

# **Product User Manual**

Twelfth generation Intel Core <sup>™</sup> processor



Low power consumption fanless embedded machine Ver: 1.0

In order to protect your personal safety and avoid property damage, you must pay attention to the tips in this manual. Tips related to property damage do not carry warning triangles. Warning tips are shown below according to the risk level from high to low.

### Awarn

Indicates that failure to take appropriate action may result in irreparable damage to the machine.

## **▲**pay attention to

Indicates that failure to pay attention to the corresponding prompt may result in undesirable results or states.

The products/systems covered by this document are only allowed to be operated by qualified personnel who meet the requirements of the work.

Its operation must be in accordance with the accompanying documentation, especially the safety and warning instructions. Qualified personnel can detect the risks of the product/system and avoid possible hazards due to relevant training and experience.

## ∕∕warn

IFC products are only permitted for use as specified in the catalog and related technical documents. If other company products and components are to be used, approval and permission from IFC are required. Proper transportation, storage, assembly, fitting, installation, commissioning, operation, and maintenance are prerequisites for product safety and proper functioning. The required environmental conditions must be ensured. Attention should be paid to the instructions in relevant documents.

### Disclaimer

The company reserves the right to change this manual, and will not give further notice when the product is subsequently changed. The company shall not be responsible for any direct, indirect, intentional or unintentional damage and hidden dangers caused by improper installation and use.

Before ordering products, please ask the dealer to understand in detail whether the product performance meets your needs.

### Warranty Terms:

The product warranty period is three years. If the user has other requirements, the contract signed by both parties shall prevail.

# catalogue

I. Product Introduction	5
1.1 Product Overview	5
2. Equipment connection	6
2.1 Precautions before connection	6
2.2 Connect the device to the power supply	6
3. Definition of motherboard interface	7
4. BIOS Settings1	2
4.1 Power on and start the device Settings1	3
4.2 Set the timing of startup1	4
4.3 COM port configuration1	5
4.4 BOOT startup configuration1	6
5. Daily use and maintenance1	6
6. Common hardware faults and troubleshooting methods1	7

### I. Product Introduction

IFC-BOX-NS51 is a miniature low-power embedded computer. The whole machine uses the Intel 12th generation core processor, onboard TPM2.0 security encryption, supports Windows 10, Windows 11, Linux and other operating systems, hard disk support M.2 and 2.5 inch hard disk position, very convenient to use.

The whole machine is formed by full aluminum alloy mold, with simple structure, good dustproof, heat dissipation, anti-vibration and EMC performance, high system reliability, strong environmental adaptability.

# 2. Equipment connection

# 2.1 Precautions before connection

# Awarn

Peripheral devices that are connected or built in shall not be connected to devices with opposite polarity.

# Awarn

This device can only be operated on a grounded power network. It is prohibited to operate on an ungrounded or impedance grounded power network.



The rated voltage of the equipment used must conform to the power characteristics of this product.

# Apay attention to

Only approved peripheral devices suitable for industrial applications can be connected. When the machine is running, hot-plug I/O modules (USB) can be connected. I/O devices without hot-plug function can only be connected after the device is disconnected from power.

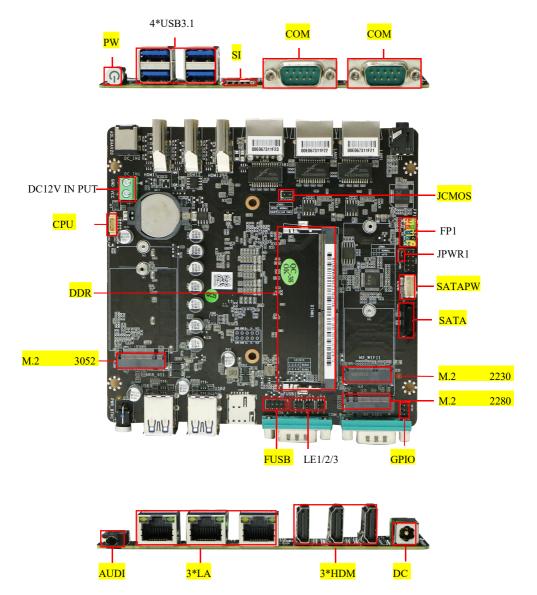
# 2.2 Connect the device to the power supply

The steps to connect the device to the power supply	diagrammatic sketch
Connect the DC 12V power adapter to the power input interface ①, and then press the power switch button on the front panel of the device. The device starts up and the blue power light is on.	

# Awarn

The on/off button signal will not cut off the PC power supply!

