CoreIPC

NUC67D User Manual

Issue 1.1

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Security Guidance

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- To help you use the CoreIPC motherboard, please read the [User Manual] carefully.
- For product-related information, please be sure to read these safety instructions carefully.
- Identifying the Product Version
  You can find the version of this motherboard labeled [Issue:X.X] on the motherboard itself. X.X represents a number; for example, a label reading [Issue1.0] indicates that the version of this motherboard is 1.0. Please note the product version when updating the motherboard's BIOS or drivers, or when referring to other technical documentation.

Basic Safety Tips

1. Before using this product, please be sure to read the product manual carefully.
2. Any cards not yet ready for installation should be stored in anti-static bags.
3. Before removing the board from the antistatic bag, place your hand on a grounded metal object for a moment (such as 10 seconds) to discharge any static electricity from your body and hands.
4. When handling circuit boards, you must wear anti-static gloves and make it a habit to touch only the edges.
5. To prevent electric shock or damage to the product, be sure to turn off the AC power before inserting, removing, or reconfiguring the board.
6. Before moving a board or the entire unit, you must first turn off the AC power.
7. For complete systems, be sure to turn off the AC power before adding or removing any boards.
8. Before connecting or disconnecting any device, you must first turn off the AC power.
9. To avoid unnecessary damage to the product caused by frequent power cycles, wait at least 30 seconds after turning it off before turning it back on.

Ordering Information：

No.	Model	CPU	Core	Freq.	Memory	HDMI	VGA	LAN	USB	COM/485	POWER
1	NUC67D-N22-6300U VER1.1	I5-6300U	2	2.4G	1*DDR4	1	1	2	8	2/ 2	12V
2	NUC67D-N22-7200U VER1.1	I5-7200U	2	2.5G	1*DDR4	1	1	2	8	2/ 2	12V
3	NUC67D-N22-8250U VER1.1	I5-8250U	4	1.6G	1*DDR4	1	1	2	8	2/ 2	12V

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1. Product Description

NUC67D is a CoreIPC NANO series industrial motherboard supporting the full Intel® Skylake-U and Kaby Lake-U processor families. It is widely used in soft routers, network security appliances, industrial control systems, cloud terminals, and similar applications.

Key features of the NUC67D motherboard:

- Supports Intel® Skylake-U or Kaby Lake-U Celeron®, Pentium®, and Core™ i3/i5/i7 processors.
- Supports one DDR4 SO-DIMM socket, up to 2133 MHz at 1.2 V, with a maximum capacity of 32 GB.
- Supports VGA or DP and HDMI display outputs.
- Supports two Realtek Gigabit Ethernet ports, with a single-LAN configuration available as an option.
- Supports one M.2 Key-M storage interface with automatic SATA/PCIe compatibility.
- Supports one Mini PCIe slot for Wi-Fi or 4G modules.
- Supports up to eight USB ports.
- Supports two RS-232 serial ports and two RS-485 serial ports by default; an optional configuration supports four RS-232 ports.
- Supports AT and ATX power-on modes, with 12 V DC input power.

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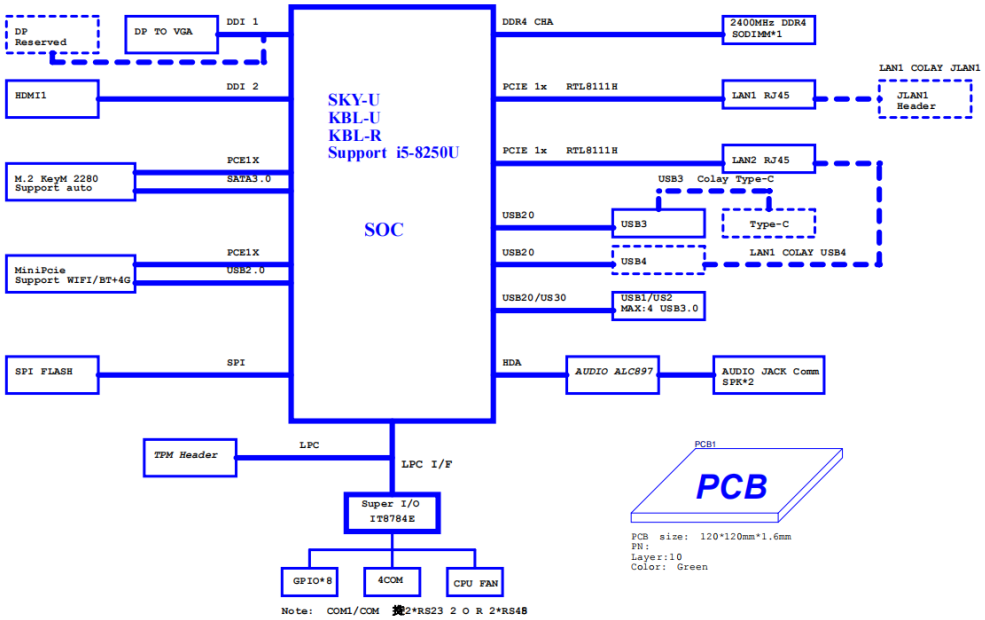
2. Motherboard Block Diagram



