

CoreIPC

NUC54D

120 x 120 mm Industrial NUC Motherboard Datasheet

Intel® Haswell-U / Broadwell-U Platform

Document	Datasheet
Model	NUC54D
Issue	1.1
Product Type	120 x 120 mm Industrial NUC Motherboard
Website	www.CoreIPC.com

This datasheet is prepared based on NUC54D User Manual Issue 1.1.

1. Product Overview

The NUC54D is a compact 120 x 120 mm CoreIPC NANO-series industrial motherboard supporting Intel® Haswell-U and Broadwell-U processors. It integrates DDR3L memory, VGA/HDMI dual-display, up to dual Gigabit Ethernet, SATA and mSATA storage, Mini PCIe expansion, USB and serial connectivity, GPIO, audio, fanless cooling, and 12 V DC input for commercial displays, mini PCs, medical instruments, industrial control, financial equipment, cloud terminals, and other embedded applications.

2. Key Features

- Supports Intel® Haswell-U / Broadwell-U Celeron®, Pentium®, and Core™ i3/i5/i7 processors.
- 1 x DDR3L SO-DIMM slot supporting single-channel DDR3L-1333/1600, 1.35 V memory, up to 8 GB.
- 1 x VGA and 1 x HDMI 1.4 display interface; supports simultaneous or independent dual-display output.
- Up to 2 x Realtek RTL8111H Gigabit Ethernet ports with Wake-on-LAN and PXE boot; single-LAN option available.
- Storage includes 1 x SATA 3.0 connector and 1 x mSATA 3.0 slot.
- 1 x Mini PCIe slot supports Wi-Fi or 4G modules.
- Supports 4 x USB 3.0 and up to 3 x USB 2.0 ports; USB availability depends on LAN and 4G configuration.
- 2 x DB9 RS232 ports are standard; COM1 and COM2 can be configured for RS485 by jumper settings.
- Onboard Realtek ALC897 7.1-channel HD audio with combo Line-out/MIC and optional dual-channel 5 W amplifier output at 2 ohms.
- 120 x 120 mm form factor; 12 V DC input; fanless thermal design; operating temperature -20°C to 60°C.

3. Technical Specifications

Category	Specification
Processor	Intel® Haswell-U / Broadwell-U Celeron®, Pentium®, and Core™ i3/i5/i7 processors. Ordering examples: Core™ i3-4030U, i5-4300U, and i5-5200U.
Memory	1 x SO-DIMM; single-channel DDR3L-1333/1600, 1.35 V; up to 8 GB.
Graphics / Display	Integrated Intel® HD Graphics 4400; 1 x VGA and 1 x HDMI 1.4; simultaneous or independent dual-display output supported.
Ethernet	Up to 2 x Realtek RTL8111H Gigabit Ethernet controllers; single-LAN option; Wake-on-LAN and PXE support.
Storage	1 x SATA 3.0 connector, up to 6 Gbps; 1 x mSATA 3.0 slot.
Audio	Realtek ALC897 7.1-channel HD audio; combo MIC/Line-out; optional dual-channel 5 W amplifier output at 2 ohms.
Expansion	1 x Mini PCIe slot supporting Wi-Fi/4G modules.
USB	4 x USB 3.0 + up to 3 x USB 2.0. Port availability depends on LAN and 4G configuration.
Serial Ports	2 x DB9 RS232 standard; COM1/COM2 can support RS485 through jumper settings.
GPIO	4-channel GPIO input/output.
BIOS	64 Mb Flash ROM.
Watchdog	Hardware reset watchdog, 256 levels (0-255 seconds).
OS Support	Windows 7 / Windows 10 / Linux.
Power	12 V DC input; AT/ATX power-mode selection.
Operating Temperature	-20°C to 60°C.
Storage Temperature	-20°C to 70°C.
Operating Humidity	5%-95% RH, non-condensing.
Dimensions	120 mm x 120 mm.

4. I/O Interface Summary

4.1 Rear Panel I/O

Interface	Description
Display	1 x HDMI 1.4; 1 x VGA.
USB	Front I/O: 4 x USB 3.0; rear I/O: up to 2 x USB 2.0 depending on LAN configuration.
LAN	Up to 2 x RJ45 Gigabit Ethernet ports; LAN2 is mutually exclusive with the stacked rear USB 2.0 ports.
Serial / Audio	2 x DB9 RS232; 1 x 3.5 mm combo Line-out/MIC jack.
Controls / Power	1 x HDD activity LED; 1 x illuminated power button; 1 x 12 V DC input.

