



ROG NUC (2025)

NUC15JNKH9X9

NUC15JNKH9X7

NUC15JNKH9X6

NUC15JNKH7X4

Technical Product Specifications (TPS)

Regulatory Model: NUC15JNK

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About This Document

This technical product specification includes information on the following NUC SKUs and only applies to the standard ASUS NUC15JNK with BIOS identifier JNARL579.XXXX:

- **NUC Mini PC**
Memory, M.2 solid state drive, and Windows 11 64-bit Operating System included in the NUC system.
- **Technical Product Specification (TPS)**
Specifies the board layout, components, connectors, power requirements, environmental limits, integration features, and BIOS features.

Audience

This technical product specification is intended to provide information about the NUC Mini PC, NUC Kit, or NUC Board to vendors, system integrators, and other engineers and technicians who need this level of information. For steps to setup the NUC Mini PC or NUC Kit, refer to the User Guide located at www.asus.com/support.

How This Document is Organized

This guide contains the following parts:

- **Chapter 1: Product Specification**
This chapter provides an overview of the specifications of the NUC system.
- **Chapter 2: Product Introduction**
This chapter provides you with the figures, layouts, physical description of the system, and detailed features.
- **Chapter 3: Technical references**
This chapter details technical references and considerations.
- **Chapter 4: BIOS Support**
This chapter provides an overview of BIOS features.

Conventions Used in This Guide

To highlight key information in this manual, some text are presented as follows:

IMPORTANT! This message contains vital information that must be followed to complete a task.

NOTE: This message contains additional information and tips that can help complete tasks.

WARNING! This message contains important information that must be followed to keep you safe while performing certain tasks and prevent damage to your NUC system's data and components.

Other common notation

#	Used after a signal name to identify an active-low signal (such as USBP0#)
GB	Gigabyte (1,073,741,824 bytes)
GB/s	Gigabytes per second
Gb/s	Gigabits per second
KB	Kilobyte (1024 bytes)
Kb	Kilobit (1024 bits)
kb/s	1000 bits per second
MB	Megabyte (1,048,576 bytes)
MB/s	Megabytes per second
Mb	Megabit (1,048,576 bits)
Mb/s	Megabits per second
TDP	Thermal Design Power
xxh	An address or data value ending with a lowercase h indicates a hexadecimal value.
x.x V	Volts. Voltages are DC unless otherwise specified.
x.x A	Amperes.

Production identification information

ASUSTeK NUC Product ROG NUC (2025) Identification Information

Product Name	ROG NUC (2025)
NUC15JNK	NUC15JNKU9X9
	NUC15JNKU9X7
	NUC15JNKU9X6
	NUC15JNKU7X4

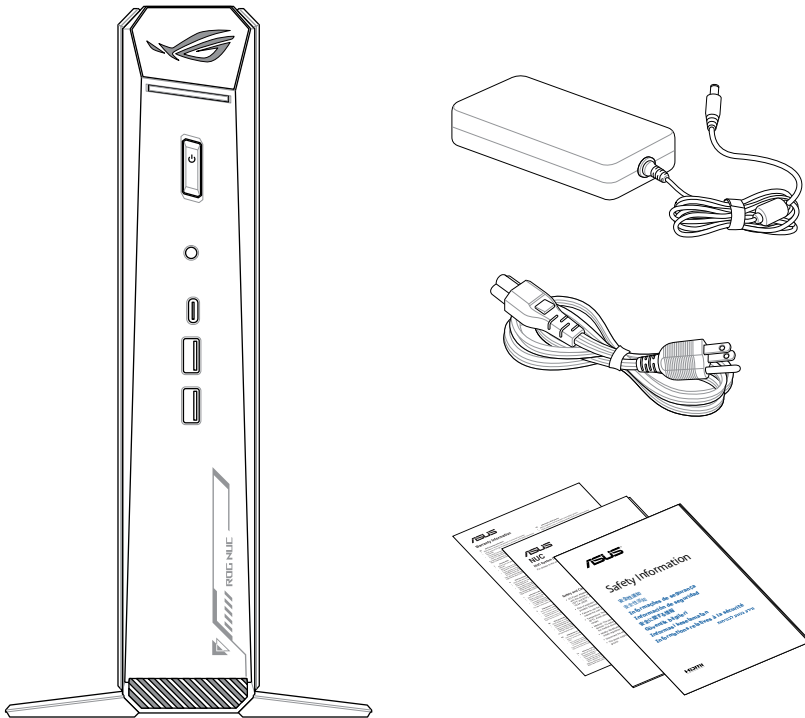
Where to Find More Information

Refer to the following sources for additional information and for product and software updates.

ASUS website

The ASUS website (www.asus.com) provides updated information on ASUS hardware and software products.

Package Contents



NOTE:

- The most up-to-date and accurate product specifications are available on rog.asus.com for download.
 - Product and accessory images are for illustrative purposes only. The actual appearance and specifications may vary depending on the model.
 - The bundled power adapter may vary depending on the model and the country (or region) of sale.
 - The availability of the power cord may vary depending on the country (or region) of sale.
 - Some bundled accessories may vary depending on the model. For details on these accessories, refer to their respective user manuals.
 - If the device or its components fail or malfunction during normal and proper use within the warranty period, bring the warranty card to the ASUS Service Center for replacement of the defective components.
 - The base of the system is fixed and cannot be removed.
 - The system is not wall mountable.
-

IMPORTANT! Ensure to only use the system in a vertical orientation. Due to thermal conditions, we do not recommend placing or mounting the system in a horizontal orientation.

1. Product Specification

1.1 Specifications

Mini PC SKUs

The NUC Mini PC is a small form factor PC system. The NUC Mini PC comes with RAM, storage, and operating system pre-installed.

ASUS Project Code		NUC15JNK			
Product Name		NUC15JNKU9X9	NUC15JNKU9X7	NUC15JNKU9X6	NUC15JNKU7X4
Processor		Intel® Core™ Ultra 9 Processor 275HX 2.7GHz (36MB Cache, up to 5.4 GHz, 24 cores, 24 Threads); Intel® AI Boost NPU up to 13, cTDP 45-75W*			Intel® Core™ Ultra 7 Processor 255HX 2.4GHz (30MB Cache, up to 5.2 GHz, 20 cores, 20 Threads); Intel® AI Boost NPU up to 13, cTDP 45-65W*
		* Overall power consumption is dependent on both GPU and CPU power utilization under specific thermal and operational mode conditions.			
Chipset		Intel® Chipset HM870			
Graphics	Integrated	Intel® Graphics GPU			
	Discrete	NVIDIA® GeForce RTX™ 5080 Laptop GPU (150+25W) Dynamic Boost 16GB GDDR7	NVIDIA® GeForce RTX™ 5070Ti Laptop GPU (115+25W) Dynamic Boost 12GB GDDR7	NVIDIA® GeForce RTX™ 5070 Laptop GPU (100+15W) Dynamic Boost 8GB GDDR7	NVIDIA® GeForce RTX™ 5060 Laptop GPU (100+15) Dynamic Boost 8GB GDDR7
AC Cord		US, EU, AU, UK, CN, TW, JP(Type A) or No Cord* * Availability of AC cord will vary depending on region or processor.			
Memory		2 x DDR5-6400 CSO-DIMM slots Max Capacity: 96GB* Supports dual channel memory * Supports SODIMM up to 5600MHz; requires CSODIMM for 6400MHz			
Storage		1 x PCIe 5.0 NVMe M.2 slot available 1 x PCIe 4.0 NVMe M.2 slot available			
Wireless Network		Intel® Killer™ Wi-Fi 7 BE1750x (Gig+) Bluetooth® 5.4 wireless card* * Bluetooth® version may change with different OS version.			
LAN		Intel® Ethernet Controller E3100G, 2.5G			
Audio		ALC3251			
TPM		Firmware TPM			

