JEC-2510
(AMR-TGU)
User's Manual

Version 1.0

Disclaimer

The content of this manual is the intellectual property of the Company, and the copyright belongs to the Company. The ownership of all parts of this product, including accessories and software, is vested in the Company. Without the written permission of the Company, this manual and its any content shall not be imitated, copied, extracted or translated into other languages in any form.

We have carefully prepared this manual with an attitude of being responsible for users, but we do not guarantee that the contents of this manual are completely accurate. This manual is a purely technical document, without any hint or innuendo of third-party content, and does not bear any ambiguity in user understanding caused by typographical errors. In case of any direct or indirect information loss or business termination caused by this manual or all the information about the product mentioned in this manual, the Company and its employees shall not shoulder any responsibility.

Since our products are continuously being improved and updated, the Company reserves the right to amend the contents of this manual without prior notice.

Copyright statement

The trademarks mentioned in this manual belong to their legally registered companies.

The product names involved in this manual are for identification purposes only, and their ownership belongs to their manufacturers or brand owners.

Safety Instructions
General Safety Instructions

⚠ Caution
Before you have read related safety instructions, please do not expand your device.

⚠ Warning
This is a Class A product. In a domestic environment, this product may cause radio interference, in which case, the user may be required to take practical measures against interference.

This device is compliant with the relevant safety measures required for information technology. If you have any doubt about the effectiveness of the installation in the planned environment, please contact your service representative.

Repair
The device can only be repaired by authorized personnel.

⚠ Warning
Unauthorized opening of the device and improper repair may result in serious damage to the device or endanger the users' safety.

System expansion
Only system expansion devices designed for this device can be installed. Installing other expansion devices may damage the system and violate regulations on radio interference suppression. To know the system expansion devices that can be installed, please contact technical support team or local distributor.

⚠ Caution
If the device is damaged by improper installation or replacement of system expansion devices, the warranty for the product will become invalid.

ESD Instructions
The following label can be used to identify the modules that contain electrostatic sensitive devices (ESD):

When operating the modules that contain ESD, please strictly follow the guidelines below:
- Be sure to release static electricity on your body (for example, by touching a grounded conductor) before operating the modules that contain ESD.
- All devices and tools must not carry static electricity.
- Before installing or removing the modules that contain ESD, make sure to pull out the power plug and remove the battery.
- When assembling the modules that contain ESD, always handle them by their edge.
- Please do not touch any connector pin or conductive part on modules that contain ESD.

Contents

Chapter 1 Product instruction

1.1 Overview

JEC-2510(AMR-TGU) industrial BOX machine adopts Intel Elkhart Lake series processor, featuring ultra-low power consumption and high cost-effectiveness. JEC-1300 adopts fanless design with an aluminum alloy die-casting shell for efficient heat dissipation and firm protection, making it suitable for application scenarios with heavy dust, high vibration and strong interference. With its rich expansion options and efficient transmission capabilities, JEC-1300 is suitable for a wide range of applications.
The product supports Gen.11 INTEL Core series i3, i5, and i7 CPUs. With three display interfaces of HDMI+DP+LVDS or eDP (optional), it supports five Gigabit Ethernet ports, and allows for expansion with 4G and 5G modules. With the latest LPC interface, it allows for flexible expansion of encryption, serial ports, and other modules, and supports the standard single power supply through the PHOENIX terminal power interface on the machine. It supports fanless operation and is compatible with WINDOWS and LINUX. Its system can be customized according to customer needs.

1.2 Specifications

Product model	- JEC-2510(AMR-TGU)
Product type	- Industrial BOX machine
Processor	- Uses Intel Celeron 6305E/Intel Core i3-1115G4E/Intel Core i5-1145G7 / Intel Core i7-1165G7
Chipset	- IntelElkhartLakeSOC
Memory	- Supports up to 32GB DDR4-3200, 4GB/8GB/16GB onboard DDR4 memory optional, and additionally provides one DDR4 SODIMM memory expansion slot
Display controller	- Intel UHD Graphics (integrated graphics) for 11th or Iris Xe Graphics (based on different CPU)
Display interface	- Dual display interface HDMI+DP HDMI 2.0 max resolution up to 4096*2160@60Hz DP, max resolution up to 7680x4320@60Hz
Storage	- 1 * SATA3.0+PWR 2.5” HDD installation area (only share one SATA with SSD on M.2 at the same time) - 1 * M.2 Key-M, supports 2242/ 2280 SSD (SATA or NVME)
Audio	- Supports Mic-in+Line-out (single hole 2 in 1), and digital audio output with power amplifier (3W, 4Pinwafer)
Network	- 4 * Intel i226 2.5Gb RJ45 network interface (optional module supports POE) - 1 * Intel i210AT RJ45 network interface (4KV surge protection)
USB	- 4 * USB3.0, 3 * USB2.0, interface uses built-in pin, 1 * built-in USB2.0 Type A
Serial port	- 4 * serial port (COM1& 2 that support RS232/485, COM3& 4 that support RS232
GPIO	- 1 * 32-bit digital I/O (16-bit input, 16-bit output), 4-channel 24V@1A constant-voltage light source power supply
PS/2	- 1 * PS/2 2-in-1 interface font panel
TPM	- 1 * onboard encryption chip SLB9670, supports TPM2.0

Others	- 1 * SM bus and 1 * I²C bus, uses 2.0mm Wafer interface and supports smart sensor - 1 * M.2 Key-B 3042/3052, supports 4G/5G wireless module (USB3+PCIe x1) - 1 * M.2 Key-E 2230 slot, supports half-length Wifi+BT module expansion - 2 * CAN2.0 bus interface, PHOENIX terminal
Watch Dog	- 255-level WDT, programmable in the mode of seconds/minutes, supports timeout interrupt or system reset
BIOS	- AMIUEFI BIOS
Operating System	- Win10x64, Win11x64, LinuxUbuntu21.04, and above
Temperature & Humidity	- When normal temperature memory and storage are used: 0℃-45℃, RH 0%-90%, BP 85-105kPa - When wide temperature memory and storage are used: -20℃-60℃, RH 0%-90%, BP 85-105kPa - To ensure the optimal performance of the machine, please ensure that the machine is working in good heat dissipation conditions, such as airflow or contact with good conductors.
Power source	- DC 9V~36V 2Pin terminal input
Dimensions (L*W*H)	- 230mm(W)×160mm(D)×68mm(H)

1.3 Order information

Order Information of JEC-2510 (AMR-TGU) Machine with Fan and POE:

Part No.	**Model / Description**	**Configuration Description**
5CBX-CA1363-00	Industrial standard system with fan JEC-2510-05 (AMR-TGU05)	Industrial standard system with fan AMR-TGU05, industrial motherboard PXH-TGU05, expansion board PXH-MIO1, 6305E, 4GB DDR4, 4*POE, 1 * i210, 3 * USB3, 2 * USB2, 4 * COM, 2 * CAN, 32 GPIO, M.2-2230, M.2-3052, power supply, and accessories package
Apply for material number when an order is placed	Industrial standard system with fan JEC-2510-i3 (AMR-TGUi3)	Industrial standard system with fan AMR-TGUi3, industrial motherboard PXH-TGUi3, expansion board PXH-MIO1, i3-1115G4E, 8GB DDR4, 4 * POE, 1 * i210, 3 * USB3, 2 * USB 2, 4 * COM, 2 * CAN, 32GPIO, M.2-2230, M.2-3052, power supply, and accessories package
5CBX-CA1364-00	Industrial standard system with fan JEC-2510-i5 (AMR-TGUi5)	Industrial standard system with fan AMR- TGUi5, industrial motherboard PXH-TGUi5, expansion board PXH-MIO1, i5-1145G7, 8GB DDR4, 4 * POE, 1 * i210, 3 * USB3, 2 * USB2, 4 * COM, 2 * CAN, 32GPIO, M.2-2230, M.2-3052, power supply, and accessories package
Apply for material number when an order is placed	Industrial standard system with fan JEC-2510-i7 (AMR-TGUi7)	Industrial standard system with fan AMR-TGUi7, industrial motherboard PXH-TGUi7, expansion board PXH-MIO1, i7-1165G7, 8GB DDR4, 4 * POE, 1 * i210, 3 * USB3, 2 * USB2, 4 * COM, 2 * CAN, 32GPIO, M.2-2230, M.2-3052, power supply, and accessories package

Order Information of JEC-2510 (AMR-TGU) Machine with No Fan and POE:

Part No.	**Model / Description**	**Configuration Description**
5CBX-CA1365-00	Industrial standard system with no fan JEC-2510-05 (AMR-	Industrial standard system with no fan JEC-2510-05, industrial motherboard PXH-TGU05, expansion board PXH-MIO1, 6305E, 4GB DDR4, 4 * i226, 1 * i210,

	TGU05)	3 * USB3, 2 * USB2, 4 * COM, 2 * CAN, 32GPIO, M.2-2230, M.2-3052, power source, accessories package, and airtight
Apply for material number when an order is placed	Industrial standard system with no fan JEC-2510-i3 (AMR-TGUi3)	Industrial standard system with no fan JEC-2510-05, industrial motherboard PXH- TGUi3, expansion board PXH-MIO1, i3-1115G4E, 8GB DDR4, 4 * i226,1 * i210, 3 * USB3, 2 * USB2, 4 * COM, 2 * CAN, 32GPIO, M.2-2230, M.2-3052, power source, accessories package, and airtight
5CBX-CA1366-00	Industrial standard system with no fan JEC-2510-i5 (AMR-TGUi5)	Industrial standard system with no fan AMR-TGUi5, industrial motherboard PXH-TGUi5, expansion board PXH-MIO1, i5-1145G7, 8GB DDR4, 4 * i226, 1 * i210, 3 * USB3, 2 * USB2, 4 * COM, 2 * CAN, 32GPIO, M.2-2230, M.2-3052, power supply, accessories package, and airtight
Apply for material number when an order is placed	Industrial standard system with no fan JEC-2510-i7 (AMR-TGUi7)	Industrial standard system with no fan AMR-TGUi7, industrial motherboard PXH-TGUi7, expansion board PXH-MIO1, i7-1165G7, 8GB DDR4, 4 * i226, 1 * i210, 3 * USB3, 2 * USB2, 4 * COM, 2 * CAN, 32GPIO, M.2-2230, M.2-3052, power supply, accessories package, and airtight

Chapter 2 Application planning

2.1 Transportation

Well-packaged products are suited for transportation to any place by all kinds of vehicles. During the long-distance transportation, products should not be put in the open cabin and carriage. During the transshipment on route, products should not be stored in the open warehouse. Products should not be transported together with inflammable, explosive and corrosive substances by the same vehicle (or other means of transport) and are not allowed to be exposed to rain, snow or liquid substances and mechanical force.