# 3. Definition of motherboard interface



Note: The above location map may be different from your motherboard layout for reference only

**Note**: The identification method of the first pin 1PIN on the motherboard is as follows:

1 There is a white bold silk printing mark or arrow mark; 2 The pins seen on the back of the motherboard are square holes.





FP1

Signal name	pin	pin	Signal name
HDD LED	1	2	PWR LED
+			+
HDD LED -	3	4	PWR LED -
Reset SW -	5	6	Power SW +
Reset SW +	7	8	Power SW -
	9	10	

FUSB1

Signal name	pin	pin	Signal name
VCC	1	2	VCC
USB Data -	3	4	USB Data -
USB Data +	5	6	USB Data +
GND	7	8	GND
	9	10	

### JCMOS1

pin	Signal name
1-2	Clear CMOS

### COM DB9

pin	RS232	RS485	
1	DCD	TX-	
2	RXD	TX+	
3	TXD		
4	DTR		
5	GND	GND	$\left(\bigcirc \left(\bigcirc \begin{array}{cccc} \circ & \circ & \circ & \circ & \circ \\ 1 & 2 & 3 & 4 & 5 \\ 6 & 7 & 8 & 9 \\ \circ & \circ & \circ & \circ \\ \end{array}\right)$
6	DSR		
7	RTS		
8	CTS		
9	RI		

LE1/2/3 COM1/COM2 RS232/RS485 (requires BIOS Settings to take effect)

gorge line	LE1/LE2/LE3	pattern	
COMI	1-3	RS232	
COM1	3-5	RS485	m <b>4</b>
COMD	2-4	RS232	0
COM2	4-6	RS485	

## SATA1

pin	Signal name
1	GND
2	SATA TXP
3	SATA TXN
4	GND
5	SATA RXP
6	SATA RXN
7	GND

### SATAPWR

pin	Signal name
1	+5V
2	GND
3	GND
4	+12V

### CPU FAN1

pin	Signal name
1	GND
2	VCC +12V
	FG (speed
3	measurement
	signal)
4	PWM

#### GPIO1

Signal	nin	nin	Signal
name	pın	pın	name
+ V5	1	2	GND
GPIO 56	3	4	GPIO 57
GPIO 60	5	6	GPIO 61

#### JPWR1

pin	Signal name
1-2	NC
2-3	AUTO-ON

# ∕∆warn

The internal wiring of the machine has been installed, and the wire plug and screw have been fixed with glue. Please do not disassemble the motherboard or jump the wire at will to avoid damage to the motherboard.

# 4. BIOS Settings

### **BIOS** brief introduction

BIOS (Basic Input Output System, Basic Input and Output System) stores the most critical programs for basic input and output, self-check upon startup, and system bootup. It can read and write specific system settings from the CMOS. Its primary function is to provide the lowest-level and most direct hardware configuration and control for the computer. Since product BIOS updates and optimizations are not scheduled, the settings interface may vary slightly; the following interface is for reference only.

The BIOS Settings menu is divided into the following options (please consult the Railing Industrial Control customer service hotline for specific BIOS Settings):



After the device is started, press "Delete" to enter the BOIS setting

interface Main: BIOS information and date

Advanced: BIOS advanced menu Settings

Chipset: Chipset Settings

Security: Security Settings

Boot: Boot options Settings

Save & Exit: Save and exit the BIOS Settings

## 4.1 Power on and start the device Settings

"Advanced" to "ACPI Configuration" to "Restore On AC Power Loss", as shown in

#### the figure below



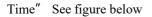
### **Restore on AC Power loss Function description:**

Power Off: After the equipment is connected to 12V power supply, press the power button to start up;

Power On: The device will automatically start up after being connected to 12V power supply; Last State: After the equipment is connected to 12V power supply, it will be powered on or not according to the status value of the last equipment.

# 4.2 Set the timing of startup

"Advanced"  $\rightarrow$  "ACPI Configuration"  $\rightarrow$  "RTC Wake up"  $\rightarrow$  "Fixed



Advanced	Aptio Setup – AMI	
ACPI Settings		Enable or disable System wake on alarm event. When enabled,
Enable Hibernation ACPI Sleep State Restore AC Power Loss Wakeup On LAN support	[Enabled] [S3 (Suspend to RAM)] [Power Off] [Enabled]	System will wake on the hr::min::sec specified
Wake Up on Alarm		
Wake up day	0	
Wake up hour	0	
Wake up minute	0	
Wake up second	0	
		→+: Select Screen
Watch Dog Function	[Disabled]	<b>↑↓</b> : Select Item
		Enter: Select
		+/-: Change Opt.
		F1: General Help
		F2: Previous Values
		F3: Optimized Defaults
		F4: Save & Exit
		ESC: Exit

**RTC Wake Up Function description:** 

Wake up hour: The awakening time unit is hour;

Wake up Minute: The wake-up time is measured in minutes;

Wake up Second: The wake-up time unit is in seconds.