(continued on next page)

ASUS Project Code	NUC15JNK
Card Reader	-
HDMI CEC	Yes, 2 ports on back panel
Front I/O Ports	2 x USB 10Gbps Type-A ports 1 x USB 10Gbps Type-C® port 1 x 3.5mm Combo Audio Jack
Back I/O Ports	1 x Thunderbolt 4 Type-C® w/ DisplayPort™ 2.1 4 x USB 10Gbps Type-A 2 x HDMI™ 2.1 FRL 2 x DisplayPort 2.1 1 x RJ45 LAN 1 x DC-in 1 x Kensington Lock Slot
Side I/O Ports	-
Power Supply	Power Adapter Meets DOE Level VI, efficiency > 88% 19.5VDC, 16.9A, 330W Power Adapter
Dimensions (W x D x H)	282.4mm x 187.7mm x 56.5mm (bottom: 146mm)
Weight	3.12kg (6.88 lbs)
OS	Windows 11 Home 64-bit

NOTE: Pre-configured memory capacity, storage and Windows OS version may differ by country inquire with local sales

1.2 Feature Summary

The tables below summarizes the major features of the NUC system.

Chassis Dimensions	11.11in. x 7.39in. x 2.22in. (282.4mm x 187.7mm x 56.5mm) (including feet)
Processor	ROG Mini PCs NUC15JNK have a soldered down Intel® Core™ Ultra[X]. <ul style="list-style-type: none"> • Intel® Core™ Ultra 9-275HX processor or • Intel® Core™ Ultra 7-255HX processor
Memory	Two 262-pin 1.1 V DDR5 SDRAM Clocked Small Outline Dual Inline Memory Module (CSO-DIMM) sockets.* <ul style="list-style-type: none"> • Support for DDR5 6400 MHz CSO-DIMMs • Support for 8 Gb and 16 Gb technology • Support for up to 96 GB of system memory with two SO-DIMMs using 48 GB memory modules • Support for non-ECC memory • Support for 1.1 V JEDEC memory only * 2 Gb, 4 Gb and 8Gb memory technology (SDRAM Density) is not supported
Graphics	Discrete graphics support: For products with following Graphics Processors <u>NVIDIA GeForce RTX 5080 with 16GB GDDR7 VRAM</u> <u>NVIDIA GeForce RTX 5070Ti with 12GB GDDR7 VRAM</u> <ul style="list-style-type: none"> • Two Full Size High Definition Multimedia Interface (HDMI 2.1 FRL compatible) back panel connector • Two DisplayPort 2.1 Back panel connectors For products with following Graphics Processors <u>NVIDIA GeForce RTX 5070 with 8GB GDDR7 VRAM</u> <u>NVIDIA GeForce RTX 5060 with 8GB GDDR7 VRAM</u> <ul style="list-style-type: none"> • Two Full Size High Definition Multimedia Interface (HDMI 2.1 FRL compatible) back panel connector Note: One of the Full Size High Definition Multimedia Interface connectors is connected the Integrated Graphics Processor (refer to Block Diagram section) <ul style="list-style-type: none"> • Two DisplayPort 2.1 Back panel connectors
Audio	Audio via digital display outputs <ul style="list-style-type: none"> • When using an encoded format (such as DTS-HD MA or Dolby True HD) the system supports a single 7.1 stream. When using an un-encoded format, the system supports 8 discrete, unencoded channels per HDMI port simultaneously, for a total of 16 discrete/un-encoded channels. Realtek Audio via a stereo microphone/headphone 3.5mm jack on the front panel
Storage	Two M.2 PCIe connectors supporting M.2 22x80 (key type M) for NVMe only. <ul style="list-style-type: none"> • 1 x PCIe 5.0 NVMe M.2 slot (Port 1) • 1 x PCIe 4.0 NVMe M.2 slot (Port 2)

(continued on next page)

Communication	<p>Wireless connectivity using the Intel® Wi-Fi 7 BE1750x wireless networking module</p> <ul style="list-style-type: none"> • 802.11be, Concurrent Dual Band, 2x2 Wi-Fi , 4K QAM + Bluetooth® 5.4 • Bands 2.4, 5, 6 GHz (320MHz) • Maximum Transfer speed up to 2.4 Gbps • M.2 2230 Hybrid Key E form factor <p>Gigabit (10/100/1000/2500 Mbps) LAN subsystem using the Intel® Killer™ Ethernet E3100 Controller</p> <ul style="list-style-type: none"> • PCIe 3.1 5GT/s support for x1 width (Lane) • Single-port integrated multi-gigabit (up to 2.5G) • Full wake up support • Supports for packets up to 16 KB (Jumbo Frames)
Thunderbolt™	<p>1x Thunderbolt™ 4 port (back panel)</p> <ul style="list-style-type: none"> • 15W and 18W port bus power <ul style="list-style-type: none"> - Charging capability up to 12V @ 1.5A, 5V @ 3A and 9V @ 2A • Thunderbolt networking • Protocol support: <ul style="list-style-type: none"> PD Modes Supported: TBT3, USB4, USB3, DP-alt/MF <p>TBT3 Tx/Rx rates: 40G (2 x 20.625), 20G (2 x 10.3125) PCI Express Tunnel: 32 Gbps</p> <p>USB4 Tx/Rx rates: 40G (2 x 20), 20G (2 x 10) USB3 Native: 10Gbps (1 x10G) USB3 Tunnel: 10Gbps USB2: 480 Mbps</p> <p>DP2.1 HBR3 DisplayPort Tunneling: Port 1: 2 streams (~35 Gbps, Thunderbolt 4 certified) For more information about the location of the Thunderbolt™ port(s), see Rear View section.</p>
USB Ports and Headers	<p>1 x USB4 Type-C® / Thunderbolt™ 4 (back panel) 6 x USB 10Gpbs ports (2 front panel and 4 back panel) 1 x USB 10Gpbs Type-C® port (front panel)</p> <p>For more information about the location of the USB ports and headers see Rear View section. For more information about the pinout of the USB ports and headers see Signal Tables for the Connectors and Header section.</p>
TPM	<p>Intel® Platform Trust Technology (Intel® PTT) supported on all SKUs - TPM 2.0 Compliant</p> <p>More information about TPM and Intel® PTT is available on https://www.asus.com/support/</p>
Power	<p>AC Adapter</p> <ul style="list-style-type: none"> • Ships with a 330W adapter • Adapter output: 19.5VDC @ 16.9 Amps • System Power Input 19.5VDC +/- 5% with DC transient voltage protection
Operating Temperature	<p>0-35°C external ambient operating temperature</p> <p>For more information about environmental specifications see Environmental section.</p>

(continued on next page)

BIOS	BIOS resident in the Serial Peripheral Interface (SPI) Flash device Support for Advanced Configuration and Power Interface (ACPI), Plug and Play, and System Management BIOS (SMBIOS)	
Operating System	ROG NUC (2025) Mini PC NUC15JN ships with: <ul style="list-style-type: none">Windows® 11 Home 64-bit preinstalled. For a full list of latest supported operating systems, Please visit www.asus.com/support .	
Other Supported Operating System	Windows:	Windows 11 Pro 64-bit Windows 11 Pro Education 64-bit Windows 11 IoT Enterprise 64-bit
	Linux:	Ubuntu 24.04 LTS 64-bit RedHat Enterprise Linux 64-bit
	These are the validated and supported operating systems list for Mini PC, they may not be included in pre-built systems sold directly by ASUS.	
Hardware Monitor Subsystem	Hardware monitoring subsystem including: <ul style="list-style-type: none">Voltage sense to detect out of range power supply voltagesThermal sense to detect out of range thermal valuesThree fan headers	