2.2 Storage

Products should be stored in the original package box when it is unused. The warehouse temperature should be 0℃-40℃, and relative humidity should be 20%-85%. In the warehouse, there should be no harmful gas, inflammable and explosive products, corrosive chemical products, and strong mechanical vibration, shock and strong magnetic field interference. The package box should be at least 10 cm above ground and 50 cm away from wall, thermal and cold source, window or air inlet.

Risk of destroying the device!

When shipping the device in cold weather, attention should be paid to the extreme temperature variation. Under this circumstance, please make sure no water drop (condensation) is formed on the surface or interior of the device. If condensation is formed on the device, please wait for at least 12 hours before connecting the device.

2.3 Open the box and perform the initial examination

2.3.1 Open the box and examine the device

Please pay attention to the following issues when opening the box:

- Do not discard the original packing material. Please keep the original packing material for re-transportation.
- Please keep the documentation at a safe place. The documentation, which is a part of the device, is required for initial device debugging.
- When conducting the initial examination, please check whether there are distinct damages to the device caused during the transportation.
- Please check whether the goods contain the intact device and all of the independently ordered accessories. Please contact the customer service when any unconformity or transportation damages occur.

2.4 External environment conditions

When planning a project, the following conditions should be considered:

- Please observe the weather and mechanical environment conditions specified in the operating instructions.
- Please avoid extreme environmental conditions, and keep the device away from dust, moisture and heat.
- Please avoid direct sunlight on the device.
- Please make sure other assemblies or the side of cabinet is 50 mm and 100 mm respectively away from the upper / lower sides of the device.
- Please do not cover the ventilation hole of the device.
- The installation location requirement allowed for the device should always be observed.
- The I/O connected or installed should not generate reverse voltage of larger than 0.5 V in the device.

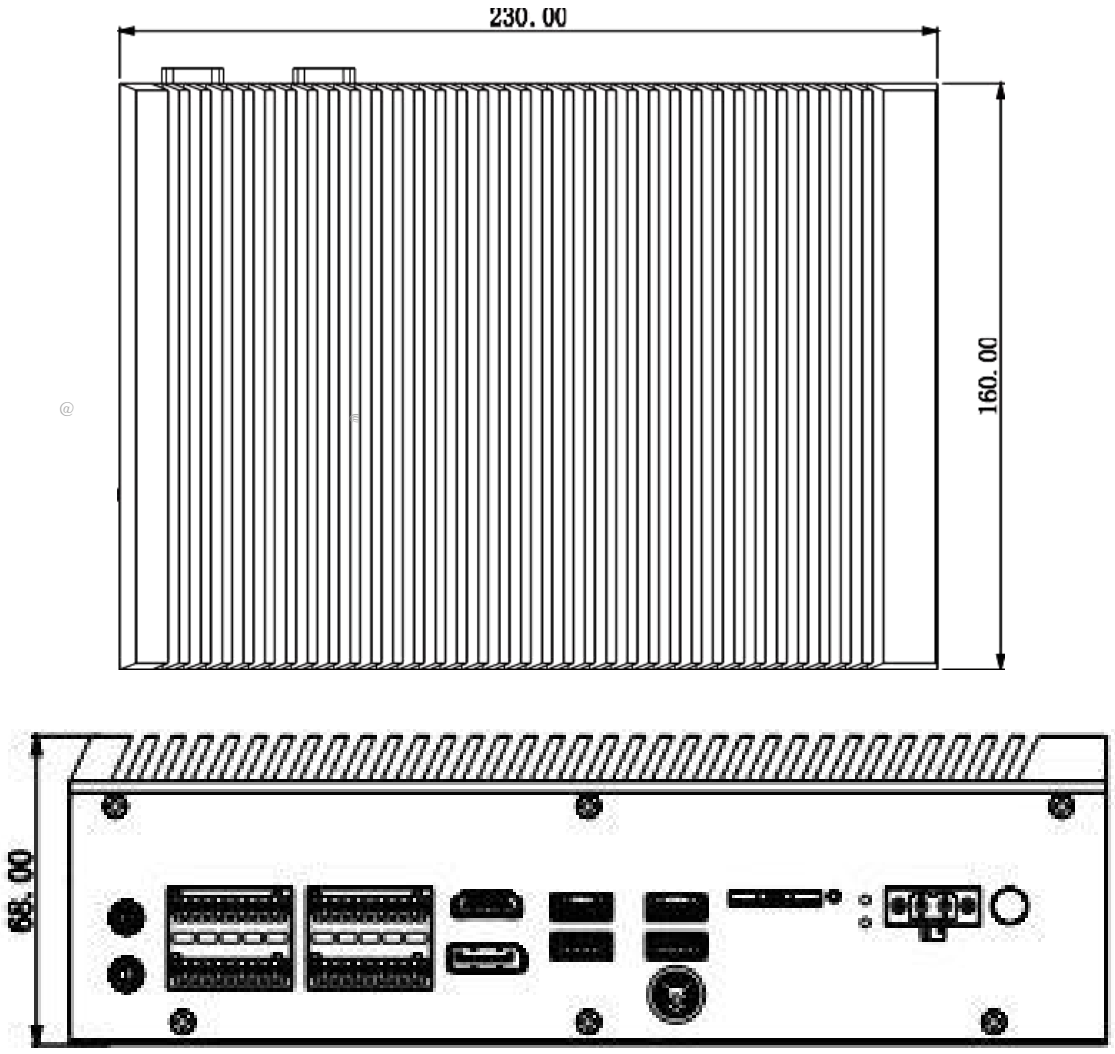
Chapter 3 Install the product

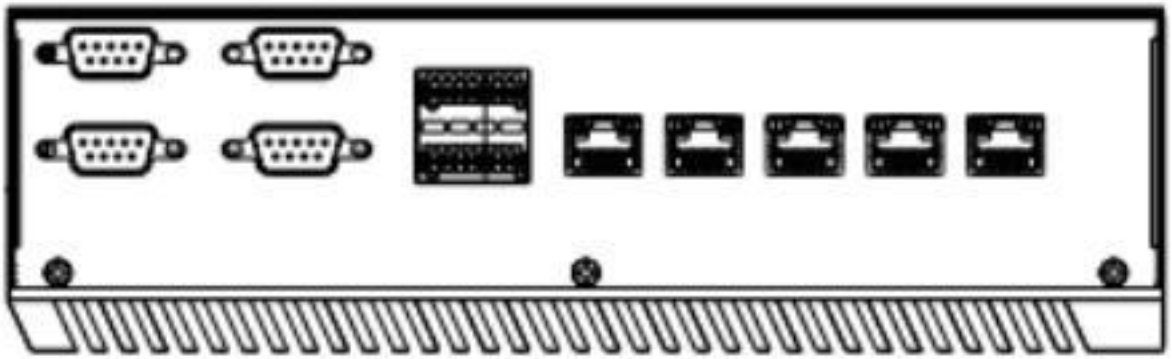
3.1 Installation method

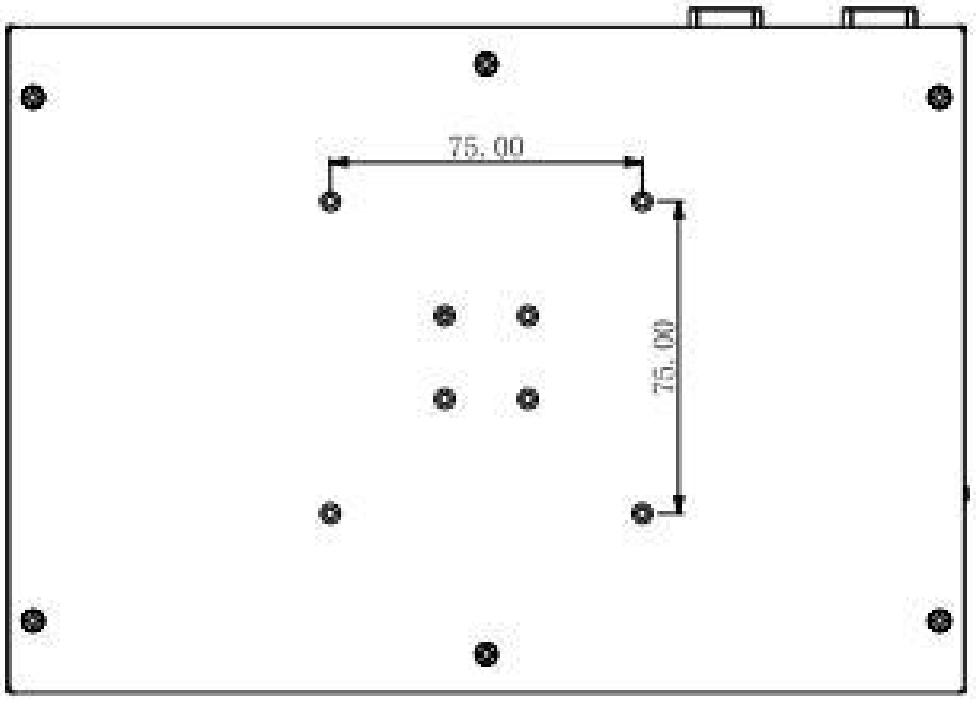
□19″ Rack Mount ■ Desktop (Deck) □ Embedded Panel
■ Wall Mount □ VESA Standard Arm □ Portable
□ Others _____

3.2 Overall dimension drawing of product

Unit: mm






75.00
75.00

Chapter 4 Device connection

4.1 Things to know before connection

⚠ Warning
The connected or built-in peripherals with opposite polarities are not allowed.

