



# Intel® NUC X15 Laptop Kit

LAPAC71G

LAPAC71H

## Product Specification

Version 1.0

Regulatory Model Name: AC57

*May 2022*

Intel® NUC X15 Laptop Kits LAPAC71G and LAPAC71H may contain design defects or errors known as errata that may cause the product to deviate from published specifications. Current characterized errata, if any, are documented in this Product Specification.

# Revision History

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Revision	Revision History	Date
1.0	First Release	May 2022

# Disclaimer

This product specification applies to only the standard Intel® NUC X15 Laptop Kits LAPAC71G and LAPAC71H with BIOS identifier starting with ACADL357.

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# Intel® NUC X15 Laptop Kits Identification Information

## LAPAC71G and LAPAC71H Identification Information

Original SA Revision	Product Code	Original BIOS Revision	Notes
M55628-403	BAC71GBBU6000	ACADL357.0046.2022.0509.1913	1,2
M75738-403	BAC71GBBL6001	ACADL357.0046.2022.0509.1913	1,2
M81842-403	BAC71HBBL6001	ACADL357.0046.2022.0509.1913	1,2
M81843-403	BAC71HBBU6000	ACADL357.0046.2022.0509.1913	1,2

Notes:

1. The SA number is found on the back cover.
2. The processors used on this SA revision may consist of the following components:

Device	Stepping	Spec Code
Intel® Core™ i5-12500H	L0	SRLCY
Intel® Core™ i7-12700H	L0	SRLD1

## Specification Changes or Clarifications

The table below indicates the Specification Changes or Specification Clarifications, if any, that apply to the Intel® NUC X15 Laptop Kits LAPAC71G and LAPAC71H

### Specification Changes or Clarifications

Date	Type of Change	Description of Changes or Clarifications

## Errata

Current characterized errata, if any, will be documented in a separate section of this Product Specification.

# Preface

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This Product Specification specifies the layout, components, connectors, power, and environmental features for the Intel® NUC X15 Laptop Kits LAPAC71G and LAPAC71H.



## NOTE

In this document, the use of "Intel® NUC X15 Laptop Kits will refer to the LAPAC71G and LAPAC71H versions of the laptop kit unless otherwise noted.

## Intended Audience

This document is intended to provide technical information about LAPAC71G and LAPAC71H and its components to the vendors, system integrators, and other engineers and technicians who need this level of information. It is specifically *not* intended for general audiences.

## What This Document Contains

Chapter	Description
1	A description of the laptop
2	A technical description of the Intel® X15 Laptop features

## Typographical Conventions

This section contains information about the conventions used in this specification. Not all of these symbols and abbreviations appear in all specifications of this type.

## Notes, Cautions, and Warnings



### NOTE

*Notes call attention to important information.*



### CAUTION

*Cautions are included to help you avoid damaging hardware or losing data.*

## 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.
*	This symbol is used to indicate third-party brands and names that are the property of their respective owners.

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# 1 Product Description

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## 1.1 Overview

The Intel® X15 Laptop Kits are metal, thin, and light performance laptops.

## 1.2 Version Summary

There are two versions of LAPAC71G and two versions of LAPAC71H documented in this product specification which are summarized in Table 1. Unless otherwise noted in this document, not all features are available on all versions.

**Table 1. Version Summary**

Version	Product Code	CPU	GPU	Display	Keyboard	AC Cord
LAPAC71G	BAC71GBBU6000	Intel® Core™ i7-12700H	A550M	FHD 144Hz	ANSI, US English	None
LAPAC71G	BAC71GBBL6001	Intel® Core™ i7-12700H	A550M	FHD 144Hz	ISO, Spanish (LAR)	US Type B
LAPAC71H	BAC71HBBL6001	Intel® Core™ i7-12700H	A730M	FHD 144Hz	ISO, Spanish (LAR)	US Type B
LAPAC71H	BAC71HBBU6000	Intel® Core™ i7-12700H	A730M	FHD 144Hz	ANSI, US English	None