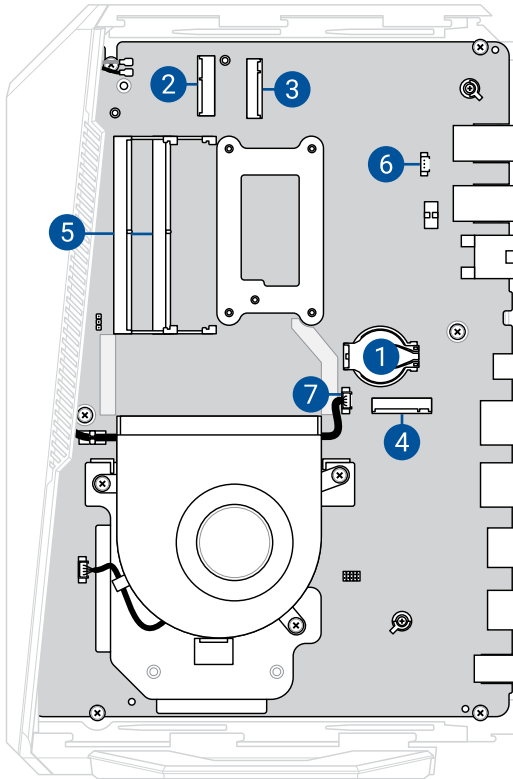
Additional features

Chassis Expandability and Replaceable Lids	No Chassis Expansion available
HDMI CEC API	CEC commands are supported on all HDMI ports for display power on/off and the BIOS provides an option to enable/disable the onboard CEC controls.
Delayed AC Start	There is a short delay after AC power is applied before unit is ready to power-up to protect the system after AC loss.

2. Product Introduction

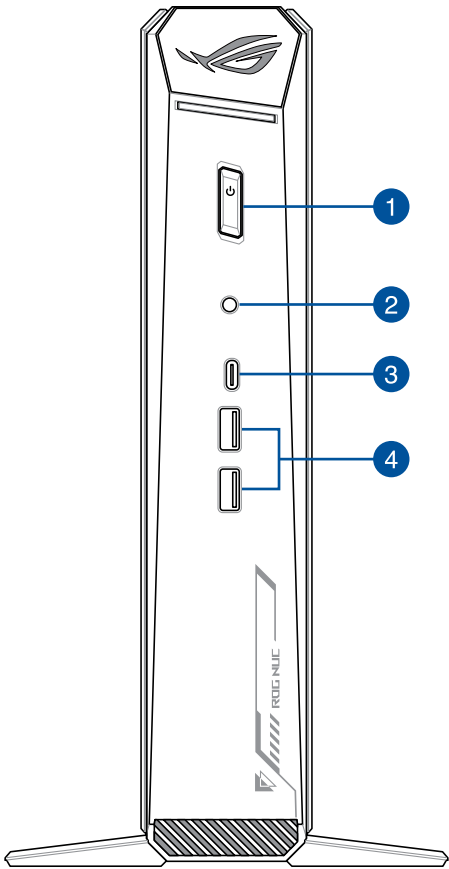
2.1 Board Layout

The illustration below shows the location of the major components on the motherboard.



- 1 CMOS battery
- 2 M.2 2230 module connector (Key Type E) (WiFi)
- 3 M.2 2280 module connector (Key Type M, PCIe Gen 5.0) (NVMe only)
- 4 M.2 2280 module connector (Key Type M, PCIe Gen 4.0) (NVMe only)
- 5 DDR5 CSODIMM sockets
- 6 ARGB panel header
- 7 RGB light bar front panel header

2.2 Front View



1



Power button

2



Headphone/Headset/
Microphone jack

3



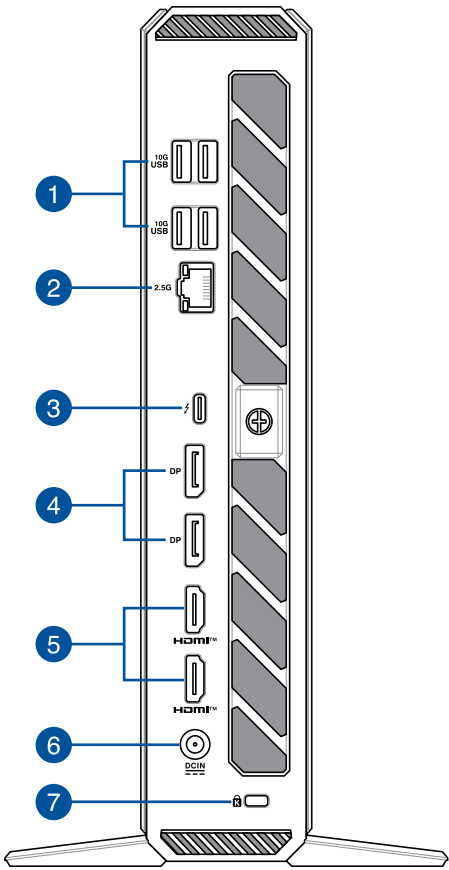
USB 20Gbps Type-C® port

4



USB 10Gbps port

2.3 Rear View



- | | | | | | |
|---|------------|---------------------|---|-------|--------------------------|
| 1 | 10G
USB | USB 10Gbps port | 5 | HDMI™ | HDMI™ port |
| 2 | 2.5G | LAN Port | 6 | DC IN | Power input |
| 3 | ⚡ | Thunderbolt™ 4 port | 7 | 🔒 | Kensington security slot |
| 4 | DP | DisplayPort | | | |

Display resolution table:

The tables below show the maximum resolutions supported by the NVIDIA® GeForce RTX™ 5080.

Single Display

	HDMI 1	HDMI 2	DP 1	DP 2	TBT 4
HDMI 1 FRL	4K (3840 x 2160) @ 143.86Hz	-	-	-	-
HDMI 2 FRL	-	4K (3840 x 2160) @ 143.86Hz	-	-	-
DP1 2.1	-	-	4K (3840 x 2160) @ 144Hz-	-	-
DP2 2.1	-	-	-	4K (3840 x 2160) @ 144Hz-	-
TBT 4	-	-	-	-	8K (3840 x 2160) @ 30Hz
Both DP 1 & DP 2	-	-	8K (7680 x 4320) @ 60Hz		-

Dual Displays

	HDMI 1	HDMI 2	DP 1	DP 2	TBT 4
HDMI 1 FRL + HDMI 2 FRL	4K (3840 x 2160) @ 143.86Hz	4K (3840 x 2160) @ 143.86Hz	-	-	-
HDMI 1 FRL + DP1 2.1	4K (3840 x 2160) @ 143.86Hz	-	4K (3840 x 2160) @ 144Hz	-	-
HDMI 1 FRL + DP2 2.1	4K (3840 x 2160) @ 143.86Hz	-	-	4K (3840 x 2160) @ 144Hz	-
HDMI 1 FRL + TBT 4	4K (3840 x 2160) @ 143.86Hz	-	-	-	4K (3840 x 2160) @ 144Hz
HDMI 2 FRL + DP1 2.1	-	4K (3840 x 2160) @ 143.86Hz	4K (3840 x 2160) @ 144Hz	-	-
HDMI 2 FRL + DP2 2.1	-	4K (3840 x 2160) @ 143.86Hz	-	4K (3840 x 2160) @ 144Hz	-
HDMI 2 FRL + TBT 4	-	4K (3840 x 2160) @ 143.86Hz	-	-	4K (3840 x 2160) @ 144Hz
DP1 2.1 + DP2 2.1	-	-	4K (3840 x 2160) @ 144Hz	4K (3840 x 2160) @ 144Hz	-
DP1 2.1 + TBT 4	-	-	4K (3840 x 2160) @ 144Hz	-	4K (3840 x 2160) @ 144Hz
DP2 2.1 + TBT 4	-	-	-	4K (3840 x 2160) @ 144Hz	4K (3840 x 2160) @ 144Hz
(Both DP 1 & DP 2) + HDMI 1 FRL	4K (3840 x 2160) @ 143.86Hz	-	8K (7680 x 4320) @ 60Hz		-
(Both DP 1 & DP 2) + HDMI 2 FRL	-	4K (3840 x 2160) @ 143.86Hz	8K (7680 x 4320) @ 60Hz		-
(Both DP 1 & DP 2) + TBT 4	-	-	8K (7680 x 4320) @ 60Hz		4K (3840 x 2160) @ 144Hz

