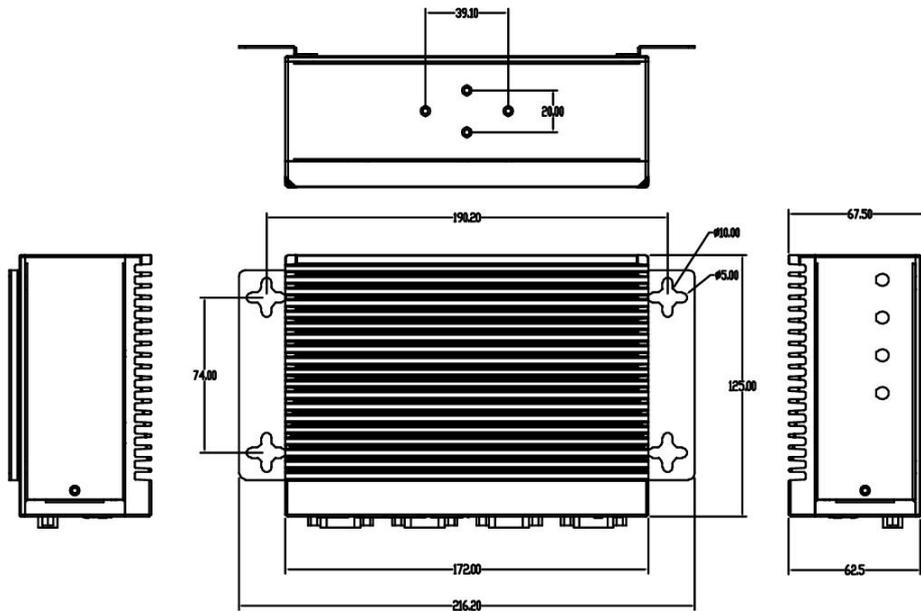


Figure 1-2 HG31 specific size diagram

2.Interface description

This chapter mainly introduces the peripheral interfaces of HG31 series industrial computers, and describes the pins of some interfaces in detail, which can provide reference for users' wiring. The interface in the HG31 series is shown in Figure 2-1.

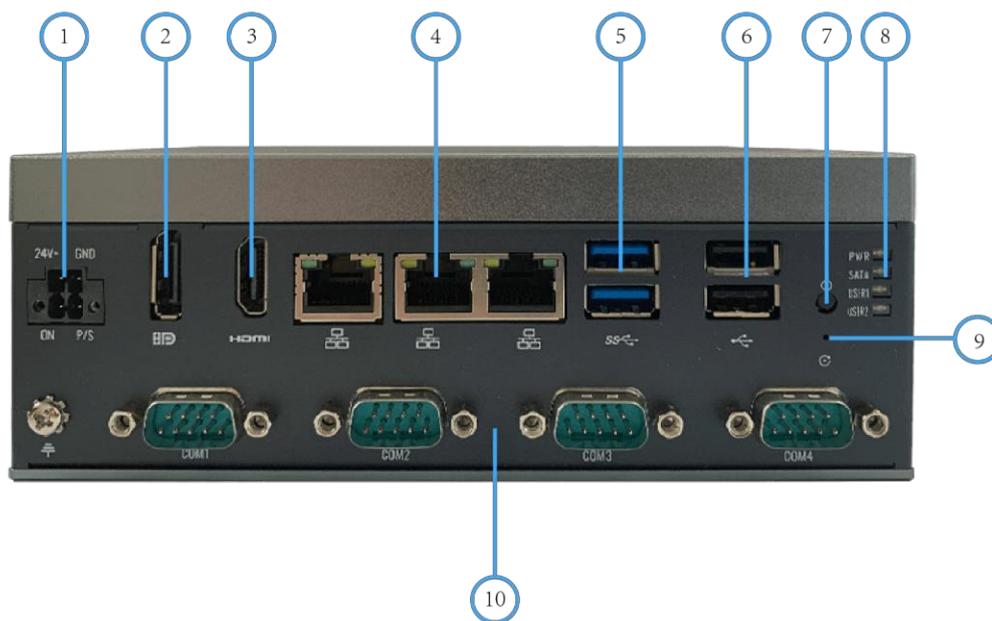


Figure 2-1 HG31 interface diagram

Number	Name	Number	Name
1	Power input interface	6	2 USB 2.0
2	DP	7	Power Button
3	HDMI	8	LED
4	LAN 1~3	9	Reset
5	2 USB 3.0	10	COM 1~4

2.1 Power input interface

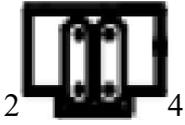


Figure.2-2 Power input interface diagram

The HG31 series is equipped with a 24V 4PIN Phoenix terminal, as shown in Figure 2-2.

Please use the adapter or switching power supply of the equipment. Do not connect more than 36 V voltage power supply, otherwise it will lead to over-voltage burning of the main board. The interface definition is as follows :

PIN	Signal
1	PC_START
2	PC_ACTIVE
3	VIN
4	GND

2.2 DP

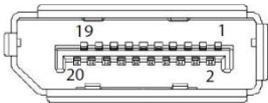


Figure.2-3 DP PIN schematic

The HG31 series is equipped with a DP display interface that supports up to 4096x2304x36bpp @ 60Hz / 5120x3200x24bpp @ 60Hz.