## 1.3 Feature Summary

Table 2 summarizes the major features of the LAPAC71G and LAPAC71H

**Table 2. LAPAC71G and LAPAC71H Feature Summary**

Feature	LAPAC71G	LAPAC71H
Color	Black	Black
Materials	Aluminum and Plastic	Aluminum and Plastic
Processor	Intel® Core™ i7-12700H	Intel® Core™ i7-12700H
Chipset	Integrated	Integrated
Memory	2 DDR5 SO-DIMM Slots, 4800Mhz	2 DDR5 SO-DIMM Slots, 4800Mhz
Graphics	Intel® Arc™ A550M Graphics	Intel® Arc™ A730M Graphics
VRAM	8GB GDDR6	12GB GDDR6
Storage	1 M.2 22x80 PCIe x4 Gen4 NVMe 1 M.2 22x80 PCIe x4 Gen3 NVMe or SATA SSD	1 M.2 22x80 PCIe x4 Gen4 NVMe 1 M.2 22x80 PCIe x4 Gen3 NVMe or SATA SSD
Display Panel	Narrow Bezel IPS 15.6" 1920x1080 144Hz, 72% NTSC, 16:9 ratio, LED backlight, average brightness of 300 nits.	Narrow Bezel IPS 15.6" 1920x1080 144Hz, 72% NTSC, 16:9 ratio, LED backlight, average brightness of 300 nits.
Display Outputs	1 Full Size HDMI* 2.1 TMDS Compatible Output 1 DisplayPort* 1.4b via USB Type C	1 Full Size HDMI* 2.1 TMDS Compatible Output 1 DisplayPort* 1.4b via USB Type C
Audio	Realtek* ALC269M with Intel® HD Audio 1 3.5mm Audio Headset Jack	Realtek* ALC269M with Intel® HD Audio 1 3.5mm Audio Headset Jack
Speakers	2 Built In, 2W each	2 Built In, 2W each
Microphones	2 Digital Microphones	2 Digital Microphones
Keyboard	Membrane with single zone RGB backlight	Membrane with single zone RGB backlight
Pointing Device	Glass Click Pad with Microsoft* Precision Touchpad Driver Support Enable/Disable option with LED indicator	Glass Click Pad with Microsoft* Precision Touchpad Driver Support Enable/Disable option with LED indicator
Camera	HD IR with Windows Hello Support	HD IR with Windows Hello Support
Wired LAN	2.5 Gigabit Ethernet (RJ-45)	2.5 Gigabit Ethernet (RJ-45)
Wireless LAN	Intel® WiFi 6 AX 201, Bluetooth 5.2	Intel® WiFi 6 AX 201, Bluetooth* 5.2
Power Supply	19.5V, 180W 100/240V AC 50/60Hz 1 Power Input Jack	19.5V, 230W 100/240V AC 50/60Hz 1 Power Input Jack
Battery	62Whr (4100mAh) with Fast Charge Support	62Whr (4100mAh) with Fast Charge Support
Power, Charging and Battery LED	Power On: White, Power Off: Off Suspend: Breathing White Charging (Power On): White Charging (Power Off): White Battery Low (<6%): Amber Charging Finish (w/AC): White, w/o AC: Off	Power On: White, Power Off: Off Suspend: Breathing White Charging (Power On): White Charging (Power Off): White Battery Low (<6%): Amber Charging Finish (w/AC): White, w/o AC: Off
USB	3 USB 3.2 (Gen1) Type A 1 Type C Thunderbolt™ 4	3 USB 3.2 (Gen1) Type A 1 Type C Thunderbolt™ 4
Size	358.26mm x 235mm x 22.2mm	358.26mm x 235mm x 22.2mm
Weight	2.2kg +/- 10g	2.2kg +/- 10g
Security	1 Kensington Lock	1 Kensington* Lock
Advanced Technologies Supported	Intel® Speed Shift Technology Intel® Turbo Boost Technology 2.0 Intel® Hyper-Threading Technology Intel® Dynamic Tuning Technology Intel® Virtualization Technology (VT-x) Intel® Virtualization Technology for Directed I/O (VT-d) Intel® Deep Learning Boost (Intel® DL Boost) Intel® 64 Architecture Intel® SSE4.1, Intel® SSE4.2, Intel® AVX2, Intel® AVX-512 Thermal Monitoring Technologies	Intel® Speed Shift Technology Intel® Turbo Boost Technology 2.0 Intel® Hyper-Threading Technology Intel® Dynamic Tuning Technology Intel® Virtualization Technology (VT-x) Intel® Virtualization Technology for Directed I/O (VT-d) Intel® Deep Learning Boost (Intel® DL Boost) Intel® 64 Architecture Intel® SSE4.1, Intel® SSE4.2, Intel® AVX2, Intel® AVX-512 Thermal Monitoring Technologies