Triple Displays

	HDMI 1	HDMI 2	DP 1	DP 2	TBT 4
HDMI 1 FRL + HDMI 2 FRL+ DP1 2.1	4K (3840 x 2160) @ 60Hz	4K (3840 x 2160) @ 60Hz	4K (3840 x 2160) @ 60Hz	-	-
HDMI 1 FRL + DP1 2.1 + DP2 2.1	4K (3840 x 2160) @ 60Hz	-	4K (3840 x 2160) @ 60Hz	4K (3840 x 2160) @ 60Hz	-
HDMI 1 FRL + DP2 2.1 + TBT 4	4K (3840 x 2160) @ 60Hz	-	-	4K (3840 x 2160) @ 60Hz	4K (3840 x 2160) @ 60Hz
HDMI 1 FRL + DP1 2.1 + TBT 4	4K (3840 x 2160) @ 60Hz	-	4K (3840 x 2160) @ 60Hz	-	4K (3840 x 2160) @ 60Hz
HDMI 1 FRL + HDMI 2 FRL + TBT 4	4K (3840 x 2160) @ 60Hz	4K (3840 x 2160) @ 60Hz	-	-	4K (3840 x 2160) @ 60Hz
HDMI 1 FRL + HDMI 2 FRL + DP2 2.1	4K (3840 x 2160) @ 60Hz	4K (3840 x 2160) @ 60Hz	-	4K (3840 x 2160) @ 60Hz	-
HDMI 2 FRL + DP1 2.1 + DP2 2.1	-	4K (3840 x 2160) @ 60Hz	4K (3840 x 2160) @ 60Hz	4K (3840 x 2160) @ 60Hz	-
HDMI 2 FRL + DP1 2.1 + TBT 4	-	4K (3840 x 2160) @ 60Hz	4K (3840 x 2160) @ 60Hz	-	4K (3840 x 2160) @ 60Hz
DP1 2.1 + DP2 2.1 + TBT 4	-	-	4K (3840 x 2160) @ 60Hz	4K (3840 x 2160) @ 60Hz	4K (3840 x 2160) @ 60Hz
HDMI 2 FRL + DP1 2.1 + TBT 4	-	4K (3840 x 2160) @ 60Hz	-	4K (3840 x 2160) @ 60Hz	4K (3840 x 2160) @ 60Hz
(Both DP 1 & DP 2) + HDMI 1 FRL + HDMI 2 FRL	4K (3840 x 2160) @ 60Hz	4K (3840 x 2160) @ 60Hz	8K (7680 x 4320) @ 60Hz		-
(Both DP 1 & DP 2) + HDMI 2 FRL + TBT 4	-	4K (3840 x 2160) @ 60Hz	8K (7680 x 4320) @ 60Hz		4K (3840 x 2160) @ 60Hz
(Both DP 1 & DP 2) + HDMI 1 FRL + TBT 4	4K (3840 x 2160) @ 60Hz	-	8K (7680 x 4320) @ 60Hz		4K (3840 x 2160) @ 60Hz

Quad Displays

	HDMI 1	HDMI 2	DP 1	DP 2	TBT 4
HDMI 1 FRL + HDMI 2 FRL+ DP1 2.1 + DP2 2.1	4K (3840 x 2160) @ 60Hz	4K (3840 x 2160) @ 60Hz	4K (3840 x 2160) @ 60Hz	4K (3840 x 2160) @ 60Hz	-
HDMI 1 FRL + DP1 2.1 + DP2 2.1 + TBT 4	4K (3840 x 2160) @ 60Hz	-	4K (3840 x 2160) @ 60Hz	4K (3840 x 2160) @ 60Hz	4K (3840 x 2160) @ 60Hz
HDMI 1 FRL + HDMI 2 FRL + DP2 2.1 + TBT 4	4K (3840 x 2160) @ 60Hz	4K (3840 x 2160) @ 60Hz	-	4K (3840 x 2160) @ 60Hz	4K (3840 x 2160) @ 60Hz
HDMI 1 FRL + HDMI 2 FRL + DP1 2.1 + TBT 4	4K (3840 x 2160) @ 60Hz	4K (3840 x 2160) @ 60Hz	4K (3840 x 2160) @ 60Hz	-	4K (3840 x 2160) @ 60Hz
(Both DP 1 & DP 2) + HDMI 1 FRL + HDMI 2 FRL + TBT 4	4K (3840 x 2160) @ 60Hz	4K (3840 x 2160) @ 60Hz	8K (7680 x 4320) @ 60Hz		4K (3840 x 2160) @ 60Hz

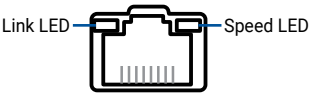
Five Displays

	HDMI 1	HDMI 2	DP 1	DP 2	TBT 4
HDMI 1 FRL + HDMI 2 FRL + DP1 2.1 + DP2 2.1 + TBT 4	4K (3840 x 2160) @ 60Hz	4K (3840 x 2160) @ 60Hz	4K (3840 x 2160) @ 60Hz	4K (3840 x 2160) @ 60Hz	4K (3840 x 2160) @ 60Hz

Thunderbolt 4 / USB4 (Type-C®) specifications:

Feature	Details
Type-C® output support	Thunderbolt 4 (40Gbps), native USB4 (10Gbps), DP2.1
Power over Type-C®	15W; 18W
Power profiles support	12V @ 1.5A, 5V @ 3A and 9V @ 2A

LAN port LED indications:



Link LED	
Status	Description
OFF	No link
GREEN	Linked
BLINKING	Data activity

Speed LED	
Status	Description
OFF	100 Mbps / 10 Mbps connection
YELLOW	1 Gbps connection
GREEN	2.5 Gbps connection