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3. Motherboard Specifications

Item	Description			
CPU	Intel®Core i5-6300U	Intel®Core i7-6660U	Intel®Core i5-7200U	Intel®Core i5-8250
	Dual-core 2.4 GHz processor, up to 3.0 GHz	Dual-core 2.6 GHz processor, up to 3.4 GHz	Dual-core 2.5 GHz processor, up to 3.1 GHz	Quad-core 1.6 GHz processor, up to 3.4 GHz
	Compatible with Intel® Skylake-U or Kaby Lake-U low-power Pentium®, Celeron®, and Core™ i3/i5/i7 processors			
Memory	1 × SO-DIMM memory slot, supporting DDR4 2133 MHz memory with a maximum capacity of 32 GB			
Display	Integrated Intel® HD Graphics 540/610/620/650, depending on the specific processor model			
	1 × VGA or DP interface (DP supports up to 4K at 60 Hz), and 1 × HDMI interface (supports up to 4K at 30 Hz)			
	VGA or DP and HDMI, supporting synchronous or independent dual-display output			
Network	2 × Realtek RTL8111H Gigabit Ethernet controllers (1 LAN optional), supporting Wake-on-LAN and PXE			
Storage	1 × 7-pin SATA 3.0 connector, supporting data transfer rates up to 6 Gbps			
	1 × M.2 Key-M 2280 slot, supporting auto-detection of M.2 PCIe and SATA storage devices			
Audio	Onboard ALC897 7.1-channel high-definition audio controller, supporting MIC, Line-out, and a 2 Ω 5 W × 2-channel power amplifier			
Expansion Slot	1 × Mini PCIe slot, supporting Wi-Fi and 4G modules			
Front I/O	1 × HDMI display interface			
	1 × VGA display interface (selectable as an alternative to the 4K @ 60 Hz DP interface; VGA by default)			
	2 × USB 2.0 ports (optional Type-C interface; USB ports by default)			
	2 × RJ-45 Gigabit Ethernet ports (LAN2 is selectable as an alternative to the USB 2.0 interface)			
	1 × 12V DC power input connector			
Rear I/O	1 × 3.5 mm audio jack, supporting both Line-out and Mic-in			
	2 × RS-232 serial ports (DB9)			
	1 × HDD activity LED			
	4 × USB 3.0 ports			
	1 × illuminated power button			
	1 × Clear CMOS button			
Internal I/O	2 × COM pin headers (not populated by default; optional support for up to 4 × RS-232 ports)			