Feature	LAPAC71G	LAPAC71H
Security and Reliability	Intel® AES New Instructions Intel® Boot Guard Intel® OS Guard Intel® Software Guard Extensions (Intel® SGX) Intel® Platform Trust Technology (Intel® PTT) Mode -based Execute Control (MBE)	Intel® AES New Instructions Intel® Boot Guard Intel® OS Guard Intel® Software Guard Extensions (Intel® SGX) Intel® Platform Trust Technology (Intel® PTT) Mode -based Execute Control (MBE)
Operating System Features	NUC Software Studio, Windows Hello Support, Voice Assistant Support for Alexa, and Cortana	NUC Software Studio, Windows Hello Support, Voice Assistant Support for Alexa, and Cortana

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## 2 Technical Reference

### 2.1 Block Diagram

Figure 1 is a block diagram of the major functional areas.

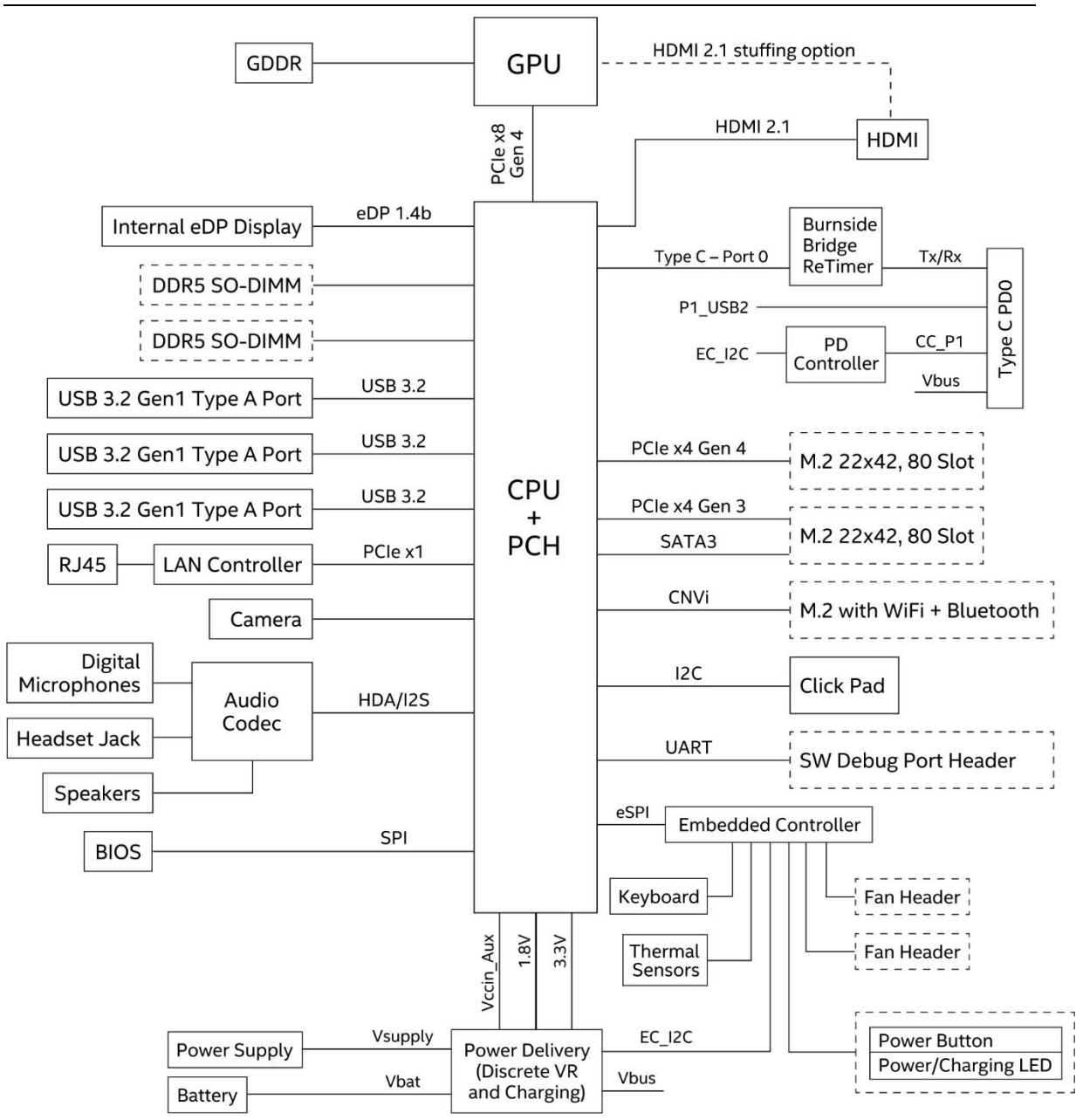


Figure 1. Functional Block Diagram

## 2.2 Exterior Features

The following figures show the exterior features of the laptop

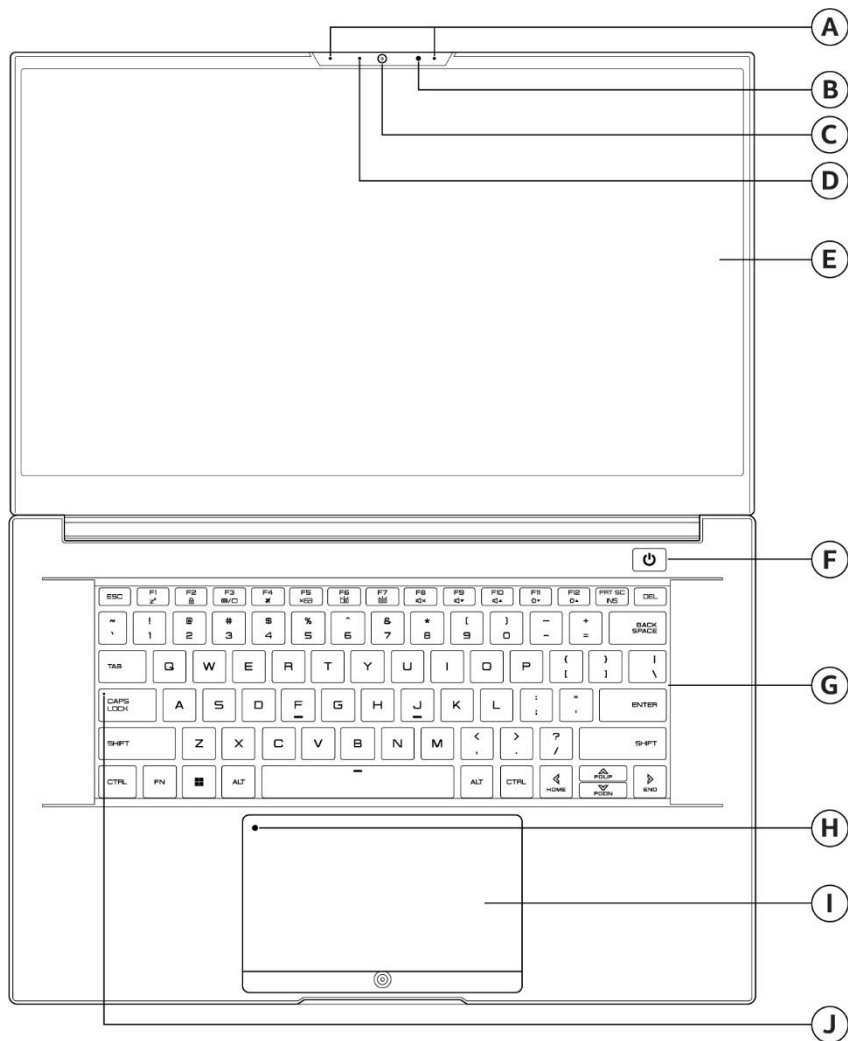


Figure 2. Top-Open Features

Table 3. Top-Open Features

Feature	Description	Feature	Description
A	Digital Microphones	F	Power Button with LED
B	Infrared LED	G	Keyboard
C	HD Camera	H	Touchpad Switch with LED
D	Camera Status LED	I	Touchpad/Clickpad
E	LCD Screen	J	Caps Lock Status LED