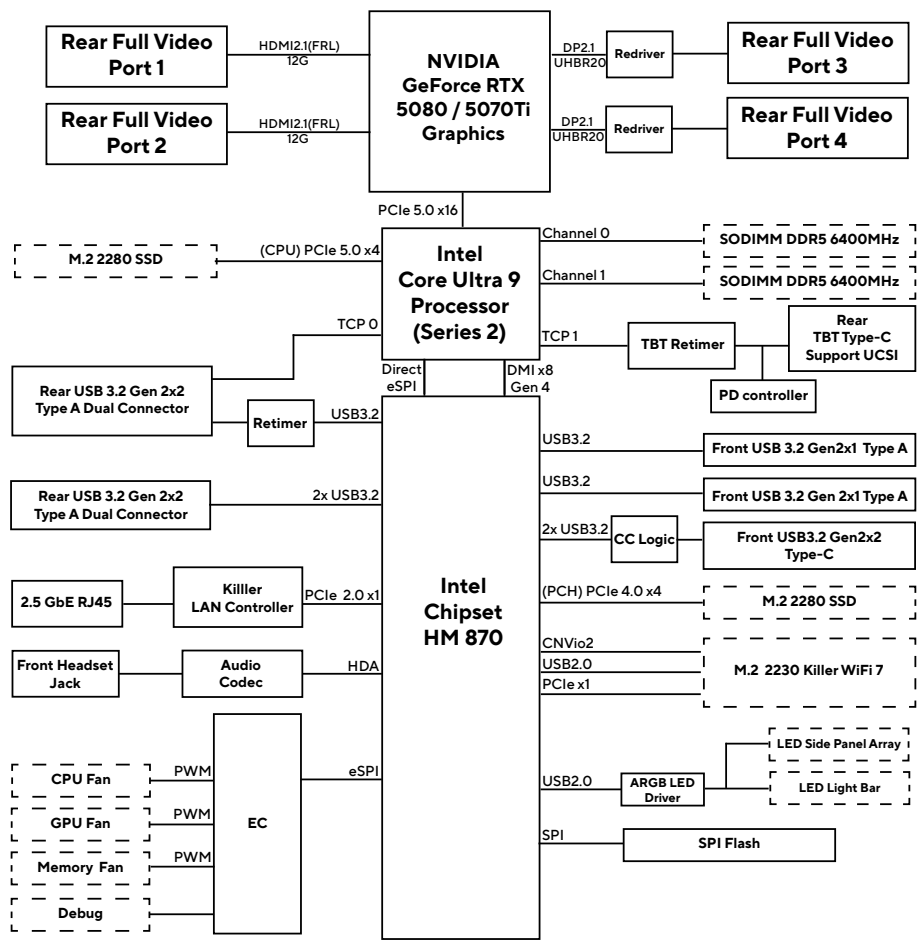
Wireless Network Module specification

The Intel® Killer™ Wi-Fi 7 BE1750x module provides hi-speed wireless connectivity with the following capabilities:

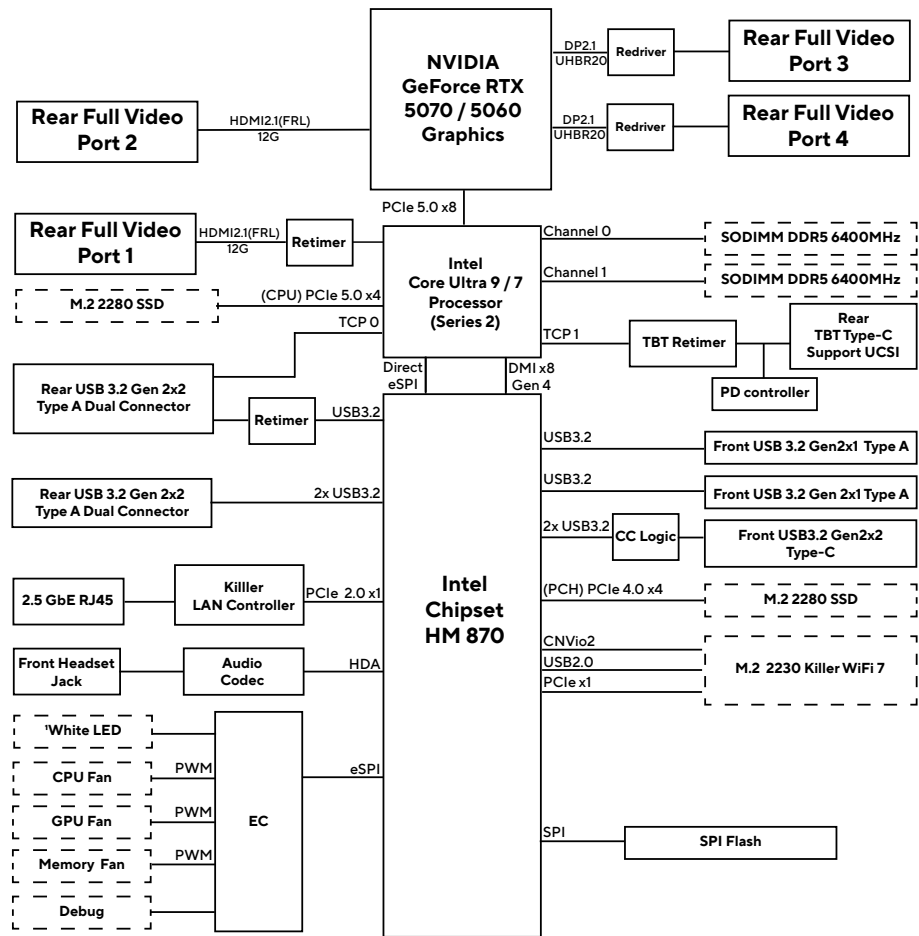
- Bluetooth 5.4
- Bands: 2.4, 5, 6 GHz (320MHz)
- UL and DL MU-MIMO
- OFDMA

2.4 Block Diagram

NUC15JNKU9X9 and NUC15JNKU9X7



NUC15JNKU9X6 and NUC15JNKU7X4



2.5 Feature Descriptions

2.5.1 System Memory

ROG NUC (2025) Mini PC Memory Information

ROG NUC (2025) Mini PC NUC15JNK can be purchased with DDR5 6400 MHz CSODIMMs included. More information about available ROG NUC (2025) Mini PC NUC15JNK can be found under the **Specifications** section.

2.5.2 Processor Graphics Subsystem

ROG NUC15JNK supports NVIDIA RTX 50 series discrete mobile Graphics.

General Power and Memory Guidance for Optimal Graphics Performance

ROG NUC15JNK performance is significantly impacted by power levels and memory selection. For the best performance:

- Allow for higher system power level budgets
- Recommended DDR5-6400 128bit 2Rx8
 - 128bit (Dual Channel) memory is better performing than 64bit (Single Channel) memory
- Recommended memory configuration for maximum multiple display utilization will require greater than or equal to 2Rx32 (\geq 64GB system RAM).

Display Features

Multiple DisplayPort, USB Type-C® (Thunderbolt 4), and HDMI configurations feature the following port designations:

- Two HDMI 2.1 FRL
- Two DisplayPort DP2.1
- One USB Type-C® (rear Thunderbolt 4)

2.5.3 Integrated Audio

HDMI, Thunderbolt and DP interfaces can carry audio along with video. The GPU supports four HD audio streams over four digital ports simultaneously.

The processor supports the following audio formats:

- AC-3 Dolby Digital
- Dolby Digital Plus
- DTS-HD
- LPCM, 192 kHz/24 bit, 6 channel
- Dolby TrueHD, DTS-HD Master Audio

Discrete Audio

The integrated Realtek audio subsystem supports the following features:


- Analog line-out/Analog headphone/Analog Microphone (front panel jack)

2.5.4 Real-Time Clock Subsystem

A coin-cell battery (CR2032) powers the real-time clock and CMOS memory. When the computer is not plugged into a wall socket, the battery has an estimated life of three years. When the computer is plugged in, the standby current from the power supply extends the life of the battery. The clock is accurate to ~13 minutes/year at 25°C with 3.3 VSB applied via the power supply 5V STBY rail.

Button cell and coin battery notice

1. Remove and immediately recycle or dispose of used batteries according to local regulations and keep out of reach of children. Do not incinerate or dispose of batteries in household trash.
2. If ingested or inserted inside any part of the body, call a local poison control center for treatment information. Even used batteries may cause serious injury or death.
3. This product uses CR2032 type batteries with a nominal voltage of 3V.
4. Do not attempt to recharge non-rechargeable batteries.
5. Do not forcibly discharge, recharge, disassemble, heat above the battery manufacturer's specified temperature rating, or incinerate. Doing so may result in injury or chemical burns caused by venting, leakage, or explosion.
6. When installing batteries, ensure that the polarity (+ and -) is correct.
7. Do not mix old and new batteries, or batteries of different brands or types (such as alkaline, carbon-zinc, or rechargeable batteries).
8. Remove and immediately recycle or dispose of batteries from equipment not used for an extended period of time according to local regulations.
9. Always completely secure the battery compartment. If the battery compartment cannot be securely closed, stop using the product, remove the batteries, and keep the batteries out of reach of children.

