



NUC54D User Manual

Issue 1.1

www.CoreIPC.com

Security Guidance

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- The contents of this user manual may not be reproduced, modified, reprinted, distributed, or published in any form without prior written permission from CoreIPC.
- 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	Cores	Freq.	Memory	HDMI	VGA	LAN	USB	PS2	LPT	COM /485	POWER
1	NUC54D-N22-4030U VER1.1	I3-4030U	2	1.9G	DDR3L	1	1	2	7	/	/	2 / 2	12V
1	NUC54D-N22-4300U VER1.1	I5-4300U	2	1.9G	DDR3L	1	1	2	7	/	/	2 / 2	12V
1	NUC54D-N22-5200U VER1.1	I5-5200U	2	2.2G	DDR3L	1	1	2	7	/	/	2 / 2	12V

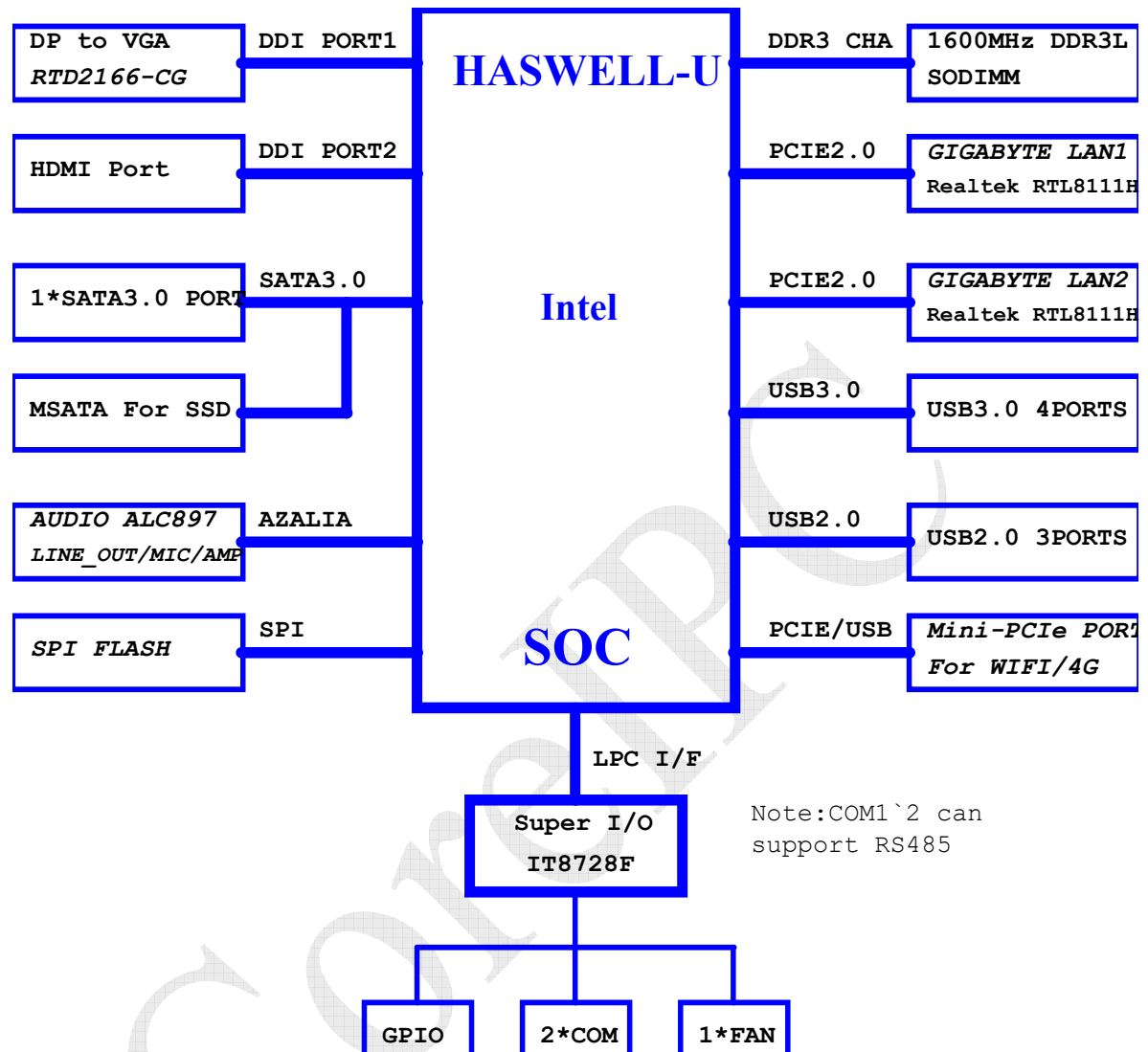
1. Product Description

NUC54D is a CoreIPC NANO-series motherboard supporting the full range of Intel® Haswell-U and Broadwell-U processors. It is suitable for commercial displays, mini PCs, medical instruments, industrial control, financial equipment, cloud terminals, and other applications.

The main features of the NUC54D motherboard are as follows:

- Supports Intel® Haswell-U or Broadwell-U Celeron®, Pentium®, and Core™ i3/i5/i7 processors;
- Supports single-channel 1600/1333 MHz DDR3L 1.35 V memory, up to 8 GB;
- Supports dual displays via VGA and HDMI;
- Supports two Gigabit Ethernet ports, with a single-LAN option;
- Supports one Mini PCIe slot for Wi-Fi/4G and one mSATA slot;
- Supports four USB 3.0 ports and three USB 2.0 ports;
- Supports two RS232 serial ports, optionally configurable as two RS485 ports;
- Fanless cooling supports fully enclosed system designs for dust and moisture resistance;
- Supports a wide operating temperature range of -20°C to 60°C;
- Supports AT/ATX power mode switching and 12 V DC power input.

