

CoreIPC

NUC16R-D5

120 x 120 mm Six-LAN Industrial Motherboard Datasheet

Intel® Alder Lake-N / Twin Lake-N Platform

Document	Datasheet
Model	NUC16R-D5
Issue	1.1
Product Type	120 x 120 mm Six-LAN Industrial Motherboard
Website	www.CoreIPC.com

This datasheet is prepared based on NUC16R-D5 User Manual Issue 1.1.

1. Product Overview

The NUC16R-D5 is a compact 120 x 120 mm CoreIPC NANO multi-LAN motherboard supporting Intel® Alder Lake-N and Twin Lake-N processors. It integrates DDR5 memory, six 2.5GbE LAN ports, dual 4K display outputs, SATA and M.2 storage, Mini PCIe expansion, USB and serial interfaces, watchdog, TPM footprint, and 12 V DC input for software routers, network security, industrial control, cloud terminals, and other embedded applications.

2. Key Features

- Supports Intel® Alder Lake-N and Twin Lake-N processors, including N95, N100, N200, Core™ i3-N305, N150 and N250 configurations listed in the source manual.
- 1 x DDR5 SO-DIMM slot supporting single-channel DDR5-4800 memory, up to 16 GB.
- 1 x HDMI 1.4 and 1 x DisplayPort output; both are specified up to 4K @ 60 Hz.
- 6 x Intel® I225-V / I226-V 2.5GbE LAN ports with Wake-on-LAN and PXE support.
- 1 x SATA 3.0 connector plus 1 x M.2 Key M 2280/2242 slot supporting PCIe/SATA SSDs.
- 1 x Mini PCIe slot supporting 4G and Wi-Fi by default; mSATA support available through hardware modification.
- Supports up to 2 x USB 3.0 and 5 x USB 2.0 ports; available USB count depends on 4G module usage.
- 2 x RS232 serial ports by default. COM1 can optionally support RS485; JCOM2 can optionally support RS485 or RS422 through hardware modification.
- Fanless CPU cooling design with a reserved 4-pin CPU fan header; watchdog timer and optional GPIO support are provided.
- 120 x 120 mm form factor; 12 V DC input; operating temperature -10°C to 60°C.

3. Technical Specifications

Category	Specification
Processor	Integrated Intel® Celeron® N100 quad-core processor, 0.8 GHz, TDP 6 W; compatible with Intel® Alder Lake-N and Twin Lake-N series processors.
Memory	1 x 262-pin DDR5 SO-DIMM slot; single-channel DDR5-4800; up to 16 GB.
Graphics / Display	Integrated Intel® UHD Graphics; 1 x HDMI 1.4 and 1 x DisplayPort, both specified up to 4K @ 60 Hz; simultaneous or independent display supported.
Ethernet	6 x Intel® I225 / I226 2.5GbE controllers with Wake-on-LAN and PXE support.
Storage	1 x SATA 3.0 connector, up to 6 Gbps, shared with mSATA signal; 1 x M.2 Key M 2280/2242 slot supporting PCIe/SATA SSDs.
Expansion	1 x Mini PCIe slot supporting 4G and Wi-Fi by default; mSATA support available through hardware modification.
USB	2 x USB 3.0 and up to 5 x USB 2.0. One USB signal group is shared with the 4G module; up to 4 internal USB 2.0 ports are available when 4G is not used.
Serial Ports	2 x RS232 by default. COM1 can optionally support RS485; JCOM2 can optionally support RS485/RS422. Optional modes require hardware modification.
SIM	1 x SIM card slot.
GPIO	4-channel GPIO input/output according to the detailed specification.
TPM	Reserved footprint for onboard TPM 2.0.
BIOS	128 Mb Flash ROM.
Watchdog	Hardware watchdog timer, 256 levels (0-255 seconds).
OS Support	Windows 10 / Windows 11 / Linux.
Power	12 V DC input; AT/ATX power-on mode switching.
Operating Temperature	-10°C to 60°C.
Storage Temperature	-20°C to 70°C.
Operating Humidity	5%-95% relative humidity, non-condensing.
Dimensions	120 mm x 120 mm.

4. I/O Interface Summary

4.1 Rear Panel I/O

Interface	Description
Network	6 x RJ45 2.5GbE LAN ports using Intel® I225-V / I226-V controllers.
Display	1 x stacked DP + HDMI connector; both outputs specified up to 4K @ 60 Hz.
USB	2 x USB 3.0 and 2 x USB 2.0 front I/O ports.
Serial / SIM	1 x console port; 1 x SIM card slot.
Control / Power	1 x HDD LED, 1 x Clear CMOS button, 1 x auto power-on switch, 1 x power button with LED, 1 x 12 V DC input.