⚠ WARNING	
<ul style="list-style-type: none">• INGESTION HAZARD: This product contains a button cell or coin battery.• DEATH or serious injury can occur if ingested.• A swallowed button cell or coin battery can cause Internal Chemical Burns in as little as 2 hours.• KEEP new and used batteries OUT OF REACH of CHILDREN.• Seek immediate medical attention if a battery is suspected to be swallowed or inserted inside any part of the body.	

NOTE:

- If the battery and AC power fail, date and time values will be reset and the user will be notified during the POST.
 - When the voltage drops below a certain level, the BIOS Setup program settings stored in CMOS RAM (for example, the date and time) might not be accurate. Replace the battery with an equivalent battery.
-

2.5.5 Hardware Management Subsystem

Fan monitoring

Fan monitoring can be implemented using third-party software.

System states and power states

Please refer to the table below for ACPI states supported by the processor.

State	Description
G0/S0/C0	Full On: CPU operating. Individual devices may be shut to save power. The different CPU operating levels are defined by Cx states.
G0/S0/Cx	Cx State: CPU manages C-states by itself and can be in lower power states.
G1	Suspend-To-RAM (STR): The system context is maintained in system DRAM, but power is shut to non-critical circuits. Memory is retained and refreshes continue. All external clocks are shut off; RTC clock and international oscillator clocks are still toggling.
G1/S4	Suspend-To-Disk (STD): The context of the system is maintained on the disk. All power is then shut to the system except to the logic required to resume. Externally appears the same as S5 but may have different wake events.
G2/S5	Soft Off: System context not maintained. All power is shut except for the logic required to restart. A full boot is required when waking.
G3	Mechanical Off: System context not maintained. All power shut except for the RTC. No "Wake" events are possible because the system does not have any power. This state occurs if the user removes the batteries, turns off a mechanical switch, or if the system power supply is at a level that is insufficient to power the "waking" logic.

Wake-up devices and events

Please refer to the table below for devices or specific events that can wake the computer from specific states.

Devices/events that wake up the system...	...from this sleep state	Comments
Power switch	S0iX, S4, S5	-
RTC alarm	S0iX, S4, S5	Option for monitor to remain in sleep state
LAN	S0iX, S5	"S5 WOL after G3" is supported; monitor to remain in sleep state
Bluetooth	S0iX	-
USB	S0iX, S4, S5	Wake S4, S5 controlled by BIOS option (not after G3)
PCIe	S0iX, S4	Via WAKE; monitor to remain in sleep state
HDMI CEC	S0iX, S4, S5	Wake S4, S5 controlled by BIOS option

NOTE:

- S4 implies operating system support only.
 - Will not wake from Deep S4/S5. USB S4/S5 Power is controlled by BIOS. USB S5 wake is controlled by BIOS. USB S4 wake is controlled by OS driver, not just BIOS option.
 - Windows Fast startup will block wake from LAN and USB from S5.
 - WoL from S4 via Magic Packet is not supported.
 - The use of these wake-up events from an ACPI state requires an operating system that provides full ACPI support. In addition, software, drivers, and peripherals must fully support ACPI wake events.
-

3. Technical References

3.1 Signal Tables for the Connectors and Header

IMPORTANT!

Only the following connectors and headers have overcurrent protection:

- Rear USB Type A and USB Type-C®
- Front USB
- Internal power header
- DC Vin jack

All other connectors and headers are not overcurrent protected and should connect only to devices inside the computer’s chassis, such as fans and internal peripherals. Do not use these connectors or headers to power devices external to the computer’s chassis. A fault in the load presented by the external devices could cause damage to the computer, the power cable, and the external devices themselves.

Furthermore, improper connection of serial port header single wire connectors may eventually overload the overcurrent protection and cause damage to the board.

3.1.1 M.2 2280 Module Connector

SSD support is provided via PCIe Gen5x4 NVMe on CPU attached when using Core Ultra Processors. When using Core processors, the PCIe is Gen4x4 NVMe. Please see the below table for M.2 2280 connector signals.

M.2 2280 Module (Mechanical Key M) Connector			
Pin	Signal Name	Pin	Signal Name
74	3.3V (4A total for pins 74, 72, 70, 18, 16, 14, 12, 4, 2 (0.5A per pin))	75	GND
72	3.3V (4A total for pins 74, 72, 70, 18, 16, 14, 12, 4, 2 (0.5A per pin))	73	GND
70	3.3V (4A total for pins 74, 72, 70, 18, 16, 14, 12, 4, 2 (0.5A per pin))	71	GND
68	SUSCLK(32kHz) (0)(0/3.3V)	69	PEDET (NC-PCIe)
66	Connector Key	67	N/C
64	Connector Key	65	Connector Key
62	Connector Key	63	Connector Key
60	Connector Key	61	Connector Key
58	N/C	59	Connector Key
56	N/C	57	GND

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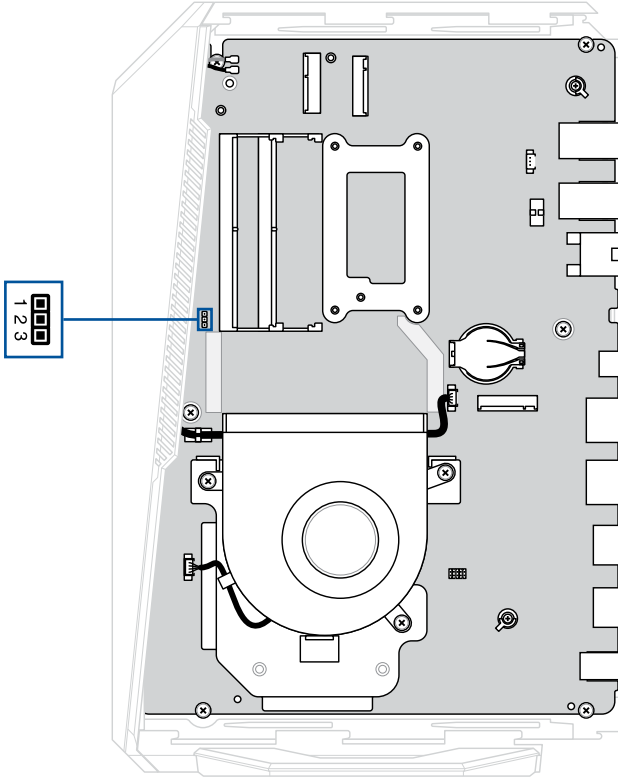
M.2 2280 Module (Mechanical Key M) Connector