⚠ Warning
The device may only be operated when connecting with grounded power. No operation is allowed when the device power is ungrounded or only impedance is grounded.

⚠ Warning
Rated voltage of the device in use must be in accord with the power feature of the product.

Note:
Only the peripheral devices approved for industrial application can be connected. When operating the device, hot swappable I/O modules (USB) can be connected. The IO devices without hot swap function can only be connected when the device is powered off.

4.2 Connect the device to power

Steps to connect the device to power:	
Connect the power adapter to the power cable, and then insert the power cable into the DCIN power socket.	

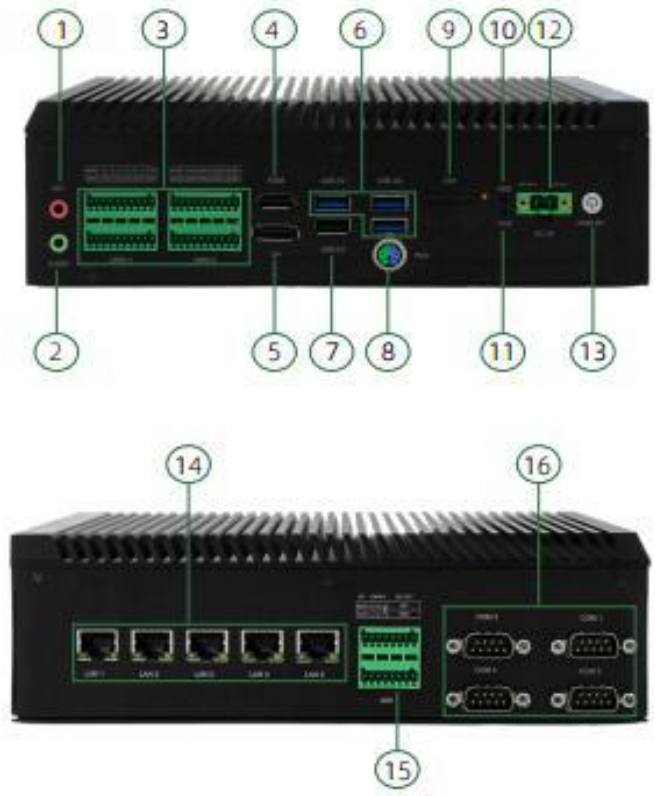
⚠ Danger
Disconnect the power and data cables during a lightning storm.

Attention
The device is completely isolated from the power supply only by disconnecting the power connector.

Chapter 5 Instructions for use

5.1 Product appearance drawing

5.2 Product IO interface drawing

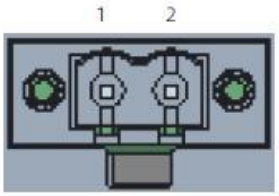


1. MIC: Microphone jack
2. AUDIO: Headset jack
3. GPIO: GPIO interface
4. HDMI: HDMI display interface
5. DP: DP display interface
6. USB3.0: USB3.0 interface
7. USB2.0: USB2.0 interface
8. PS/2: Keyboard & mouse interface
9. SIM: SIM slot
10. HDD: Hard disk indicator
11. ALM: Alarm indicator
12. DCIN: Power interface
13. PWR-BT: Power switch (Remarks: ON/OFF button signal will not power off the device!)
14. LAN: RJ45 Ethernet interface
15. MIO: Multi-functional IO interface
16. COM: Serial port

5.3 Status indicator

Display	Meaning	LED	Description
HDD	Display the hard disk access	Unlighted	No access
		Red	Access
ALM	Alarm indicator	Flash once	Access
		Keep flashing	No access

5.4 Power interface



Pin	Signal name
1	DC+
2	DC-

This product uses the 4pin crimp terminal (PHOENIX terminal with pitch 3.5 mm) connector to provide external DC power input:

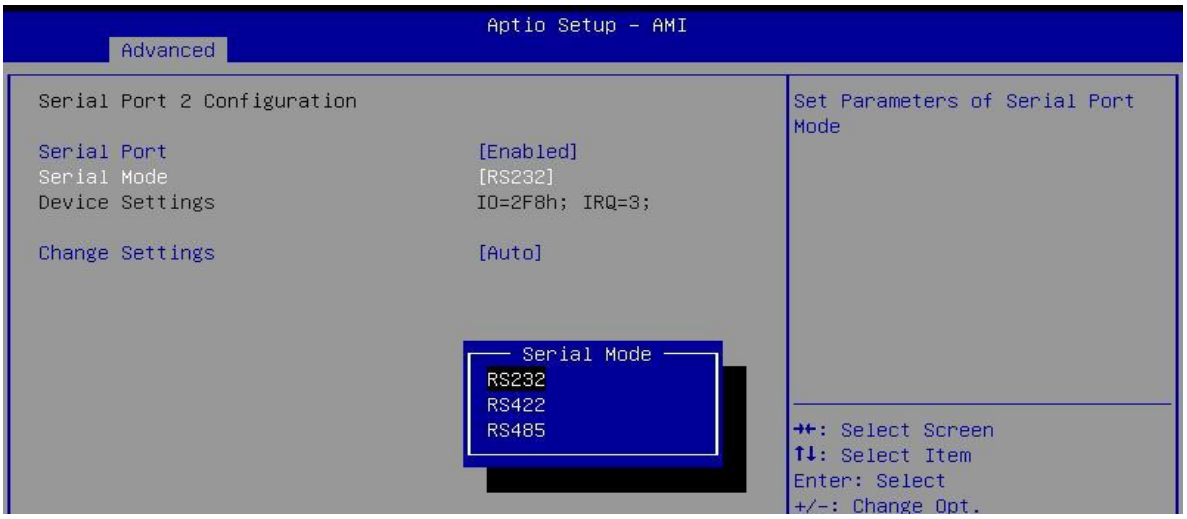
5.5 Audio interface

Interface	Interface function
Pink	MIC IN
Green	LINE OUT

5.6 COM1/2 serial ports

Pin	Definition of pin	
PIN	**RS232**	**RS485**
1	DCD	485-
2	SIN	485+
3	SOUT	/
4	DTR	/
5	GND	/
6	DSR	/
7	RTS	/
8	CTS	/
9	RI	/

Note: To set COM1/2 to RS232/485 mode: It is required to enable the corresponding options, as shown in below figure:

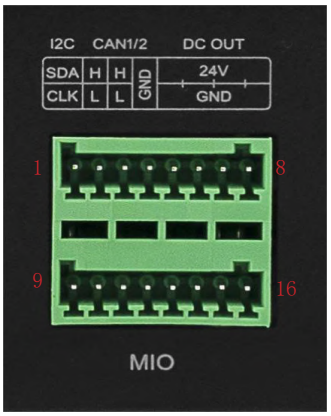


5.7 COM3/4 serial ports

Pin	Definition of pin	Pin	Definition of pin
1	DCD	6	DSR
2	SIN	7	RTS
3	SOUT	8	CTS
4	DTR	9	RI
5	GND		