4.2 Internal I/O and Headers

Interface / Header	Description
USB 2.0	2 x 2 x 5-pin USB 2.0 headers. Up to 3 additional USB 2.0 ports are standard; up to 4 when the 4G function is not used.
Serial	2 x optional 2 x 5-pin JCOM headers. JCOM1 shares signals with COM1; JCOM2 is RS232 by default.
RS485 / RS422	JCOM1 can be modified for RS485; JCOM2 can be modified for RS485/RS422. Advance production arrangement is required.
Drive Power	1 x 4-pin SATA/HDD power connector.
Front Panel	1 x 2 x 5-pin front-panel switch and LED header.
Fan	1 x optional 4-pin CPU fan header reserved.
TPM	Reserved footprint for onboard TPM 2.0.
GPIO	4-channel GPIO input/output support.
Storage Sharing	SATA 3.0 and optional mSATA share resources as specified in the source manual.

5. Display Support

NUC16R-D5 provides one HDMI 1.4 and one DisplayPort output. The source manual specifies both interfaces at up to 4K @ 60 Hz and supports simultaneous or independent display operation.

Item	Description
Integrated Graphics	Intel® UHD Graphics.
HDMI	1 x HDMI 1.4 output, specified up to 4K @ 60 Hz in the source manual.
DisplayPort	1 x DP output, specified up to 4K @ 60 Hz.
Multi-display	Supports simultaneous or independent display through HDMI and DP.
Connector	Stacked DP + HDMI display connector.

6. Serial Port Configuration

Port	Default / Optional Function
COM1	Console port by default; optional pin-header configuration. RS485 requires hardware modification.
JCOM1	Optional 2 x 5-pin header; shares signals with COM1.
COM2 / JCOM2	RS232 by default; optional RS485 or RS422 requires hardware modification.
Standard Configuration	2 x RS232 serial ports.
Optional Differential Serial	1 x RS485 or 1 x RS422 depending on the selected production configuration.

7. Power, Cooling and Reliability Functions

Item	Description
Main Power	12 V DC input.
AT / ATX Mode	AT-ATX1 jumper enables or disables power-on auto-start.
Cooling	Fanless CPU cooling design; 1 x optional 4-pin CPU fan header reserved.
Watchdog	Hardware watchdog timer, 256 levels (0-255 seconds).
Clear CMOS	1 x Clear CMOS push button plus JBAT1 1 x 3-pin Clear CMOS jumper.

8. Mechanical and Environmental Information

Item	Description
Product Type	120 x 120 mm six-LAN industrial motherboard.
Dimensions	120 mm x 120 mm.
Operating Temperature	-10°C to 60°C.
Storage Temperature	-20°C to 70°C.
Operating Humidity	5%-95% relative humidity, non-condensing.
Power Input	12 V DC.

9. Ordering Information

Model	Description
NUC16R-D5 VER1.1 - N95	Intel® N95; 4 cores; up to 3.4 GHz; 15 W; DDR5; HDMI + DP; 6 LAN; 7 USB; 2 COM / 0 RS485; 12 V.
NUC16R-D5 VER1.1 - N100	Intel® N100; 4 cores; up to 3.4 GHz; 6 W; DDR5; HDMI + DP; 6 LAN; 7 USB; 2 COM / 0 RS485; 12 V.
NUC16R-D5 VER1.1 - N200	Intel® N200; 4 cores; up to 3.7 GHz; 6 W; DDR5; HDMI + DP; 6 LAN; 7 USB; 2 COM / 0 RS485; 12 V.
NUC16R-D5 VER1.1 - i3-N305	Intel® Core™ i3-N305; 8 cores; up to 3.8 GHz; 15 W; DDR5; HDMI + DP; 6 LAN; 7 USB; 2 COM / 0 RS485; 12 V.
NUC16R-D5 VER1.1 - N150	Intel® N150; 4 cores; up to 3.6 GHz; 6 W; DDR5; HDMI + DP; 6 LAN; 7 USB; 2 COM / 0 RS485; 12 V.
NUC16R-D5 VER1.1 - N250	Intel® N250; 4 cores; up to 3.8 GHz; 6 W; DDR5; HDMI + DP; 6 LAN; 7 USB; 2 COM / 0 RS485; 12 V.

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 source manual consistently specifies 1 x DDR5 SO-DIMM, single-channel DDR5-4800 memory, up to 16 GB. Ordering Information also identifies the platform memory type as DDR5.
- The standard motherboard provides 2 x RS232 ports. RS485 or RS422 requires hardware modification and advance production arrangement. USB availability can also vary depending on whether the 4G function is used.

11. Contact Information

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Disclaimer: This datasheet was compiled from NUC16R-D5 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.