Pin	Signal Name	Pin	Signal Name
54	PEWAKE# (I/O)(0/3.3V) or N/C	55	REFCLKP
52	CLKREQ# (I/O)(0/3.3V) or N/C	53	REFCLKN
50	PERST# (O)(0/3.3V) or N/C	51	GND
48	N/C	49	PETp0
46	N/C	47	PETn0
44	N/C	45	GND
42	N/C	43	PERp0
40	N/C	41	PERn0
38	DEVSLP (O)	39	GND
36	N/C	37	PETp1
34	N/C	35	PETn1
32	N/C	33	GND
30	N/C	31	PERp1
28	N/C	29	PERn1
26	N/C	27	GND
24	N/C	25	PETp2
22	N/C	23	PETn2
20	N/C	21	GND
18	3.3V (4A total for pins 74, 72, 70, 18, 16, 14, 12, 4, 2 (0.5A per pin))	19	PERp2
16	3.3V (4A total for pins 74, 72, 70, 18, 16, 14, 12, 4, 2 (0.5A per pin))	17	PERn2
14	3.3V (4A total for pins 74, 72, 70, 18, 16, 14, 12, 4, 2 (0.5A per pin))	15	GND
12	3.3V (4A total for pins 74, 72, 70, 18, 16, 14, 12, 4, 2 (0.5A per pin))	13	PETp3
10	DAS/DSS# (I/O)/LED1# (I)(0/3.3V)	11	PETn3
8	N/C	9	GND
6	N/C	7	PERp3
4	3.3V (4A total for pins 74, 72, 70, 18, 16, 14, 12, 4, 2 (0.5A per pin))	5	PERn3
2	3.3V (4A total for pins 74, 72, 70, 18, 16, 14, 12, 4, 2 (0.5A per pin))	3	GND
		1	GND

3.1.2 BIOS Security Jumper

WARNING! Do not move a jumper with the power on. Always turn off the power and unplug the power cord from the computer before changing a jumper setting. Otherwise, the system could be damaged.

The illustration below shows the location of the BIOS security jumper. The 3-pin jumper determines the BIOS Security program's mode.



BIOS Security Jumper Settings

Please refer to the table below for jumper settings for the three modes: normal, lockdown, and configuration.

Function / Mode	Jumper Setting	Configuration
Normal	1-2	The BIOS uses current configuration information and passwords for booting.
Lockdown	2-3	<p>The BIOS uses current configuration information and passwords for booting, except:</p> <ul style="list-style-type: none">• All POST Hotkeys are suppressed (prompts are not displayed and keys are not accepted. For example, F2 for Setup, F10 for the Boot Menu).• Power Button Menu is not available (see Power Button Menu section). <p>BIOS updates are not available except for automatic Recovery due to flash corruption.</p>
Configuration	None	<p>BIOS Recovery Update process if a matching *.bio file is found. Recovery Update can be canceled by pressing the Esc key.</p> <p>If the Recovery Update was canceled or a matching *.bio file was not found, a Config Menu will be displayed. The Config Menu consists of the following (followed by the Power Button Menu selections):</p> <ul style="list-style-type: none">[1] Suppress this menu until the BIOS Security Jumper is replaced.[2] Clear BIOS User and Supervisor Passwords.[3] Reset Intel® AMT to default factory settings.[4] Clear Trusted Platform Module. <p>Warning! Data encrypted with the TPM will no longer be accessible if the TPM is cleared.</p> <p>[F2] Visual BIOS. [F4] BIOS Recovery.</p> <p>See Power Button Menu section.</p>

3.1.3 Fan Header Current Capability

The table below lists the current capability of the fan headers.

Fan Header	Maximum Available Current
Processor fan	1A

3.1.4 Power Supply Connectors

The system has the following power supply connectors:

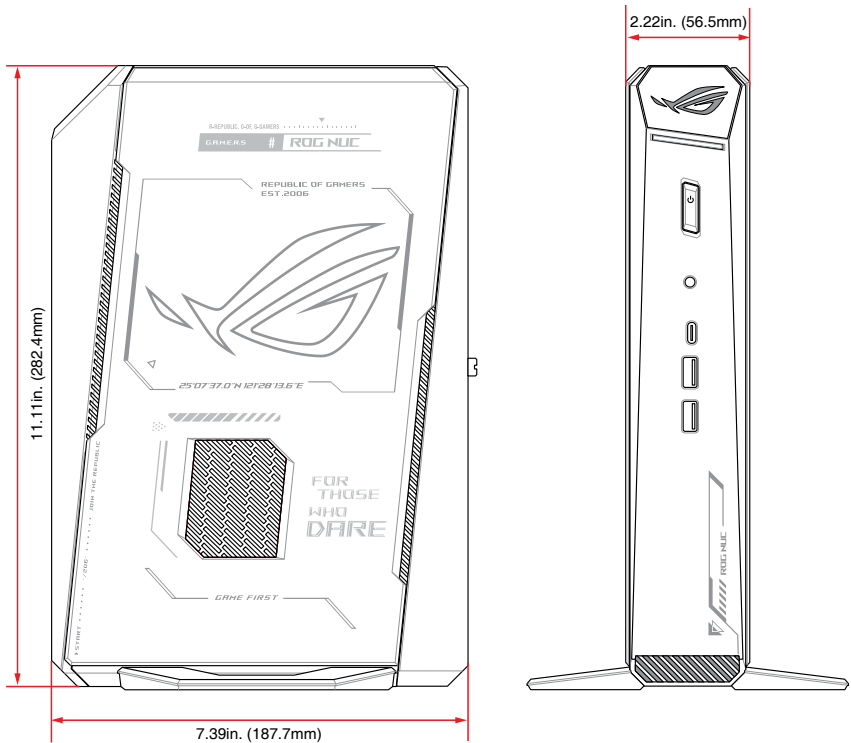
- **External Power Supply** - the kit can be powered through a 19.5v DC connector on the back panel. The back-panel DC connector is compatible with a 7.4mm/OD and 5.0mm/ID plug, where the inner 0.8mm contact is +19.5V DC ($\pm 5\%$) and the shell is GND.

NOTE: External power voltage, 19.5 V DC ($\pm 5\%$), is dependent on the type of power adapter used.

3.2 Mechanical Considerations

3.2.1 NUC15JNK Chassis Dimensions

The illustration below shows the mechanical form factor for the system. Dimensions are given in inches (millimeters). The outer dimensions are 11.11in. x 7.39in. x 2.22in. (282.4mm x 187.7mm x 56.5mm) (not including stand).



3.3 Thermal Considerations

IMPORTANT!

- Failure to ensure appropriate airflow may result in reduced performance of both the processor and/or voltage regulator or, in some instances, damage to the system.
All responsibility for determining the adequacy of any thermal or system design remains solely with the system integrator. ASUS makes no warranties or representations that merely following the instructions presented in this document will result in a system with adequate thermal performance.
- Ensure that the ambient temperature does not exceed the system's maximum operating temperature. Failure to do so could cause components to exceed their maximum case temperature and malfunction. For information about the maximum operating temperature, see the environmental specifications in **Environmental** section.
- Ensure that proper airflow is maintained in the processor voltage regulator circuit. Failure to do so may result in shorter than expected product lifetime.

3.4 Environmental

The table below lists the environmental specifications for the system.

IMPORTANT! If the external ambient temperature exceeds 40°C, further thermal testing is required to ensure components do not exceed their maximum operating temperature.

Parameter	Specification
Temperature	
Sustained Storage Limits (i.e. warehouse)	-20°C ~ +40°C
Short Duration Limits (i.e. shipping)	-40°C ~ +60°C
Ambient Operating - NUC Mini PC	Up to 0°C ~ +40°C
Humidity	0°C ~ +92°C
	Non-condensing humidity as defined by temperature vs dew point. For more information please visit https://www.asus.com/ca-en/support/faq/1052552/
* Processor performance may automatically decrease when the system operates in the top 5°C of the ambient operating temperature ranges above.	