PIN	Signal	PIN	Signal
1	ML_Lane 0 (p)	11	GND
2	GND	12	ML_Lane 3 (n)
3	ML_Lane 0 (n)	13	CONFIG1
4	ML_Lane 1 (p)	14	CONFIG2
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_Lane2 (2)	19	Return
10	ML_Lane 3 (p)		

2.3 HDMI

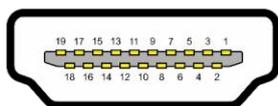


Figure 2-4 HDMI display interface schematic diagram

The HG31 series is equipped with a HDMI display interface, which can realize high-definition transmission of signals at high speeds, and also has good anti-interference ability. The interface is shown in Figure 2-4.

PIN	Signal	PIN	Signal
1	TMDS Data2+	11	TMDS Clock Shield
2	TMDS Data2 Shield	12	TMDS Clock-
3	TMDS Data2-	13	CEC
4	TMDS Data1+	14	Reserved (N.C. on device)
5	TMDS Data1 Shield	15	SCL(I ² C serial clock for DDC)
6	TMDS Data1-	16	SDA(I ² C serial data for DDC)
7	TMDS Data0+	17	DDC/CEC Ground)
8	TMDS Data0 Shield	18	+5 V Power
9	TMDS Data0-	19	Hot Plug Detect
10	TMDS Clock+		

2.4 Ethernet interface (LAN)

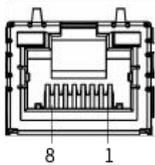


Figure.2-5 Ethernet interface diagram

The HG31 series is equipped with three Ethernet interfaces, as shown in Figure 2-5, each of which is controlled by an independent Intel chip (1 x Intel i225-V, 2 x Intel i210-AT), two of which can support POE function. The port features a standard RJ-45 jack with an LED indicator.

PIN	Signal	Description
1	TRD0P	Tranceive Data+
2	TRD0N	Tranceive Data-
3	TRD1P	Received Data+
4	TRD2P	Bi-directionalData+
5	TRD2N	Bi-directionalData-
6	TRD1N	Received Data-
7	TRD3P	Bi-directionalData+
8	TRD3N	Bi-directionalData-

2.5 Power Button



Figure 2-6 Power on / off key

The HG31 series computer has a power switch button. The LED indicator on the front panel can indicate the state of power on and off, the state of power on (blue LED) and the state of power off (LED lights off). The interface is shown in Figure 2-6.

2.6 USB 3.0

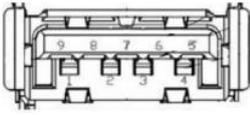


Figure 2-7 USB3.0 interface schematic diagram

The HG31 series is equipped with two USB3.0, and the USB interface supports the plug and play function, allowing users to connect or disconnect the device at any time, as shown in Figure 2-7. The pin is defined as follows :

PIN	Signal (USB 3.0)	PIN	Signal (USB 3.0)
1	Vbus	6	StdA_SSRX+
2	D -	7	GND_DRIAN
3	D +	8	StdA_SSTX-
4	GND	9	StdA_SSTX+
5	StdA_SSRX-		

2.7 USB 2.0



Figure 2-8 USB2.0 interface schematic diagram

HG31 series is equipped with two USB2.0, USB interface supports plug and play function, allowing users to connect or disconnect the device at any time, as shown in Figure 2-8, the pin is defined as follows :

PIN	Signal (USB 2.0)	Description (USB 2.0)
1	Vbus	+5V
2	D -	Data -
3	D +	Data +
4	GND	Ground

2.8 Serial communication interface.

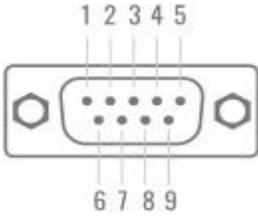


Figure 2-9 Serial port interface diagram

The HG31 series is equipped with four DB9 serial ports, 1 x RS-232, 2 x RS-232 / 485 and 1 x RS-232 / 422 / 485. The internal dial code switching method can realize communication with the device. The interface is shown in Figure 2-9.

PIN	RS232 (DB9)	RS422(DB9)	RS485 (DB9)
1	DCD	Tx-	DATA -
2	RXD	Tx+	DATA+
3	TXD	Rx+	NC
4	DTR	Rx-	NC
5	GND	GND	GND
6	DSR	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	RI	NC	NC

Note : NC means ' no connection '.

2.9 Reset



Figure.2-10 Reset key diagram

There is a system reset button (Reset) on HG31. Press the system reset button to restart the system, the icon is shown in Figure 2-10.

2.10 LED



Figure. 2-11 LED schematic diagram

The HG31 series front panel has four LED indicators, from top to bottom are USER1, USER2, SATA, PWR.

Name	Description
USER1	User-defined indicator light
USER2	User-defined indicator light
SATA	Yes : constant light / work : flicker / no : extinguished
PWR	DC power switch : Extinguish / DC power switch : constant light

3. Operating Instructions

In this chapter, the simple operation instructions for the normal use of HG31 series products are introduced, and the working environment, installation steps and detailed operation of system protection functions of industrial computers are introduced.

3.1 unpacking inspection

Before opening the packaging, please check whether the product model indicated in the outer packaging is consistent with the product model ordered. After opening the packaging, please first check whether the surface of the industrial computer is mechanically damaged, and then carefully check whether the accessories are ready according to the packing list or the order contract. If the industrial computer surface damage, or product content does not conform to, please do not use, immediately contact the dealer.