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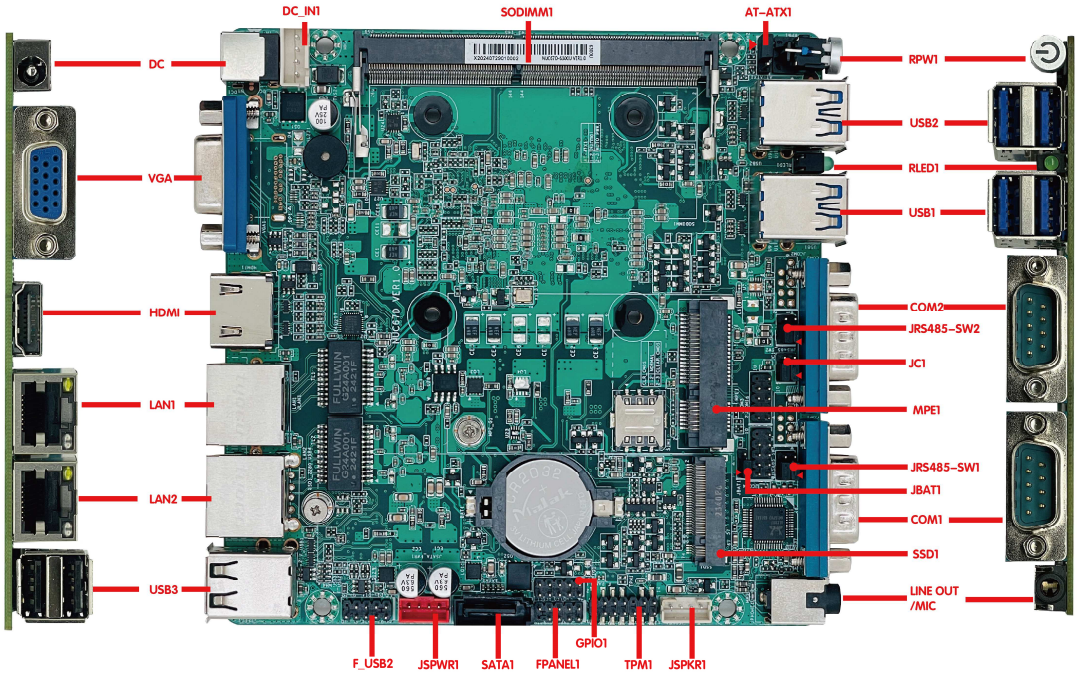
	1 × USB 2.0 pin header, supporting expansion of 2 × USB 2.0 ports and sharing signals with LAN2
	1 × power amplifier header (1 × 4-pin)
	1 × GPIO header (2 × 5-pin)
	1 × SATA power connector (1 × 4-pin)
	1 × 4-pin ATX power connector
	1 × front-panel switch and LED header (2 × 5-pin)
Security	1 × TPM 2.0 header (2 × 7-pin)
Operating Temperature	-10℃～60℃
Storage Temperature	-20℃～70℃
Operating Humidity	5%–95% relative humidity, non-condensing
Dimensions	120mm x 120mm



Note: The above image shows the front view of NUC67D VER1.1. Images of other models may vary.

Click the image to enlarge. Pin 1 of all headers is marked with a red triangle.

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4. Board Installation

Safety Precautions：

Before installing the motherboard, please read and follow the safety precautions below:

- Do not remove or damage the serial number label, distributor warranty label, or any other warranty-related labels on the motherboard before installation. Otherwise, it may affect the warranty validation.
- Before installing or removing the motherboard or any other hardware devices, make sure the power is turned off and the power cord is unplugged from the power outlet.
- When installing hardware devices into the motherboard connectors or slots, make sure the connectors are firmly and properly seated.
- When handling the motherboard, avoid touching the metal contacts or circuit areas to prevent short circuits.
- When handling the motherboard, CPU, or memory module, it is recommended to wear an anti-static wrist strap. If an anti-static wrist strap is not available, make sure your hands are dry and touch a grounded metal object first to discharge static electricity.
- Before installation, place the motherboard on an anti-static mat or inside an anti-static bag.
- Before unplugging the power connector from the motherboard, make sure the power supply is turned off.
- Before turning on the power, make sure the power supply voltage is set according to the local voltage standard.
- Before turning on the power, make sure all hardware cables and power cables are correctly connected.
- Do not allow screws to contact the circuits or components on the motherboard, as this may cause damage or malfunction.
- Make sure no screws or metal objects are left on the motherboard or inside the computer chassis.
- Do not place the computer system on an unstable surface.
- Do not place the computer system in a high-temperature environment.
- Turning on the power during installation may cause damage to the motherboard, other devices, or personal injury.
- If you are not familiar with the installation process, or if you encounter any technical problems while using this product, please consult qualified technical personnel.

Memory Installation

This motherboard provides **1 × 260-pin DDR4 SO-DIMM memory slot**.

Before installing the memory module, please note the following:

1) Make sure the memory module you purchased is compatible with the specifications supported by this motherboard.
2) Before installing or removing the memory module, make sure the computer power is turned off to prevent damage.