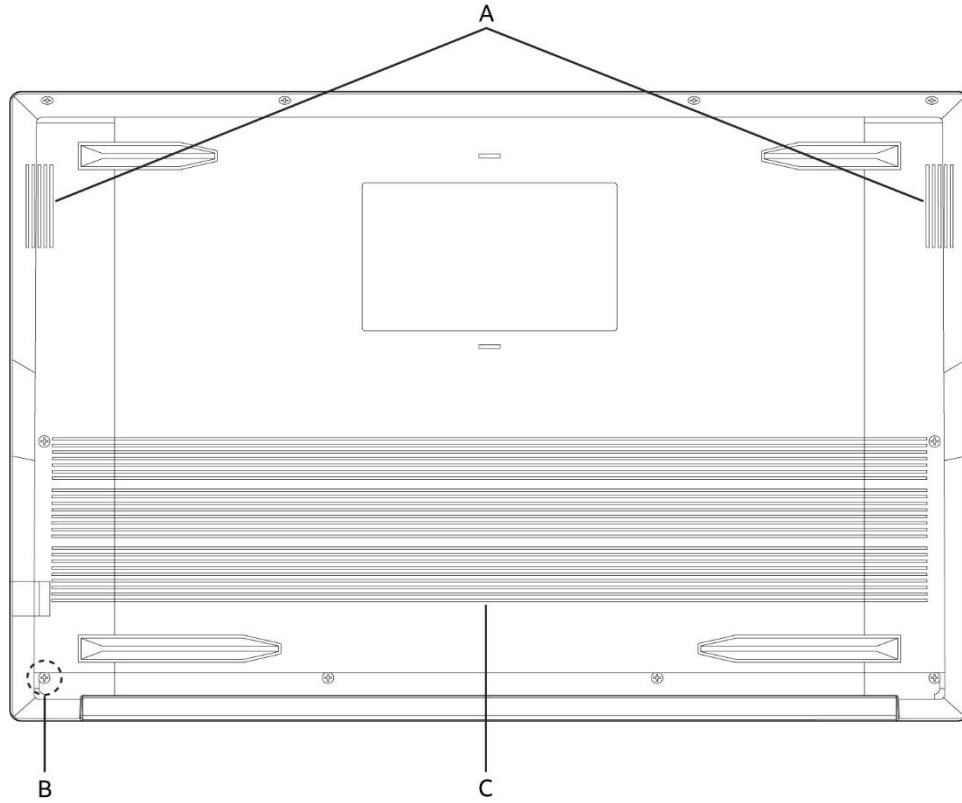


Figure 3. Bottom Features

Table 4. Bottom Features

Feature	Description
A	Speakers
B	Back Cover Screws
C	Air Vents

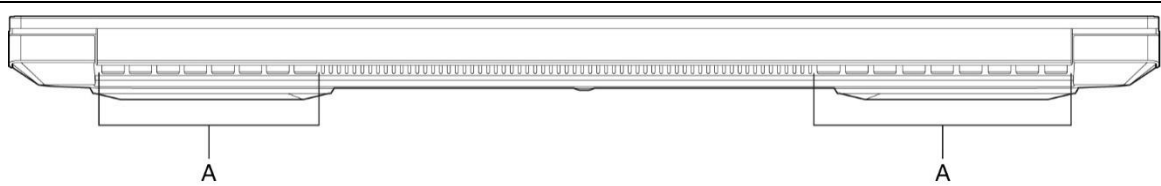


Figure 4. Back Features

Table 5. Back Features

Feature	Description
A	Air Vents

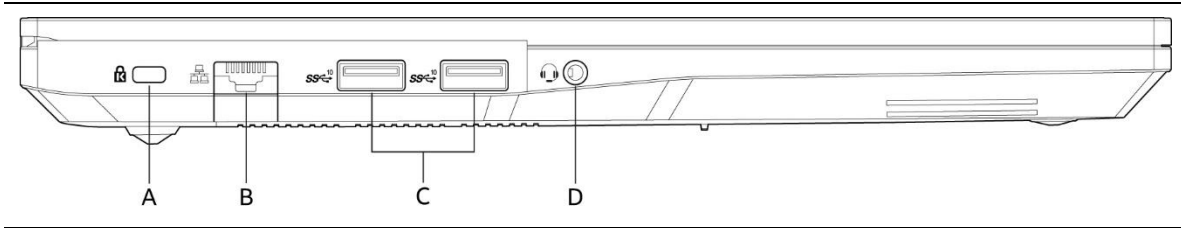


Figure 5. Left Features

Table 6. Left Features

Feature	Description
A	Kensington Security Lock
B	RJ-45 Network Jack
C	USB 3.2 (Gen 1) Type A
D	3.5mm Head Set Jack