To prevent static electricity from damaging the industrial controller, touch an efficient grounded metal object before touching the industrial controller circuit to release the static charge carried by the body and wear anti-static gloves.

3.2 work environment

- 1) Industrial computers need to be far away from high-power, strong electromagnetic interference of electrical and environmental ;
- 2) The working environment temperature should be between 0 degrees and 50 degrees ;
- 3) The supply voltage should be maintained between 200V ~ 240V.

3.3 preparatory work

Before installation, please prepare the relevant items, such as :

- 1) HG31 series industrial computer, and related power supply, cable ;
- 2) the display, and the display connection line between the display and the industrial computer ;
- 3) USB mouse, keyboard ;
- 4) PLC, camera and corresponding connecting line ;
- 5) Power supply.

3.4 installation procedure

1. Hardware connection :

- 1) Connect the equipped display to the industrial computer HDMI interface ;
- 2) Connect the keyboard, mouse, etc. to the industrial computer USB interface ;
- 3) Connect other hardware such as PLC and camera according to the corresponding interface ; the power adapter is connected to the 220 V voltage and turned on ;

2. Gigabit network card camera configuration ;

1) Confirm that the camera is connected to the power supply, and the camera is connected to the industrial computer with a network cable

2) Close the firewall

control Panel -> Windows Defender -> Setup -> Implement Protection -> Remove Tick and Administrator -> Enable Windows Defender -> Remove Tick.

3) Open the camera software

4) Advanced network settings

The device manager -> network adapter -> attribute -> configuration -> advanced page sets the value of ' Jumbo Packet ' to the maximum value of ' 9014 Bytes '; select the attribute of ' Internet Protocol Version 4 (TCP / IPv4) ' in the Ethernet attribute, and set its IP address to the address of the same network segment as the camera IP address, as shown in Figure 3-1.

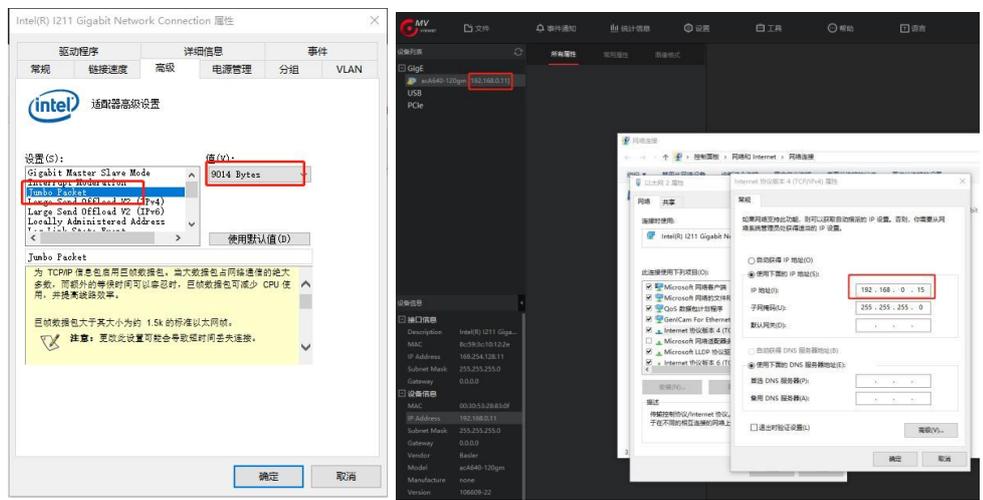


Figure.3-1 High-level network setup diagram

5) Several parameters that need to be adjusted when collecting images

Packet Size parameter setting : This parameter unit is bytes, as far as possible to set a parameter close to the network card giant frame parameters, such as giant frame = 9K, the camera software Packet Size to be set to 8000 or close to the number of 9K. Clicking on the continue shot in the Pylon viewer, the rule is to see that the camera can achieve full frame rate acquisition until the Packet Size is set to the larger the better (no more than the giant frame size), which can effectively reduce the CPU occupancy rate.

3.5 system protection

3.5.1 system recovery

The HG31 series industrial computer is allocated a hidden space (A disk) for storing backup system, the user can repair the system through simple operation.

1) power on the industrial computer, press ' F8 ' into the repair mode ;

2) Select ' repair computer ', enter startnet.cmd, type ' 0 ' according to the prompt, and start system repair after returning (system repair is generally a backup system, if there is no pre-backup, the default is a pure system, and the file is not retained after repair.

Equivalent to the re-installed system)

3.5.2 system backup

The HG31 series industrial computer allocates a hidden space (A disk) for storing backup systems, and users can independently backup systems through simple operations.

- 1) power on the industrial computer, press ' F8 ' into the repair mode ;
- 2) Select ' repair computer ', enter the startnet.cmd, follow the prompt type ' 1 ', start the backup system (backup system is the content of the current system, pay attention to the size of the system does not exceed 15G)

3.5.3 C disk protection

The C _ Protect program is pre-installed in the HG31 series industrial computer, and the user can choose to turn on or off the C-disk protection (the default closed state) according to the requirements.

- 1) Enter the C _ Protect folder in the root directory of the C disk folder, you can see the files shown in Figure 3-3.



Figure 3-2 C drive protector

- 2)If you want to turn on the C disk protection, right-click ' Enable ' to run as an administrator, do not do anything until the machine restarts.