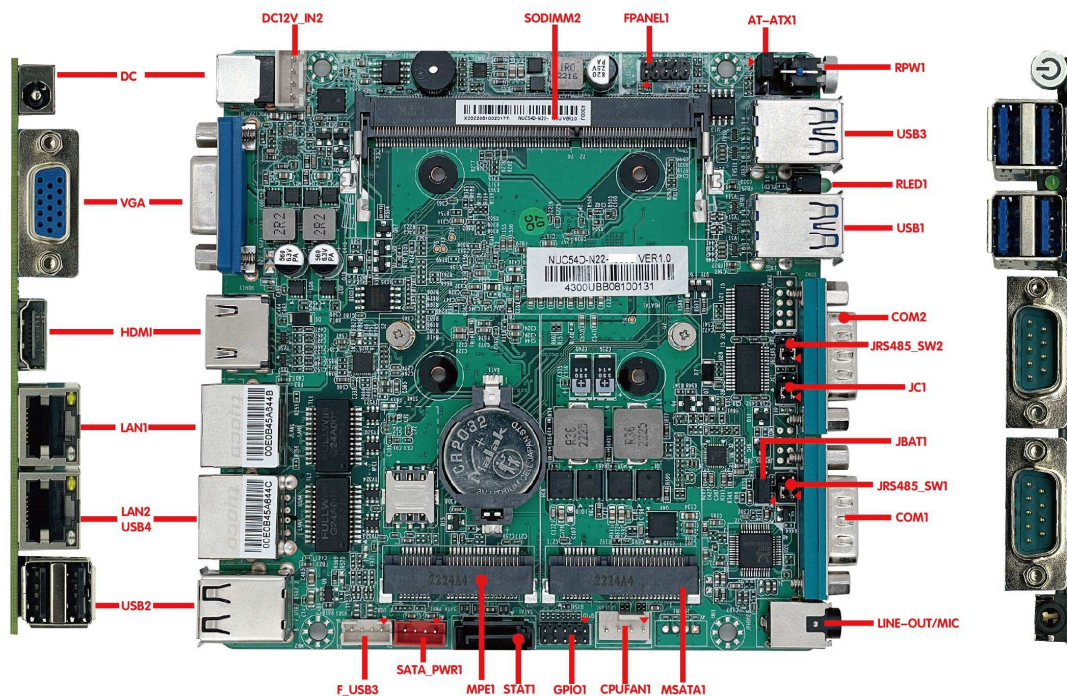
2. Motherboard Block Diagram



3. Motherboard Specifications

Item	Description
Processor	Supports Intel® Haswell-U/Broadwell-U Celeron®, Pentium®, and Core™ i3/i5/i7 processors
Memory	1 × SO-DIMM slot; supports single-channel 1600/1333 MHz DDR3L 1.35 V memory, up to 8 GB
Display	Integrated Intel® HD Graphics 4400
	1 × VGA port and 1 × HDMI display port
	Supports simultaneous or independent VGA and HDMI displays
Network	2 × Realtek RTL8111H Gigabit Ethernet controllers; single-LAN option; supports Wake-on-LAN and PXE boot
Storage	1 × 7-pin SATA 3.0 drive connector, up to 6 Gbps
	1 × mSATA 3.0 slot
Audio	Onboard ALC897 7.1-channel HD audio controller; supports MIC/Line-out and optional dual-channel 5 W amplifier output at 2 ohms
Expansion Slot	1 × Mini PCIe slot supporting Wi-Fi/4G modules
Rear I/O	1 × HDMI 1.4 display port
	1 × VGA display port
	2 × USB 2.0 ports
	2 × RJ-45 Gigabit Ethernet ports; LAN2 and the stacked USB 2.0 ports are mutually exclusive, with LAN2 populated by default
	1 × 12 V DC power input
Front I/O	4 × USB 3.0 ports
	1 × standard 3.5 mm combo Line-out/MIC jack
	2 × DB9 RS232 serial ports; COM1 and COM2 support optional RS485 through jumper settings
	1 × HDD activity LED
	1 × illuminated power button
Onboard I/O	1 × 1 × 4-pin USB 2.0 header; supports two USB 2.0 ports when dual LAN is enabled and 4G is not used