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Parameter	Specification		
Shock (System)			
Unpackaged	50 g trapezoidal waveform Velocity change of 170 inches/s ²		
Packaged	Free fall package drop machine set to the height determined by the weight of the package.		
	Product Weight (pounds)	Non-palletized Product drop height (inches)	Palletized drop heights (single product) (inches)
	20	36	N/A
	21-40	30	N/A
	41-80	24	N/A
	81-100	18	12
	100-120	12	9
Unpackaged/ Packaged	Random profile 5 Hz @ 0.001 g ² /Hz to 20 Hz @ 0.01 g ² /Hz (slope up) 20 Hz to 500Hz @ 0.01 g ² /Hz (flat) Input acceleration is 2.20g RMS		

NOTE:

- The operating temperature of the system may be determined by measuring the air temperature from the junction of the heatsink fins and fan, next to the attachment screw, in a closed chassis, while the system is in operation.
- Before attempting to operate this system, the overall temperature of the system must be above the minimum operating temperature specified. It is recommended that the system temperature be at least room temperature before attempting to power on the system. The operating and non-operating environment must avoid condensing humidity.

4. BIOS Support

4.1 Introduction

The system uses an AMI BIOS core that is stored in the Serial Peripheral Interface Flash Memory (SPI Flash) and can be updated through multiple methods (see **BIOS Updates** section). The SPI Flash contains the BIOS Setup program, POST, the PCI auto-configuration utility, LAN EEPROM information, and Plug and Play support. The SPI Flash includes a 32 MB flash memory device.

The BIOS Setup program can be used to view and change the identification information and the BIOS settings for the system. The BIOS Setup program is accessed by pressing <F2> after the POST memory test beings and before the operating system boots.

4.2 Legacy USB Support

Legacy USB support enables the USB devices to be used even when the operating system's USB drivers are not yet available. Legacy USB support is used to access the BIOS setup program and to install an operating system that supports USB. By default, Legacy USB support is set to Enabled.

To install an operating system that supports USB, verify that Legacy USB support in the BIOS Setup program is set to Enabled and follow the operating system's installation instructions.

4.3 BIOS Updates

The BIOS can be updated using one of the following methods:

- Express BIOS (Windows-based) Update
- F7 Update
- Power Button Menu Update
- iFlash Update
- UEFI Shell Update

4.3.1 BIOS Recovery

It is unlikely that anything will interrupt a BIOS update; however, if an interruption occurs the BIOS could be unstable. The table below lists the drives and media types that can be used for BIOS recovery. The BIOS recovery media does not need to be made bootable.

Media Type	Can be used for BIOS recovery?
Hard disk drive (connected to SATA or USB)	Yes
USB flash drive	Yes
NVME SSD (M.2 interface)	Yes

NOTE: Supported file systems for BIOS recovery: NTFS (sparse, compressed, or encrypted files are not supported), FAT32, EXT.

4.4 Boot Options

In the BIOS Setup program, the user can choose to boot from a hard drive, removable driver, or the network. The default setting is for the hard drive to be the first boot device, the removable drive second, and the network third.

NOTE: The network can be selected as a boot device. This selection allows booting from the onboard LAN or a network add-in card with a remote boot ROM installed. Pressing the <F12> key during POST automatically forces booting from the LAN. To use this key during POST, the User Access Level in the BIOS Setup program’s Security menu must be set to Full.

4.4.1 Boot Device Selection During Post

Pressing the <F10> key during POST causes a boot device menu to be displayed. The menu displays the list of available boot devices.

4.4.2 Power Button Menu

As an alternative to Configuration Mode or normal POST hotkeys, the user can use the power button to access a menu with BIOS and boot options. The Power Button Menu is accessible via the following sequence:

1. System is in S4/S5 (not G3).
2. User pushes the power button and holds it down for 3 seconds.
3. The Front Panel Power Button LED will be on for the first 3 seconds. After 3 seconds, the LED will begin to blink in the following pattern: 0.25 seconds off, 0.25 seconds on, 0.25 seconds off to signal the user to release the power button.

4. User releases the power button before the 4-second shutdown override. If this boot path is taken, the BIOS will use default settings, ignoring settings in VPD where possible. At the point where Setup Entry/Boot would be in the normal boot path, the BIOS will display the following prompt and wait for a keystroke: If an unrecognized key is hit, then the BIOS will do nothing and wait for another keystroke. If one of the listed hotkeys is hit, the BIOS will follow the indicated boot path. Password requirements must still be honored.

Power Button Menu Options		
Keystroke	Option	Description
[ESC]	Normal Boot	-
[F2]	BIOS Setup Menu	-
[F3]	Disable Fast Boot	NOTE: Will only be displayed if at least one Fast Boot optimization is enabled. If Disable Fast Boot is selected, the BIOS will disable all Fast Boot optimizations and reset the system.
[F4]	BIOS Recovery	The BIOS will search for a matching .CAP file from the \EFI\Intel folder in the supported media with the supported file system. If a matching recovery capsule is found, the BIOS will display the following: BIOS will Recover to <BIOSID> in 20 seconds. [ESC] Cancel Recovery Recovery will proceed if not canceled via the ESC key within 20 seconds. The BIOS shall display the recovery progress. If a BIOS .CAP file was not detected (or the BIOS Recovery was canceled) then the BIOS will reset the system and continue normally to POST.
[F5]	Restore BIOS Settings	The BIOS will restore the current setup settings and the current defaults to the build time defaults in the case of a boot issue caused by setup variable changes.
[F7]	Update BIOS	BIOS Update during the BDS phrase. The BIOS will update independent of any OS loading and provides a menu UI accessible during boot up. This is not a recovery tool and will not overwrite a corrupt BIOS or ME firmware.
[F9]	Remote Assistance	NOTE: Will only be displayed if Remote Assistance is supported.
[F10]	Enter Boot Menu	-
[F12]	Network Boot	-

4.5 BIOS Security Features

The BIOS includes security features that restrict access to the BIOS Setup program and who can boot the computer. A Supervisor and User password can be set for the BIOS Setup program and for booting the computer, with the following restrictions:

- The Supervisor password gives unrestricted access to view and change all the Setup options in the BIOS Setup program. This is Supervisor Mode.
- The User password gives restricted access to view and change Setup options in the BIOS Setup program. This is User Mode.
- If only the Supervisor password is set, pressing the <Enter> key at the password prompt of the BIOS Setup program allows the user restricted access to Setup.
- If both the Supervisor and User passwords are set, users can enter either the Supervisor or User password to access Setup. Users have access to Setup regardless to which password is used.
- Setting the User password restricts who can boot the computer. The password prompt will be displayed before the computer boots. If only the Supervisor password is set, the computer boots without asking for a password. If both passwords are set, the user can enter either password to boot the computer.
- For enhanced security, use different passwords for the Supervisor and User passwords.
- Valid password characters are A-Z, a-z, 0-9, and special characters. Passwords may be up to 20 characters in length.
- To clear a set password, enter a blank password after entering the existing password.

The table below shows the effects of setting the Supervisor password and User password. This table is for reference only and is not displayed on the screen.

Password Set	Neither	Supervisor only	User only	Supervisor and User set
Supervisor Mode	Any user can change all options	Can change all options	N/A	Can change all options
User Mode	Any user can change all options	Can change a limited number of options	Can change all options	Can change a limited number of options
Setup Op-tions	None	Supervisor Password	Enter Password Clear User Password	Supervisor Password Enter Password
Password to Enter Setup	None	Supervisor	User	Supervisor or User
Password During Boot	None	None	User	Supervisor or User

4.6 BIOS Error Messages

Error Message	Explanation
CMOS Battery Failure	The battery may be losing power. Replace the battery soon.
CMOS Checksum Error	The CMOS checksum is incorrect. CMOS memory may have been corrupted. Run Setup to reset values.
Memory Size Decreased	Memory size has decreased since the last boot. If no memory was removed, then the memory may be bad.
CMOS Timer Not Set	The battery may be losing power. Replace the battery soon.
Processor Thermal Trip	Processor overheated.
Auto RTC Reset	The system triggers RTC clear to recover the system back to the normal condition from consecutive boot failure.