- 3)In the C-disk protection open state, if you want to close the C-disk protection program, then right-click ' Disable ' to run as an administrator, do not do anything until the machine restarts.

Note : The C disk protection program is only valid for the content of the C disk (including desktop content). When the C disk protection is turned on, all additions, deletions, and modifications to the C disk will not be saved. Therefore, if you need to modify the program or file in the C disk, you need to cancel the C disk protection first.

4. BIOS Setup Instructions

4.1 BIOS description

BIOS is a basic input and output control program stored in Flash Memory. It is a bridge between the main board and the operating system, and is responsible for managing the relevant parameter settings between the main board and the expansion card. When the computer is activated, it will be controlled by the BIOS program. First, a self-test called POST will be performed, which will detect all hardware devices and confirm the synchronization of hardware parameters. When all detections are completed, it hands over control of the system to the operating system (OS). Because BIOS is the only channel between hardware and software, how to properly set the parameters in BIOS will determine whether your computer runs stably and works in the best state. Therefore, the correct setting of BIOS is the key factor of system stability, so as to ensure that the system performance can reach the best state.

The CMOS Setup will store the set data in the built-in CMOS SRAM on the motherboard. When the power supply is turned off, the lithium battery on the motherboard continues to power the CMOS SRAM. The BIOS setup utility allows you to configure :

- 1) Hard disk drive and peripheral equipment
- 2) Video display type and display options
- 3) Password protection
- 4) Power management features



As the BIOS version of the motherboard is constantly being upgraded, the description of the BIOS in this manual is for informational purposes only. We do not guarantee the consistency between the relevant content of this manual and the information you have obtained.

4.1.1 Enter the CMOS Setup Settings

When the controller starts, the BIOS enters the boot self-test (Post) program. The self-test program is a series of diagnostic programs fixed in the BIOS. When the self-test program is completed, there is no error. If you want to enter the BIOS, press the DEL key or ESC key until you enter the BIOS interface. If this information disappears before you react, you can turn it off and restart your computer, or you can press <Ctrl> + <Alt>+<Delete> to restart your computer at the same time.

4.1.2 Functional keys and Auxiliary Instruction

↑ (Up key)	Used to move to the previous project
↓ (Down key)	Used to move to the next project
← (Left key)	Used to move to the left project
→ (Right key)	Used to move to the right project
ESC key	Used to exit the current screen
Enter key	Used to confirm the selection
+ key	Used to change the set state, or increase the numerical content
– key	Used to change the set state, or reduce the numerical content
F1 key	Used to display
F2 key	Used to load the last set parameters
F3 key	Used to load optimized parameters
F4 key	Used to store set parameters and leave the CMOS SETUP program.

Auxiliary description of the main screen

When you're in the Setup main screen, as the options move, the main settings for the respective options are shown below. If you want to leave the auxiliary description window, just press the [ESC] key.

4.2 Main Menu Function

When you enter the CMOS setup setting menu, you can see the main menu as shown in Figure 4.1 above the screen. In the main menu, you can select different setting options, press the left and right arrow keys to select. After selecting the submenu, the detailed setting options will be displayed below.