	1 × 1 × 4-pin amplifier header (optional)
	2 × 2 × 5-pin COM headers sharing signals with the front I/O serial ports (optional)
	1 × 4-pin power connector
	1 × drive power connector
	1 × 2 × 5-pin front-panel switch and LED header
Fan Header	Rear-mounted CPU with fanless cooling design; 1 × 4-pin CPU fan header reserved

GPIO	Supports 4-channel input/output GPIO
BIOS	64Mb Flash ROM
Watchdog	Supports hardware reset watchdog with 256 levels (0-255 seconds)
Operating System	Windows 7/Windows 10/Linux
Power Type	12 V DC power input
Operating Temperature	60°C ~ -20°C
Storage Temperature	-20°C ~ 70°C
Operating Humidity	5%-95% relative humidity, non-condensing
Dimensions	120mm x 120mm



Note: The image above shows the front view of NUC54D VER1.1. Images of other models may differ.

The image can be enlarged for viewing. Pin 1 of each header is marked with a red triangle.

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 × 204-pin DDR3 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.

- 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.

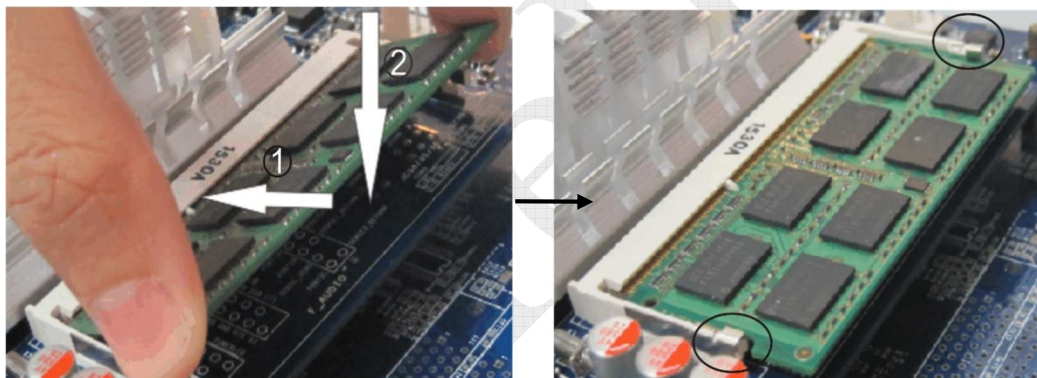
Memory Installation Steps:

- 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.

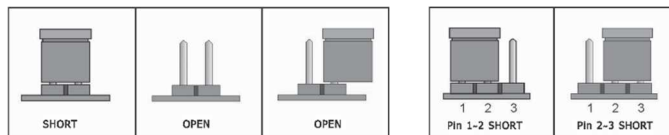


5. Jumper Settings

Jumper Description

For a 2-pin header, placing a jumper cap over both pins closes the circuit (shorts the pins).