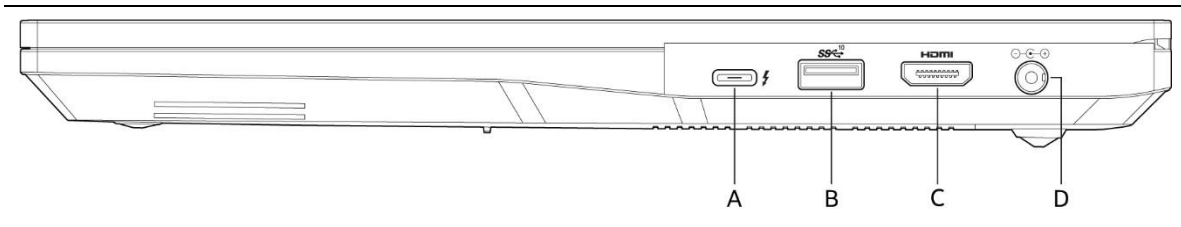


Figure 6. Right Features

Table 7. Right Features

Feature	Description
A	Thunderbolt™ 4 Port (USB Type C with support for DisplayPort*)
B	USB 3.2 (Gen 1) Type A
C	HDMI* 2.1 TMDS Compatible Port
D	Power Connector

## 2.3 Memory

Two 260-pin SO-DIMM sockets support the following memory features:

- DDR5 4800 MHz
- Two independent memory channels with interleaved mode support
- Unbuffered, single-sided or double-sided SO-DIMMs
- 64 GB maximum total system memory
- Non-ECC SO-DIMMs
- Serial Presence Detect



### NOTE

To be fully compliant with all applicable DDR SDRAM memory specifications, the LAPAC71 should be populated with SO-DIMMs that support the Serial Presence Detect (SPD) data structure. This allows the BIOS to read the SPD data and program the chipset to accurately configure memory settings for optimum performance.

Table 8 lists the supported SO-DIMM configurations.

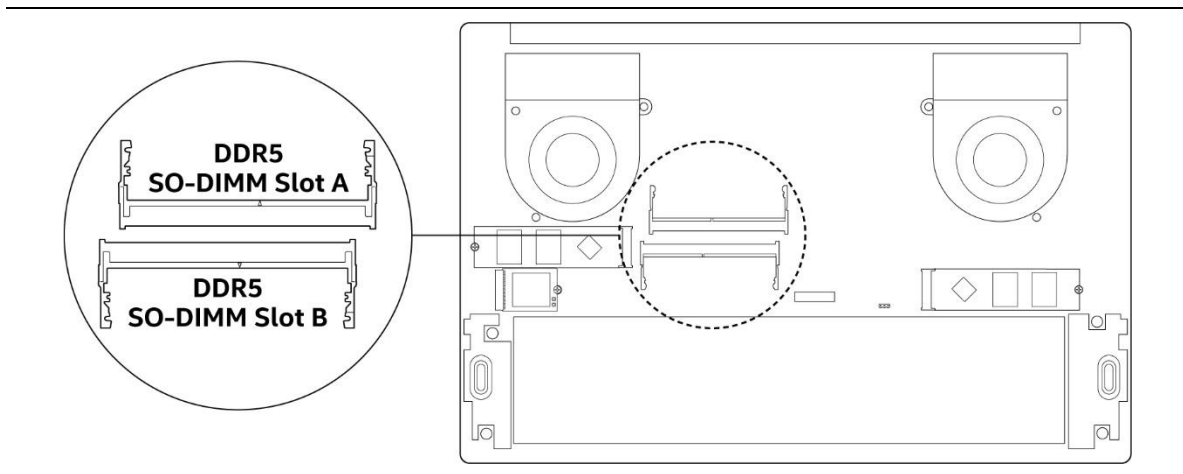
**Table 8. Supported DDR5/-RS Non-ECC SO-DIMM Module Configurations**

Raw Card Version	DIMM Capacity	DRAM Device Technology	DRAM Organization	# of DRAM Devices	# of Ranks	# of Row/Col Address Bits	# of Banks Inside DRAM	Page Size
A	16GB	16Gb	2048M x 8	8	1	17/10	16	8K
C	8GB	16Gb	1024M x 16	4	1	17/10	8	8K
B	32GB	16Gb	2048M x 8	16	2	17/10	16	8K



### CAUTION

*Do not add or remove memory with the power on. Always turn off the power and unplug the power cord from the system before adding or removing memory. Otherwise, the system could be damaged.*



**Figure 7. Location of the SO-DIMM Connectors**

## 2.4 External Graphics

### Maximum Supported Resolutions

- HDMI\* 2.1 TMDS Compatible – 4096x2160 @ 60 Hz
- DisplayPort\* 1.4b via Thunderbolt™ 4 Port - 4096 x 4320 @ 60 Hz



## 2.5 Storage

The following storage interface options are supported via two M.2 2280 (key type M) connectors:

- SATA 6.0 Gb/s storage modules are only supported on M.2 slot B
- Gen 3 PCIe x4 AHCI, NVMe storage modules are supported on M.2 slots A and B
- Gen 4 PCIe x4 AHCI, NVMe storage modules are only supported on M.2 slot A



### NOTE

Intel® Optane™ Memory H10 and H20 with Solid State Storage is supported.