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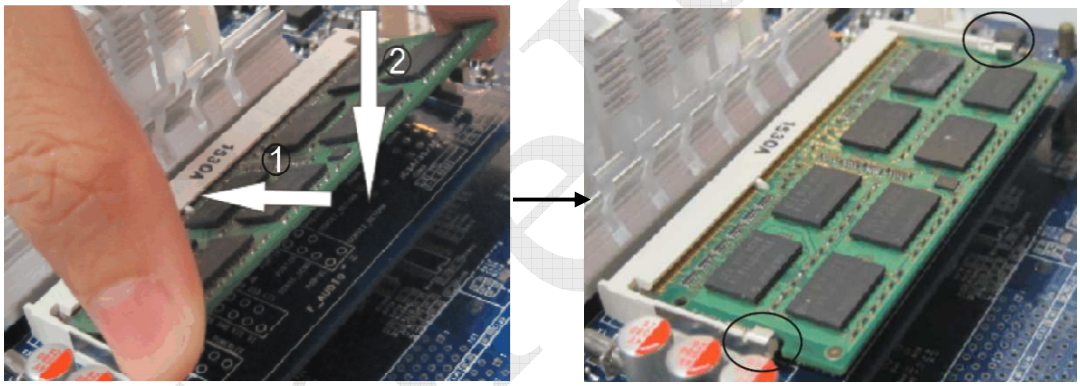
3) The memory module is designed with a foolproof notch. If the insertion direction is incorrect, the module cannot be inserted. In this case, please change the insertion direction immediately.

Memory Installation Steps:

1) Before installing or removing the memory module, turn off the power and unplug the AC power cord.
2) Carefully hold the memory module by both edges. Do not touch the metal contacts.
3) Align the gold fingers of the memory module with the memory slot. Make sure the notch on the memory module matches the key in the slot.
4) Insert the memory module into the slot at an angle of approximately 30 degrees, then gently press it down until you hear a “click” sound. This indicates that the memory module has been properly installed and is ready for use.
   Note: Do not apply excessive force when pressing down the memory module to avoid damage.
5) To remove the memory module, push the retaining clips on both sides of the DIMM slot outward at the same time, then remove the memory module carefully.

Note: The installation diagram is for reference only.



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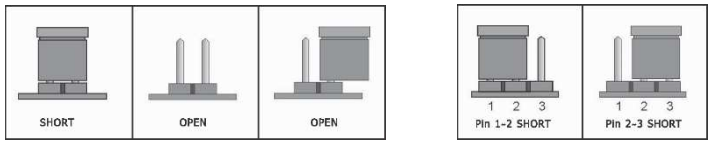
5. Jumper Settings

Jumper Settings

2-pin header: Installing a jumper cap across both pins closes the circuit (short circuit).
3-pin header: Installing a jumper cap across pins 1–2 or pins 2–3 closes the circuit (short circuit).



How to Identify Pin 1 of a Jumper Header?

1) Check the motherboard carefully. A pin marked "1" or indicated by a thick white line is Pin 1.
2) On the back of the board, the square solder pad usually indicates Pin 1.

Clear CMOS Jumper: The motherboard provides one 1 × 3-pin Clear CMOS header, JBAT1, for clearing or retaining CMOS settings (2.0 mm pitch). The CMOS is powered by the onboard coin-cell battery.

Clearing the CMOS permanently erases the previous system configuration and restores the factory-default settings.To clear the CMOS:

1) Shut down the computer and disconnect the power supply.
2) Short pins 2–3 of JBAT1 for approximately 5 seconds.
3) Power on the computer.
4) During startup, press the key indicated on the screen to enter BIOS Setup and load the optimized defaults.
5) Save the settings and exit.

The pin definitions are as follows:

JBAT1 Definition:

Function	JBAT1 Setting
Normal operation	Pin 1–2 shorted
Clear CMOS and restore all BIOS settings to factory defaults	Pin 2–3 shorted

Power-On Function Jumper: The motherboard provides one 1 × 3-pin AT-ATX1 jumper (2.54 mm pitch), which can be used to enable or disable automatic power-on when power is applied.