Note: COM3/4 only support RS232 mode

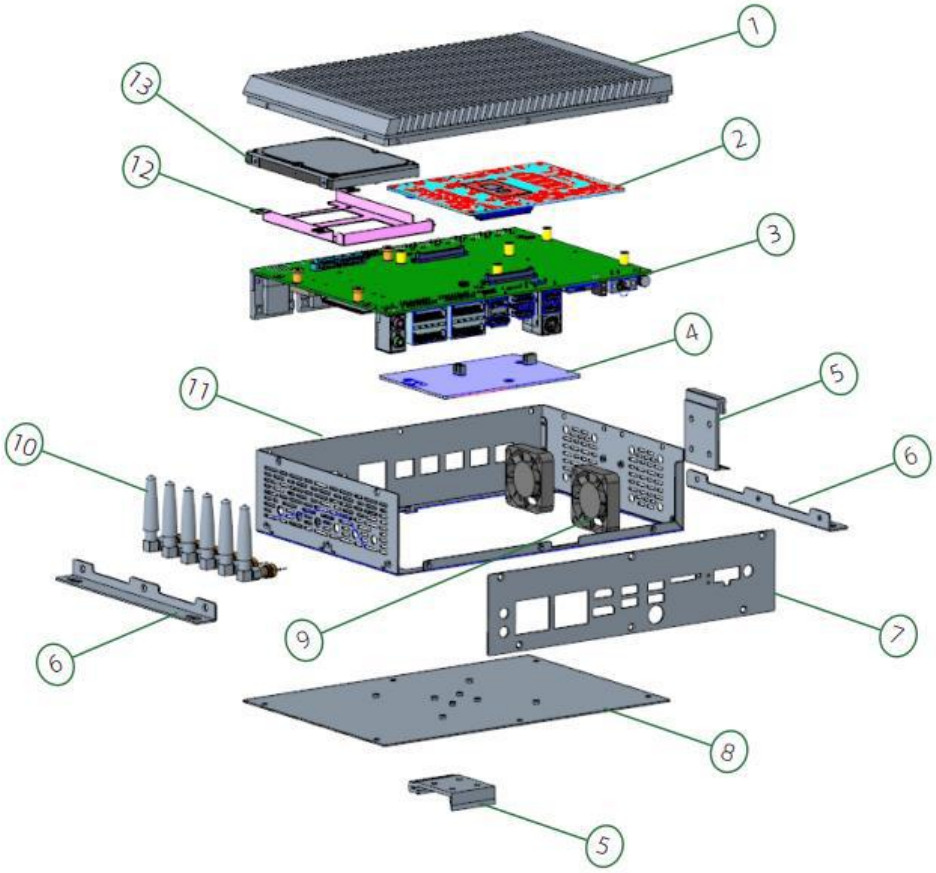
5.8 MIO interface



Pin	I²C	Pin	CAN1	Pin	CAN2	Pin	GND	Pin	DC OUT
1	SDA	2	H	3	H	4	GND	5-8	24V
9	CLK	10	L	11	L	12	GND	13-16	GND

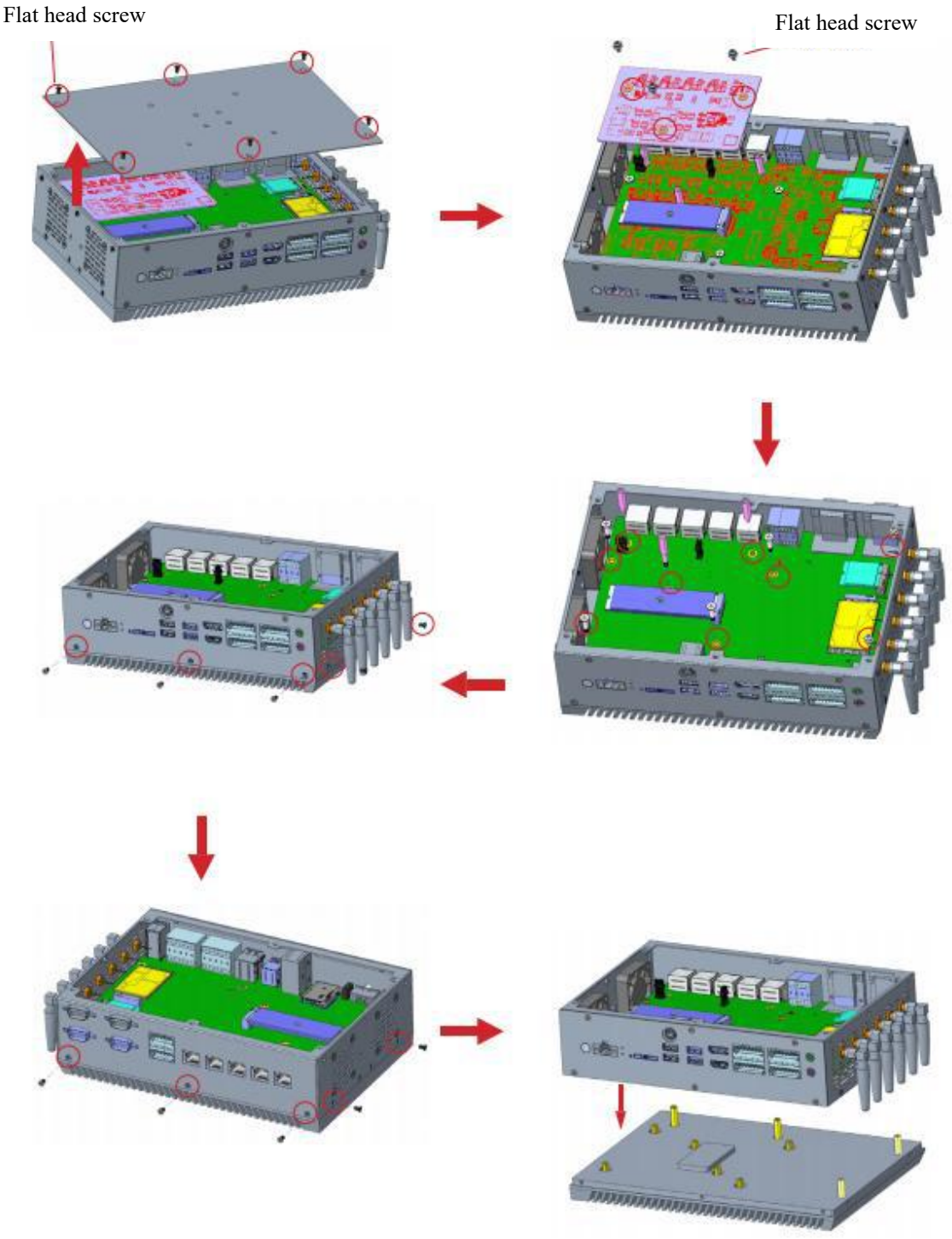
Chapter 6 Expansion and maintenance

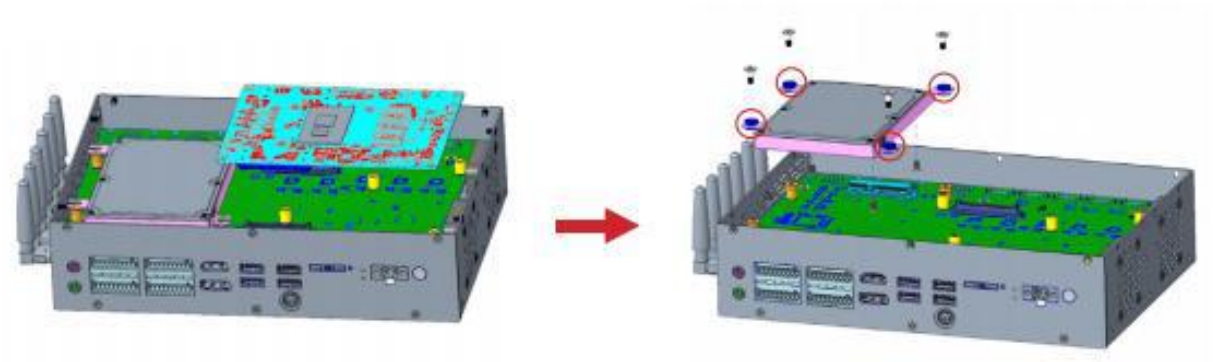
6.1 Machine Part Drawing



S/N	Name	S/N	Name		S/N	Name
1	Upper cover profile	2	Core board		3	Motherboard
4	POE module	5	Wall-hanging strip		6	Wall-hanging strip
7	Front panel	8	Bottom cover		9	Radiator fan
10	WIFI antenna	11	Cabinet		12	HDD bracket
13	Hard disk					

6.2 Install and remove hard disk drive



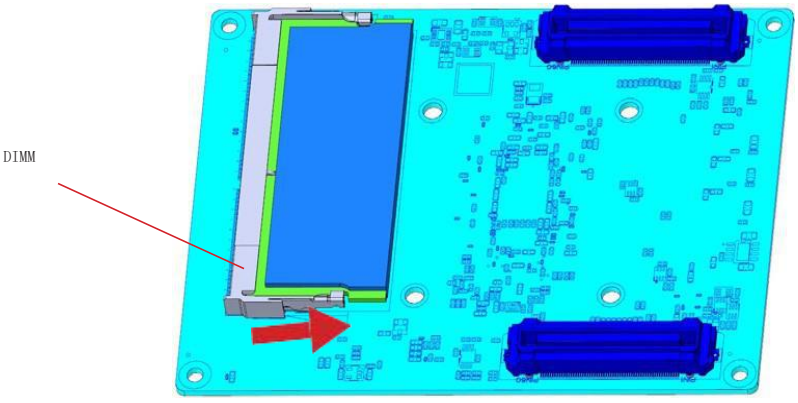


As shown in the above figure:

1. Loosen the ten flat head screws on the bottom cover to remove the bottom cover;
2. Loosen the four screws on the POE module to remove it;
3. Loosen the five screws on the motherboard;
4. Loosen all the screws around on the box to remove the upper cover;
5. Loosen the four screws on the core board to remove it;
6. Loosen the four screws on the HDD bracket to remove it;
7. Loosen the four screws on the hard disk drive to remove it.

Note: If our company is responsible for installing the hard disk drive, it can be installed and removed as shown in the above figure; If the customer chooses to install it themselves, the cable and screws for hard disk drive are included in the accessories package.

6.3 Install and remove the memory module

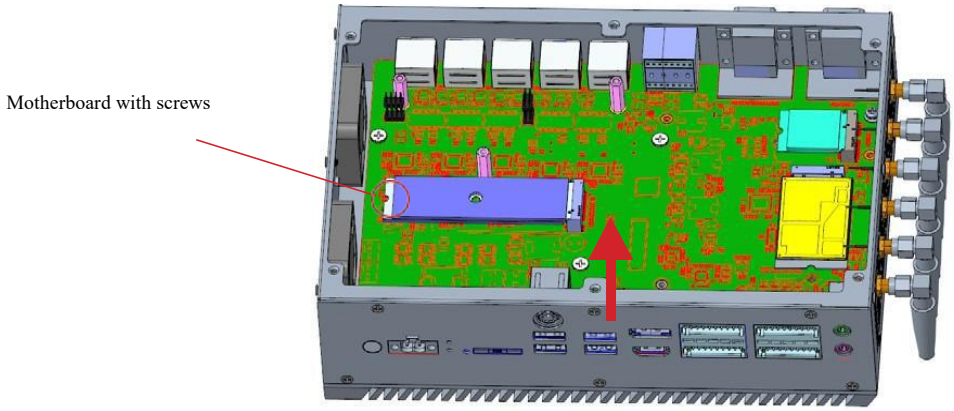


After removing the core board by following steps indicated in "**6.2 Install and remove the hard disk drive**", as shown in the above figure:
Push the retaining clips on both ends of the DIMM slot outward at the same time, and then remove the memory module.

Note: 1. Static electricity can damage the electronic components of the computer or memory, so before performing the above steps, be sure to briefly touch the grounded metal objects to remove static electricity from your body;

2. Be careful to hold both edges of the memory module, do not touch its metal contacts, and remove the DIMM memory module;
3. To install the memory module, insert DIMM into the slot at an angle of 30° and fasten it.