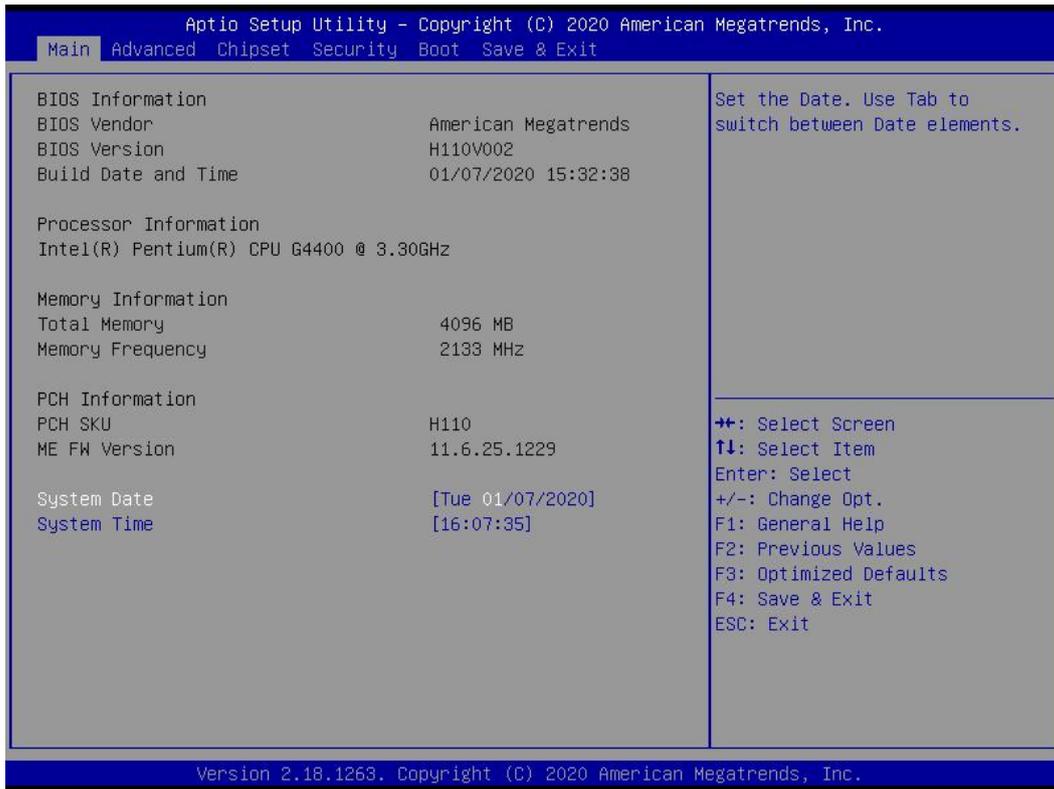


Figure 4-1: Main menu

- 1) Main (standard CMOS function setting)
Set the date, time, etc.
- 2) Advanced (Advanced BIOS function settings)
Set the special functions provided by BIOS, such as CPU, USB, PCI, network port, etc.
- 3) Chipset (Chipset performance settings)
Set North Bridge, South Bridge and other equipment options
- 4) Security (set administrator / user password)
- 5) Boot (boot configuration feature)
- 6) Save & Exit (Save & Exit Options)
This option includes abandoning changes / not saving exit / saving exit and so on.

4.3 Main (Standard CMOS Function Setting)

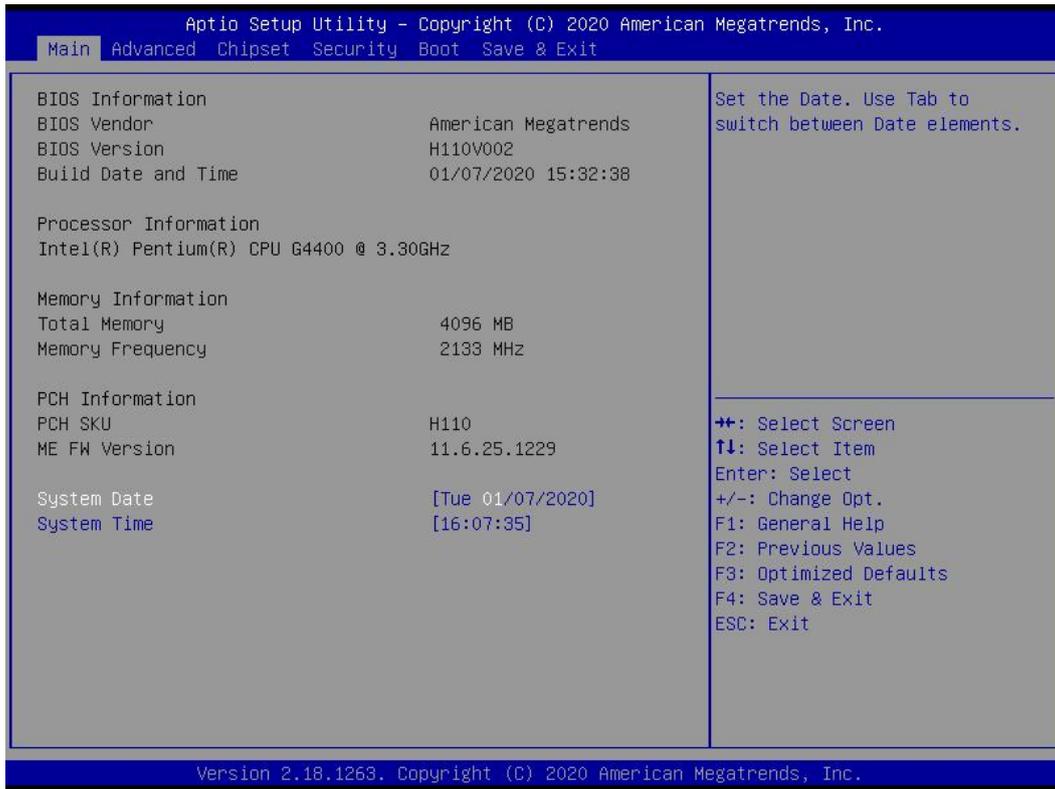


Figure 4-2 : Main menu

1) System Time (hh : mm : ss) (time setting)

Set the time in the computer in the format of ' hours / minutes / seconds'

2) System Date (mm : dd : yy) (date set)

Set the date on the computer in the format of ' week, month / day / year '.