### 2.5.1 AHCI Mode

LAPAC71G and LAPAC71H support AHCI storage mode.



### NOTE

*To use AHCI mode, AHCI must be enabled in the BIOS. Microsoft\* Windows\* 11 includes the necessary AHCI drivers without the need to install separate AHCI drivers during the operating system installation process; however, it is always good practice to update the AHCI drivers to the latest available by Intel.*

### 2.5.2 Intel® Rapid Storage Technology / SATA RAID

LAPAC71 supports Intel® Rapid Storage Technology, providing both AHCI and integrated RAID functionality. The RAID capability provides high-performance RAID 0 and 1 functionality on all PCIe NVMe M.2 drives. Other RAID features include hot spare support and SMART alerting. Software components include an Option ROM for pre-boot configuration and boot functionality, a Microsoft Windows compatible driver, and a user interface for configuration and management of the RAID capability.



### NOTE

*To use supported RAID features, you must first enable RAID in the BIOS.*



### CAUTION

*Do not add or remove storage with the power on. Always turn off the power and unplug the power cord from the system before adding or removing storage. Otherwise, the system could be damaged.*

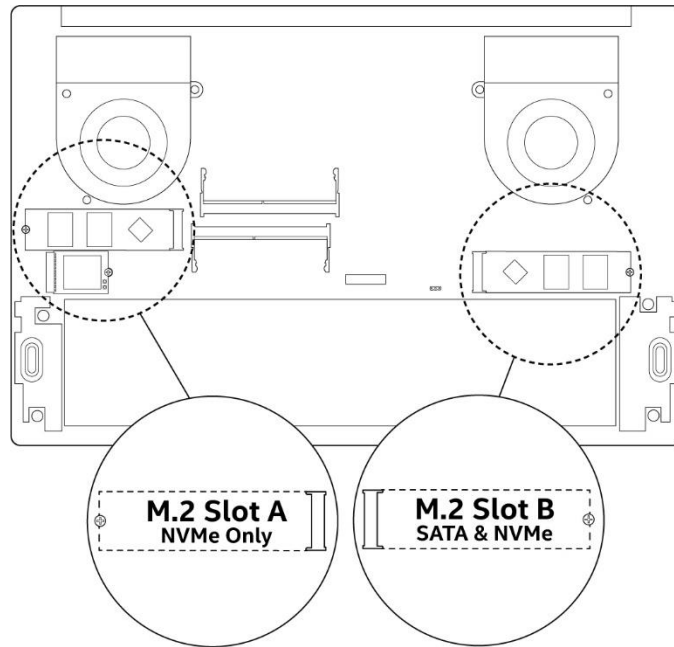


Figure 8. Location of the M.2 Connectors

## 2.6 BIOS Security Jumper



### CAUTION

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

Figure 9 shows the location of the BIOS Security Jumper. The 3-position jumper determines the BIOS Security program's mode.

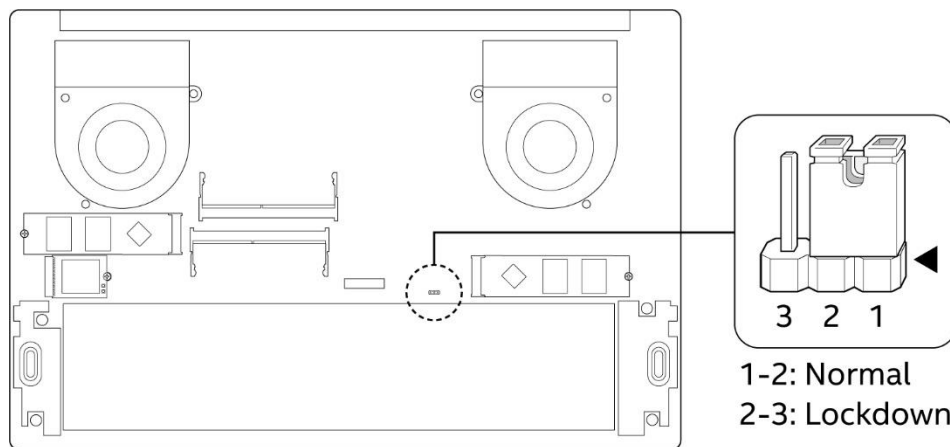


Figure 9. Location of the BIOS Security Jumper

Table 9 describes the jumper settings for the three modes: normal, lockdown, and configuration.