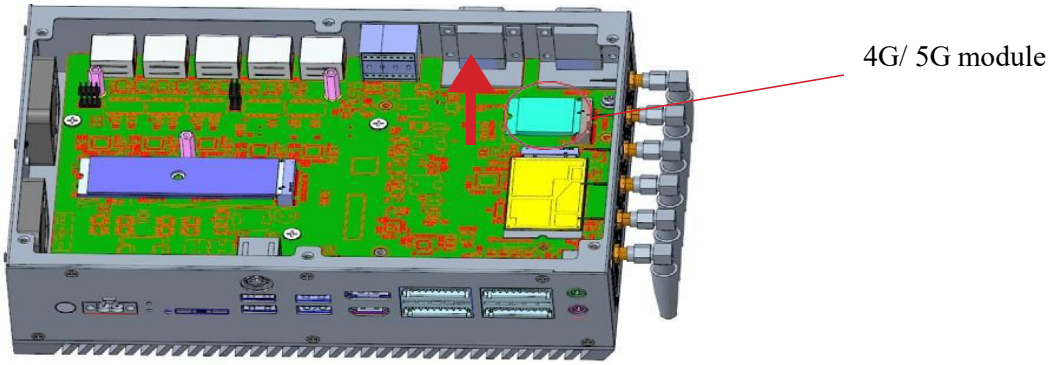
6.4 Install and remove M.2 2242/2280



As shown in the above figure: Loosen the one screw for locking M.2 attached to the M2 motherboard to remove M.2 2242/2280 SATA SSD.

Note: 1.When installing this card, please insert the card at an angle of 30°, press down to the stud, and then fix it with screws;
2. To install M.2 2242, move the studs and screws on the M.2 2280 to M.2 2242.

6.5 Install and remove 4G/ 5G module



As shown in the above figure: Uniformly pull out the 4G/5G card.
Note: To install the 4G/5G card, insert it at an angle of 30°.

Chapter 7 BIOS settings

7.1 BIOS explanation

This motherboard uses AMI BIOS. The full name of BIOS is Basic Input Output System. It is stored in a ROM (Read-Only Memory) chip on the computer motherboard. When you turn on your computer, BIOS is the first program to run. It mainly has the following functions:

a. Initialize your computer and detect hardware, this process is called POST (Power On Self Test).
b. Load and run the operating system.
c. Provide the lowest and most basic control over your computer hardware.
d. Manage your computer through SETUP.

The modified BIOS data will be stored in a battery-maintained CMOS RAM, and the stored data area will not be lost when the power is cut off. Generally, there is no need to modify the BIOS when the system is running normally. If the CMOS data is lost due to other reasons, the BIOS value must be reset.

7.2 BIOS setting

This chapter provides information about the BIOS Setup program, allowing users to configure and optimize system settings by themselves. Some items in the BIOS that have not been explained too much are not commonly used items. It is recommended to keep the default settings and not change them arbitrarily before fully understanding their functions.

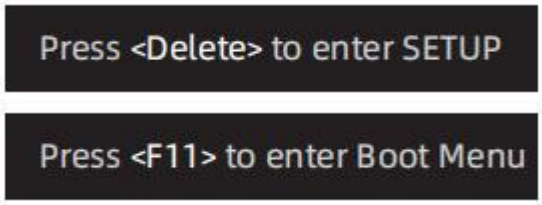
You need to run the SETUP program under the following cases:

a. An error message appears on the screen during the system self-test, and it is required to enter the SETUP program;
b. You want to change the factory default settings according to customer characteristics.

Note: Since the BIOS version of the motherboard is constantly being upgraded, the description of the BIOS in this manual is for reference only. We do not guarantee that the relevant content in this manual is consistent with the information you have obtained.

7.2.1 Enter the BIOS setup program

Turn on the power or restart the system, you can see the following information on the self-test screen, press <DEL> key to enter the BIOS setup program.



7.2.2 Control the keys

You can use the arrow key to move the highlighted option, and press <Enter> key to select, <F1> key for help, and <Esc> key to exit. The following table will detail how to use the keyboard to boot the program settings of system.

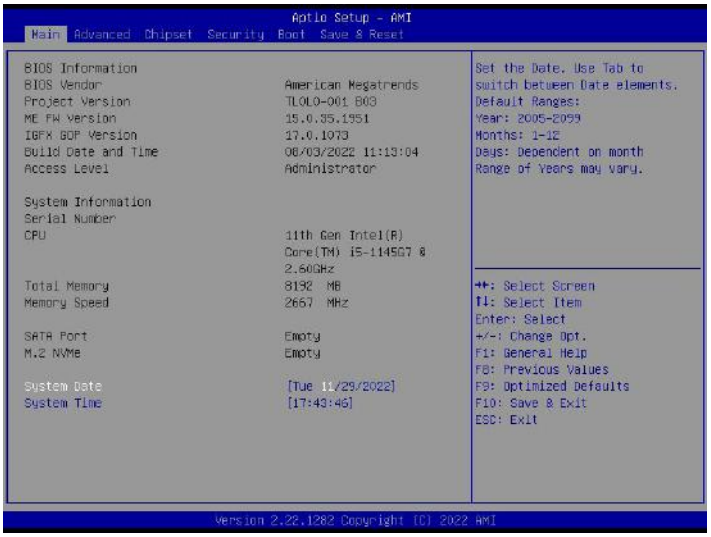
Control key	Functional description
← / →	Move the left and right arrows to select the screen
↑ /↓	Move the up and down arrows to select the items up and down.
+/ -	Increase/decrease value or change option
<Enter>	Select this option to enter the sub-menu
<ESC>	Return to the main screen, or end the CMOS SETUP program from the main screen
<F1>	Show the related help
<F7>	Previous settings
<F9>	Load the optimized settings

<F10>	Save the modified CMOS settings and reboot

7.3 Introduction of BIOS main menu

Identification	Description	Comments
Main	Basic information page	BIOS basic information page
Advanced	Advanced options	BIOS advanced configuration page
Chipset	Chipset	Chipset setting
Security	Security setting	Include the user name and password settings.
Boot	Boot options	Select the sequence of booting devices
Save & Exit	Save and exit	Save settings and exit BIOS

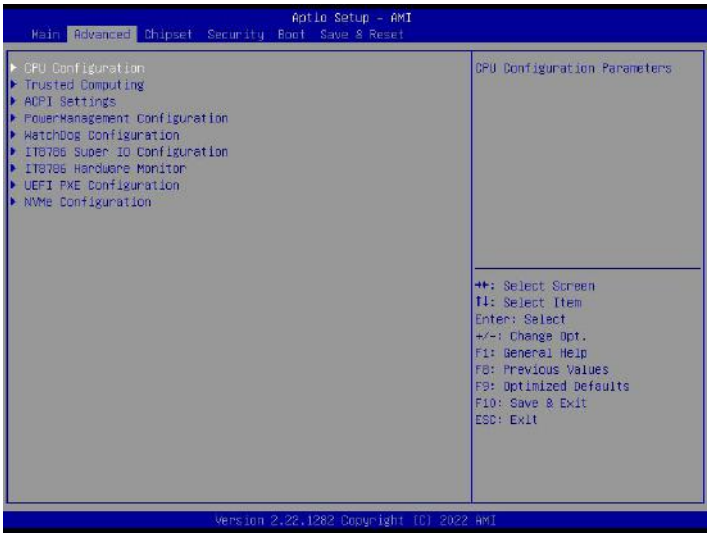
7.4 Main



· **System Date (system date setting)**
Set the date of the computer in the format of “day of the week, month/day/year”.

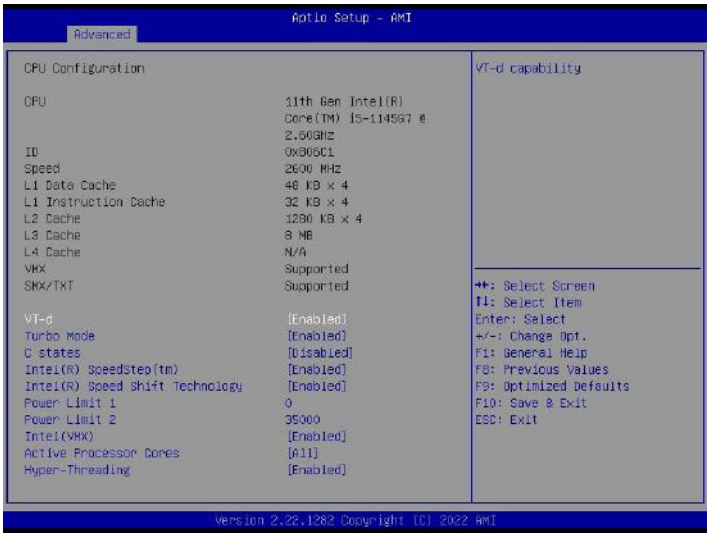
· **System Time (system time setting)**
Time format is <hour><minute><second>.

7.5 Advanced



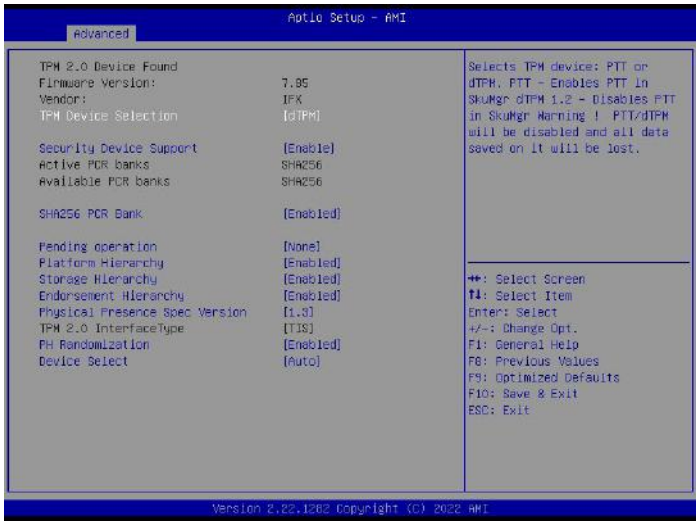
Identification	Description	Comments
CPU Configuration	Configure CPU	Sub-menu selection available
Trusted Computing	Set the trusted computing	Sub-menu selection available
ACPI Settings	ACPI settings	Sub-menu selection available
Power Management Configuration	Configure the power management	Sub-menu selection available
Watch Dog Configuration	Set Watch Dog	Sub-menu selection available
IT8786 Super IO Configuration	Super IO setting information	Sub-menu selection available
IT8786 Hardware Monitor	Hardware state	Sub-menu selection available
UEFI PXE Configuration	Configure UEFI PXE	Sub-menu selection available
NVMe Configuration	Configure NVMe	Sub-menu selection available

► CPU Configuration Press <Enter> key to enter the sub-menu.