4.4 Advanced(Advanced BIOS Function Settings)

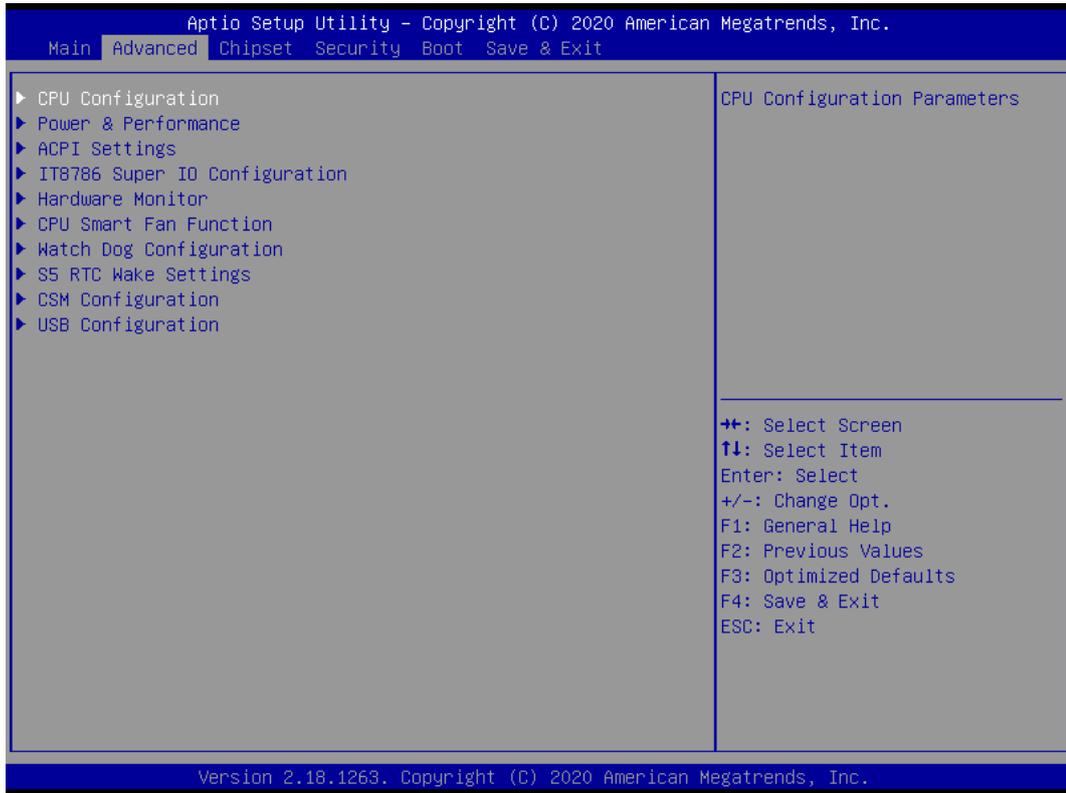


Figure 4-3 : Advanced menu

- 1) CPU Configuration
- 2) Power & Performance
- 3) ACPI Settings
- 4) IT8786 Super IO Configuration
- 5) Hardware Monitor
- 6) CPU Smart Fan Function
- 7) Watch Dog Configuration
- 8) S5 RTC Wake settings
- 9) CSM Configuration
- 10) USB Configuration

4.5 Chipset(Chipset Performance Settings)



Figure 4-4 : Chipset menu

- 1) System Agent (SA) Configuration
- 2) PCH-ID Configuration

4.6 Security (Set Administrator / User Password)

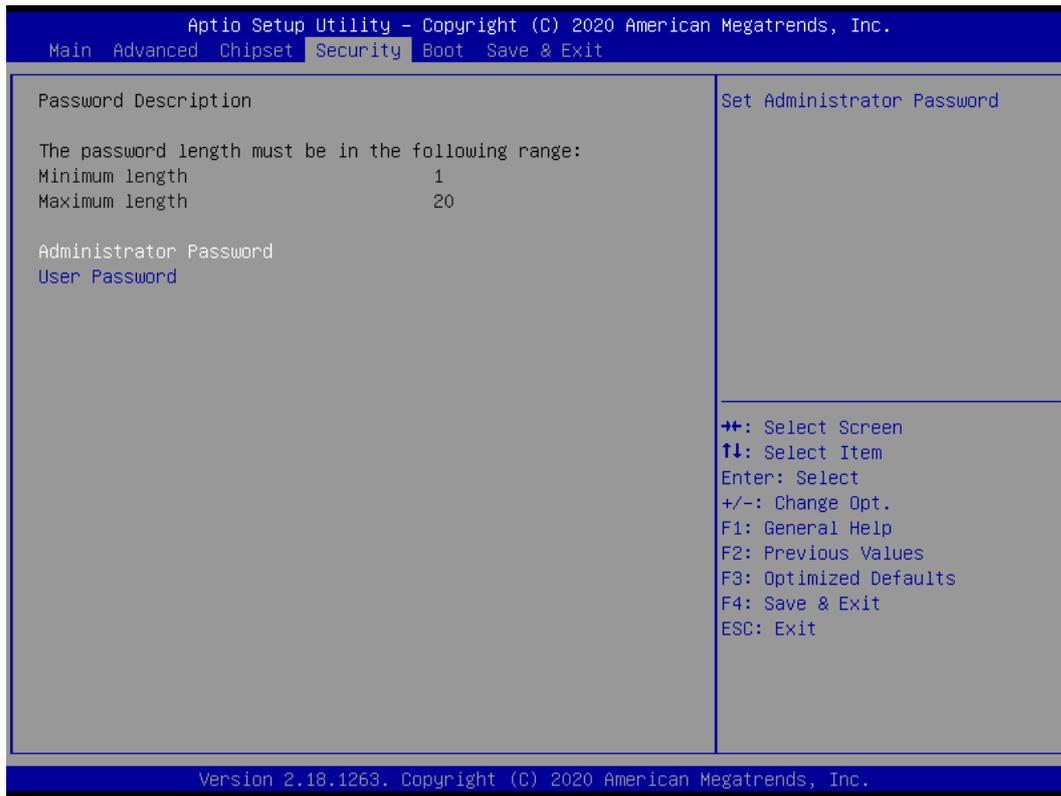


Figure 4-5: Security menu

- 1) Administrator Password : Set the super user password option, which has the highest permissions. When you select this feature, the following information will appear :
Crate New Password * * * * * *

Enter the password, up to twenty characters, and then press the key. The BIOS requires the same password to be entered again. After the input is completed, the BIOS saves the set password. Once you use the password function, you will be asked to enter the password each time before entering the BIOS setup program. This prevents any unauthorized person from using your controller.