**Table 9. BIOS Security Jumper Settings**

Function/Mode	Switch Setting	Configuration
Normal	1-2	The BIOS uses current configuration information and passwords for booting.
Lockdown	2-3	The BIOS uses current configuration information and passwords for booting, except: <ul style="list-style-type: none"> <li>All POST Hotkeys are suppressed (prompts are not displayed, and keys are not accepted. For example, F2 for Setup, F10 for the Boot Menu).</li> </ul> BIOS updates are not available except for automatic Recovery due to flash corruption.
Configuration	None	BIOS Recovery Update process if ACADL357.CAP file is found. Recovery Update can be cancelled by pressing the Esc key.  If the Recovery Update was cancelled or ACADL357.CAP file was not found, a Config Menu will be displayed. The Config Menu consists of the following options: <ul style="list-style-type: none"> <li>[1] Suppress this menu until the BIOS Security Jumper is replaced.</li> <li>[2] Clear BIOS User and Supervisor Passwords.</li> <li>[3] Clear Trusted Platform Module Warning: Data encrypted with the TPM will no longer be accessible if the TPM is cleared</li> <li>[F2] BIOS Setup</li> <li>[F4] BIOS Recovery</li> </ul>

## 2.7 Thunderbolt™ 4

Thunderbolt™ 4 is supported with up to 40 Gbps of data throughput, USB 4 connection, charging output capabilities up to 5V at 3A via the USB Type C connector. Maximum graphics output supported is 5K@60Hz or 8K@30/60Hz (HBR3).

## 2.8 Environmental

Table 10 lists the environmental specifications for the LAPAC71G and LAPAC71H.

**Table 10. Environmental Specifications**

Parameter	Specification		
<b>Temperature</b>			
Non-Operating	-40 °C to +45 °C		
Operating	0 °C to +30 °C		
<b>Shock</b>			
Unpackaged	50 g trapezoidal waveform		
	Velocity change of 170 inches/s <sup>2</sup>		
Packaged	Half sine 2 millisecond		
	Product Weight (pounds)	Free Fall (inches)	Velocity Change (inches/s <sup>2</sup> )
	<20	36	167
	21-40	30	152
	41-80	24	136
	81-100	18	118
<b>Vibration</b>			
Unpackaged	5 Hz to 20 Hz: 0.01 g <sup>2</sup> Hz sloping up to 0.02 g <sup>2</sup> Hz		
	20 Hz to 500 Hz: 0.02 g <sup>2</sup> Hz (flat)		
Packaged	5 Hz to 40 Hz: 0.015 g <sup>2</sup> Hz (flat)		
	40 Hz to 500 Hz: 0.015 g <sup>2</sup> Hz sloping down to 0.00015 g <sup>2</sup> Hz		

**Note:** Before attempting to operate this product, the overall temperature of the product must be above the minimum operating temperature specified. It is recommended that the product temperature be at least room temperature before attempting to power on the product. The operating and non-operating environment must avoid condensing humidity.

**Warning!** To reduce the possibility of heat-related injuries or of overheating the computer, do not place the computer directly on your lap or obstruct the computer air vents. Use the computer only on a hard, flat surface. Do not allow another hard surface, such as an adjoining optional printer, or a soft surface, such as pillows or rugs or clothing, to block airflow. Also, do not allow the AC adapter to come into contact with the skin or a soft surface, such as pillows or rugs or clothing, during operation. The computer and the AC adapter comply with the user -accessible surface temperature limits defined by the International Standard for Safety of Information Technology Equipment (IEC 60950-1 and IEC 62368-1).

## 3 Characterized Errata

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This section of the document communicates product Errata for the Intel® NUC X15 Laptop Kits.

Errata are design defects or deviations from current published specifications for a given product. Published errata may or may not be corrected. Hardware and software designed to be used with any given processor stepping must assume that all errata documented for that process stepping are present on all devices.

There are no characterized errata currently.