- **VT-d**
  Enable or disable VT-d performance.
  Options: Disable,Enable.
- **Turbo Mode**
  Enable or disable the turbo mode of professor.
  Options: Disable, Enable.
- **C states**
  Enable or disable CPU power source management
  Options: Disable, Enable.
- **Intel(R) SpeedStep(tm)**
  Allow or not allow to support more than two frequency ranges.
  Options: Disable, Enable.
- **Intel (R) Speed Shift Technology**
  Enable or disable Intel (R) speed shift technology.
  Options: Disable, Enable.
- **Intel(VMX)**
  Enable or disable Intel (VMX).
  Options: Disable, Enable.
- **Active Processor Cores**
  Number of cores in each professor package to be activated.
  Options: ALL,1,2,3.
- **Hyper-Threading**
  Number of cores in each professor package to be activated.
  Options: Disable, Enable.

► Trusted Configuration Press <Enter> key to enter the sub-menu.



- **TPM Device Selection**
  Select the TPM device.
  Options: dTPM, PTT.
- **Security Device Support**
  Enable or disable the BIOS support of security device.
  Options: Disable, Enable.
- **SHA256 PCR Bank**
  Enable or disable SHA256 PCR Bank.
  Options: Disable, Enable.
- **Pending Operation**
  Planned operation of security device.
  Options: None, TPM Clear.
- **Platform Hierarchy**
  Enable or disable the structure setting of platform hierarchy.
  Options: Disable, Enable.
- **Storage Hierarchy**
  Enable or disable the structure setting of memory hierarchy.
  Options: Disable, Enable.
- **Endorsement Hierarchy**
  Enable or disable the structure setting of memory hierarchy.
  Options: Disable, Enable.
- **Physical Presence Spec Version**
  Select the operating system to support the physical presence specification.
  Options: 1.2,1.3.
- **PH Randomization**
  Enable or disable the platform hierarchy randomization.
  Options: Disable, Enable.
- **Device Select**
  Set the TPM device selection.
  Options: TPM 1.2,TPM 2.0,Auto.

► ACPI Settings Press <Enter> key to enter the sub-menu.

- **Enable ACPI Auto Configuration**
  Disable or enable BIOS-ACPI auto-configuration.
  Options: Disable, Enable.
- **Enable Hibernation**
  Disable or enable system hibernation.
  Options: Disable, Enable.

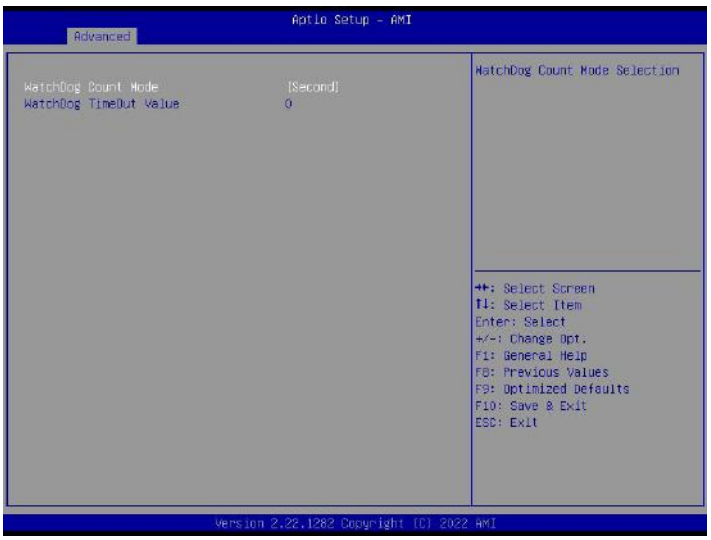
► Power Management Configuration Press <Enter> key to enter the sub-menu

- **USB/PS2 Power**
  Disable or enable USB/PS2 S5 power.
  Options: Disable, Enable.
- **USB Wakeup**
  Disable or enable USB KB and MS wakeup system from S3/S4
  Options: Disable, Enable.
- **PS2 Wakeup**
  Disable or enable USB KB and MS wakeup system PS2
  Options: Disable, Enable.
- **LAN Wake**
  Enable or disable LAN wakeup system.
  Options: Disable, Enable.
- **Restore AC Power Loss**

Set the state after the device is powered on again (G3).
Options: Power on, Power off, Last State.

- **RTC Wake system**
  Enable or disable the wake events of system alarm.
  Options: Disable, Enable.

► Watch Dog Configuration Press <Enter> key to enter the sub-menu.



- **WatchDog Count Mode**
  Select the count mode of watch dog.
  Options: Disable, Enable.

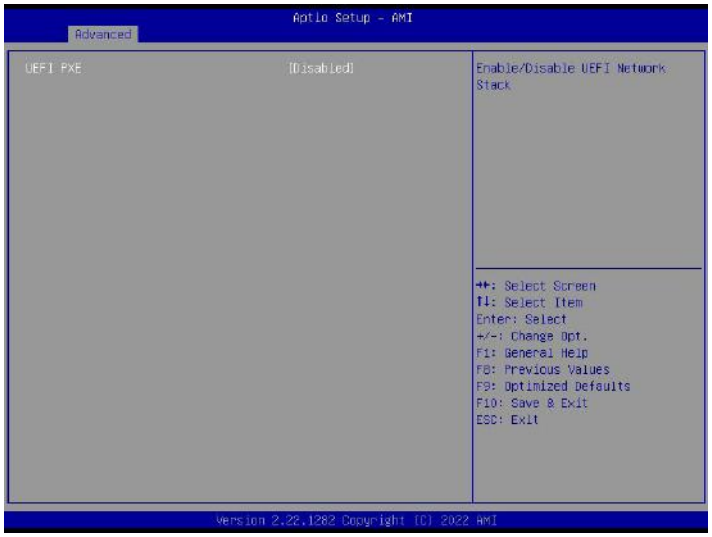
► IT8786 Super IO Configuration Press <Enter> key to enter the sub-menu.

· **Serial Port 1/2/3/4 Configuration**
  Configure the serial port.

► IT8786 Hardware Monitor Press <Enter> key to enter the sub-menu.

- **SYS Smart Fan**
  Set the system smart fan.
  Options: Automatic Mode, Full on Mode, Manual Mode.

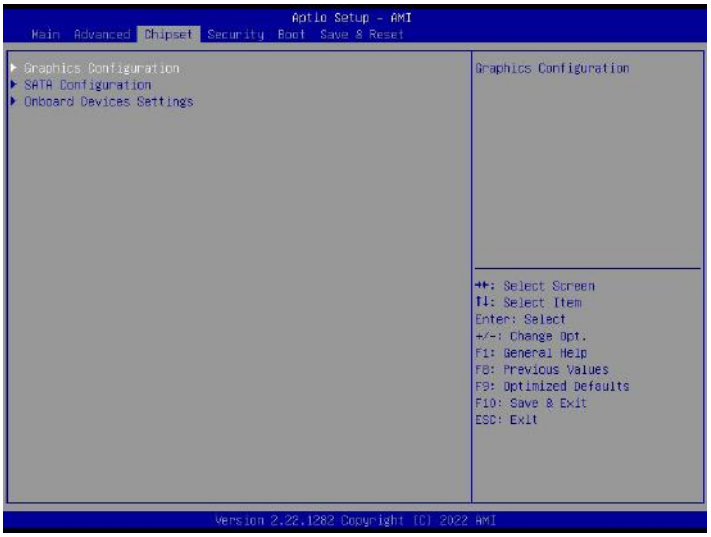
► UEFI-PXE Configuration Press <Enter> key to enter the sub-menu.



- **UEFI PXE**
  Disable or enable UEFI network stack.
  Options: Disable, Enable.

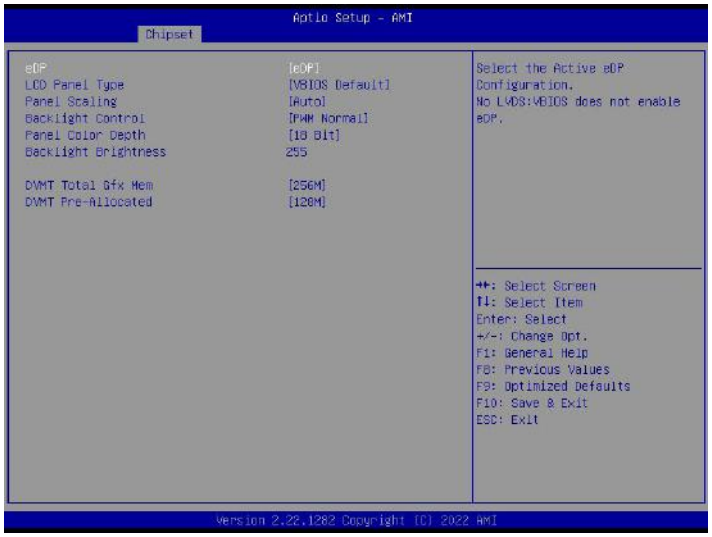
► NVMe Configuration Press <Enter> key to enter the sub-menu.

7.6 Chipset



Identification	Description	Comments
Graphics Configuration	Configure graphics	Sub-menu selection available
SATA Configuration	Configure SATA	Sub-menu selection available
Onboard Devices Settings	Set the onboard devices	Sub-menu selection available

► Graphics Configuration Press <Enter> key to enter the sub-menu.