- 2) User Password : Set the user password options, this password permissions will be limited, some settings can not be changed. When you select this feature, the following information will appear :
Crate New Password * * * * * *

Enter the password, up to twenty characters, and then press the key. The BIOS requires the same password to be entered again. After the input is completed, the BIOS saves the set password. Once you use the password function, you will be asked to enter the password each time before entering the BIOS setup program.

4.7 Boot (Boot Settings)

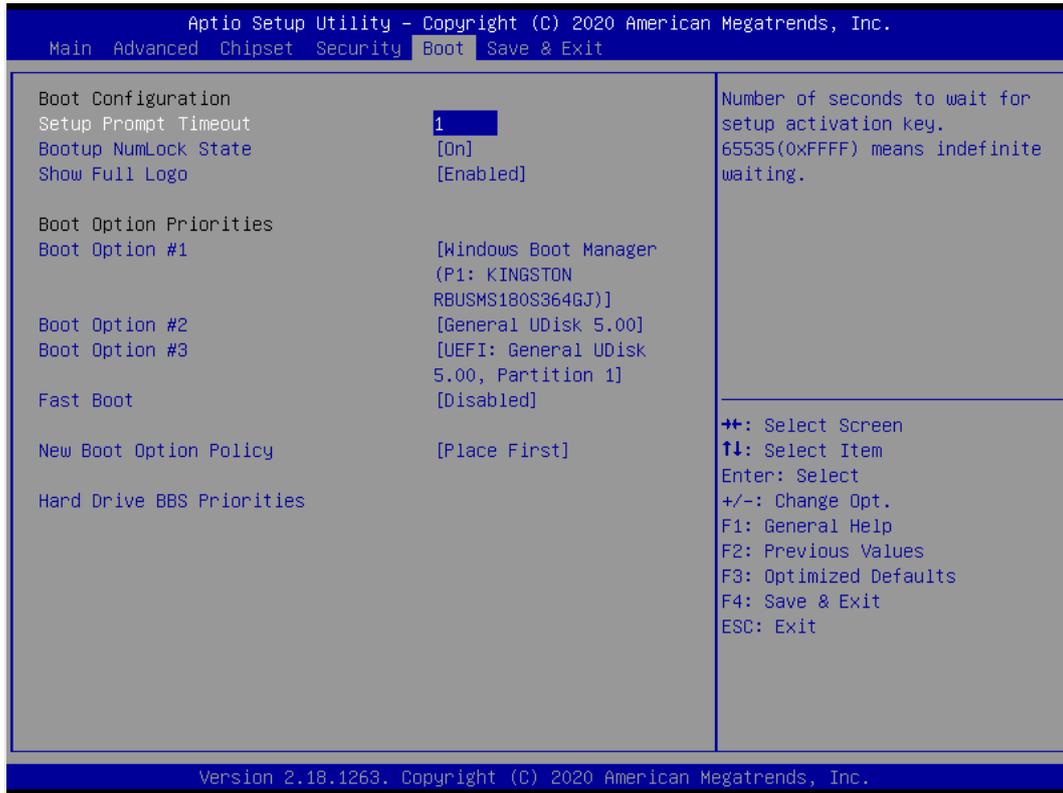


Figure 4-6: Boot menu

1) Boot Configuration

Setup Prompt Timeout : Setup Prompt Timeout

The start-up shows the POST residence time, and the larger the value, the longer the residence time.

Bootup NumLock State : Num Lock key status after system startup

The setting values are : [On] / [Off]. This option specifies the state of the Num Lock key on the keyboard after the controller starts. Show Full Logo : Show LOGO

The setting values are : [Disabled] / [Enabled]. This option specifies whether the LOGO is displayed when the controller is started.

2) Boot Option Priorities : Priority launch option

Boot Option # 1 : First boot option

Boot Option # 2 : Second boot option

Boot Option # 3 : Third Boot Option

Fast Boot : Static start.

The setting values are : [Disabled] / [Enabled].

3) New Boot Option Policy

The setting values are : [Default] / [Place First] / [Place Last]