AT-ATX1 Definition:

Function	AT-ATX1 Setting
Disable Auto Power-on	Pin 1–2 (default)
Enable Auto Power-on	2-3Pin

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6. Pin Definitions

6.1 Supports up to 4 serial ports (2 standard DB9 serial ports by default), with 4 onboard 2 × 5-pin standard COM headers (2.0 mm pitch). COM1 and COM2 support RS-232 or RS-485, selectable via jumpers. The standard pin assignments for JCOM1, JCOM2, JCOM3, and JCOM4 are as follows:

（**For configurations requiring 4 × RS-232 ports, please contact the CoreIPC sales team in advance with your customization requirements.**）

PIN	Signal Name	PIN	Signal Name
1	DCD（A）	2	RXD（B）
3	TXD	4	DTR
5	GND	6	DSR
7	RTS	8	CTS
9	RI	10	NC

JCOM1 and COM1 share the same signals and are mutually exclusive. JCOM2 and COM2 share the same signals and are mutually exclusive. JCOM1 and JCOM2 are not populated by default. Hardware modifications are required to support 4 serial ports; please contact the CoreIPC sales team in advance.。

6.2 COM1 and COM2 support RS-232 by default and can be configured for RS-485 through jumper settings, as shown below:

Port	Function	JRS485_SW1 Setting	JC1 Setting	Definition
COM1	RS232	Pin 1–3, Pin 2–4 shorted (default)	Pin 1–3 shorted (default)	COM1 Pin 2: RXD COM1 Pin 3: TXD
	RS485	Pin 3–5, Pin 4–6 shorted	Pin 3–5 shorted	COM1 Pin 1: A COM1 Pin 2: B

Port	Function	JRS485_SW2 Setting	JC1 Setting	Definition
COM2	RS232	Pin 1–3, Pin 2–4 shorted (default)	Pin 2–4 shorted (default)	COM2 Pin 2: RXD COM2 Pin 3: TXD
	RS485	Pin 3–5, Pin 4–6 shorted	Pin 4–6 shorted	COM2 Pin 1: A COM2 Pin 2: B

6.3 The motherboard provides one 1 × 4-pin power amplifier header, JSPKR1 (2.0 mm pitch). The pin assignments are as follows:

PIN	Signal Name
1	SPKL-
2	SPKL+
3	SPKR-
4	SPKR+

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6.4 The motherboard provides one 2 × 5-pin FPANEL1 header (2.0 mm pitch).
The chassis power switch, reset switch, HDD activity LED, and power LED can be connected to this header. The FPANEL1 pin assignments are as follows:

PIN	Signal Name	PIN	Signal Name
1	HDDLED+	2	PWRLED+
3	HDDLED-	4	PWRLED-
5	GND	6	PWRBTN#
7	RESETBTN#	8	GND
9	NC	10	

6.5 Provides one optional 1 × 4-pin fan header. The CPUFAN1 pin assignments are as follows:

PIN	Signal Name	PIN	Signal Name
1	GND	2	+12V
3	DET	4	PWM

Note: DET: Fan speed pulse output; PWM: Fan speed PWM control.

6.6 Provides one 2 × 7-pin TPM 2.0 header. The TPM1 pin assignments are as follows:

PIN	Signal Name	PIN	Signal Name
1	LAD1	2	3.3V
3	LAD2	4	3.3V
5	LAD3	6	PCICK
7	LAD4	8	GND
9	-LFRAME	10	NC
11	SERIRQ	12	PLTRST
13	3.3V	14	3.3V

6.7 Provides one 2 × 5-pin GPIO header (2.0 mm pitch). The GPIO1 pin assignments are as follows:

PIN	Signal Name	PIN	Signal Name
1	GND	2	+5V
3	GPO1	4	GPI1
5	GPO2	6	GPI2
7	GPO3	8	GPI3
9	GPO4	10	GPI4

6.8 Provides one 1 × 4-pin red SATA power connector (2.0 mm pitch). The JSATA_PWR1 pin assignments are as follows:

PIN	Signal Name
1	+12V
2	GND
3	GND
4	+5V

Make sure to identify Pin 1 of JSPWR1 correctly; incorrect connection may damage the hard drive.

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Use only the power cable supplied by CoreIPC.

6.9 Provides one onboard 1 × 4-pin DC power connector. The DC_IN1 pin assignments are as follows:

PIN	Signal Name
1	+12V
2	+12V
3	GND
4	GND

6.10 Provides one onboard 2 × 5-pin USB 2.0 header (2.0 mm pitch). The F_USB3 pin assignments are as follows:

PIN	Signal Name	PIN	Signal Name
1	+5V	2	+5V
3	Data0-	4	Data1-
5	Data0+	6	Data1+
7	GND	8	GND
9		10	GND

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