- **eDP**
  Select the eDP configuration for activity.

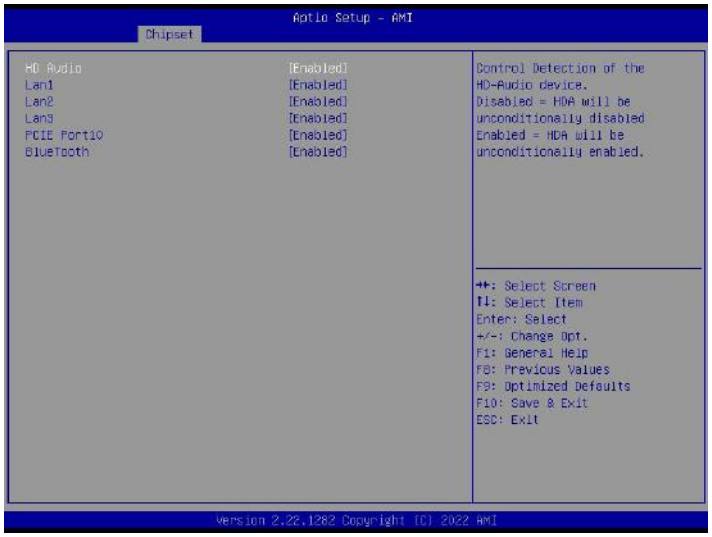
Options: eDP, No eDP.

- LCD Panel Type
  Select the LCD panel used by internal graphics devices by selecting proper setting options.
  Options: VBIOS Default,640x480 LVDS,800x600 LVDS,1024x768 LVDS,1280x1024 LVDS,1400x1050 LVDS1,1400x1050 LVDS2,1600x1200 LVDS,1366x768 LVDS,1680x1050 LVDS,1920x1200 LVDS,1024x768 LVDS,1280x800 LVDS,1920x1080 LVDS,2048x1536 LVDS.
- **Panel Scaling**
  Select the LCD panel zoom options used by internal graphics devices.
  Options: Auto, Off, Force Scaling.
- **Backlight Control**
  Set the backlight control.
  Options: PWM Inverted, PWM Normal.
- **Panel Color Depth**
  Select the color depth of LFP panel.
  Options: 18 Bit, 24 Bit.
- **Backlight Brightness**
  Set the brightness of vbios.
  Options: 255.
- **DVMT Total Gfx Mem**
  Select the size of DVMT5.0 graphics memory used by internal graphics devices.
  Options: 128M, 256M, MAX.
- **DVMT Pre-Allocated**
  Select the size of dvmt5.0 pre-allocated (fixed) graphics memory used by internal graphics devices.
  Options: 32M,64M,128M,256M,512M.

► SATA Configuration Press <Enter> key to enter the sub-menu.

· **SATA Controller(s)**
Enable or disable SATA device.
Options: Disable, Enable.

► Onboard Devices Settings Press <Enter> key to enter the sub-menu.



· **HD Audio**
Control detection of HD Audio device.
Options: Disable, Enable.
· **LAN1/2/3**
Enable or disable LAN1/ 2/3.
Options: Disable, Enable.
· **PCIE Port10**
Enable or disable PCIE port 10.
Options: Disable, Enable.
· **Bluetooth**
Enable or disable Bluetooth.
Options: Disable, Enable.

7.7 Security

- **Administrator Password**

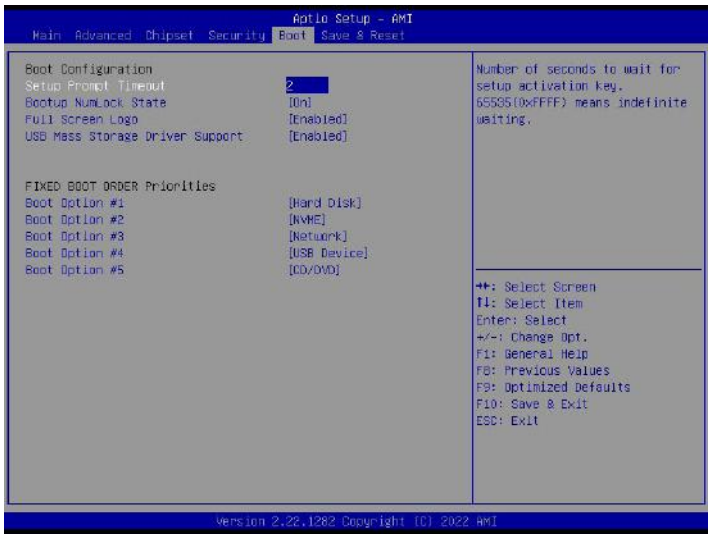
  If this option is used to set the system administrator password, there are the following steps:

  1. Select the Administrator Password setting item, and press <Enter> key.
  2. Enter 3 to 20 character or numeric passwords to be set in the “Create New Password” dialog box. After the input is completed, press <Enter> key, and then enter the password again to confirm that the password is correct in the “Confirm Password” dialog box. If the screen shows “Invalid Password!”, it indicates that the passwords entered twice are different, please enter them again. To delete the system administrator password, please select “Administrator Password”, and complete deletion when the “Create New Password” dialog box appears after entering the old password in the “Enter Current Password” dialog box and pressing <Enter>.

- **Secure Boot**

  Secure boot configuration.

7.8 Boot



- **Setup Prompt Timeout**

  Installation prompt timeout.

- **Boot NumLock State**

  Set the NumLock state

  Options: On, Off.

- **Full Screen Logo**

Disable or enable the full screen logo display.
Options: Disable, Enable.

- **USB Mass Storage Driver Support**
  Disable or enable USB mass storage driver support.
  Options: Disable, Enable.
- **Boot Option #1/2/3/4/5**
  Set the boot options 1/2/3/4/5.
  Options: Kingston Data Traveler 2.01.00, Disable.

7.9 Save & Exit

- **Save Changes and Reset**
  Installation prompt timeout.
- **Discard Changes and Reset**
  Discard the changes and reboot the system.
- **Launch EFI Shell from file system device**
  To launch EFI Shell from file system device.

Chapter 8 WDT programming guide

8.1 Description about programming guide document

This document contains the secondary development specification and software sample pseudo code for WDT of AMR-TGU motherboard.

Description: This programming guide applies to the project with the WDT sourced from the corresponding signals of ITE8786 Super IO, and the specific WDT settings used by different boards may be different.

8.2 Definition of the functions involved

Under Linux, several header files need to be included:

```
#include <stdio.h>
#include <errno.h>
#include <sys/io.h>
```

//read 1 Byte from IO address

```
/*
   Name:IoRead8
   Input:   GpioAddress      - GPIO base address
   Output: GPIO port read value
   Description:
*/
unsigned char IoRead8(unsigned short GpioAddress) {
   unsigned char ret;
   ret = iopl(3);
   if (ret)
   {
         printf("ret = %d\n", ret);
         printf("errno = %d\n", errno);
         printf("error for iopl\n");
         return 1;
      }
return inb(GpioAddress);
}
```

// write 1 Byte to IO address

```
   unsigned char IoWrite8(unsigned short GpioAddress, unsigned char Data) {
   unsigned char ret;
   ret = iopl(3);
   if (ret)
   {
         printf("ret = %d\n", ret);
         printf("errno = %d\n", errno);
         printf("error for iopl\n");
         return 1;
   }
         outb(Data, GpioAddress);
         return 0;
   }
```

8.2.1 GPIO programming examples

Configuration and access examples of ITE8786 WDT TIME

```
      #define ITE8786_Index_Port                0x2E
```

```
#define ITE8786_Data_Port               0x2F
#define GPIO_LDN_DEVICE                 0x07
#define WDT_TIMER_STATUS                0x71
#define WDT_TIMER_CONFIGURATION         0x72
#define WDT_TIMEROUT_LSB                0x73
#define WDT_TIMEROUT_MSB                0x74

//a. Enter the Configuration Mode of Super IO
IoWrite8(ITE8786_Index_Port, 0x87);
IoWrite8(ITE8786_Index_Port, 0x01);
IoWrite8(ITE8786_Index_Port, 0x55);
IoWrite8(ITE8786_Index_Port, 0x55);

//C.  Clear wdt status
IoWrite8(ITE8786_Index_Port, WDT_TIMER_STATUS); IoWrite8(ITE8786_Data_Port,
IoRead8(ITE8786_Data_Port) & ~BIT0);

/d1. If WDT TIMEOUT is set as 20 seconds
IoWrite8(ITE8786_Index_Port, WDT_TIMER_CONFIGURATION);
IoWrite8(ITE8786_Data_Port, IoRead8(ITE8786_Data_Port) | BIT7); //Second

IoWrite8(ITE8786_Index_Port, WDT_TIMEROUT_LSB);
IoWrite8(ITE8786_Data_Port,20); //20 Second
IoWrite8(ITE8786_Index_Port, WDT_TIMEROUT_MSB);
IoWrite8(ITE8786_Data_Port, 0x00);/

//d2.  If WDT TIMEOUT is set as 2 minutes
IoWrite8(ITE8786_Index_Port, WDT_TIMER_CONFIGURATION);
IoWrite8(ITE8786_Data_Port, IoRead8(ITE8786_Data_Port) & ~BIT7); //Minute

IoWrite8(ITE8786_Index_Port, WDT_TIMEROUT_LSB);
IoWrite8(ITE8786_Data_Port,2); //2 Minute

IoWrite8(ITE8786_Index_Port, WDT_TIMEROUT_MSB);
IoWrite8(ITE8786_Data_Port, 0x00);/
```

//e. The register value of TIMEOUT requires to be set continuously within TIMEOUT time. wdt can be triggered if exceeds TIMEOUT time.