4.8 Save & Exit (Save & Exit options)

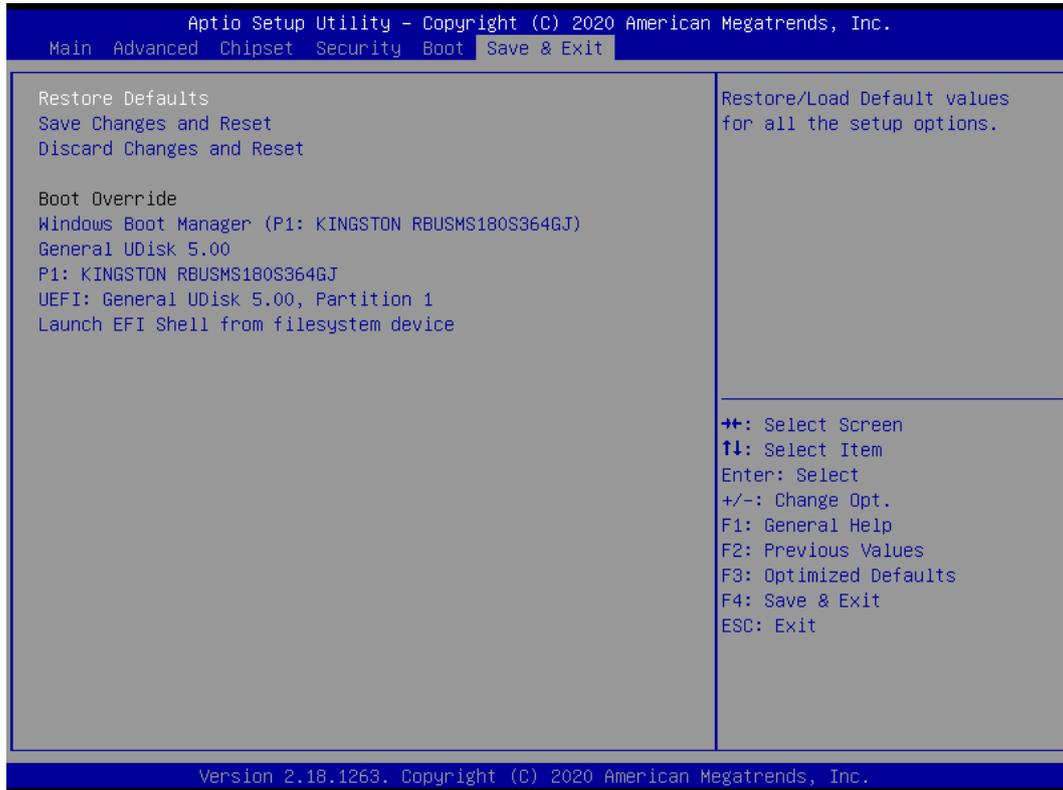


Figure 4-7 : Save & Exit menu

- 1) Save Options
 - Save Changes and Reset: Save changes and restart
 - Discard Changes and Reset: Discard changes and restart
- 2) Restore Defaults
 - Restore Defaults: Load Optimal Defaults
 - This option in the main menu allows the user to restore all BIOS options to optimized values. The default value is the default value set to optimize the performance of the motherboard, if you select YES and press Enter, you can save all the settings to the CMOS SRAM and exit the BIOS configuration program. If you don't want to save, select NO to return to the main menu.
 - Save as User Defaults: Save as user defaults
 - Restore as User Defaults: Restore as user defaults
- 3) Boot Override: Boot boot directly

5.Troubleshooting Guide

Abnormal startup

1) After pressing the power button to turn on, the power indicator light does not turn on

- a. check whether the industrial computer connection is correct, whether the power socket has electricity ;
- b. check the industrial computer power adapter, plug the power line, display data line and keyboard and mouse line, to confirm whether the display and the host connection is correct ;
- c. Check whether the positive and negative poles of the power plug are reversely connected.

2) the power indicator light is on, the display is not displayed

- a. check the display power and switch ;
- b. Check whether the display data line is in bad contact ;
- c. if the DisplayPort or VGA converter is used, replace the other brand converter ;
- d. Observe the keyboard and mouse indicator lights, such as keyboard indicator lights, mouse indicator lights have been on, replace the display troubleshooting.

3) The motherboard can not be self-checked successfully after boot.

Press [Del] key to reset CMOS or clear CMOS.

4) The mouse and keyboard can not be used after power on.

- a. To see whether the keyboard lock lock, remove the keyboard lock ;
- b. if not, check whether the connection between the motherboard and the bottom board and the keyboard and mouse are connected correctly ;
- c. Check whether the keyboard and mouse are connected to the two-turn connector, if there is, the keyboard and mouse are used in reverse ;
- d. Replacement of one-two connector ;
- e. Replace the mouse and keyboard.

5) Unable to boot the system from the hard disk after booting

- a. Press the "Del" key to enter the CMOS hard disk, whether the parameter settings and boot order are correct;
- b. After booting with an optical drive or floppy drive, check whether the hard drive has a boot system or whether the hard disk is partitioned normally and boot has been activated disk partitioning
- c. Press F8 when booting, select the last correct configuration to boot the operating system;
- d. Replace the hard drive with a new one and reinstall the system.

The system freezes or has a blue screen during operation

- 1) Check whether the temperature of the industrial computer is too high;
- 2) Check if you have installed the wrong or outdated driver;
- 3) Check whether the system is infected with viruses;
- 4) Whether system files or applications and disks are corrupted.

The device driver could not be installed correctly

- 1) Check whether the driver is correct and up-to-date ;
- 2) whether the driver needs the support of the operating system patch ;
- 3) Whether the resources occupied by other devices are in conflict with the resources occupied by the devices that need to be driven ;
- 4) If the peripheral equipment, change a slot and re-install the drive ;
- 5) Replace the device and reinstall the driver.

BIOS Upgrade Method

- 1) Prepare a UEFI boot U disk, if not, you need to make one ;
- 2) Please copy the required refresh BIOS files and batch to the U disk root directory ;
- 3) boot press F7, select the production of good UEFI U disk, back, into the Shell ;
- 4) input FS0 : return (if not connected to other storage devices is fs0 :) ;
- 5) run flash.nsh, brush BIOS, the middle can not be powered off ;
- 6) After brushing the BIOS, power off, and then power on, restart the industrial computer, enter the BIOS settings, F3 load BIOS optimization value (Load optimized defaults back to select Y).

Notes: The following situations may cause the refresh to fail and fail to boot.

- 1) Power outage in the refresh process ;
- 2) Viruses exist in the U disk ;
- 3) BIOS file corruption ;
- 4) Non-UEFI system.

In the case of not being able to boot after refreshing, you can empty the BIOS to try, if the situation is still, please return to the factory for maintenance.