For a 3-pin header, place the jumper cap over Pins 1-2 or Pins 2-3 to close the corresponding circuit.



How to Identify Pin 1 of a Jumper?

- 1) Carefully inspect the motherboard. A pin marked "1" or indicated by a thick white line is Pin 1.
- 2) Check the solder pads on the back of the board. The square solder pad normally indicates Pin 1.

Clear CMOS Jumper:

The motherboard provides 1 × 1×3-pin Clear CMOS header JBAT1 for clearing or retaining CMOS settings.

Pin pitch: 2.54 mm

The CMOS is powered by the onboard button battery. Clearing the CMOS will permanently erase the previous system configuration and restore the system settings to the default factory values.

To clear the CMOS, follow the steps below:

- 1) Turn off the computer and disconnect the power supply.
- 2) Short Pin 2–3 of JBAT1 for approximately 5 seconds.
- 3) Power on the computer.
- 4) During startup, follow the on-screen prompt to enter BIOS Setup, then load the optimized default settings.
- 5) Save the settings and exit BIOS Setup.

Pin definition is shown below:

JBAT1 Definition:

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

AT/ATX Power Mode Jumper

The motherboard provides 1 × 1×3-pin **AT-ATX1 jumper** for selecting the power-on mode.

Pin pitch: 2.54 mm

The power-on behavior can be configured by the jumper setting.

AT-ATX1 Definition:

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

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6. Pin Definitions

6.1. The motherboard provides two standard DB9 serial ports and two onboard 2 × 5-pin standard COM headers with a 2.0 mm pitch. JCOM1 and COM1 share the same signals and are mutually exclusive; JCOM2 and COM2 also share the same signals and are mutually exclusive. JCOM1 and JCOM2 are not populated by default.

The standard RS232 pin definitions for JCOM1 and JCOM2 are as follows:

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

6.2. COM1 and COM2 support RS232 by default and can also support RS485 through jumper settings, as shown below:

Interface	Function	JRS485_SW1 Setting	JC1 Setting	Definition
COM1	RS232	Pins 1-3 and 2-4 (default)	Pins 1-3 (default)	COM1 Pin 2: RXD COM1 Pin 3: TXD
	RS485	3-5Pin ,4-6Pin	3-5Pin	COM1 Pin 1: A COM1 Pin 2: B

Interface	Function	JRS485_SW2 Setting	JC1 Setting	Definition
COM2	RS232	Pins 1-3 and 2-4 (default)	Pins 2-4 (default)	COM2 Pin 2: RXD COM2 Pin 3: TXD
	RS485	3-5Pin ,4-6Pin	4-6Pin	COM2 Pin 1: A COM2 Pin 2: B

6.3. The motherboard provides one onboard 1 × 4-pin amplifier header with a 2.0 mm pitch, supporting dual-channel 5 W output at 2 ohms. The JSPKR1 pin definition is as follows:

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

The amplifier interface is optional. Please contact CoreIPC sales if required.

6.4. The motherboard provides one 2 × 5-pin USB 2.0 header with a 2.0 mm pitch. By default, only one USB 2.0 port is supported.

When the Mini PCIe slot is not used for a 4G module, two USB 2.0 ports can be supported. The

F_USB1 pin definition is 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

6.5. The motherboard provides one red 1 × 4-pin SATA drive power connector with a 2.0 mm pitch. The JSPWR1 pin definition is as follows:

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

Be sure to identify Pin 1 of JSATA_PWR1 correctly; an incorrect connection may damage the drive. Use only the power cable supplied by CorelPC.

6.6. The motherboard provides one 1 × 4-pin fan header. The CPUFAN1 pin definition is as follows:

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

Note: DET is the fan speed pulse output; PWM controls the fan speed.

6.7. The motherboard provides one 2 × 5-pin FPANEL1 header with a 2.0 mm pitch. The chassis power switch, reset switch, HDD LED, and power LED can be connected to this header. The FPANEL1 pin definition is 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	

6.8. The motherboard provides one 2 × 5-pin GPIO header with a 2.0 mm pitch. The GPIO1 pin definition is 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

6.9. The motherboard provides one 1 × 4-pin 12 V DC power input connector. The DC12V_IN2 pin definition is as follows:

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