//f. Exit the Configuration Mode of Super IO

```
IoWrite8(ITE8786_Index_Port, 0x02);
IoWrite8 (ITE8786_Index_Port, 0x02);// All logical devices of Super IO can't be accessed after exiting the Configuration Mode of Super IO, unless re-entering the Configuration Mode of Super IO.
```

Chapter 9 GPIO programming guide

9.1 Description about programming guide document

This document contains the secondary development specification and software sample pseudo code for GPIO of AMR-TGU motherboard.

Description: This programming guide applies to the project with the GPIO sourced from the corresponding signals of ITE8786 Super IO, and the specific GPIO signals used by different boards may be different.

9.2. Definition of the functions involved

Under Linux, several header files need to be included:

```
#include <stdio.h>
#include <errno.h>
#include <sys/io.h>
```

//read 1 Byte from IO address

```
/*
Name:IoRead8
Input:  GpioAddress       - GPIO base address
Output: GPIO port read value
Description:
*/
unsigned char IoRead8(unsigned short GpioAddress) {
unsigned char ret;
ret = iopl(3);
if (ret)
{
      printf("ret = %d\n", ret);
      printf("errno = %d\n", errno);
      printf("error for iopl\n");
      return 1;
   }
return inb(GpioAddress);
}
```

// write 1 Byte to IO address

```
unsigned char IoWrite8(unsigned short GpioAddress, unsigned char Data) {
   unsigned char ret;
   ret = iopl(3);
   if (ret)
   {
         printf("ret = %d\n", ret);
         printf("errno = %d\n", errno);
         printf("error for iopl\n");
         return 1;
   }
      outb(Data, GpioAddress);
      return 0;
   }
```

9.2.1 GPIO programming examples

Configuration and access examples of ITE8786 GPIO Group 7

```
#define ITE8786_Index_Port                0x2E
#define ITE8786_Data_Port                 0x2F
```

```
#define GPIO_LDN_DEVICE                 0x07
#define GPIO_BASE_ADDRESS               0xa00
#define GPIO1_INPUT_OUTPUT_REGISTER     0xc8
#define GPIO2_INPUT_OUTPUT_REGISTER     0xc9
#define GPIO3_INPUT_OUTPUT_REGISTER     0xca
#define GPIO4_INPUT_OUTPUT_REGISTER     0xcb
#define GPIO5_INPUT_OUTPUT_REGISTER     0xcc
#define GPIO6_INPUT_OUTPUT_REGISTER     0xcd
#define GPIO7_INPUT_OUTPUT_REGISTER     0xce
#define GPIO8_INPUT_OUTPUT_REGISTER     0xcf
#define GPIO9_INPUT_OUTPUT_REGISTER     0xd2
#define GPIOA_INPUT_OUTPUT_REGISTER     0xd7

#define GPIO1_DATA_REGISTER         GPIO_BASE_ADDRESS + 0x00
#define GPIO2_DATA_REGISTER         GPIO_BASE_ADDRESS + 0x01
#define GPIO3_DATA_REGISTER         GPIO_BASE_ADDRESS + 0x02
#define GPIO4_DATA_REGISTER         GPIO_BASE_ADDRESS + 0x03
#define GPIO5_DATA_REGISTER         GPIO_BASE_ADDRESS + 0x04
#define GPIO6_DATA_REGISTER         GPIO_BASE_ADDRESS + 0x05
#define GPIO7_DATA_REGISTER         GPIO_BASE_ADDRESS + 0x06
#define GPIO8_DATA_REGISTER         GPIO_BASE_ADDRESS + 0x07
#define GPIO9_DATA_REGISTER         GPIO_BASE_ADDRESS + 0x08
#define GPIOA_DATA_REGISTER         GPIO_BASE_ADDRESS + 0x09
```

//a. Enter the Configuration Mode of Super IO

```
IoWrite8(ITE8786_Index_Port, 0x87);
IoWrite8(ITE8786_Index_Port, 0x01);
IoWrite8(ITE8786_Index_Port, 0x55);
 IoWrite8(ITE8786_Index_Port, 0x55);
```

//b. Select the GPIO, LDN 7 of logical device IoWrite8 (ITE8786_Index_Port,0x07);

```
IoWrite8(ITE8786_Data_Port,GPIO_LDN_DEVICE);
```

//c. 70-77 of GPIO Group7 are assumed as GPI (input) function, it is programmed by the following methods

```
UINT8 BitOffset;
UINT8 GpioNumber;
```

//Offset 0xce, bits 0-7 are respectively set as 0, and GPIO70-77 are used as GPI (input) function. Note: Each GPIO can be individually programmed and configured as GPI or GPO. However, for the same GPIO, such as GPIO72, it can only be used as either GPI or GPO at a given time, but not both simultaneously.

```
for(GpioNumber=0x70; GpioNumber<=0x77; GpioNumber++)
{
      BitOffset = GpioNumber - 0x70;
I  oWrite8(ITE8786_Index_Port,GPIO7_INPUT_OUTPUT_REGISTER);
Data8 = IoRead8(ITE8786_Data_Port);
Data8 = Data8&(~(0x1<<BitOffset));
IoWrite8(ITE8786_Data_Port,Data8);
}
```

//c. 70-77 of GPIO Group7 are assumed as GPO (output) function, it is programmed by the following methods. Offset 0xce, bits 0-7 are respectively set as 1, and GPIO70-77 are used as GPO (output) function.

```
for(GpioNumber=0x70; GpioNumber<=0x77; GpioNumber++)
{
      BitOffset =GpioNumber - 0x70;
```

```
    IoWrite8(ITE8786_Index_Port,GPIO7_INPUT_OUTPUT_REGISTER);
    Data8 = IoRead8(ITE8786_Data_Port);
    Data8 = Data8|(0x1<<BitOffset);
    IoWrite8(ITE8786_Data_Port,Data8);
}
```

//d. Write a value to GPIO. Note: The value can be written to GPIO only when used as GPO, and writing value is invalid when used as GPI.
//GPIO7_DATA_REGISTER, bits 0-7 respectively represent the level status of GPIO70-77. If the corresponding bit is set as 0, the corresponding GPIO outputs low level signal. If set as 1, outputs high level signal.

```
for(GpioNumber=0x70; GpioNumber<=0x77; GpioNumber++)
{
        BitOffset = GpioNumber - 0x70;
        Data8 = IoRead8(GPIO7_DATA_REGISTER);
        Data8 &=~(0x1<<BitOffset);//The corresponding bit is cleared, and the corresponding GPIO
        outputs low level signal
        //Data8 |= 0x1<<BitOffset;/*The corresponding bit is 1, and the corresponding GPIO outputs high
        level signal*/
        IoWrite8(GPIO7_DATA_REGISTER,Data8);
}
```

//e. Read the level status of current GPIO, GPIO7_DATA_REGISTER, bits 0-7 respectively represent the level status of GPIO70-77.

```
For(GpioNumber=0x70; GpioNumber<=0x77; GpioNumber++)
{
    BitOffset = GpioNumber - 0x70;
    Data8 = IoRead8(GPIO7_DATA_REGISTER);
    Data8 = Data8>>BitOffset;
    Data8 = Data8 &0x1;
}
if(Data8&0x1){
    return 1;//The corresponding GPIO is high
  }else{
    return 0;//The corresponding GPIO is low
}
```

//f. Exit the Configuration Mode of Super IO

```
IoWrite8(ITE8786_Index_Port, 0x02);
IoWrite8 (ITE8786_Index_Port, 0x02);// All logical devices of Super IO can't be accessed after exiting
the Configuration Mode of Super IO, unless re-entering the Configuration Mode of Super IO.
```

Chapter 10 Instructions on driver program installation

Please refer to the disc attached to the machine for the driver program installation of this product, it will not be introduced here.
When the driver program cannot be installed normally, for example, yellow question mark, exclamation mark, etc. appear, it is recommended to install the latest patch package of the corresponding operating system or directly install the latest version of the operating system, and then install the driver program.

Chapter 11 Appendix

11.1 Analysis and solutions of common malfunctions

Common malfunctions	Possible reasons	Troubleshooting or avoiding mistakes
The device is not operating	No power supply	Please check the power supply and the power cable / connector.
	Improper device operating environment conditions	1. Check the environment conditions 2. Please wait for about 12 hours before powering on the device shipped in cold weather.
The external display is black	The display has not been turned on	Turn on the display
	The display is under “power saving” mode	Press any key on the keyboard
	The luminance control is set to “Black”	Increase the screen luminance by luminance control. Please refer to the instructions of the display for detailed information.
	The power cable or display cable is not connected	1. Please check whether the power cable is correctly connected to the display, system unit or the grounded port. 2. Please check whether the display cable is correctly connected to the system unit and display. 3. Contact technique support if the screen remains black after implementing the above measures.
No system disk can be found when powering on	The HDD power cable or data cable is not connected well	Check whether the power cable and the data cable of the hard disk (it must be installed with operating system and be bootable) are well connected
	System files on the hard disk are damaged	Enter the system (usually Winpe system) with a bootable disk; Check whether the system in the hard disk is damaged. Reinstall the system if necessary.
Plug and play I/O card, no I/O card is detected or can be used when used again	Poor contact of the slot	Poor contact is usually caused by frequent installation / un-installation of the PCI or ISA card, unstable fixing, or improper dust-proof measures; Please remove and install the card for a few times or use another slot.
Incorrect time or date on the device	Incorrect BIOS settings	Follow the power-on prompt and press the key to enter the BIOS Setup; Adjust the time and date in BIOS Setup.
BIOS settings are correct while the time and date are incorrect	Insufficient backup battery capacity	Replace the battery
The computer is not booted or displays “Boot device not found”	In the booting priority of the BIOS settings, the device is not the first priority or the device is not included in the booting devices.	Modify the booting priority of the device in the Boot menu of BIOS settings, or include that device into the booting priority
USB device has no response	USB 2.0 device is connected, however USB 2.0 is disabled.	Enable USB 2.0
	USB port is not supported by the operating system.	1. Enable USB Legacy Support for the mouse and keyboard (Legacy USB is supported) 2. For other devices, appropriate USB drivers for the operating system are required.