# 4.3 COM port configuration

"Advanced"  $\rightarrow$  "IT8659 Super IO Configuration"  $\rightarrow$  "Serial Port 1 Configuration"

#### See figure below

Advanced	Aptio Setup — AMI	
Serial Port 1 Configuration		
Serial Port Device Settings	[Enabled] IO=3F8h; IRQ=4;	
Change Settings Mode	[Auto] [RS232]	
	Mode RS232 RS485	++: Select Screen T4: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Versi	on 2.22.1288 Copyright (C) 202	4 AMI

### Serial Port Configuration Function description:

Serial Port: Enable COM port in Enabled;

Serial Port: Disabled closes the COM port;

Mode: RS232/RS485 switching. (The motherboard serial port jump hat needs to be modified

synchronously, and the motherboard serial port jump hat setting should be checked in detail.)

## 4.4 BOOT startup configuration

Boot Configuration Setup Prompt Timeout Bootup NumLock State Full Logo Boot Delay Fast Boot	3 [On] [Enabled] O [Disable Link]	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
FIXED BOOT ORDER Priorities Boot Option #1 Boot Option #2 Boot Option #3 Boot Option #4 Boot Option #5 Boot Option #6 Boot Option #7 Boot Option #8	[USB Device] [NVME] [Hard Disk] [CD/DVD] [SD] [Network] [Other Device] [UEFI AP]	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>

#### **Boot Configuration Function description:**

Setup Prompt Timeout: The duration of the LOGO waiting when the machine is turned on, in seconds;

Bootup NumLock State: The status of the numeric lock key on the keyboard at startup;

Quiet Boot: "Enabled" turns on the boot LOGO, "Disabled" turns off the boot LOGO.

### Awarn

The setting of BIOS directly affects the performance of the computer. Setting the wrong parameters will cause damage to the computer, and even cannot be turned on. Please do not change the BIOS Settings at will, so as to avoid the machine can not be used normally.

## 5. Daily use and maintenance

1. When the machine is in normal use, please ensure that the machine works in a non-vibration environment, To avoid damaging the hard disk and internal components.

2. When using the machine, please pay attention to the ambient temperature between-10°C and 50°C.

3. This machine adopts shell heat dissipation. In order to ensure the heat dissipation effect of the machine, we strongly recommend it. It recommended that you clean the surface of the machine every three months when there is a lot of dust It is recommended to clean the machine surface once a month in the environment.

4. In order to ensure the efficient and reliable operation of the machine, we recommend that you regularly check it every three months run a disk cleanup and disk defragmentation on the hard disk.

5. When using the internal slot of the machine, we strongly recommend that you do not plug and unplug it with power on to avoid cause static damage. When the machine encounters a power failure for reasons other than human, in order to ensure If the machine works normally and reliably, we strongly recommend that you immediately power the machine Disconnect, confirm the stability of the power grid and then connect to the operation;

6. We suggest that the machine be dedicated to a specific machine and managed by a specific person.

# 6. Common faults and troubleshooting methods of equipment

## Hardware faults and troubleshooting methods

1. The device cannot be started

Cause of failure: power failure, motherboard failure, loose memory stick, etc.

Elimination method:

- Check whether the power adapter is working properly and whether the plug is loose.
- Check if the power indicator light on the motherboard is on.
- Reinsert the memory module and make sure it is securely installed.
- 2. The display has no signal

Cause of failure: Loose or damaged display cable. Elimination method:

- Check that the graphics card is securely plugged in.
- Check whether the monitor cable is loose or damaged.
- Replace the display cable and test.

# Software faults and troubleshooting methods

1. The system cannot be started

Cause of failure: The operating system is damaged and the boot guide file is lost.

Elimination method:

- Use system repair tools (such as Windows startup repair).
- Use the system installation disk to reinstall the operating system.
- 2. Blue screen

Cause of failure: driver conflict, hardware failure, software

compatibility problem.

Elimination method:

- Check recently installed software and uninstall software that may cause conflicts.
- 3. The system runs slowly

Cause of failure: excessive system resource usage, malicious software, and too many hard disk fragments.

Elimination method:

- Use the Task Manager to view system resource usage and terminate high-usage processes.
- Run anti-virus software to check and clean up malware.
- Run the disk defragmentation tool to defragment the hard disk.
- 4. The application cannot be started

Cause of failure: software damage, missing system files. Elimination method:

- Reinstall the application that cannot be started.
- Use a system file checker tool (such as Windows's SFC command) to fix the system files.