4.2 Internal I/O and Headers

Interface / Header	Description
USB 2.0	1 x onboard 2 x 5-pin USB 2.0 header. One USB 2.0 port is available by default; two can be supported when dual LAN is enabled and 4G is not used.
Serial	2 x optional 2 x 5-pin COM headers sharing signals with the two front DB9 serial ports; not populated by default.
Audio Amplifier	1 x optional 1 x 4-pin amplifier header, dual-channel 5 W output at 2 ohms.
Storage Power	1 x red SATA drive-power connector.
DC Power	1 x 4-pin 12 V DC power connector.
Front Panel	1 x 2 x 5-pin front-panel switch and LED header.
Fan	1 x reserved 4-pin CPU fan header; CPU is rear-mounted for fanless cooling.
GPIO	1 x 2 x 5-pin GPIO header.

5. Display Support

NUC54D provides VGA and HDMI 1.4 outputs and supports simultaneous or independent dual-display operation. The source manual identifies integrated Intel® HD Graphics 4400 for the reference configuration.

Item	Description
Integrated Graphics	Intel® HD Graphics 4400.
VGA	1 x VGA output.
HDMI	1 x HDMI 1.4 output.
Multi-display	Supports simultaneous or independent VGA and HDMI display output.

6. Serial Port Configuration

Port	Default / Optional Function
COM1	DB9 RS232 by default; supports RS485 through jumper settings.
COM2	DB9 RS232 by default; supports RS485 through jumper settings.
JCOM1 / JCOM2	Optional onboard headers sharing signals with COM1 / COM2; mutually exclusive with the DB9 connectors and not populated by default.
RS485 Option	Up to 2 x RS485 through jumper configuration.

7. Power, Cooling and Reliability Functions

Item	Description
Main Power	12 V DC input.
AT / ATX Mode	AT-ATX1 jumper selects automatic power-on behavior.
Cooling	Rear-mounted CPU with fanless thermal design; 1 x reserved 4-pin CPU fan header.
Watchdog	Hardware reset watchdog, 256 levels (0-255 seconds).
Clear CMOS	JBAT1 1 x 3-pin Clear CMOS jumper.

8. Mechanical and Environmental Information

Item	Description
Product Type	Industrial NANO-series motherboard.
Dimensions	120 mm x 120 mm.
Operating Temperature	-20°C to 60°C.
Storage Temperature	-20°C to 70°C.
Operating Humidity	5%-95% RH, non-condensing.
Power Input	12 V DC.

9. Ordering Information

Model	Description
NUC54D-N22-4030U VER1.1	Core™ i3-4030U; 2 cores; 1.9 GHz; DDR3L; HDMI + VGA; 2 LAN; 7 USB; 2 COM / 2 RS485 shown in ordering table; 12 V DC.
NUC54D-N22-4300U VER1.1	Core™ i5-4300U; 2 cores; 1.9 GHz; DDR3L; HDMI + VGA; 2 LAN; 7 USB; 2 COM / 2 RS485 shown in ordering table; 12 V DC.
NUC54D-N22-5200U VER1.1	Core™ i5-5200U; 2 cores; 2.2 GHz; DDR3L; HDMI + VGA; 2 LAN; 7 USB; 2 COM / 2 RS485 shown in ordering table; 12 V DC.
LAN Option	Single-LAN configuration available; LAN2 and stacked rear USB 2.0 are mutually exclusive.

10. Compliance and Documentation Notes

- Certification and compliance information is not specified in the source manual. Contact CoreIPC for project-specific certification or compliance documentation.
- The main product and motherboard specifications identify the memory as DDR3L-1333/1600 at 1.35 V, up to 8 GB. The Memory Installation section calls the socket a 204-pin DDR3 SO-DIMM slot. This datasheet follows the main/detailed DDR3L specification and recommends confirming the production BOM before ordering.
- LAN and USB resources are configuration-dependent. The source manual states that LAN2 and the stacked rear USB 2.0 ports are mutually exclusive, with LAN2 populated by default. The internal USB header can provide two USB 2.0 ports when dual LAN is enabled and a 4G module is not used.

11. Contact Information

Company	CoreIPC
Sales Team	CoreIPC Sales Team
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Disclaimer: This datasheet was compiled from NUC54D User Manual Issue 1.1. Product specifications, interface counts and optional functions may vary by production configuration. Please confirm the selected configuration before order placement. All product names, trademarks and registered trademarks are the property of their respective owners.